THE EFFICACY OF A PAIN MANAGEMENT PROGRAMME FOR PEOPLE WITH CHRONIC LOW BACK PAIN

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by

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ABSTRACT

The efficacy of a pain management programme for people with chronic low back pain

The current study examined the efficacy of a pain management programme based on cognitive behavioural principles for chronic low back pain patients. Historically pain management programmes have exclusively taken place in a group environment, whilst methodological considerations have prevented firm conclusions being made regarding overall therapeutic efficacy.The current study attempted to address these questions.

Both group and individual modes of treatment were directly compared. Fourty two patients completed the full eighteen hour programme (twenty were seen individually and twenty two were seen in groups). Results confirm the efficacy of a pain management programme based on cognitive behavioural principles. No significant differences were found between group v individual treatment modes. Both interventions demonstrated significant and positive changes concerning affect, behaviour, disability and specific cognitive appraisals which were maintained at follow up. Important outcome variables namely pain report, medication usage and work status did not however change from initial assessment position.

Three recently developed cognitive measures addressing self efficacy beliefs, pain locus of control appraisals and specific pain cognitions were employed in the current study. Reliability and concurrent validity of these particular measures is undertaken providing positive support overall, for their efficacy as psychometric instruments in pain research. An attempt to predict outcome (both physical and psychological) based upon a biopsychosocial model of low back disability did not yield significant results.

The results of the current study suggest therefore that a focused, cognitive behavioural intervention for a chronic group of low back pain patients is physically and psychologically valuable. Effects are maintained at follow up. Both group and individual treatments are equally effective. Predicting treatment outcome based upon a physical and psychological model of low back disability was not successful. Discussion of the research findings and recommendations for future research is undertaken.

CONTENTS

CHAPTER 1

Psychological Ideas and Pain

1.1 Defining Pain

Defining pain is problematic. Many definitions can be criticized on semantic, empirical and clinical grounds. A number of definitions completely ignore the emotional-affective dimension of pain and state equivocally that 'pain is that sensory experience' (Mountcastle 1980).

Other definitions are unsatisfactory in that pain is defined exclusively in terms of tissue damage (Mountcastle 1980; Sternbach 1968) yet empirical evidence demonstrates that pain may occur in the absence of injury or long after the injury has occurred (Melzack and Wall 1982). The aetiology of pain as a direct effect of tissue damage is therefore unsatisfactory and ignores a wealth of clinical and psychological evidence which is well documented in the literature on pain (ref. Melzack and Wall 1988). Therefore such a perspective does not address the emotional, behavioural or cognitive dynamics of pain experience (eg Fordyce 1976; Turk et al 1987). Sternbach (1968) sees pain as a "personal, private sensation of hurt". This raises the question that if pain is a hurt, then how does one define a hurt? The answer is presumably by pain. This circular argument thus renders such a definition unworkable.

A preferable definition of pain is that by Merskey et al (1986) where pain is defined as:

> "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".

The merits of this definition are its explicit recognition of the loose relationship between injury and pain and its recognition and inclusion of the emotional dynamics of pain experience. Melzack and Wall (1988) argue that whilst the definition put forward by Merskey et al (1986) is 'much better' than previous attempts, it is nonetheless incomplete thereby failing to win unanimous agreement amongst clinicians and researchers. Melzack and Wall (1988) note the inclusion of the word ' unpleasant' and illustrate the many difficulties and concerns regarding a sound operational definition here. Pain is without doubt unpleasant - but its qualities are complex and rich. The word 'unpleasant' fails to recognise the misery, despair and anxiety which are often attendant consequences of a painful experience. Thus the unpleasant or affective dynamic of pain is really comprised of multiple dimensions which have yet to be determined.

The diversity of pain experience is an illustration of its complexity and disruption to peoples lives. Melzack and Wall (1988) therefore argue that research must be content with guidelines towards a definition rather than a fully adequate definition. They define pain as follows:

> 'A category of experiences signifying a multitude of different unique experiences having different causes and characterised by different qualities varying along a number of sensory, affective and evaluative dimensions'

1.2 The Economic Costs of Low Back Pain

Back pain is an extremely common ailment. Statistics in the United Kingdom (The Office of Health Economics 1985) indicate that low back pain emerged as the third most frequently experienced symptom (after headache and tiredness) for 198 women over a twenty-eight day period (Morrell and Wale

1976). Various estimates indicate that between 60% - 85% of all American adults will have an episode of low back pain at some point during their lives (Addison 1985) whilst as many as eight million American adults are partially or permanently disabled because of low back pain (Mayer and Gatchel 1988). Between 15% and 18% of all occupational injuries reported in the USA are back injuries. Low back pain is the most frequently cited cause of disability in people under forty-five years of age (Kelsey et al 1979).

In addition musculoskeletal disorders, dorsopathies and back strains together account for approximately 25% of annual work loss in the UK (360 million days). Of approximately 23 million annual episodes of low back pain, 63,000 resulted in hospital admissions and 10,000 in spinal surgery (Office of Health Economics 1985). In 1982, back pain was estimated to have cost the National Health Service £156m. - a figure equivalent to 1.15% of total NHS spending in the UK.

In 1982, low back pain was responsible for 33.3 million days of certificated incapacity in Britain, which represented 9.2% of all certified days of absence, exceeding the losses attributable to both coronary heart disease and bronchitis. Furthermore, low back pain exceeded by more than six times the number of working days lost through industrial stoppages (OHE 1985).

The costs of low back pain are considerable, in terms of work loss, invalidity allowances, disability payments and mobility awards. The disabling effects of low back pain are experienced during the most active and economically productive years of twenty-five to sixty, the cost of which, Polatin et al (1989) argue, are ‘staggering’. Consequently Industry and the State are responsible for ever increasing costs, both financial and social. Recent research in the USA indicates that low back pain annually costs the Exchequer in excess of $40 billion (Bonica 1980). In addition there are profound costs for both individuals and families in terms of social, occupational and psychological areas of life (Slade 1984). The precise nature, course and dynamics of this complex, costly and distressing problem should therefore be addressed.

1.3 Acute and Chronic Pain

Acute and chronic pain represent qualitatively different experiences in terms of time course, affective response and the psychosocial impact upon individuals, the wider community and the State at National level.

It has long been recognised that pain is adaptive, enabling the individual to sense impending tissue damage, avoid harm and promote survival (Melzack and Wall 1988). Evidence supporting such an hypothesis comes from studies of people with congenital insensitivity to pain (Sternbach 1963; Sternbach 1968). The failure of such individuals to experience pain results in early death because of the effects of unrecognised trauma and consequent disease. Hence there is a common perception that pain is adaptive and acts as a warning signal of potential injury, enabling the individual to engage in a "flight" response (Phillips 1987).

Such considerations however are pertinent only to the study of acute pain (usually defined as lasting up to a few days duration). The functions of more disabling and persistent pain are more problematic (chronic pain is usually defined as constant pain of greater than six months duration). Chronic pain persists after all possible healing has occurred or at least long after pain can serve any useful function. The experience of chronic pain and the resultant psychosocial consequences become increasingly dissociated from their original physical pathology (Fordyce 1982; Phillips 1987; Rose et al 1992). In addition there may be little objective evidence of any remaining nociceptive input (Loeser 1983; Fordyce 1982; Nachemson 1983).

Thus whereas acute pain is positive and adaptive in nature, chronic pain differs in both time and its "destructive" physical and psychosocial impact upon the individual (Sternbach 1974). Acute pain is typically associated with changes in autonomic activity (increases in cardiac rate, respiration, sweating and muscle tension) and there is usually a positive relationship between pain and peripheral stimulus, nociception and tissue damage (International Association for the Study of Pain, 1974).

Alternatively chronic pain is associated with an habituation of autonomic responses. Behavioural and psychosocial consequences are common illustrating the multi-faceted nature of chronic pain. Chronic pain is seen as a "nightmare" which Livingstone (1943) described as interfering

> "with thought processes, it disturbs sleep impairs appetite undermines morale and may disorganise the functioning of every part of the body"

Hence vegetative signs which affect both appetite, libido, sleep and overall energy are typically associated with chronic pain.

Pain of recent onset and short duration requires rapid but relatively minimal change and adjustment. Anxiety is the primary psychological reaction associated with acute pain and is typically associated with individual perceptions concerning the intensity, duration and meaning of pain. Once again the level of anxiety is proportionate to the level of peripheral stimulation and resolves with healing (Waddell 1987; Melzack and Wall 1982).

Chronic pain has a major impact upon the individual. Depression, fear of pain and avoidance/withdrawal from physical, social and occupational responsibilities represent common experiences (Waddell 1987; Lethem et al 1983; Turk et al 1983; Main and Parker 1989). The individual gives up work, must depend upon state benefit and sees little possibility of positive change or hope. Chronic pain thus represents a complex and multifaceted experience.

Chronic pain is often adequately explained by the underlying pathology when for example pain is due to some active disease process, such as arthritis or cancer. However 'chronic pain syndrome' (Chapman 1977) or "exaggerated pain perception" (Lethem et al 1983) refer to a desynchronous relationship between physical findings and the associated emotional-behavioural consequences. In essence, the affective behavioural response is magnified and disproportionate to the patients physical pathology.

Patients with chronic pain typically report high levels of constant pain. Alternatively an acute episode of pain is characterized by pain of variable intensity which gradually subsides until healing takes place. Swanson and Marata (1980) found that for a group of chronic pain patients admitted to a Pain Management Programme approximately 25% of the total group reported average pain ratings of 8-10 (where 1 = no pain and 10 = worst pain imaginable), suggesting constant pain of maximum severity.

Karoly and Jensen (1985) argue that the acute v chronic pain distinction based on temporal dimensions is too simplistic and fails to take account the coping strategies of the patient. Karoly and Jensen (1985) propose a fourfold characterization of acute and chronic pain based primarily on the work of Crue (1979, 1985) Keeefe and Brown (1982) and Sternbach (1974).

The descriptive model recognises the discrete nature of pain and the need to assess individual coping styles and behavioural responses. For example chronic benign pain is persistent pain of no known aetiology, yet the patient copes adequately and has formed a positive working relationship with their doctor.

The inability of traditional medical intervention to adequately treat such patients and the lack of demonstrable pathology have led a number of writers to conclude that the origin of such pain is psychogenic, i.e. the nature of such pain is psychologically based. Chronic pain patients have been variously described as 'malingers', 'hysterical', "low back losers" and that "their pain is imaginary" (Sternbach 1974).

Consequently it is necessary to discriminate between conscious malingering and for example exaggerated pain perception (Slade et al 1983). Malingering represents a conscious attempt to deliberately deceive and fake so that others will believe there is real evidence of disease or pain. Other definitions are those which recognise that the patients pathology is real but that behavioural and psychosocial reactions are desynchorous with physical findings (Mechanic 1977).

Later definitions recognise the true, multi-faceted nature of chronic low back pain and the implicit role that psychological ideas play in understanding and treating this complex problem. The massive economic costs of low back pain were previously noted. Whilst only 5% - 10% of all individuals suffering from low back pain will eventually become chronic, this small group of patients are responsible for the vast majority (upwards of 80%) of all medical costs for back treatment (Aronoff et al 1981). In addition, a number of authors argue that such costs are accelerating whilst the incidence of low back pain has remained stable.

1.4 Low Back Disability Since the Second World War

Waddell (1987; 1989) argues that the incidence of low back pain or rather low back disability has increased dramatically since the second world war. However low back pain is not new. Statistics demonstrate that low back pain is thought to be experienced by between 80% (Auchincloss 1983) and almost 100% (Roland 1983) of the population at some point in their lives.

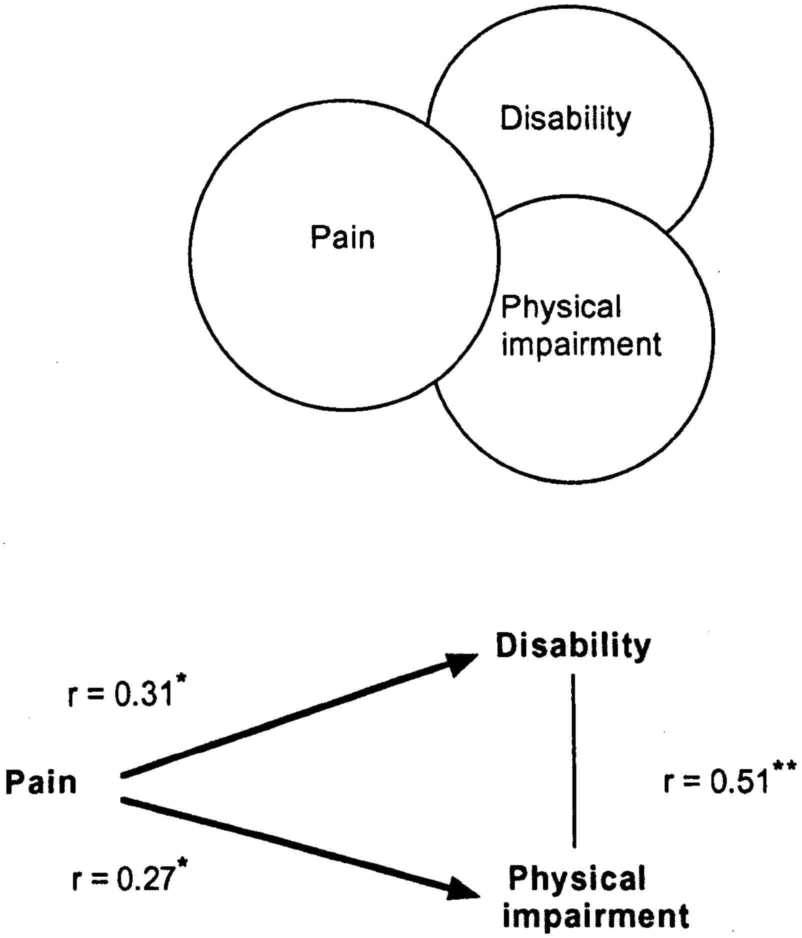
Similarly data suggest that the exact nature of such low back pain is of insufficient severity to warrant consultation with a doctor. Dixon (1980) estimated that only 10% of episodes are brought to medical attention. Other research has found that as many as 60% of the population during the past year have experienced low back pain but the majority will not seek or require medical attention and won't lose time from work (Dunnell and Cartwright 1972; Consumer Association, Back Pain Survey 1986).

The evidence clearly suggests that low back pain has always existed. However, since the second world war there has been an "epidemic of low back disability" (Waddell 1987) which must be understood from an historical and social context. The rise of low back disability can be attributed to a number of independent but related themes which include models of patient care, mechanistic ideas of disease, as well as economic and social change.

Low back pain, physical impairment and disability must be distinguished. Pain represents an "unpleasant sensory and emotional experience" (Merskey et al 1986) which can be related to the underlying physical disorder in the individual patient. Physical impairment represents an anatomical and pathological abnormality leading to the loss of normal bodily activity; disability is the consequent "diminished capacity for everyday activities and gainful employment" (Waddell 1987; 1989). Disability is thus a somewhat different, albeit related experience. Whilst clinically related to impairment and patients reports of pain - recent work demonstrates a great deal of independence among these clinical constructs (Figure 11). Thus impairment represents objective physical findings and identifiable pathology. Impairment is clearly related to disability, which can be seen as a form of behaviour, dependent upon social and psychological influence as well as 'physical disease'.

Low back disability (LBD) as opposed to low back pain or impairment has increased dramatically since the second world war. Data from America, Canada and the United Kingdom demonstrate that days of sick certification, periods of incapacity, as well as compensation, social security and disability claims have all increased substantially since the 1950's (DHSS 1982; Social Security Bulletin 1985; Waddell 1987).

Figure 1.1



The relationship between pain a) physical impairment b) and disability c) showing Pearson product-moment correlation coefficients (r) * P < 0.01, ** P < 0.001 and variance in common (based on data from Waddell et al 1992). a) visual analogue scale, b) clinical evaluation of objective physical impairment, c) self-report disability in activities in daily living. (Waddell, 1987)

The growth of low back disability has been attributed to economic and social change and is largely a product of an industrialized society. Contributory factors include the growth and development of compensation legislation, an expanding Trade Union movement which sought to protect workers rights and the establishment of a National Health Service (1948) directed towards health promotion as well as reducing ill health, pain and disease.

Such findings can be contrasted with a less industrialized but rapidly developing country such as Oman. Newly established Orthopaedic Services in Oman demonstrate that low back pain is a universal experience. However, there is very little evidence of low back disability as evidenced in Western industrial society. Individual responses to low back disability are much more positive. Few give up work, alter their life styles or become permanently disabled by low back pain. Hence social and cultural norms, learned patterns of behaviour, as well as economic and social considerations appear to have promoted low back disability (Bond 1978; Jacox 1980).

Waddell et al (1989) argues that chronic low back disability is a function of Western industrial society. He questions whether

> 'simple backache was easily accepted as a reason for chronic disability in ages dominated by infections, limited food supplies and a life expectancy of less than forty years. Where is low back disability in the third world today?'.

Chronic low back disability is strongly associated with the nature of employee and employer relations, the financial infrastructure of society and the need to provide for those who aren't working. The first real evidence of low back disability can be traced to the 19th century when rapid economic and social change led to a railway building programme. The Lancet Commission (1862) in a report 'On the Influence of Railway Travel on the Public Health' demonstrated that the amount of sickness for railway workers was greater than for other similar programmes. Significantly whilst "railway spine" increased between 1860 and 1880, prolonged low back disability only appeared in context with an emerging compensation infrastructure.

Epidemiological evidence of low back disability is unavailable before the 1950's and demonstrates society's perception of low back pain and its greater concern with more serious health issues such as infectious diseases. Whilst empirical evidence is not available before this period, the twentieth century has witnessed continued and considerable increases in the incidence of low back disability.

For example, the Department of Health for Scotland in the 1930's commissioned a national report which addressed national morbidity but also included all those who had been sick listed for a period of twelve months continuously (1935-6). Rheumatism accounted for 13% of all disability, of which 15% was low back specific. Significantly chronic low back pain due to rheumatism was increasing faster than that due to any other cause (Mackinlay et al 1937; Department of Health for Scotland 1937).

Additional evidence of increasing low back disability in the last fifty years is found in studies of the British Forces during the first and second world wars. Withdrawal from army duties (ie sick certification due to low back pain) increased five fold between both wars whilst in World War II the average period away from work had increased to two months. This is contrasted with

50% being back to work within two weeks during the First World War. (Macpherson 1921; Buckley and Copeman 1952).

Gender considerations add further weight to the hypothesis that low back disability is a function of an industrialized society. Allan and Waddell (1989) argue that historical evidence of low back disability is almost exclusively an account of male disability. The "epidemic" of male disability is strongly associated and can be defined by their relations with the employment network. Fifty years ago, the social role of women was defined largely by domesticity and motherhood. The absence of female disability strongly suggests that social and psychological variables have promoted low back disability. Chronic low back pain is only partly explained by physical disease. In order to understand the current epidemic of low back disability important social, economic and psychological issues associated with the dynamic of physical health must be addressed.

The growth of low back disability since the Second World War can be attributed to a number of factors which include: (1) a medical model in order to explain low back disability; (2) a failure to recognise and act upon psychosocial variables; (3) a growing compensation system designed to protect people with back pain; (4) Patients expectations and understanding of disease.

1.4.1 The History of Low Back Disability and Compensation

It is too simplistic to assert that disability is created by compensation. Rather, legislation was put forward in order to address a real need. Remuneration was provided in order that basic employment rights and financial protection was secured for those who were unable to work because of injury.

However, compensation provides a social infrastructure which makes chronic disability possible. The negative social and economic effects of "compensation neurosis" (Parker 1977) or "accident neurosis" (Miller 1961) have long been recognised in medico-legal circles. Kennedy (1946) states the case of many clinicians and researchers working in this area. He defined compensation neurosis as:

> "a state of mind, borne out of fear, kept alive by avarice, stimulated by lawyers and cured by a verdict".

The evolution of low back disability is, a number of authors argue, the history of the compensation system (Mendelson 1992) which can be traced back to the nineteenth century when there was increasing awareness of the social responsibility to provide support and care for those who were sick and disabled. Once again social change in the form of an expanding rail network was instrumental in shaping a financial infrastructure which recompensed those disabled by low back pain.

Such expansion led to many serious injuries and fatalities. For example in 1872, UK figures show that over one thousand people were reported killed and three thousand injured whilst travelling or working on the railways.

Legislation was introduced in order to protect both 'the wounded soldiers of industry' (Bartrip and Burman 1983) and passengers. The Fatal Accidents Act (1846) first gave the right of compensation for the family of a person killed in an accident. The first reported case of an employee seeking compensation from an employer took place in England in 1837. An employee injured in his employer's van received financial remuneration to the sum of £100. Significantly however, the judgement was reversed on appeal when the negative effects of such action were recognised early on, Priestly and Fowler (1837) note.

> "if the master be liable for the servant in this action the principle of that liability will be found to carry on to an alarming extent".

Additional legislative change of significance includes The Workmen's Compensation Act (1897) which made insurance compulsory for large groups of workers regardless of fault. In 1911 Lloyd George introduced the first comprehensive state insurance scheme which covered both injury and sickness, heralding the foundations of the Welfare State and a firm recognition of state responsibility for disability. Such change led to the establishment of the National Health Service and Social Security System. Recent economic and social changes have therefore established remuneration for sickness and disability as a matter of right.

Concern about the efficacy and merit of such legislation has long existed in medico-legal circles. Osgood and Morrison (1924) for example note how 'the compensation dole has made a lazy liberation possible'. The growth of low back disability since World War II is strongly associated with a legislative framework designed to protect disabled individuals.

Questions have been raised in relation to patients severity of injuries, the overall efficacy of financial rewards for disability and clinicians' ability to discriminate between cases of genuine pathology and those with important psychosocial overlays. Wider considerations include whether individuals financially supported by the State will return to work again, become independent and make a physical recovery. Evidence clearly suggests that this is not the case (Beals and Hickman 1972; Miller 1976; Waddell et al 1986). The orthodox view here is that because patients income is contingent upon reports of pain, social support in the form of compensation will act as a disincentive for successful rehabilitation. A large body of work provides empirical support here demonstrating that compensation patients report less satisfactory response to rehabilitation programmes (Kleine et al 1988; Guck et al 1985).

Research demonstrates that patients claiming compensation for their injuries have a longer recovery period, less satisfactory response to treatment, as well as greater disability and psychological distress than a comparable non compensation group (Balla and Moraitis 1970; Tait et al 1990; Sanders and Meyers 1986). Greenough and Fraser (1989) examined the influence of compensation on recovery from low back pain in a retrospective study of three hundred compensatable and non compensatable patients. The incidence of reported pain, disability, psychological disturbance and length of time off work was significantly greater in the compensation group ($p<0.001$) Settlement of the patients claim did not however result in any reduction in morbidity. The finding that patients continue to experience both physical disability and psychological distress after a compensation claim has been settled is supported by a number of studies (Hohl 1974; Kelly and Smith 1981;

Sprehe 1984; Trsch and Royston 1985; Mendelson 1992). Thus a number of studies have found little relationship between disability status, level of compensation received and rehabilitation success (Barnes et al 1989). A number of authors stress the importance of avoiding the 'compensation-litigation patient uniformity myth' (Turk and Rudy 1990). Clearly the issue of compensation and rehabilitation is complex and multidetermined. A multivariate as opposed to a univariate understanding of the compensation-rehabilitation equation has however proved more profitable. Pretreatment variables such as employment position and level of depression in combination with compensation status has helped predict treatment outcome more effectively (Javid 1985).

Dworkin et al (1986) found that compensation status interacted with level of depression in predicting rehabilitation outcome. In depressed patients, successful response to treatment was independent of receipt of worker's compensation, whilst for non depressed patients, compensation status did predict poorer outcome.

Greenough and Fraser (1989) and Guest and Drummond (1992) argue that the adversarial nature of the compensation system is a potential source of major stress, with state and employment practises institutionalising disability. Guest and Drummond (1992) measured emotional state, pain and disability between matched groups of claimants who were actively pursuing compensation and those who had settled. The compensation group evidenced greater psychological distress, difficulty in coping and interference with the quality of their life. In the settlement group however there was still clear evidence of physical and psychological distress.

Guest and Drummond (1990) argue that the nature and organisation of the compensation system, actually promotes disability and distress. The promise of financial rewards often discourage workers from resuming employment after injury. Yet pursuing such action which often involves protracted periods away from the work environment equally increases the risk of pain becoming chronic and future financial hardship. It has to be remembered that the outcome of such cases is often very uncertain.

Greenough and Fraser (1989) additionally found that pursuing litigation was very distressing, that often a strong incentive existed to terminate employment of those pursuing such claims and that future employees perceived a back injury in a very negative way. The authors argue that the whole ethos and pursuit of compensation is a source of stress and that uncertainity about the outcome of a litigation procedure could actually increase distress and disability. Whilst some systems provide only limited funds for episodes of disability others recompense workers for the entire duration of their time off work.

Thus Carron et al (1985) in an analysis of low back pain sufferers from America and New Zealand found that 49% of the American sample received financial compensation as opposed to only 17% of the New Zealand subject group. Outcome (eg use of medication, levels of inactivity) however was more positive in the New Zealand sample, which the authors attribute to the lack of an adversial relationship among insurer, employer and claimant. In the USA, however, employees are placed in a more insecure position - claims are processed much more slowly and emphasis is attached to patients proving work-related disability. The long term behavioural and psychological consequences of such doctor-patient relationships is well documented as mitigating powerfully against rehabilitation (Waddell 1987; Rose et al 1993).

Both sets of authors argue that financial resources should be redirected towards the rehabilitation of employees as soon as possible after injury, as opposed to fostering disability via litigation. The relationship between litigation/compensation and rehabilitation outcome is both complex and multidetermined. Low back disability has increased substantially in the past fifty years. A number of authors (eg Waddell 1987) have attributed this phenomenon to a changed economic and social dynamic. A burgeoning compensation infrastructure designed to protect and support individuals disabled by low back pain has been blamed, in part, for the current situation. Early empirical work supported such ideas although recent authors have questioned the valididty of such simplistic and 'uncharitable' hypotheses (Rose et al 1993). Here attention is focused on the individual with concepts such as malingering and secondary gain viewed as the primary cause of failed rehabilitation. More recent work stresses the role of the wider dynamic - the infrastructure as opposed to the individual associated with pursuing such action and the adversarial relationship that often exists between claimant, medical profession, insurer and state.

What is clear however from the vast majority of research is that powerful socioeconomic variables (eg litigation) are recognised as directly influencing the time course, treatment success and level of physical and psychological disruption which individuals experience following low back pain. Socioeconomic variables focus on the wider environment in which pain functions, recognising that factors such as social class can shape both individual and community responses to disability.

Much attention has therefore focused attention on the role of such variables. This eclectic emphasis upon the aetiology of prolonged pain and disability illustrates its complex nature and the reductive explanatory power of traditional pain models. One can speculate on the drive behind such research. Faced with a persistent and disabling stressor such as low back pain, the indiviudal's drive for rehabilitation, perceived ability to cope independently and potential for a successful treatment outcome would be mediated and shaped by important socioeconomic variables such as age, income, social class and education. Research into the psychopathology of depression has demonstrated the role of social variables as powerful prerequisites of a depressive disorder (Brown and Harris 1978).

The duration, nature of interference and response to conservative modes of intervention have been predicted by various socioeconomic indicies which include level of income and education (Volinn et al 1991), perceived job satisfaction (Polatin et al 1988), life disruption (Main and Waddell 1987), ethnic group (Lee et al 1989) and length of time away from work (Waddell 1987). Such findings illustrate the need for a new appraisal of the dynamics of chronic low back pain. Historically however, both patient and clinician have understood low back pain as a purely mechanical / physical problem.

1.5 Medical Models of Disease

The treatment and understanding of low back pain is based upon the medical model of disease. The evolution of medical thought in relation to disease illustrates a number of current clinical and empirical observations. These include (a) why medicine has adopted a physical pathology model in order to explain illness; (b) the reductive and unsuccessful nature of such ideas (Main 1989) and (c) the consequent need for a more holistic philosophy of patient care; a model which addresses physical as well as social, behavioural and psychological dimensions of pain experience (Turk et al 1992).

The history of modern approaches to disease and low back pain can be traced to the sixteenth and seventeenth centuries which witnessed the successful demonstration of empirical science - the triumph of reason over faith. Before this time the development of medicine was severely constrained by religious ideology which held that body and soul were one. If the human body was not preserved intact the soul could not ascent to heaven. A preserved physical body as dictated by religious ideology severely constrained the advancement and development of science during the Dark Ages (Davidson 1991). As a result human dissection was virtually impossible and without knowledge of anatomy, the development of medical science was severely impaired (Hart 1985).

Such ideas became discredited and unpopular (Brennan 1991). The empirically based laws of mathematics, astronomy and physics as developed by Bacon (1561-1626) Galileo (1564-1642) Kepler (1571-1630) and Newton (1642-1727) established methodological rigour and the scientific method. Detailed and controlled observation and measurement, systematic collection of information and mathematical reasoning became established principles in science (Gregory 1989). Reason dictated that the basis of the physical world must have parallel expression in other disciplines such as medicine (Porter 1989).

Psychiatry was also influential in shaping medical thought towards a medical model of disease. The disease model of mental illness achieved its greatest success at the end of the nineteenth century with the discovery of general paresis - a once prevalent and severely disabling disorder marked by gross physical decline, psychological disturbance and pronounced personality change. The conquest of general paresis via the discovery of the origin and nature of syphilis reinforced the belief that all mental disorders were organically based (Dale 1975).

The discovery of germ theory by Pasteur (1822-1895) illustrated the success of empirical science and how studies of anatomy and physiology, within a strict scientific framework, could provide new insight into the nature and aetiology of disease. The discovery of germ theory established the Doctrine of Specific Aetiology : a specific disease always has a specific cause.

René Descartés the foremost philosopher of the Renaissance period advocated a strict dichotomy between mind and body. Such ideas had profound implications for medical thought and the approach to disease. Descartés' dualistic idea held two levels of activity. The physical world followed the order of strict mechanical laws, ideas based on empirical observation and mathematical laws. Descartes' viewed the mind as separate from the body - a spiritual and non physical identity (Brennan 1991; Hart 1985).

Descartés' system recognised the advance in the natural sciences which conceptualized the physical world as governed by strict scientific laws. Such ideas had important and far reaching implications for the study of disease and pain. Drawing on such dualistic ideas, pain can be viewed as a simple reflex response to a physical stimulus (Melzack and Wall 1988; Gleitman 1991).

The model in clinical practice with low back patients is thus as follows. Behaviour which communicates pain is viewed positively as evidence of underlying pathology; diagnosis follows. Treatment compliments diagnosis and cure is expected to follow. This procedure is well documented by Berkson et al (1977).

> "A pain, an ache, a discomfort - these are the common complaints of those who seek the doctor's help. Pain issues a warning with kindly intent. She calls to action and pointing the way brooks no delay - and thus the ancient cycle is served, from pain to cause, to treatment to cure".

The achievements of the scientific method during the sixteenth and seventeenth centuries alongside the dualistic ideas of Descartés helped shape the medical model of disease and pain. This understanding of pain as a pure sensory experience is the standard medical model - largely accepted as fact and rarely questioned (Melzack and Wall 1988). Theoretically such ideas are explained by the Specificity Theory of Pain.

1.5.1 Specificity Theory of Pain

The traditional and orthodox theory of pain is known as specificity theory. Melzack and Wall (1988) argue that specificity theory is presented as a model where the major questions in relation to pain have been answered as fact as opposed to theory. Specificity theory proposes that a specific pain system conveys pain messages in the skin to a pain centre located in the brain. Thus pain is conceptualised as a direct sensation resulting from a nociceptive stimulus by way of pain receptor stimulation.

The evolution of Specificity Theory can be traced back to Descartés' (1644) dualistic ideas of mind and body. A classic description of specificity theory is provided by Descartés who draws on an analogy of a bell ringing mechanism in order to illustrate a direct transmission of nociceptive stimulation and pain experience. Descartes advocated that when the rope at the bottom of the tower is pulled - the bell rings.

Mullers (1842) doctrine of specific nerve energies attempted to account for different qualities of sensation, a question faced by Physiologists in the nineteenth century. Muller recognised only the five senses seeing, hearing, taste, smell and touch. By the early twentieth century it was argued that the quality of sensation is given by the termination of sensory nerves in the brain.

Pain was therefore viewed as a specific sensation. The intensity of pain is proportional to the stimulation of peripheral pain receptors. Medical treatments for pain are based upon this theory and aim to reduce tissue damage directly or to intercept the transmission of neural impulses so that the experience of pain is reduced or eliminated.

Specificity theory was later expanded by Von Frey, whose work drew on a number of assumptions. Firstly that there are four major cutaneous modalities - touch, warmth, cold and pain - each one with a specialised projection centre where pain could be directly experienced in the brain. Secondly the skin comprises of a mosaic of four types of sensory spots; and thirdly there are free nerve endings that branch out into the upper layer of the skin.

Von Frey hypothesised that since free nerve endings are freely found and that pain spots are found almost anywhere, then free nerve endings must be pain receptors. Von Frey's understanding of the free nerve endings as pain receptors represents the basis of specificity theory - namely a direct relationship between nociceptive stimulation and pain experience. Specific pain receptors project via pain fibres and a pain pathway to a pain centre in the brain. Conventional intervention for the treatment of low back pain is based upon a medical model of disease as advocated by Vichrow (1821-1902) who proposed the concept of cellular pathology. Assessment and treatment for acute and chronic pain is based upon the following clinical procedure (a) recognition of patterns of illness behaviour as signs and symptoms; (b) infer underlying pathology; (c) relate physical therapy to pathology; (d) expect physical improvement and a reduction in illness behaviour.

Pain experience is however a more complex phenomenon and the widely held belief that tissue damage and experience of pain are directly related does not hold up to clinical and empirical investigation. Increasing dissatisfaction with the Specificity theory of pain is demonstrated by Livingstone (1943)

> "I was brought up in a medical generation in which ...... pain was (considered to be) a primary sensation dependent upon the stimulation of a specific sensory ending ..... pain was as simple as that ..... in practice I found that it was incredibly difficult to make this concept consistent with clinical observations'.

This is demonstrated by pain reports in the absence of injury (Melzack 1965) and reports of absence of pain despite severe injury (Beecher 1956) as evidenced by patients with congenital insensitivity to pain (Sternbach 1979).

Similarly, chronic pain is often demonstrated by a desynchronous relationship between physical pathology and patients reports of and reaction to painful episodes (Karoly and Jensen 1985). A large body of work has long demonstrated the attendent role of psychological variables as implicit in the understanding of pain (Beecher 1956; Fordyce 1976). Specificity Theory of Pain is thus an incomplete and reductive model. The nature and aetiology of pain is clearly a complex experience. Psychosocial models of pain and illness represent new attempts to explain such complexity.

1.6 A Psychosocial Concept of Illness

An understanding of 'illness' as opposed to 'disease' demands clear working definitions of these important constructs. Disease refers to objective pathological changes in anatomy or physiology. Illness is somewhat different and concerns the subjective aspects of pain and disability (Ford 1992). Illness is therefore eclectic, disease highly specific. Illness thus embraces the psychological, behavioural and social dynamic of pain experience.

A distinction between these two constructs is necessary. Many authors consider the epidemic of low back disability and the failure of modern medicine to treat low back pain, a consequence (in part) of a disease specific model of pain (Karoly 1985). A true understanding of the dynamic of pain can only be made, from a multifaceted model of pain, that is illness centered (eg Ford 1992).

The role of psychological, as well as social and cultural variables, in shaping behaviour as well as contributing to our understanding of disease and illness have long been recognised.

Regarded as the father of modern medicine, Hippocrates (460-377 BC) separated medicine from the prevailing influences of religion, magic and superstition. Hippocrates argued that physical and mental disease had natural causes and were somatically based. He nevertheless recognised the relationship between mind and body and stressed the associated consequences of disease for both thought and behaviour. He also recognised the role of environmental and emotional stress and emphasised that the physician must combine both a healing role with the social responsibility of helping individuals cope with illness and suffering.

Hippocrates somatogenic ideas, whilst unorthodox, were widely accepted (Davison 1989). He therefore stressed the physical nature of disease, yet recognised psychosocial dimensions and consequences. His ideas were fostered by other Greek philosophers such a Plato (427-347 BC) Aristotle (384-322 BC) and Socrates (470-399 BC).

Socrates advocated a humanistic interpretation of life which emphasised the "role of individuals and their place in nature" (Brennan 1991). Similarly Plato (427-347 BC) and Aristotle (384-322 BC) stressed the interdependent relationship between mind and body. In addition, both recognised the critical nature of the environment in shaping behaviour, a point illustrated by Waddell et al (1989)

> "man is a social animal who lives and acts and becomes ill in social relationships"

1.6.1 A history of psychological ideas in understanding illness

Psychosocial factors implicit in the understanding and aetiology of disease and ill health were developed in the nineteenth century by way of hysteria which featured a variety of symptoms that appeared to be organically based. Charcot's (1825-93) ideas were shaped by his study of hysteria, dissatisfaction with a strict mechanistic model of disease and his success in treating patients whilst under hypnosis (Zangwill 1989).

His work influenced others including Janet (1859-1947) and Breuer (1842-1925) whose celebrated case of Anna O established catharcism as a therapeutic tool and demonstrated that psychological factors were implicitly involved in causes of psychopathology and physical disease (Brennan 1991; Davison 1991).

Freud developed such ideas into a comprehensive theory of human behaviour and psychopathology (Zangwill 1989) reaffirming the importance of psychological factors in medicine and thereby demonstrating how psychological experience influences individual perception and response to disease. Neo Freudians such as Alfred Adler (1870-1937) Erich Fromm (1900-1980) and H.S. Sullivan (1892-1949) recognised that cultural, psychosocial and interpersonal factors influenced the course and outcome of every illness and that each person must be viewed holistically - as a person rather than a disease (Brennan 1991; Gleitmann 1991).

The implicit role that psychological variables play in health and illness has long been recognised in the medical profession and yet evidence clearly suggests that overriding concentration on the physical aspects of disease, as well as clinicians pressure of time, lead to the neglect of psychological and social aspects of illness (Hart 1985).

Such a mechanistic model of disease is not without critics (Mechianic 1977) who argue that this approach only deals with one half - and not necessarily the most important half of medicine's role in society (Porter 1989).

Holistic views of medicine have been the hallmark of Psychiatry (Lipowski 1985) who have raised serious questions about the standard medical model and put forward an alternative biopsychosocial model - an understanding of human illness as opposed to disease which addresses physical, psychological and social variables (Lipowski 1985).

A multifaceted model of illness is particularly pertinent to the study of pain where behavioural (Fordyce 1976), cognitive-behavioural (Turk et al 1987), affective (Engel 1959) and socioeconomic variables (Mechianic and Vokart 1960; Pilowsky 1978) have long been recognised as shaping the experience of chronic low back pain. Important clinical variables such as return to and time away from work, failed surgery and patient rehabilitation are influenced less by the physical aetiology of low back pain and more by psychological distress (Main et al 1992), depression (Sullivan et al 1992) socioeconomic variables such as lack of job satisfaction (Lee et al 1989) and behavioural features of pain (Keefe and Gill 1986). Theoretically such ideas are explained by The Gate Control Theory of Pain.

1.6.2 The Gate Control Theory of Pain

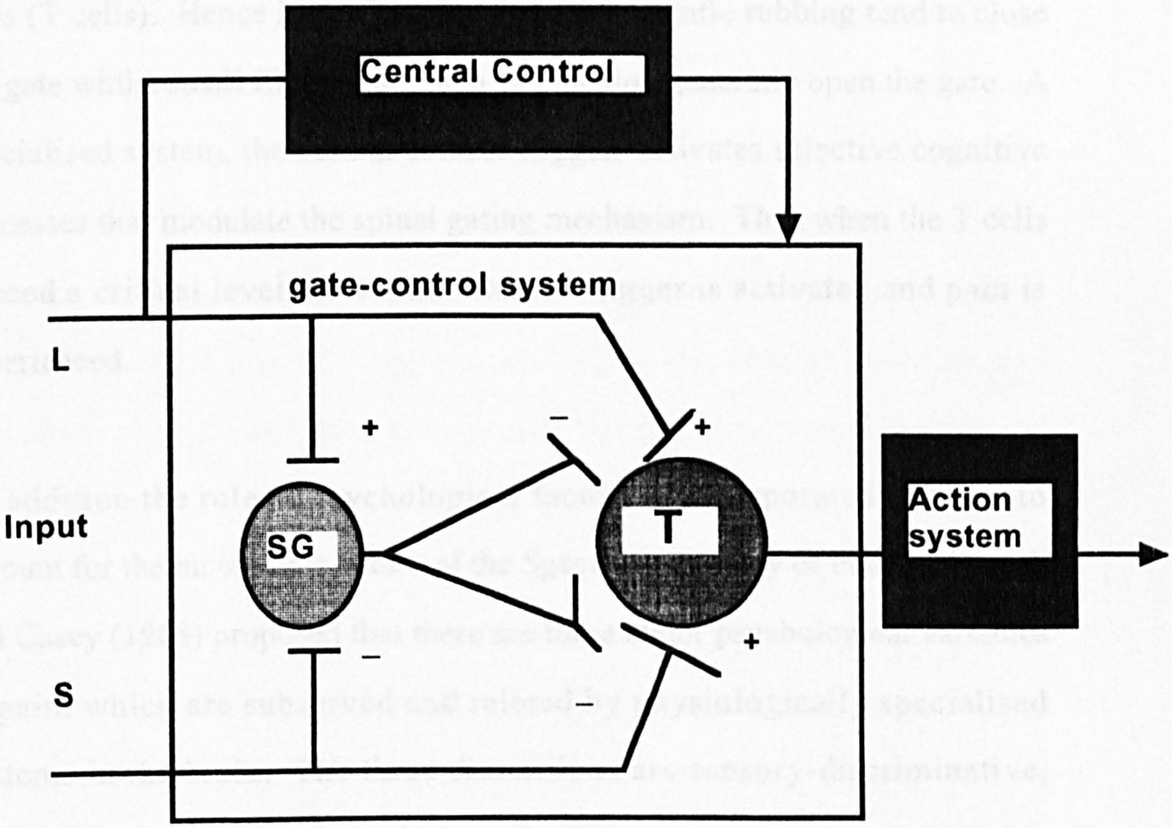
The Gate Control Theory of Pain was proposed by Melzack and Wall (1965) and represents an attempt to integrate neurophysiological and psychological variables into a unified theory of pain. The Gate Control Theory of Pain was developed from an understanding of the physiological and psychological influences of pain experience. Such influences include a high degree of fibre and pathway specialisation in the central nervous system and increasing recognition of the influence of psychological variables on pain response and treatment outcome.

The theory is outlined in Figure1.2. The Gate Control Theory proposes that a neural mechanism in the substantia gelatinosa (SG) in the dorsal horns of the spinal cord acts like a gate which can increase or decrease the flow of nerve impulses from peripheral fibres to the spinal cord cells that project to the brain (Melzack and Wall 1965). Somatic input is thus subjected to the modulating influence of the gate before it can evoke pain perception and response.

The degree to which the gate increases or decreases sensory transmission is determined by the relative activity in the large and small diameter fibres as well as descending influences from the brain. Activity of the large fibres closes the

Figure 1.2

The Gate Control Theory of Pain (Melzack and Wall, 1965)



L = large diameter fibre, S = small diameter fibre

+ = excitatory, - = inhibitory

SG = substantia gelatinosa

T = first central transmission cell

gate and inhibits transmission of some impulses whereas small diameter fibres open the gate and facilitates transmission to centrally projecting transmission cells (T cells). Hence large fibre inputs such as gentle rubbing tend to close the gate whilst small fibre inputs such as pinching generally open the gate. A specialised system, the central control trigger, activates selective cognitive processes that modulate the spinal gating mechanism. Thus when the T cells exceed a critical level the central control trigger is activated and pain is experienced.

In addition the role of psychological factors is incorporated in order to account for the incomplete nature of the Specificity Theory of Pain . Melzack and Casey (1968) proposed that there are three major psychological variables of pain, which are subserved and related by physiologically specialised systems in the brain. The three dimensions are sensory-discriminative, affective-motivational and cognitive-evaluative.

The dimension known as sensory-discriminative is essentially a sensory process with a physiological basis, dependent on pathogenic information and discriminable in time, space and intensity. The affective-motivational dimension is essentially psychological in nature and motivated by cognitive information processing and past experience. Higher central nervous system processes evaluate input (the cognitive-evaluative dimension) in terms of past experience, anxiety, attention, suggestion, expectation and sociocultural variables - all of which have profound effects on pain experience and exert control over both the discriminative and motivational systems.

Pain is clearly a complex experience, influenced by sensory, cognitive, affective and motivational dynamics. The subjective experience of pain clearly has sensory qualities, such as described by the words 'throbbing' or 'burning'. In addition, pain has distinct affective qualities which one can view in terms of it having an 'exacting, wretched and punishing' consequence (Melzack 1989). Pain becomes overwhelming, demands immediate attention and disrupts both behavioural and cognitive processes. Furthermore it motivates the organism/individual into activity which aims to stop and prevent further pain, as evidenced by rest, avoidance behaviour and use of analgesics.

The three dimensions of pain interact to provide perceptual information regarding the intensity, duration and quality of pain, which is modulated by important psychological variables. The Gate Control Theory of Pain recognises the central role of psychological processes in explaining pain. It provides an integrated theory, which views pain as a complex, interactive experience, dependent upon both physiological and psychological information. The Gate Control Theory of Pain is not without critics (eg Dyke 1975). For example, attempts to identify important features of the model (eg pre and post synaptic inhibiting processes) have not met with success. Pearce (1986) however notes that whilst further modifications of the model may take place, its basic assumptions - 'namely the modulation of peripheral input by central cognitive processes' are essentially sound. Thus the strict disease model of pain adopted by the medical establishment has resulted in doctors apparently promoting chronic low back pain; a point illustrated by Waddell (1987,) a Consultant Orthopaedic Surgeon.

> "Despite the best of intentions to reduce pain our whole approach to backache has been associated with increasing low back disability ...... we have actively prescribed low back disability".

Attention has therefore focused upon new models of understanding and treating pain and illness.

1.6.3 Important Psychological Concepts Associated With Low Back Pain

Psychological concepts such as illness behaviour, depression and somatic anxiety represent central ideas in the understanding of chronic low back pain and draw together a number of clinical and empirical themes. These include (a) a changed social and economic infrastructure; (b) the adoption of a medical model of disease in order to explain pain; and (c) behaviourist models of pain. Such interdependent themes illustrate the failure of modern medicine in treating low back pain and the recognition of important psychological concepts in physical health.

1.6.4 Illness Behaviour

In the absence of any identifiable organic pathology and in view of the perplexing nature of chronic pain - a number of authors have directed causes towards individual psychopathology - madness, hysteria, conversion or somatisation disorder, malingering (Ford 1992). The list is endless. Chronic low back pain patients have therefore been described in various ways, as having psychogenic, functional or atypical pain, as pain prone personalities or losers (Sternbach et al 1974; Bleur and Heilbronn 1982; Slade 1984).

Such ideas have evolved from a disease centered model of pain and illustrate the Descartian model of mind and body as separate, discrete entities. The failure to identify or treat pain is thus a consequence of a dysfunctional or disordered mind. Yet empirical evidence and clinical experience illustrates that this is clearly not the case. Conn (1922) for example recognised the difference between malingering and the patient with true pathology but inappropriate levels of fear, avoidance behaviour and distress.

> 'Such an individual is scarcely a malingerer but rather the victim of a false conception, the more deeply rooted often because of tactless disputes at previous examinations'

More recently Lee et al (1989) have argued that the use of such terms 'promotes an unfortunate division' which is neither supported by clinical enquiry and has many negative implications. The concept of illness behaviour and the psychopathology of chronic low back pain was noted by Wentworth (1916) who argued that 'exaggeration is as common as malingering is rare'

It has long been recognised that psychosocial variables influence the nature of outcome of health and illness. Halliday (1937) recognised that "illness is a mode of behaviour of a person and a community. It is the person not the organ that is ill". The social benefits of "public pain" (Helman 1992) are noted by Lewis (1981)

> "possibilities of care, of sympathy, the allocation of responsibility for sickness in others affect how people show their illness"

Parsons (1951) was the first medical sociologist to analyse illness in a systematic way. He recognised the social dimension of illness as vital, stressing both the responsibilities and privileges accompanying such behaviour. Key privileges include exemption from responsibility in that it is recognised that the individual cannot exert control over the disease process.

A further privilege involves the exemption from normal social obligations to a degree appropriate for this particular condition.

Obligations on behalf of the individual include a duty to recognise that to occupy a sick role is undesirable, a commitment to strive to a healthy state and a drive to seek help (in order to cooperate in the process of getting well). Allan and Waddell (1989) extends Parson's conceptualization of the sick role and recognise that the sick role is dynamic and not static. Consequently the "duties" of the individual with chronic disability include : (1) a recognition that to be ill is undesirable; (2) an obligation to reduce illness behaviour as much as possible; and (3) the individual accepting part of the responsibility for his own illness and disability. Parson's work however, has been criticized for its lack of empirical support and unrealistic expectations on behalf of the patient "to get well" (Allan and Waddell 1989).

Mechianic (1960) developed a more practical, clinically useful concept of the sick role which was more amenable to empirical investigation. Mechanic introduced the term illness behaviour which was initially defined as:

> "the varying perceptions, thoughts feelings and acts affecting the personal and social meaning of symptoms, illnesses, disabilities and their consequences.

The work of Mechianic et al (1960; 1977) illustrated cognitive aspects of illness as well as the social-behavioural context, which enabled clinicians to empirically assess illness behaviour in the form of:

> "observable actions and conduct which express and communicate the individuals own perception of disturbed ill health".

Pilowsky (1967; 1970) incorporated such concepts into an analysis of hypochrondriasis, the main clinical features including a persistent preoccupation with health and disease (despite medical reassurance) which is unjustified by the amount of objective organic pathology.

The concept of illness behaviour can thus be assessed clinically. In normal illness behaviour the sick role fostered by the patient is equivalent to the level of pathologic involvement (Pilowsky 1985). Abnormal illness behaviour defined by Waddell et al (1974) represents

> "maladaptive overt illness related behaviour which is out of proportion to the underlying physical disease and more readily attributable to associated cognitive and affective disturbance than to the objective physical disease".

Thus it would appear that an important dimension of chronic low back pain is the level of illness behaviour fostered by the patient. All behaviour represents a mode of communication which is subject to powerful reinforcement dynamics. Evidence indicates that such considerations are particularly relevant to the study of chronic low back pain where dysfunctional levels of avoidance behaviour represent a common clinical theme (Main and Parker 1989). Such communication can now be assessed clinically by way of illness behaviour (Pilowsky and Spence 1975) and represents increasing awareness of psychological variables (such as dysfunctional pain behaviours) as important indices of low back disability.

One of the most enduring features of chronic low back pain is the avoidance behaviour which persists and disrupts individual's lives, long after healing is complete. Avoidance Behaviour, Phillips (1987) argues, is "extensive and complex" and includes avoidance of stimulation, work, activity, social interaction and leisure pursuits (Phillips and Jananski 1986; Anciano 1986).

Illness behaviour, the notion of sick role and behaviourist models of pain (which stress both positive and negative reinforcement dynamics associated with low back pain) represent clinical recognition of behavioural ideas and principles as inexorably involved with the experience of chronic low back pain. The efficacy of behavioural treatments for low back disability has much empirical support (Fordyce 1976; Keefe et al 1986; Holzman and Turk 1986). Other important psychological dimensions of pain experience have focused on cognitive and affective variables.

1.6.5 Cognitive Dimensions of Chronic Low Back Pain

The role of patients' beliefs, cognitions and appraisals about pain need to be examined. Clinical assessment of pain and disability ultimately depends on the patients own subjective report. Such an appraisal is considerably influenced by patients attitudes and beliefs as well as psychological distress and illness behaviour (Main et al 1992; Jensen et al 1991; Melzack 1965).

Such ideas are supported by research which has shown how rehabilitation and adaptation to chronic pain are significantly associated with an individuals locus of control (Rudy et al 1988; Buckelew et al 1990), perceived ability to control pain (Strong et al 1990; Jensen et al 1991), attributional style (Love 1988; Cheatle et al 1990) and self efficacy beliefs (Nicholas and Wilson 1989). Cognitive errors defined as a negatively distorted belief about oneself or one's situation have also been found to predict long term adjustment to low back disability as well as mediate disease severity and rehabilitation and contribute effectively to the prediction of adjustment to disability (Jensen et al 1991).

Such ideas are supported by the fact that the majority of people with low back pain and disability manage without medical consultation or treatment irrespective of severity or duration of pain (The Consumers Association Back Pain Survey 1986). The decision about whether to seek medical advice appears dependent upon learned and cultural patterns of illness behaviour (Fordyce 1976; Helman 1992) as well as individual beliefs about pain, overall coping strategies and perceived adjustment to disability (Jensen et al 1991).

An increasing focus on cognitive dimensions of pain experience in both the assessment and treatment of low back disability illustrates recognition of a need to assess and identify dysfunctional cognitions of pain and disability (Pearce 1983; Turk et al 1987; Crisson and Keefe 1988; Main and Waddell 1991; Buckelew et al 1990).

1.6.6 Low Back Pain and Doctor-Patient Communiction

The role of physicians' diagnosis in clinical consultations, illustrate how dysfunctional belief systems evolve regarding the aetiology and prognosis of patient's low back pain. Of specific importance here is the quality or dynamic of the doctor-patient relationship illustrated by the way physicians communicate and patients understand such information. A clinical diagnosis may take two forms, substantive and nominal. A substantive diagnosis is based upon recognised, objective clinical features and pathogenic information. Investigations demonstrate a definite pathological process. In such situations treatment is largely successful.

In the vast majority of consultations however, the exact aetiology of low back pain is more complex and difficult to detect. Diagnosis is consequently very difficult or impossible as clinicians are unable to identify any definite pathological process or source of pain. Yet the fashion for a substantive diagnosis remains, shaping many dysfunctional modes of thought for clients. Such a diagnosis serves many functions. It protects doctors' power and may involve issues such as difficulties faced by clinicians giving bad news (Rose et al 1993). Clients in the face of a persistent physical stressor are naturally distressed and at the first juncture, search for meaning or some kind of understanding as a way of relieving anxiety and establishing a new equilibrium.

Thus many clinicians Waddell et al (1989) argues, are guilty of engaging in 'unjustified pseudopathological diagnosis' (nominal) when what is really required is a straightforward ambigious term such as simple strain or nonspecific low back pain. In the author's experience both client and clinicians capitulate in this process. There are negative consequences for both parties. Clients now understand that they are victims of an active disease process which is rapidly deteriorating and can only be relieved by way of traditional medical intervention. Each failed intervention and frustrating consultation reinforces fear, distress and illness behaviour. The clients entire cognitive schema is one marked by catastropizing, external locus of control, cognitive errors and faulty attribution processes. For example Colvin et al (1980) noted that 237 patients out of a total sample of 300 firmly believed pain was caused by something far more serious than what was actually wrong. Similarly Main et al (1992) found that a group of patients at risk of developing a psychological overlay were two times more likely to have an unsatisfactory outcome when offered simple advice and reassurance. Such evidence and recent work by others demonstrates the important role which clients' beliefs and ideas play in shaping the overall response and adjustment to chronic low back pain (Polatin et al 1988; Ressor et al 1988)

1.6.7 Depression and Anxiety

The prevalence of major depression in patients with chronic low back pain is approximately three to four times greater than in the general population (Sullivan et al 1992). Although the exact nature and direction of this relationship remains controversial - depression has been demonstrated to have both a substantial effect on clinical presentation (Keefe et al 1986; Kerns and Haythgornthwaite 1988; Sullivan et al 1992) and on clients response to treatment (Dworkin et al 1988; Blumer and Heilbronn 1982; Main et al 1992).

Depression has been frequently explained in terms of learned helplessness (Abramson et al 1978) as an understandable coping mechanism in response to a chronic and disabling physical condition (Hendler 1984). Such a model postulates a behavioural (Turk and Salovey 1984) and cognitive (Beck 1967) formulation suggesting that depression is a function of sustained reduction in behavioural and social reinforcement and a decline in personal ability to control and master painful episodes.

Bluer and Heilbronn (1982) offer a psychodynamic interpretation of the interdependence between depression and chronic pain. The authors postulate that chronic pain in the absence of clearly defined organic pathology should be interpreted as a masked or 'muted depressive state'. In support of such an hypothesis, evidence is put forward identifying a 'pain prone personality' or a depressed/vulnerable personality. Empirical support however for elevated levels of depression among individuals defined as 'vulnerable' or 'predisposed' is weak (Turk and Salovey 1984).

Recent research argues that the strongest statement that can be made about the relationship between pain and depression is "that the two conditions frequently coexist" (Sullivan et al 1992). Therefore depression affects and is affected by the whole dynamic of pain. However, depression has been a clinically neglected issue in the treatment of pain (Haythornthwaite 1991) and may account for some of the treatment failures in chronic pain rehabilitation (Atkinson et al 1986). Sullivan et al (1992) have explicitly advocated that treatment of the depressive disorder itself may prove a more profitable mode of patient rehabilitation. Recent research indicates that clinically significant depression using DSM III diagnostic criteria is present in more than half of chronic low back pain patients seeking treatment (Fishbain et al 1986). Such empirical evidence suggests that the depressed mood, psychomotor retardation, lack of motivation and affective distress which constitute the major symptoms of a depressive episode should form an integral part of clinical assessment and patient rehabilitation for chronic low back pain.

1.6.8 Fear and Low Back Pain

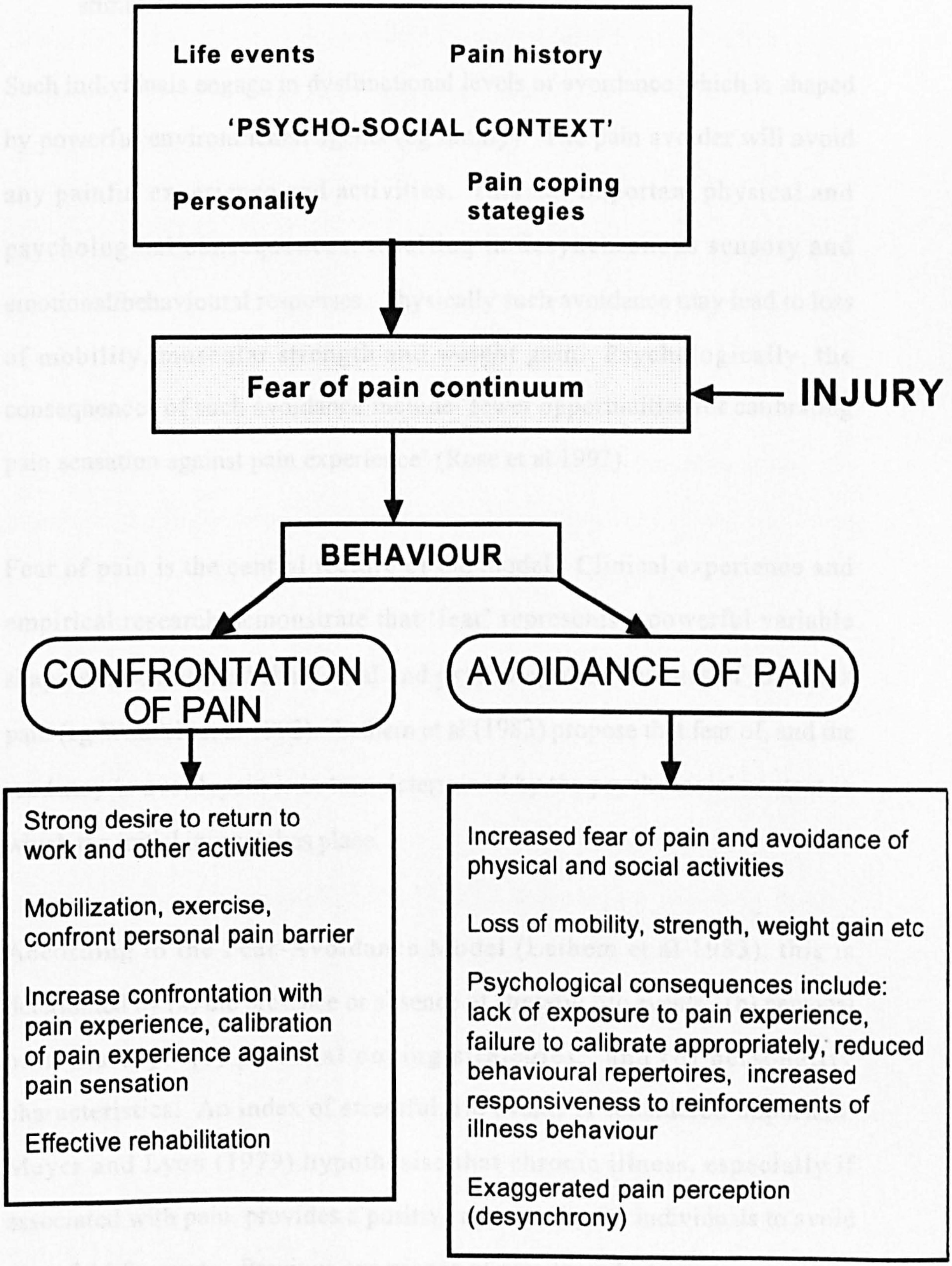
Anxiety is a frequent, attendant consequence of both acute and chronic pain. Anxiety manifests itself as the patient tries to make sense of the sensation, quality, perceived duration and disruptiveness of pain . Chronic pain is a qualitatively different experience . The patient is still anxious or distressed yet at this stage has experienced many frustrating consultations and failed interventions. Distress principally manifests itself as abnormal illness behaviour as the patient tries to communicate their anger and frustration (Waddell et al 1989). Anxiety, depression and illness behaviour thus represent common clinical features of chronic low back pain which must be addressed in combination with the wider social dynamic in which disability operates. A number of authors have attempted to measure anxiety of fear in chronic pain populations clinically. Examples include the Fear Avoidance Model of Exaggerated Pain and Perception (Lethem et al 1983) and the Fear Avoidance Beliefs Questionnaire (Waddell et al).

The Fear Avoidance Model of Exaggerated Pain Perception

Pain is one of the most powerful aversive drives in animals and humans and is closely allied to fear and anxiety. Fear theory is based upon a poweful body of animal experimental work which has emphasised classical conditioning and the learnt nature of fear. Fear of pain thus represents an important feature of the anxiety generated by many chronic pain patients. Recently a theoretical model has been developed whereby the concept of fear has been drawn upon in order to account for the psychological and behavioural overlay evident in patients with low back pain (Lethem et al 1983). The central feature of the model is a construct - fear of pain, a continum along which indivdiuals, faced with severe and disabling pain, can lie. At one end of the continum lies those individuals defined as confronters (adaptive coping) whilst at the other end are those known as avoiders (see figure 1.3).

The model is behaviourist in orientation and hypothesizes that the adaptive, positive, response to low back pain is one of confrontation - characterised by a strong rehabilitative drive - a desire to return to work and effective mobilisation. At the other end of the behavioural spectrum, are those indivdiuals who exhibit exaggerated, pain perception, defined by Lethem et al (1983) as:

Figure 1.3 **The Fear Avoidance Model of Exaggerated Pain Perception (Lethem, et al. 1983)**



> 'Pain experience and/or pain behaviour (and/or physiological responses to pain stimulation) which is out of all proportion to demonstrable organic pathology or current level of nociceptive stimulation'.

Such individuals engage in dysfunctional levels of avoidance which is shaped by powerful environmental agents (eg family). The pain avoider will avoid any painful experience and activities. This has important physical and psychological consequences, resulting in desynchronous sensory and emotional/behavioural responses. Physically such avoidance may lead to loss of mobility, muscular strength and weight gain. Psychologically, the consequences of such avoidance include 'fewer opportunities for calibrating pain sensation against pain experience' (Rose et al 1992).

Fear of pain is the central feature of the model. Clinical experience and empirical research demonstrate that 'fear' represents a powerful variable shaping much of the behavioural and psychological dynamics of low back pain (eg Waddell et al 1992). Lethem et al (1983) propose that fear of, and the tendency to avoid, pain is in turn determined by the psychosocial context in which the initial injury takes place.

According to the Fear-Avoidance Model (Lethem et al 1983), this is determined by (a) the presence or absence of stressful life events; (b) personal pain history; (c) personal coping strategies; and (d) personality characteristics. An index of stressful life events is considered important. Meyer and Lyon (1979) hypothesise that chronic illness, especially if associated with pain, provides a positive opportunity for individuals to avoid stressful life events. Previous experience of pain (pain history) may sensitise the individual to fear pain thereby increasing future avoidant responses. Pain coping responses provide an index of positive/confrontation v passive/avoidance strategies, thereby measuring the behavioural dynamics of pain. The variable known as 'personality characteristics' has been the subject of much debate and empirical inquiry, although recent attempts to identify 'pain prone personality' have met with little support.

Recent research has demonstrated support for the Fear Avoidance Model (Rose et al 1992). Three chronic pain groups, consisting of post herpatic neuralgia patients, RSD and chronic low back pain patients were compared with three pain free comparison groups. The model successfully discriminated between the three pain and pain-free groups in terms of somatic anxiety, life events and pain history, thus demonstrating the utility of the model in explaining psychological overlay in patients with chronic pain conditions

Theoretical Model/Interventions in the Current Enquiry

The theoretical and therapeutic model adopted in the current study is shaped by clinical observations, a wealth of empirical evidence demonstrating the efficacy of cognitive behavioural interventions for chronic groups of patients and recent research illustrating the role of fear avoidance beliefs in shaping the experience of chronic disability (Waddell et al 1993; Phillips 1987).

The clinical model adopted in the current inquiry thus attempts to synthesize such themes, drawing on historical evidence which suggests that whilst low back pain has affected man throughout recorded history, the experience of chronic disability is a relatively recent and specifically Western phenomenon.

The increase in low back disability appears to depend more on society's and medicine's understanding and management of low back pain than any real change in the disorder itself. More specifically, the favoured model of treating low back pain - bed rest is perceived as at best, ineffective and at worst, a major cause of iatrogenic disability (Waddell 1987; Greenough 1992).

Current orthopaedic thought in cohesion with a dominant philosophy of care advocating proactive patient responsibility - individuals actively involved in their own rehabilitation has shaped the current intervention model. Such ideas thus endorse a cognitive behavioural model of rehabilitation where fear avoidance governed behaviour represents a dominant issue shaping both disability and psychological distress.

Pain, fear avoidance and behavioural dynamics associated with disability thus constitute the major theoretical and clinical focus of the current inquiry. Fear theory is based on a powerful body of animal, experimental work, which has stressed both classical conditioning and the learned, environmentally determined nature of fear and avoidance behaviour. The strict behavioural model of Fordyce (1976) recognised powerful contingencies of reinforcement associated with pain behaviour. Such ideas have developed into a more comprehensive cognitive behavioural perspective.

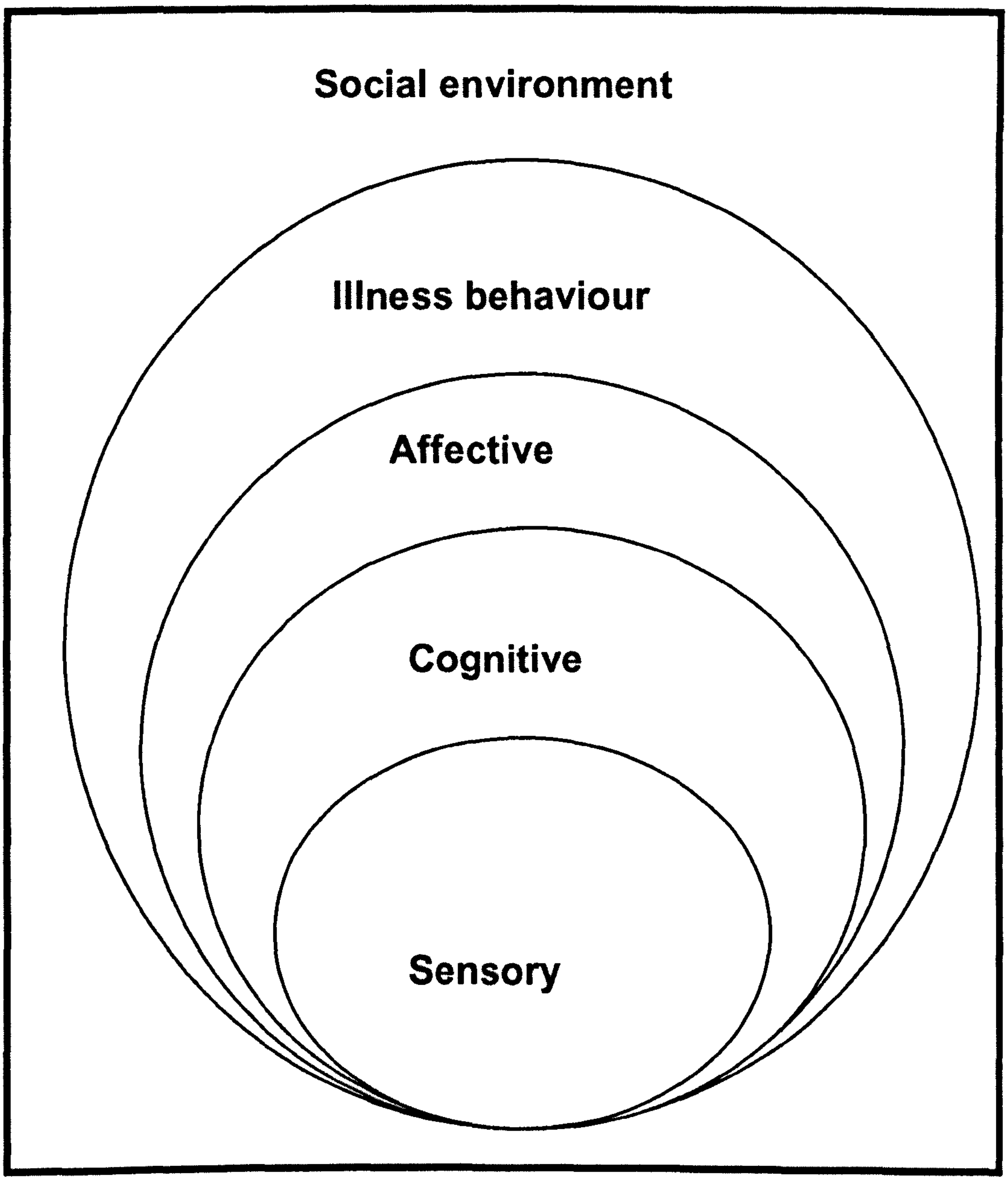
Phillips (1987) found little evidence that avoidance behaviour reduced chronic pain either on a short or long term basis. Thus from a limited mechanical view of pain, avoidance, whilst initially adaptive, appears form a cognitive behavioural perspective to be ineffective or dysfunctional. Phillips recognised the role and important consequences of specific beliefs/cognitions in shaping avoidance behaviour. Such ideas gel with an increasing body of work which has stressed the role of fear avoidance ideas as powerful behavioural (Letham et al 1983; Slade et al 1983) and cognitive behavioural mediators of chronic disability (Waddell et al 1993).

The writer endorses such ideas which are reflected in terms of the intervention programme and its contents. The experience of chronic low back pain is complex and multi-determined - a consequence both of physical pathology, but with increasing time, social and powerful psychological factors. Structured behavioural programmes have met with success, albeit limited in terms of treatment goals. The vast majority of programmes now offer a more comprehensive cognitive behavioural intervention aimed at reducing iatrogenic disability, increasing fitness and behavioural potential as well as challenging powerful/pervasive ideas which shape avoidance behaviour. The current model offered is therefore one which fosters a direct cognitive behavioural treatment package as advocated by Phillips (1987) supplemented with work aimed at identifying and rethinking fear governed cognitions concerning pain and disability. Such goals are achieved around a structured behavioural and educational programme of approximately 18 hours intervention.

1.7 Biopsychosocial Model of Illness

A number of researchers have thus incorporated physical, psychological and behavioural information into a theoretical and clinical framework in order to represent the true multifaceted nature of chronic low back pain (Engel 1977; Lipowski 1983; Loeser 1982; Waddell 1987; Rose 1993). A biopsychosocial model of illness put forward by Waddell (1987) rejects strictmechanistic ideas of low back pain. Recent research has demonstrated that the main clinical elements of low back disorders are pain disability, physical impairment, psychologic distress (as defined by heightened somatic/autonomic perception of bodily symptoms and depression) fear avoidance beliefs and illness behaviour (Main et al 1992; Turk et al 1993; Waddell et al 1993). Analysis of the relationship among these elements at one time has been used to develop a model of illness (Fig. 1.4) which illustrates the true multifaceted nature of low back disability. The model put forwardby Waddell et al (1993) illustrates the important psychosocial nature of low back disability. Significantly, distress, illness behaviour and the consequent sick role fostered by many are magnified or desynchronous in relation to the patients' physical pathology. Historically such considerations have largely been ignored or perceived as direct evidence of "malingering", "hysteria" or more seriously as proof of a serious spinal disorder, as opposed to simple low back pain (Ford 1992). From this model it can be concluded that: (1) most low back pain starts with a physical problem and psychological disturbance develops secondly; (2) the important psychological disturbance associated with low back pain is distress (ie somatic awareness and depression) which manifests itself as abnormal illness behaviour; (3) the social environment contributes to chronic low back pain. Disability based on restricted function

Fig. 1.4 A cross-sectional analysis of the clinical presentation and assessment of low back pain and disability at one time point. (Waddell et al, 1993)



represents a form of behaviour which is ultimately shaped and reinforced by social considerations (eg the State, NHS and family).

1.7.1 Surgery and Low Back Pain

The model illustrates, for example, the failure of spinal surgery (for this important minority) since the Second World War. Such treatment has been based upon a disease centered model of pain and a failure to recognise important psychological variables. A large body of research has demonstrated both the harmful and ineffective nature of surgery as well as the strong association between surgical failure and psychological disturbance (DePalma and Rothman 1970; Oostdam and Duivenvoorden 1983; Waddell et al 1986; Gray et al 1984). The Office of Health Economics (1985) estimated that ten thousand spinal operations were performed in 1982.

It would appear that decisions about whether to undertake surgery are influenced more by the patient's distress and illness behaviour and less by the actual physical disorder (Pilowsky 1978). This has important implications. If decisions to undertake conservative or surgical treatment are more frequently influenced by psychological variables such as illness behaviour, this leads to physically inappropriate treatment being undertaken with predictably poor results (Spitzer 1986).

The patient's behaviour can be viewed as an overt clinical expression of their distress about their disability. It should be recognised as such and not as objective evidence of physical pathology. In essence the patient is communicating distress, that s/he does have a physical problem, that s/he is focusing on their symptoms and is depressed at the failure of intervention to relieve their pain. Patients' cognitions are not amenable to reassurance and objective information. The patients communication in the form of illness behaviour represents a 'non verbal disease affirmation' (Waddell et al 1987). More often however such psychological information is ignored and the patients clinical presentation is viewed as evidence of hysteria, malingering or wider psychopathology. The effectiveness of such communication is confirmed by research demonstrating how abnormal illness behaviour can lead to inappropriate surgery. Distress and illness behaviour may increase the pressure for surgery and may lead to a mistaken diagnosis of a surgically treatable lesion (eg Waddell et al 1989).

1.7.2 A New Model of Illness

The assessment and treatment of low back disability should be based on a model of illness as opposed to disease. Chronic low back pain begins with a physical problem yet for many there are associated and often profound psychological consequences. The individual is often depressed, distressed and engages in dysfunctional levels of illness/avoidance behaviour. S/he firmly believes there is little hope or opportunity for change. In essence the patient is trapped in a learned helplessness situation (Abrahamson 1978)

Pain is clearly a complex experience and treatment should reflect its multifaceted nature. Medicine has failed to treat low back pain; most surgical and conservative treatments for (simple, uncomplicated) low back pain have failed. Low back disability has increased substantially in the past fifty years. Economic and social change as well as the failure of medicine in adopting a strict physically based model of pain have contributed to this current situation.

Furthermore patient expectations and beliefs as well as the physicians primary goal of pain relief, have shaped current medical treatment approaches to treatment and patients understanding of low back pain.

The experience of chronic pain and its associated disruption in social, economic and psychological areas of life have led towards more holistic models and treatments of low back disability (Phillips 1987). Treatments which treat the person as opposed to the spine. Waddell et al (1989) have tested such ideas empirically and found support for a biopsychosocial model of low back disability. A model which incorporates physical, social, behavioural and psychological dimensions of pain experience.

Research has long demonstrated that psychological factors are involved in the understanding, treatment and outcome of low back pain (Beecher 1956; Melzack and Wall 1982; Jensen et al 1991). Similarly the range of disability and distress in patients with comparable physical findings further support the role of psychological factors (Main et al 1992).

The growth and philosophy of Pain Management Programmes in the last twenty years is based upon such observations. Pain management programmes represent behavioural and increasingly cognitive-behavioural alternatives to traditional medical intervention. The primary aim is to recognise the complex nature of chronic low back pain and to rehabilitate rather than cure patients. Such ideas are based on an educational and behavioural programme which aims to reduce illness behaviour, distress and dysfunctional levels of disability. Individuals are taught positive coping strategies, thereby enabling patients to be more productive and less disabled by their pain.

CHAPTER 2

Review of Pain Management Programme

2.1 The Philosophy and Rationale of Pain Management Programmes

Multidisciplinary pain management programmes consist of a variety of approaches and procedures. The growth of treatment for chronic low back pain based on behavioural and psychological principles can be attributed to a number of clinical and wider socioeconomic influences These include, the failure of conventional intervention to treat chronic low back pain, the range of disability evident in patients with comparable physical findings in their back and a substantial growth in the incidence of low back disability since the second world war.

In addition, the growth of health psychology and the behavioural sciences has increasingly focused research on the important role that psychological variables play in the aetiology, assessment, treatment and outcome of physical health. A substantial body of work is strongly supportive of such ideas (Weisenberg 1987; Malone and Strube 1988; Allan and Waddell 1989; Fordyce 1976).

The goal of the majority of pain management programmes is to rehabilitate as opposed to cure patients (Follick et al 1985). Whilst the primary aim of conventional medical intervention is the reduction of pain, this is not a stated goal of pain management programmes. As Fordyce (1985) notes 'behavioural methods do not have as their primary objective the modification of nociception ...... pain treatment programmes are intended to treat excess disability and expressions of suffering'.

Pain management programmes were initially developed in the 1970's and drew upon strict behavioural principles (Fordyce 1976). Pain and in particular chronic pain were perceived as dependent upon environmental contingencies. In essence, Fordyce hypothesised that whatever the aetiology of the pain problem positive and negative reinforcement of pain behaviour were critical in shaping both individual and community responses to disability.

Hence pain behaviours such as excessive inactivity and avoidance behaviour can be viewed as being shaped and strengthened by their reinforcing consequences. Thus behavioural treatments for chronic low back pain aim to decrease illness and avoidance behaviour, reduce medication intake and functional impairment as well as promote activity by shaping and reinforcing well behaviours. A stated aim is therefore to shift the client from a position of illness and passive/dependent behaviour to one of fitness, reduced disability and independence. In essence, a fitter stronger individual, less dependent upon health care and medication who is able to do more.

The evolution of cognitive-behavioural pain management interventions represents an extension of the behavioural model and a recognition that pain is a complex and dynamic experience. Learned helplessness ideas have been incorporated into the study of low back pain which increasingly emphasises the role of patients cognitions, their understanding and interpretation of pain and current situation (Abramson 1978).

Pain management programmes increasingly stress an educational role in relation to chronic pain. This serves to inform and educate the patient of the complex dynamics of pain experience, correct misunderstandings and erroneous ideas of low back pain and thereby reduce patients fear and distress, all which of represent common clinical features of chronic pain (Rose et al 1992; Main et al 1992).

Depression has been documented as a frequent feature of chronic pain (Turner and Romano 1985), an understandable, even expected consequence of a chronic and incapacitating condition. Recent research has therefore advocated the treatment of depression as an explicit goal for pain management programmes (Sullivan et al 1992). Evidence supports the efficacy of this goal, ie explicitly addressing behavioural and cognitive dimensions of depressed mood, loss of energy and motivation as well as dysfunctional ideas regarding pain and future possibilities (Rudy et al 1988; Nicholas et al 1992).

Cognitive therapy directed at dysfunctional pain cognitions and more realistic interpretations of pain experience represent a major feature of many pain management programmes (Pearce and Erskine 1989). Research has long demonstrated that cognitive variables represent important dimensions in the assessment and treatment of chronic low back pain (Jensen et al 1991; Turk et al 1987). One aim of cognitive therapy is the identification and modification of negative and unhelpful pain cognitions (Beck 1967; 1976). A large body of research has demonstrated that chronic low back pain patients catastrophise their pain experience and share a number of characteristics with depressed patients in terms of cognitive processing (Rosential and Keefe 1983). Such errors include selective abstraction, arbitrary inference and dichotomous reasoning (Smith et al 1988; Main and Waddell 1991). Cognitive restructuring for example aims to identify and modify dysfunctional cognitive events, processes and structures. Common procedures include (a) evaluating the validity and viability of thoughts and beliefs; (b) eliciting and evaluating predictions; (c) exploring alternative explanations; and (d) altering an absolutist, catastrophic thinking style. Evidence strongly supports the inclusion of cognitive therapy as part of a multimodal treatment programme (Spence et al 1991).

Thus behavioural and cognitive behavioural interventions have been increasingly employed as a mode of therapy for chronic low back pain. The basic rationale of pain management programmes can thus be defined as (a) alteration of maladaptive behaviours; (b) alteration of current cognitive and affective variables which interfere with adaptive functioning; and (c) alteration of cognitive schema which give rise to habitual ways of construing the self, the world and pain. Whilst cognitive-behavioural interventions represent the most commonly advocated treatment for chronic low back pain, much research and empirical inquiry has addressed the efficacy of pure behavioural programmes.

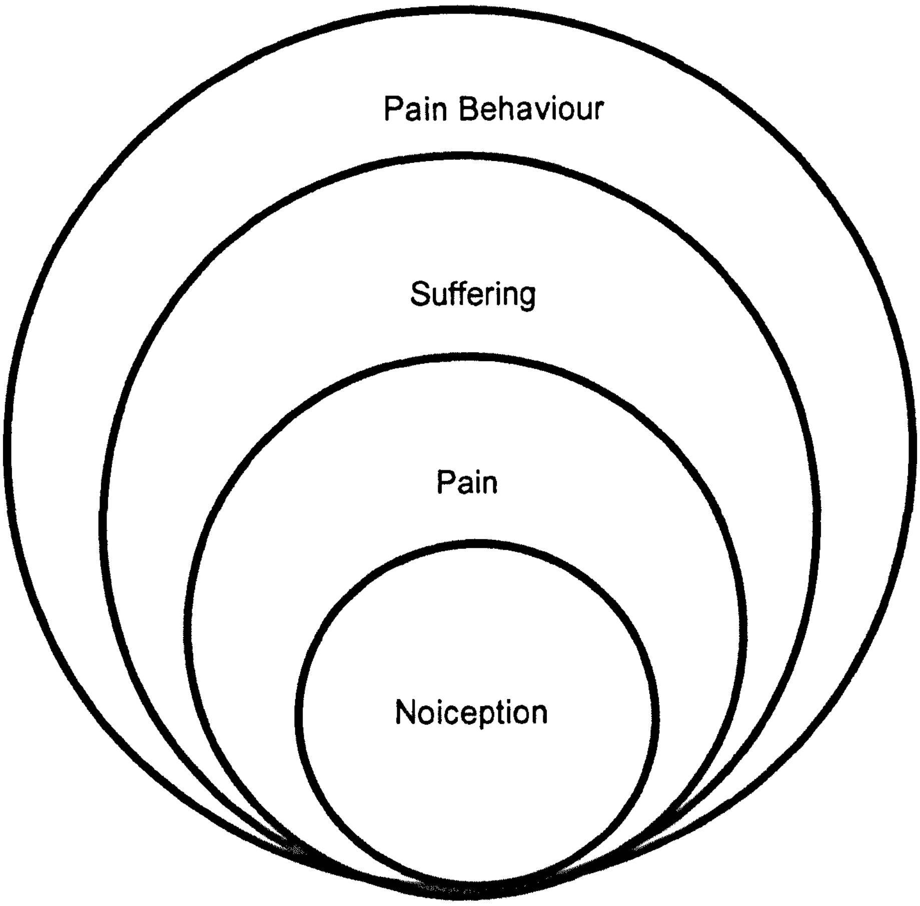
2.2 Behavioural Models of Chronic Pain

One of the most widely used treatment strategies which have been adopted by behavioural scientists for the treatment of chronic low back pain is the behavioural model put forward initially by Fordyce et al (1973; 1976). In order to address this perspective a distinction must be made between a number of clinical and theoretical pain constructs namely nociception, pain, suffering and pain behaviour. Loeser (1980) has conceptualised such ideas into a theoretical framework (figure 2.1) which illustrates both the relationship between these variables and the psychosocial impact upon the individual. The causal or rather non causal relationship between these indices of pain experience represents the foundation of behavioural treatments for chronic pain.

Pain behaviour represents the last step in the process of nociception. Nociception can be defined as the sensory dynamic of pain experience and refers to stimuli which act on A delta and C fibres. Significantly this leads but does not have to lead onto pain which represents a sensory experience based on an evaluation of nociceptive input or 'perceived nociceptive input to the nervous system' (Ghadiali 1987). This second stage of pain processing reflects an individual's immediate affective response associated with the painful sensation. It is best conceptualized as the 'moment by moment unpleasantness that is normally linked to the intense sensations evoked by nociceptive stimulation' (Wade et al 1992). This pain dimension involves only limited cognitive processing and is similar to the unpleasantness associated with sensations of nausea and dizziness which closely parallels the intensity of physical pain sensations (Price 1988). Suffering represents a negative response generated in higher nervous centres by pain and other psychosocial situations involving for example stress, depression, anger and anxiety. Pain behaviour stems from a complex interaction between nociceptive stimulation and the evaluation of pain and suffering.

Figure 2.1

A biopsychosocial model of illness
A conceptual model of pain
(Loeser, 1982)



Pain behaviours constitute all modes of behaviour including speech, gesture, facial expression, level of activity/stimulation and health care utilisation which communicate and are widely understood as objective evidence of nociceptive input.

Loeser's (1980) model thus recognises both the complex nature of pain experience and the loose or non causal relationship between nociception and pain. It is therefore possible to experience pain without nociception (such as phantom limb pain) and nociception without pain, as evidenced by soldiers injured on the battle front who do not report pain despite serious injury (Beecher 1962).

Such a model has important implications for the treatment of chronic low back pain. Fordyce (1976) has stressed the distinction between acute and chronic pain when addressing pain behaviours. Acute pain is associated with an overall lack of disruption to people's lives. Because of its short time duration, pain behaviour associated with acute pain can largely be attributed to the level of nociceptive stimulation and less to patterns of learning and conditioning.

Chronic pain is however a qualitatively different experience and involves a major disruption in people's lives. The experience of chronic pain is a composite of physical, social and important psychological variables. The balance and relationship between pain intensity and pain behaviour become increasingly desynchronous with time (Phillips 1987) resulting in a dysfunctional pattern of behaviour which involves extensive and profound avoidance behaviour and which is ultimately shaped and reinforced by important environmental agents (eg work, family, health care services).

Operant pain behaviours are those which have existed for an extended period of time in an environment that has provided contingent reinforcement. Such behaviours develop by nature of their consequences. Positive reinforcement can occur through the use of medication or by way of the care and attention of others. Negative reinforcement, in behavioural terms, represents the withdrawal or removal of an aversive or noxious stimulus, for example boring work or unpleasant responsibilities.

Phillips (1987) argues that avoidance behaviour which functions as a powerful negative reinforcer is 'prominent .... extensive and complex' and thereby acts as a potent variable in sustaining the experience of chronic pain. Such behaviour involves the avoidance of stimulation, movement, activity, social interaction and leisure pursuits (Anciano 1986).

Evidence of extensive avoidance behaviour in chronic pain populations is well documented. Phillips and Jahanshai (1986) examined the nature of pain behaviours in a large group of chronic headache sufferers and found substantial evidence of wide ranging avoidance behaviour. Using exploratory factor analysis six separable types of avoidance were identified, accounting for 42.6% of the total behavioural variance. The largest factor 'social avoidance' accounted for 21.9% of the total data variance. Furthermore avoidance of homework, daily mobility, exercises and stimulation formed separable clusters. Phillips (1987) argues that avoidance represents the most prominent and pervasive feature of pain behaviour, a point illustrated by Kerns et al (1985) who found that 43% of chronic pain cases were 'globally dysfunctional' reporting excessive avoidance and low levels of activity.

A behaviourist interpretation as to the development of such behaviour focuses on both respondent and operant models of pain behaviour. Escape from and avoidance of pain are species specific instinctual responses to aversive events that produce pain and great discomfort. A respondent model of pain recognises these sequences of events.

Classical conditioning of pain/tension occurs in an acute pain episode due to nociceptive stimulation leading to a pain-tension cycle. Pain results from sustained muscular hypertension. Avoidance of movement is therefore perceived as an active coping strategy, a way of reducing pain and nociception. However such avoidance may be reinforced leading to increased immobility and further pain. Caldwell and Chase (1977) suggest that once an active pain problem exists, conditioned fear of movement may develop, motivating avoidance of activity and leading to muscular atrophy and increased disability.

Behavioural programmes for chronic pain are based upon operant principles as initially put forward by Fordyce (1973). The goals of this procedure are (a) the identification and elimination of reinforcement sources that maintain pain behaviour; (b) the promotion of well behaviours that are by definition, incompatible with pain behaviours (eg exercise and work); and (c) the maintenance of these changes in the patients natural environment. In view of extensive research which has highlighted both the complex and extensive nature of pain behaviour (Phillips 1987) it would appear fruitful to alter the social and environmental contingencies controlling such behaviours. The majority of strict behavioural programmes are conducted on an inpatient basis and thereby allow maximum opportunity for control over powerful environmental agents (Gil et al 1987; Anton et al 1992). Spouse involvement is often considered an important feature of many behavioural programmes in order to aid maintenance and generalisation of behaviour change in the patients natural environment (Turk et al 1983). Recent research indicates the powerful role of a solicitous spouse in shaping the behavioural dynamic of pain (Lousberg et al 1992). Behavioural treatment does not involve concepts such as suffering, pain experience or other 'internal events'. Behavioural interventions for chronic pain are primarily concerned with observed behaviour and a primary goal of reducing functional disability (Fordyce et al 1973).

2.2.1 Operant Treatments for Chronic Pain

The growth and development of operant treatments for chronic pain are documented in a large number of studies and reviews which have sought to evaluate the efficacy of such interventions (Roberts and Reinhardt 1980; Turner and Chapman 1982; Turk and Flor 1984; Keefe et al 1986; Linton 1982, 1986 Weisenberg 1987; Gil et al 1987; Corey et al 1987; Cott et al 1990).

Fordyce et al (1968) illustrate the role and deployment of operant procedures in a single case study of a thirty seven year old woman who had a long history of constant low back pain and extensive illness behaviour. Treatment focused upon altering pain behaviour and environmental contingencies which shaped and reinforced functional disability. Immediate reinforcers based upon rest, attention and staff approval were dependent upon adaptive, well behaviour. Additional intervention features included an occupational therapy programme, medication withdrawal and the inclusion of significant others in order to shape adaptive well behaviour. Results demonstrated a marked increase in the patient's activity and a substantial reduction in pain communication over an eight week period.

Linton (1982) in a critical review of behavioural treatments for chronic benign pain reports on fifteen operant studies which focused on a population consisting of largely low back pain patients. The author concludes that the majority of studies show clinically significant increases in activity and reductions in medication use (eg Sternbach 1974). In addition a number of studies conclude that patients report of pain following treatment and at follow up had decreased significantly (Iqnelzi et al 1977).

Methodologically however the majority of studies are problematic in terms of design, measurement and treatment evaluation. Most studies draw on a rather weak one group pre/post test design which clearly temper conclusions by failing to control for variables such as 'patient history, maturation and reactivity to measurement' (Linton 1982). Few studies report follow up data (eg Fowler 1975) and one particular concern is the large number of patients who failed to complete the treatment programme for reasons which are often unspecified (eg Hammond et al 1978). Anderson et al (1977) report that of a total treated sample of thirty four chronic low back pain patients, 54% of the original patient cohort were rejected, 38% refused to participate and 8% failed to complete treatment. The positive conclusion of this study that 78%

of those completing the programme were functioning at normal levels of drug use and activity, clearly needs to be reevaluated in view of the substantial attrition rate and skewed population of patients who completed the course. More recently such methodological questions (and the consequent implications for research findings) have been raised concerning levels of patient drop out, participation refusal and patient rejection from treatment because of a failure to secure insurance cover (Turk and Rudy 1990).

Turner and Chapman (1982) in a similar review of operant treatments for chronic pain support the idea that such programmes are successful in increasing physical activity and decreasing medication use. The authors found little empirical support however concerning reduction of subjectively experienced pain. The favoured experimental design was once again a single group pre/post evaluation. Few control groups were employed. Concern was once again noted over the selection and rejection of subjects onto the programme, yet the behavioural benefits of intervention appeared to be maintained at follow up.

One of the earliest studies of an operant programme for patients with chronic pain is provided by Fordyce et al (1973); the authors describe the results of an inpatient programme designed for a heterogenous population of chronic pain patients (n=36). Both nursing staff and the patient's partner were instructed to withhold social reinforcement on the patient's display of pain behaviour. Positive reinforcement and praise were provided for well behaviour. Medication withdrawal was also targeted. In order to reduce the reinforcing consequences of analgesic medication patients were given medication based on a time contingent as opposed to a pain contingent basis.

This was achieved by the use of a 'pain cocktail' in which the active ingredient is disguised by a masking substance and is gradually reduced over time. This initial study provided support for the idea that pain behaviour is a function of environmental contingencies. Results indicated significant increases in activity levels, exercise tolerance and decreases in medication intake and average pain ratings during treatment. At follow up, most patients had maintained post treatment levels of physical activity.

More recent reviews (eg Linton 1986) have supported the efficacy of behavioural treatments for chronic pain although methodological concerns, whilst addressed in a number of studies, still remain (eg lack of an appropriate control group, or the failure to use well established outcome measures on all dimensions of pain experience) and temper the evaluation of treatment (Malone and Strube 1988; Flor et al 1992).

Attempts to identify active therapeutic features associated with behavioural treatments have not met with success. For example, White and Sanders (1985) divided eight chronic pain groups into two detoxification groups. Group one received medication on a time contingent basis, group two on a pain contingent as needed principle. Results indicated that the time contingent group yielded lower pain and higher mood scores than the pain contingent group. Such observation from a behavioural perspective would support the theory that the lower scores (time contingent condition) here were due to an extinction process. An alternative explanation however is that time contingent medication could lead to the reduction of anticipatory anxiety and pain and thereby to a more relaxed individual. Attempts therefore, to isolate active treatment factors in behavioural research have largely been unsuccessful.

It would appear from considerations of reviews and studies which have evaluated operant programmes for chronic pain, that intervention is of value in changing behaviour, reducing medication intake and enabling the individual to lead a fuller and more productive life. The advantages of this type of approach are its ability to test concrete hypotheses, the availability of pragmatic interventions that can be employed to change patient behaviour and a consistent framework which can be used across disciplines (Keefe et al 1986).

Operant treatments have however been criticized on a number of levels. In the majority of cases fairly rigid selection criteria are employed in order to select suitable clients for the programme. Examples include patients who show obvious pain behaviour, motivation and an available partner who is willing to cooperate in the programme. Consequently treatment is often only available to a relatively small and skewed population of patients. As Ghadiali (1987) notes in relation to the selection of individuals for behavioural treatment 'it does mean that its utility as a model and treatment for chronic pain has only limited applicability'.

From a clinical perspective, the efficacy of operant procedures for pain management has been limited to the treatment of patients in hospital or institutional settings. Whilst a number of studies have evaluated with success, 'home based' behavioural programmes thereby controlling for powerful environmental contingencies (eg Corey et al 1987; Cott et all 1990), the vast majority of programmes are conducted in institutional/hospital settings. Thus, although behaviour change does occur in treatment settings, there is often 'great concern' (Weisenberg 1987) that generalisation of well behaviour may not transfer to the home environment. A number of authors therefore note the role of the natural environment in the maintenance of treatment effects (Turk et al 1983, Trifiletti 1985; Weisenberg 1987).

Another concern of studies addressing operant programmes relates to the restricted methods of treatment evaluation. Success from an operant perspective is defined in purely behavioural terms. Roberts and Reindhart (1980) in a follow-up study of twenty six chronic pain patients treated on an inpatient basis found that 77% of the patient sample were leading normal lives as defined by (a) being employed; (b) not receiving compensation; and (c) being active for eight hours or more a day. Although the results suggest improvement in physical domains of the patients lives there is clearly still considerable room for distress, illness behaviour and suffering within this rather strict definition of 'normal'.

The nature of chronic pain and its impact upon the individual is a complex physical, behavioural and psychosocial experience. Assessment and evaluation should reflect the true experience of chronic pain and thereby address cognitive and affective dynamics of pain experience in addition to behavioural measures.

The failure to include such indices of chronic pain does not recognise therefore the true, complex nature of chronic pain and the conclusions of any treatment which does not incorporate a global physical and psychosocial evaluation must therefore be qualified.

Support for such ideas can be drawn from recent research where physical, behavioural and psychosocial information have been incorporated into a clinical model in order to assess the relationship and outcome between various dimensions of 'illness' in chronic low back pain (Waddell et al 1987; 1989). Physical disorder, psychological distress and illness behaviour combine to produce an overall measure of disability and thereby confirm that such information should be incorporated into the assessment and outcome of any intervention designed to treat chronic pain (eg Rose et al 1993).

A number of authors have argued that a behavioural model of chronic pain is reductive and fails to recognise that individual appraisals and cognitions such as expectation of pain increase, beliefs about one's ability to control pain and memories of aversive/painful events are critical variables in shaping the experience of chronic pain.

Phillips (1987) argues that chronic pain is a function of physical variables such as level of current pain, powerful behavioural dynamics and overall cognitive evaluations which includes general locus of control (Skevington 1983), perceived ability to control pain (Strong et al 1990), beliefs about being able to execute various behaviours (Bandura 1977), attributional style (Abrahamson 1978; Cheatle et al 1990) and cognitive errors (Beck 1976).

A large body of work has therefore addressed the role of cognitive indices of pain experience in relation to assessment, treatment evaluation and the mediation of pain report and experience.

2.3 Locus of Control and Pain Experience

Research indicates a positive relationship between an internal locus of control (defined as the belief that outcomes are under the control of one's own behaviour) and positive adaptation to pain. An external locus of control represents a belief that extraneous factors, eg powerful others, chance, luck, will determine outcome. For example Skevington (1983) demonstrated that a belief in chance happenings and external locus of control were strongly associated with reports of depression and pain related distress in a sample of low back pain patients. The greater patients endorsed beliefs in chance happenings the more likely they were to be depressed about their pain.

Rudy et al (1988), in an examination of the relationship between depression and chronic pain, found that a direct causal relationship between pain and depression was non significant. Rudy et al (1988) proposed however that perceptions of personal control and mastery (representing important cognitive variables) in response to chronic pain were necessary prerequisites for the development of depression. The authors, via the application of structural modelling, found empirical support for this idea representing strong evidence for the role of cognitive variables (eg locus of control as significant intervening variables) in shaping the experience of depression in chronic pain.

Such findings represent evidence of a causal relationship between locus of control and adaptation to pain and add weight to the role of a construct of internality or externality as positively associated with pain adaptation.

2.3.1 Specific Pain Beliefs and Pain

Further evidence supporting the role of cognitive variables in the experience of pain is research demonstrating 'a significant relationship between pain specific control appraisals and coping adjustment' (Jensen et al 1991). A large body of work indicates that a personal belief in the ability to control pain is associated positively with coping and adjustment. Jensen et al (1991) in a review of studies examining this relationship between pain control beliefs and adjustment, found strong support for the proposition that such appraisals were consistently related, irrespective of pain severity, to physical and psychological functioning. For example, Nicassio et al (1985) found that patients who perceived themselves as unable to control arthritic symptoms demonstrated passive pain coping beliefs, greater physical disability and psychological distress.

2.3.2 Attributional Style and Pain

Seligman's (1974) original study into the dynamics of depressive experience examined the relationship between aversive circumstances and uncontrollable outcomes. He hypothesised that where the outcome of an event was independent of any personal response, the individual would experience a learned helplessness situation, representing dysphoric mood, avoidance behaviour and vegetative symptoms - thereby constituting a depressive episode. Such situations arise where an individual's response to chronic pain whether adaptive or otherwise is independent and has little or no effect on outcome, i.e. pain report and efforts to reduce pain experience.

Such behaviourist models of depression are seen however as reductive, failing to take account of individual belief systems and appraisals of such aversive circumstances (Phillips 1987). With regards to chronic low back pain, a large body of work indicates that the majority of the population with low back pain and even chronic disability cope with the problem themselves without medical treatment. Evidence suggests that people do not consult a doctor simply because of the presence or severity of pain and that there is little difference between patients with low back pain who consult a physician and those who cope independently without medical intervention (Consumers Association Survey 1986; Office of Health Economics 1985). A number of variables do however discriminate between such populations of patients. These include psychological distress and illness behaviours, but also individual attitudes and beliefs, as well as personal interpretations as to the meaning of pain and its significance (Melzack 1975; Waddell et al 1984).

The reformulated model, developed by Abrahamson et al (1978), incorporates specific attribution styles as instrumental in the development of learned helplessness. Specifically they hypothesise that people are more likely to become depressed if they interpret events as internal (the belief that outcome results from something about the person), stable (a belief that outcomes are a result of nontransient factors) and global(a belief that similar outcomes can be expected across a wide variety of situations).

The relationship between attributional style and psychological functioning has been examined in a number of studies focusing on chronic pain populations. For example, Cheatle et al (1990) found that an overall index of stable, internal and global attributions was associated with depression amongst a group of chronic pain patients. Research into the psychopathology of depression indicates that a reformulated model of learned helplessness which incorporates both behavioural dynamics and individual appraisals of current experience represents a fuller and more valuable method of explaining individual responses to aversive, uncontrollable experience (Beck et al 1983).

The experience of chronic low back pain can be seen as a classic learned helplessness experience. The patient, in a position of constant pain, increasing disability and changed psychosocial status finds any action designed to reduce pain, remedial in terms of pain reduction. Passive, avoidant behaviour is equally ineffective and fails to reduce pain either on a short or long term basis (Phillips and Jahanshahi 1985). The individual therefore finds themselves in a position defined by lack of personal control over their environment A critical variable however appears to be the individual's understanding and appraisal of their situation. Such observations indicate that chronic low back pain is a multifaceted experience and clearly dependent upon cognitive variables such as individual attribution style regarding pain.

2.3.3 Cognitive Errors and Pain Experience

Dysfunctional cognitions or cognitive errors, defined as a negatively distorted belief about oneself or ones situation (Ellis 1962) have been studied extensively in a number of clinical populations including eating disorders, obsessive compulsive disorders and in particular depression (Blackburn 1989).

Cognitive theories of depression stress that changes in thinking are pivotal in the understanding of depressive phenomena. Beck (1976) proposed that depression is a function of a negative cognitive set, a negative view of the self, the world and the future which is maintained by information processing errors.

Processing errors maintain the negative content of thought by emphasising the negative aspects of situations or distorting reality.

Many studies have examined the relationship between the role of cognitive errors and the adjustment of chronic pain patients. A number of studies indicate that negative thoughts, such as catastrophising pain experience, predict long term adjustment to chronic pain irrespective of disease severity. Keefe et al (1990) examined the relationship between catastrophising and outcome in a longitudinal study of a heterogenous population of chronic pain patients. Results indicated that (controlling for a number of demographic variables including pain duration and disability support status) catastrophising scores at initial assessment were positively associated with pain intensity, disability and depression six months later. Similarly, a large body of work has indicated that physical and psychological improvement following intervention for chronic pain is associated with a reduction in catastrophising cognitions about pain (eg Turner and Clancey 1988).

2.3.4 Self Efficacy Beliefs and Pain

Bandura (1977) proposed that an individual's behaviour is in part a function of their belief in the ability to perform that behaviour (ie self efficacy beliefs). More recent evidence suggests that self efficacy beliefs influence not only how people behave but also how they feel and think (Bandura 1986). Self efficacy theory was developed within a framework of social learning theory and provides a mechanism through which people have overt influence over their own motivation and behaviour. Evidence supports the notion of self efficacy playing a significant role in diverse health behaviours such as smoking cessation relapse, control of eating and weight recovery from myocardial infarction and adherence to preventative health programmes (O'Leary 1985).

A number of studies have examined the nature of chronic pain patients self efficacy beliefs and their relationship with indices of active behaviour such as level of exercise. Dolce et al (1987) observed that both self efficacy beliefs regarding ability to engage in exercise and actual performance increased over the course of treatment in a behavioural chronic pain treatment programme. Kores et al (1990) drawing on Bandura's concept of self efficacy found that the strength of patient's self efficacy as measured by a five category rating scale significantly improved following attendance on a pain management programme. Those with high self efficacy scores at post-treatment rated themselves at follow-up as more improved, using less medication and engaging a substantially less downtime than those with low post treatment self efficacy scores

Research therefore indicates that cognitive dimensions of pain experience, mediate, predict and contribute to the experience and adjustment to chronic pain. Whilst the causal relationship between cognition and adjustment is largely unproved (in part because of methodological problems in research) evidence largely supports the role of cognitive dynamics of pain experience. As Jensen et al (1991) observe

> 'Patients who believe they can control their pain, who avoid catastrophising about their condition and who believe they are not severely disabled appear to function better than those who do not. Such beliefs may mediate some of the relationship between pain severity and adjustment'.

2.3.5 Cognitive Variables, Low Back Pain and Clinical Practice

Recent research has stressed the role of cognitive variables as instrumental in shaping the response to chronic low back pain (Rose et al 1993). A number of recurrent clinical themes emerge here. *Cognitive errors* include the following (a) spine degeneration; (b) deteriorating pathology; (c) a firm belief that movement is bad for clients and will make them worse. Clients often demonstrate an *external locus of control* as evidenced by cognitions relating to treatment. Here clients endorse a strict disease model of pain and believe responsibility for their health care is minimal. Great weight is attached to the role of powerful external agents such as doctors and the NHS. Fear of pain shapes many clients beliefs regarding their ability to perform various behaviours, ie *self efficacy*. In the writer's experience, fear of pain is central, yet dysfunctional. Many patients *catastrophise* their pain experience firmly believing 'they will always feel awful' that 'life is not worth living' and that past treatment has failed so 'why bother with anything else'. In view of such clinical and empirical findings much research has been directed towards establishing the value of cognitive treatments for chronic pain.

2.3.6 Cognitive Treatments for Chronic Pain

Cognitive strategies for the treatment of chronic pain assume primarily that individual appraisals mediate and shape the overall experience of painful episodes. Research in this area has been largely laboratory based where response to induced nociceptive stimuli have been studied. Work has focused on two primary areas. Firstly cognitive strategies that attempt to alter the appraisal of the painful situation and secondly those that focus attention on diversion from painful sensations (Turk et al 1987; Pearce 1983).

Turk (1975) further classified the attention-diversion procedure into categories based on the inclusion of imagery and the acknowledgement or attempt at improving intense sensations. Examples of cognitive strategies which have been used in pain management programs include imaginative attention, imaginative transformation of pain and content, mental distraction, somatization and refocusing attention on physical characteristics of the environment. For example imaginative inattention involves ignoring the intense stimulation of pain by adopting a mental image which is diametrically opposed to the experience of pain.

There is a large body of evidence that cognitive factors can influence experience of pain in acute or experimental situations (Tan 1982; Turner and Chapman 1982). Findings of cognitive influences in acute pain have been applied to chronic pain conditions (eg Sanders 1979). Most research which has evaluated the efficacy of cognitive interventions has focused on populations of headache sufferers (Bakal et al 1981; Holroyd et al 1977; Martin et al 1989) although a small number of studies have looked at other pain groups including burns patients (Wernick et al 1981) low back pain (Turner 1979) and a heterogenous group of chronic pain sufferers (Rybstein-Blynchick 1979).

A number of authors have reviewed research on cognitive interventions for chronic pain groups. Turk et al (1987) provide a summary of laboratory studies which have addressed the role of cognitions and pain report concluding that overall, research studies indicate 'equivocal results' which do not support the value of such interventions. Methodologically the majority of studies are problematic, often failing to include a no treatment comparison group and evaluating results by focusing primarily on pain tolerance and threshold, self report data and physiological dimensions of pain experience (eg Jaremko 1978). Whilst a number of studies found differences between an experimental group (which received training in a particular cognitive strategy) and a no treatment control group, an equal number of studies were unable to find such differences (Scott 1978).

One reason attributed to the inconsistent results found in such studies is the fact that control or non treatment groups may actually have employed cognitive strategies even though they were instructed not to do so. In addition evidence suggests that subjects often fail or are unable to use cognitive strategies which are part of the experimental design. Turk et al (1987) therefore conclude that the data

> 'do not convincingly establish the efficacy of any cognitive strategy relative to the strategies that subjects bring to experiments nor is there sufficient evidence to support the use of any one strategy compared to any other'.

A number of other reviews have examined the role of cognitive strategies in the treatment of chronic pain (Pearce 1983; Linton 1982, 1986). Pearce (1983) reviewed empirical studies using cognitive methods for the treatment of chronic pain conditions. Treatments were classified as being 'pain directed' or 'stress directed' according to the primary aim of therapy. Pain directed methods included techniques such as distraction, relabelling and attention switch. The primary aim of these types of intervention is to modify subjective experience of pain. Stress directed methods focus more on the patients management and control of stress and less on the direct effects of pain (Pearce and Irskine 1989; Pearce 1986).

A study by Levendusky and Pankratz (1975) illustrates the nature and quality of pure cognitive research in pain management studies. Drawing on a single case study design, a sixty five year old man, suffering with long standing abdominal pain was taught to relabel his pain sensations in terms that were meaningful to him - in this case pain was perceived as tight steel bands which he could loosen in order to help him relax. The positive conclusion of this study, the patient stopped taking medication and was no longer incapacitated by pain, is tempered in that no adequate pain assessment was made. Treatment was further confounded as the patient also received relaxation and behavioural target setting as part of his treatment.

Turner (1982) in one of the few reported controlled studies of cognitive intervention for chronic pain found that group cognitive therapy was of greater therapeutic value at one and a half year follow-up than relaxation therapy and a waiting list control condition.

A number of researchers have therefore concluded that the efficacy of cognitive interventions for the management of chronic pain have not been demonstrated. Such conclusions are a consequence of the paucity of research in this area. Pearce (1986) argues that such conclusions are

> 'based on the poverty of the outcome literature, rather than any demonstration of the inadequacy of cognitive techniques'

A similar point is made by Linton (1982, 1986), who argues that an overall lack of studies, in combination with poor experimental designs and confounding intervention programmes which include non cognitive treatments (eg relaxation) prevent firm conclusions about the value of such interventions. Consequently the vast majority of research has focused on the efficacy of multimodal, cognitive- behavioural interventions for the rehabilitation of chronic pain patients.

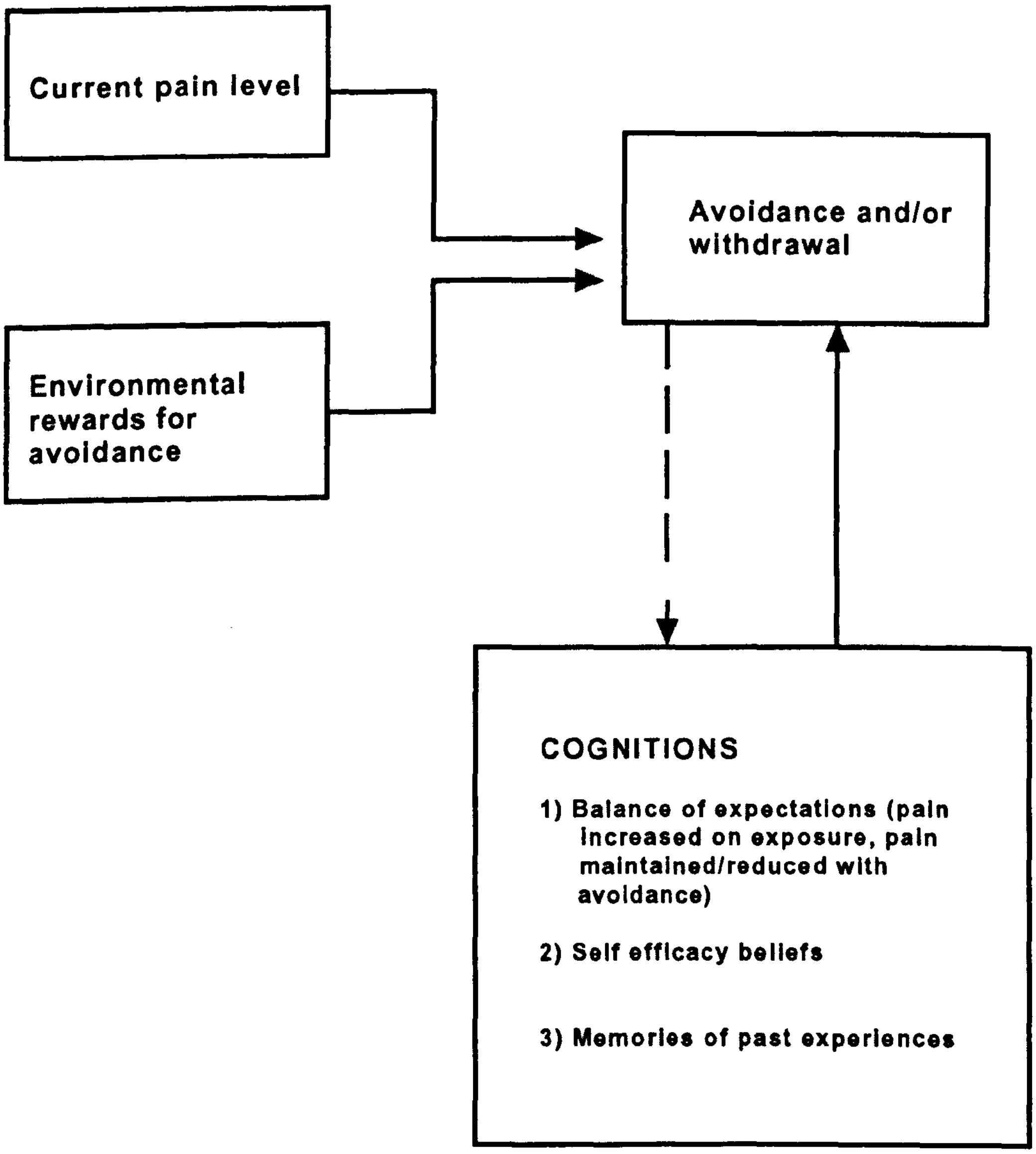
2.7 Cognitive Behavioural/Multimodal Interventions for Chronic Pain

Research indicates that pain is a multidimensional phenomenon involving sensory, affective, environmental and cognitive components (Deardoff et al 1991). Treatment should therefore reflect this complex experience. A cognitive behavioural perspective of pain stresses the role of beliefs regarding pain, meanings assigned to events and reactions to potent environmental contingencies.

The foundation of a cognitive-behavioural intervention is the aim of reducing individual feelings of hopelessness and helplessness thereby enabling the individual to obtain control over his/her life. Phillips (1987) has put forward a cognitive-behavioural model of avoidance behaviour, which emphasises the role of current pain levels and powerful environmental variables as well as cognitive dimensions of pain (which are reciprocally determined by individual behaviour). Such behaviour principally manifests itself as avoidance in chronic low back pain. (Figure 2.2).

Phillips (1987) hypothesises that pain behaviour is in part a function of individual cognitions which develop as pain persists. Such beliefs include memory of past aversive experiences, expectations of future pain increase, iatrogenic influences which shape ideas about pain and overall thoughts about one's capacity to control pain. Such beliefs are strengthened or weakened by subsequent behaviour. Hence behavioural features of pain sustain and are sustained by developing beliefs and cognitions. Such ideas

Figure 2.2 A model of chronic pain avoidance behaviour (Phillips 1987)



represent an expansion of strict behavioural models of pain (which do not address individual appraisals) and describe a learned helplessness appraisal of chronic low back pain.

Treatment should therefore be directed towards behavioural features of pain as well as changing patients beliefs and ideas about pain. In view of the dysfunctional and desynchronous relationship between pain report, thought and behaviour, such a combined intervention would appear to be of therapeutic value. These ideas are well established in work which has focused on fear and phobic responses. Evidence indicates that repeated exposure in imagination or in vivo has proved to be the most effective method of reducing phobic responses (Wilson 1984). Fear, avoidance behaviour and catastrophizing pain experience represent common clinical features of chronic low back pain patients. Exposure and non avoidance have indirect influences upon patients cognitive schema, as well as changing immediate behaviour. Direct cognitive intervention is also influential in changing patients ideas about pain and thereby influencing behaviour. Examples include modifying the subjective component of pain experience (for example, pain intensity, by way of imaginative transformation), challenging dysfunctional pain cognitions (Beck 1976; Turk and Rudy 1989) or reducing the frequency of painful episodes by stress management (Pearce 1986).

Turk and Rudy (1989) have therefore argued that a cognitive-behavioural perspective is based on five central assumptions: (1) individuals are active as opposed to passive processors of information; (2) thoughts (eg appraisals) both shape and are shaped by mood, affect, physiological processes and environmental factors; (3) behaviour is a reciprocal function of individual and environmental variables; (4) individuals can learn more adaptive ways of thinking, feeling and behaving; (5) individuals are active agents in their treatment and should be treated as such. The essence of such ideas are noted by Turk and Fernandez (1990)

> 'Cognitive behavioural interventions are active, time limited structured forms of treatment designed to help patients identify, reality test and correct maladaptive distorted conceptualisations and dysfunctional beliefs'.

Cognitive behavioural or multimodal treatments appear to be the most favoured intervention for chronic pain as evidenced by recent research (eg Nicholas et al 1992; Altmaier et al 1992; Peters et al 1992; Deardoff et al 1991; Spence 1991; Cott et al 1990; Maruta et al 1990; Kames et al 1990). Multimodal treatments have their roots in inpatient operant programmes and have developed mainly with the incorporation of cognitively based interventions. Behavioural therapy represents a major component of such programmes and thus the distinction between classic behavioural and cognitive-behavioural interventions may be somewhat arbitrary as many early pain management programmes include relaxation, biofeedback and supportive counselling (Swanson et al 1976).

A typical cognitive-behavioural intervention is described by Peters et al (1992) who incorporated the following components into treatment. Education, relaxation and EMG feedback, cognitive restructuring, a detailed exercise programme as well as counselling sessions and medication management and withdrawal. Main and Parker (1989) report on a cognitive-behavioural intervention for chronic low back pain patients similar in content to that described by Peters et al (1992). The aim of the programme was to increase mobility and fitness as well as decrease medication use, consulting and illness behaviour. Counselling sessions aimed to decrease anger and distress, enabling individuals to lead a more adaptive and proactive lifestyle which was consistent with their physical pathology. Results indicate that the programme was effective in terms of increasing fitness and mobility as well as decreasing depressive symptoms. Locus of control was also significantly enhanced; patients felt more able and personally responsible for the management of their pain. Methodologically however this study is problematic failing to include either a no treatment control condition or following patients up after treatment.

Results would therefore appear to indicate that cognitive-behavioural interventions for chronic pain patients are of therapeutic value in terms of physical and psychological functioning. However the most favoured method of evaluating multimodal treatment programmes have been studies which have compared the efficacy of such programmes with an alternative intervention which is non psychological in nature (eg Altmaier et al 1992; Deardoff et al 1991).

2.7.1 Comparative Studies of Pain Management Programmes

A large body of research, whilst supportive of the value of pain management intervention, has only recently addressed the comparative efficacy of pain programmes which include operant-behavioural, cognitive-behavioural, relaxation procedures and non psychological modes of treatment (Nicholas et al 1992, 1991; Henrich et al 1985; Kerns et al 1986; Turner and Clancey 1988). A summary of recent multimodal research studies is presented (Table 2.1).

Table 2.1 Summary of Pain Management Programmes, Designs, Outcomes, Measures and Treatment Outcome

Authors	N	Population	Intervention	Design	Outcome Measures	Follow Up	Results
Altmaier et al (1992)	45	Low Back Pain	Impatient rehabilitation programme v rehabilitation programme plus psychological support	Group outcome. No control procedure	Outcome on three levels 1. Disability 2. Self reported pain 3. Pain interference (WHYMPI)	6 months	Improvements in physical and psychological functioning. No differences in outcome between groups. 81% had returned to work or in job training at follow up. 57% employed at follow up.
Nicholas et al (1992)	20	Low Back Pain	Cognitive behavioural treatment plus relaxation v control (physiotherapy plus discussions) and attention control procedures	Group Outcome with control procedure	Measures of affective, cognitive distress (BDI, CSQ, PBQ) self efficacy beliefs, medication use, beliefs about health status.	6 months	Combined physiotherapy and cognitive behavioural treatment displayed significantly greater improvement than control on physical and psychological measures.

Authors	N	Population	Intervention	Design	Outcome Measures	Follow Up	Results
Peters et al (1992)	52	Diverse	Cognitive behavioural treatment v outpatient plus control conditions	Control multiple group outcome	1. BDI 2 McGill Pain Questionnaire 3. Sickness Impact Profile 4. GHQ 5. Pain Behavioural checklist (PBC)	9-18 months	Significant effects for inpatient group of pain ratings, pain behaviour, checklist and GHQ. Similar effects for outpatient group on GHQ.
Deardoff et al (1991)	53	Diverse	Physical occupational and psychological therapy, behavioural targets	Group comparison procedure with control conditions	1. Subjective pain and interference with daily functioning. 2. employment or vocational rehabilitation status. 3. Medication use. 4. use of home physical therapy, occupational therapy and relaxation programmes.	Approx. 10 months	Both groups showed significant increases in physical functioning, self report ratings and interference with activity. Return to work 48% for treatment group, 28% returned to vocational rehabilitation

Authors	N	Population	Intervention	Design	Outcome Measures	Follow Up	Results
Nicholas et al (1991)	58	Low Back pain	Four treatment conditions. Two control. Treatment conditions consist of 1. Cognitive treatment (with/without relaxation) 2. Behavioural treatment (with/without relaxation)	Multiple group outcome with control	1. Measures of affective distress (STAI, BDI) 2..Functional impairment 3. Medication use 4. Dysfunctional cognitions/ use of active coping strategies (CSQ)	6 and 12 months	For sample as a whole significant improvements found on all measures. At 12 month follow up - no difference found between groups
Cott et al (1990)	261	Diverse	Comparison between patients receiving field management (home based treatment) and office based treatment. Based on behaviourist/educational principles	Group comparison procedure without control condition	1. Disability a. Return to work b. Reduced limitations on work, exercises and daily living 2. Successful termination of treatment 3. Level of benefits	None Reported	Results indicate superior efficacy of field management v office management as defined by disability (84% v 61%).
Maruta et al (1990)	249	Diverse	Multimodal : operant behavioural, cognitive, behavioural, psychodynamic	Uncontrolled single group outcome	1. MMPI 2. BDI 3. McGill Pain Quest. 4. Visual Analogue Quest. 5. Chronic Illness Problem Inventory	6 months	Treatment group showed significant decrease in reported levels of pain, anxiety and depression.

Authors	**N**	**Population**	**Intervention**	**Design**	**Outcome Measures**	**Follow Up**	**Results**
Kames et al (1990)	22	Chronic Pelvic pain	Multimodal : eclectic psychological intervention acupuncture, use of antidepressants in 50% of cases.	Group outcome with control procedure	1. MMPI 2. BDI 3. Chronic Illness Problem Inventory 4. STAI 5. MPQ	6 months	Intervention group successful in reducing pain intensity, anxiety and depression. No effects for control group. Effects largely maintained at follow up.
Spence (1989)	45	Chronic occupational pain of upper limbs	Cognitive behavioural 1. Group Intervention 2. Individual Intervention	Two group outcome plus control	1. BDI 2. STAI 3. CSQ 4. MPQ 5. SIP 6. Daily self monitoring	6 months	Significant effects found for both conditions on measures of anxiety, depression, coping strategies and distress. No differences found between two intervention
Main & Parker (1989)	34	Low back pain	Multimodal - educational, cognitive behavioural in orientation	Uncon-trolled single group outcome	1. ZDI 2. MSPQ 3. Pain locus of control a. cognitive control b. pain responsibility 4. Inappropriate signs and symptoms (behavioural)	None reported	Significant changes in depression, locus of control and number of exercises. Nochanges in level of pain reported or somatic perception

Authors	**N**	**Population**	**Intervention**	**Design**	**Outcome Measures**	**Follow Up**	**Results**
Turner and Clancey (1988)	81	Low back pain	Comparative study 1. Operant behavioural versus 2. Cognitive behavioural	Two group outcome with no treatment control	1. Pain severity. The McGill Pain Questionnaire 2. Sickness Impact Profile 3. Cognitive Errors Quest. 4. Pain Behaviour Ratings 5. Pain Behaviour Checklist	6 and 12 month follow up	Significant effects for physical and disability. No significant differences at 12 month follow up between conditions
Melin and Linton (1988)	28	Diverse	1. Waiting list control 2. Regular treatment group 3. Behavioural group	Three group outcome	1. BDI 2. Visual Analogue Scale 3. Use of medications 4. leisure activities	20 months	Group No. 3 had superior outcome with regards pain/ activity at follow up. Positive effects of behavioural programme also maintained
McArthur et al (1987)	360	Low back pain	Multidisciplinary “ biofeedback, attribution based psychotherapy, counselling, behaviourly physical interventions	Uncontrolled single group outcome	1. Behavioural indices (eg endurance, strength, flexibility) 2. MMPI 3. WAIS	1 month	Significant behavioural, physical and psychosocial effects ‘successful’ outcome for no less than $^{4}/_{10}$ and as high as $^{9}/_{10}$ of total sample

Authors	**N**	**Population**	**Intervention**	**Design**	**Outcome Measure**	**Follow Up**	**Results**
Turner and Clancey (1986)	74	Low back pain	1. Waiting list control 2. Cognitive behavioural therapy 3. Operant behavioural therapy	3 group outcome	1. CSQ 2. pain diary 3. SIP 4. Beck D Inventory	None	Both treatments resulted in positive changes in coping strategies, depression
Beckman et al (1985)	50	Low back pain	Inpatient operant conditioning + education, relaxation, vocational counselling	Group outcome with quasi control group (no treatment)	Tennessee Self Concept Scale	1, 3, 6, months	Treated group - improvement in self concept, which was maintained at follow up
Large (1985)	4	Diverse	Outpatient programme relaxation, education, cognitive behavioural intervention	Controlled single group outcome	Attitudes measured by repertory grid technique : 1. Anxiety 2. BDI 3. EPQ 4. IBQ 5 Pain ratings	None	1. Improved attitudes 2. No change in pain, depression, anxiety or personality measures

Authors	**N**	**Population**	**Intervention**	**Design**	**Outcome Measures**	**Follow Up**	**Results**
Guck et al (1985)	40	Diverse	Inpatient operant conditioning, cognitive and group therapy	Two group outcome with no treatment control	1. Pain ratings 2. BDI	1-5 years	60% of treated group met criteria of success established by Roberts and Reinhardt (1980) - less depression, pain, increased activity
Henrich et al (1985)	33	Low back pain	1. Physical versus 2. Behaviour Therapy	Group outcome without control procedure	1. Physical abilities 2. Current physical functioning 3. Psychosocial functioning (MMPI)	1 year	General improvement for both groups (eg pain, psychological distress). A small number of specific treatment differences (eg Group 1 less distressed than Group 2)
Linton and Gotestam (1984)	15	Low back pain	1. Waiting list control 2. Outpatient relaxation 3. Operant programme	3 group outcome + single subject	Self monitoring pain, medications, anxiety, depression activities of daily living	None	Pain 2 > 1 Exercise 3 > 1 Activities 2, 3, > 1 Depression 2, 3 > 1

Author	N	Population	Intervention	Design	Outcome Measures	Follow Up	Results
Sanders (1983)	4	Low back pain	1. Functional pain behaviour analysis 2. Relaxation 3. Assertion training 4. Social reinforcement	Single subject, multiple baseline	1. Up time 2. Medication intake 3. Pain intensity	None	2 contributed most to improvement followed by group 4. Groups 1 and 3 - minimal improvement
Lutz et al (1983)	57	Low back pain	Inpatient operant conditioning, relaxation, counselling, education, physical therapy	Uncontrolled single group outcome	Self report questionnaire	None	All variables improved - pain - lifestyle - medication intake

Note

BDI = Beck Depression Inventory
GHQ = General Health Questionnaire
MMPI = Minnesota Multiphasic Personality Inventory
SIP = Sickness Impact Profile
CSQ = Coping Strategies Questionnaire
IBQ = Illness Behaviour Questionnaire
STAI = State Trait Anxiety Inventory
EPQ = Eysenck Personality Questionnaire
MPQ = McGill Pain Questionnaire
PBQ = Pain Beliefs Questionnaire

Turner (1982) found that a combination of cognitive-behavioural group treatment and a relaxation procedure to be of greater therapeutic value than a straightforward relaxation procedure for a hetrogenous group of chronic pain sufferers. Such evidence is contrasted with research on lower back pain patients which demonstrates that both an operant behavioural and a relaxation procedure are equally effective in terms of therapeutic outcome (Linton and Götestam 1984).

Kerns et al (1986) compared the efficacy of a cognitive-behavioural intervention with a behavioural programme and found that after a ten week treatment phase, patients in both conditions made significant behavioural and physical changes which were maintained at six month follow-up. However only patients in the cognitive-behavioural intervention improved on measures of pain severity and psychological distress. Such improvements were maintained at three month follow up but were only marginally significant at six month follow up.

Clearly the effectiveness or superiority of one particular mode of intervention has important implications in terms of service provision, financial cost and overall clinical value for patients. Turner and Clancey (1988) compared the efficacy of operant-behavioural versus cognitive-behavioural pain management procedures for eighty one mildly dysfunctional chronic low back pain patients. Results indicated that both interventions had a significant and positive impact upon physical and psychosocial functioning. Initial post treatment evaluation demonstrated that the behavioural intervention showed the greatest improvement although such differences disappeared at twelve months. Both groups maintained significant improvements in terms of reduced pain behaviours and cognitive errors as well as improved psychological functioning.

Nicholas et al (1991) in an attempt to overcome some of the methodological concerns of previous studies (such as the use of a more disabled patient population and the employment of widely used dependent measures) allocated fifty eight chronic low back pain patients to a number of experimental conditions in order to examine the relative efficacy of operant-behavioural and cognitive behavioural group treatments (either with or without relaxation) in relation to two control conditions. All conditions, including the control groups, received the same amount of physical therapy, back education and exercise programme, thereby controlling for therapist attention across conditions. Results indicated that the intervention groups showed improvement on a wide range of measures which included physical functioning, affective distress, dysfunctional pain cognitions, medication take-up and the adoption of positive coping strategies. Once again any significant differences between groups, as evidenced immediately post treatment (such as the initial superiority of psychology plus physiotherapy) were only weakly maintained and largely disappeared at six and twelve month follow up.

Linton et al (1985) drawing on mainly lower back pain patients compared a relaxation and operant-behavioural group with a group which only received the rehabilitation treatment. This consisted of a variety of therapeutic interventions involving psychologists, nurses and occupational therapists. Results indicated that the combined relaxation/operant group had a more superior outcome on a number of physical and psychological variables including reports of pain, distorted sleep patterns, activity levels and the use of medication. Follow up at approximately twenty months later confirmed the superior outcome of the combined treatment programme. Recent research has addressed the efficacy of pain management programmes in relation to alternative, non psychological treatments thereby establishing the overall 'pure' benefit of intervention (Nicholas et al 1991). The vast majority of research, which addresses therapeutic programmes for people with chronic pain, draw on waiting list controls as a means of evaluating research.

Such research is however constrained by the fact that a number of reported therapeutic gains could be attributed to non specific psychological factors such as therapist attention and the desirability to present oneself in a positive light. The employment of an alternative mode of treatment, non psychological in nature, would control for such factors in that both groups would receive equal therapist attention. For example Henrich et al (1985) found few differences between a behavioural group treatment and a back school/physical therapy programme, which consisted of information, back care strategies, relaxation training exercises and group discussion.

Turner et al (1990) report that group behaviour therapy in cohesion with aerobic exercises resulted in a superior outcome to that achieved by either behaviour therapy or exercises alone. At six and twelve months follow up, whilst all three groups had improved from initial assessment, there were no significant differences between the three groups on the major outcome variables.

Nicholas et al (1990) evaluated the efficacy of a cognitive-behavioural intervention, including relaxation training, in comparison with a non psychological control intervention. Both groups received the same level of physiotherapy, back education and exercise programme. The level of therapist attention was additionally controlled for. Results indicated that the combined psychological and physiotherapy condition had a superior level of outcome, both immediately following treatment and at six month follow up. Significant and positive effects at post treatment were found on measures which addressed self efficacy beliefs, medication use and adoption of active coping strategies.

Research which addresses the comparative efficacy of different modes of psychological intervention with non psychological therapeutic programmes is largely unequivocal. Whilst a number of studies have found that psychological intervention is of superior therapeutic value in comparison with non psychological programmes, other work has demonstrated that any differences between groups largely disappear at six or twelve month follow up (Nicholas et al 1992, 1991; Turner et al 1990; Henrich 1985).

A number of reasons can be attributed to the lack of equivocal findings in this area. One major problem concerns the client population. Such analysis indicates that patient samples are often very different, heterogeneous in terms of locus of pain, level of disability, referral source, litigation status and overall number engaged in full time work.

For example the subjects in the Nicholas et al (1991) study were homogeneous in terms of pain location and level of disability. This can be contrasted with work which has drawn on a less disabled, more physically active population, that is heterogeneous in terms of pain location (Kerns et al

1986; Phillips 1987). Patients in such studies have been variously described as 'mildly dysfunctional' (Turner and Clancey 1988) 'mildly disabled' (Turner et al 1990) or 'moderately disabled' (Nicholas et al (1991). In the Turner and Clancey (1988) study only 10% of the total sample were not working due to pain, whilst the vast majority - 73% were either working full or part time. In addition 7% were unemployed for reasons other than pain and 10% described themselves as homemakers. Hence only 10% of the total sample were sufficiently disabled by their pain that they were unable to work. The vast majority of the patient group were therefore employed, actively seeking paid work or engaged in full time unpaid work (eg homemaker). Such considerations are important when looking at reported therapeutic gains. The impact of chronic pain is a function of physical, behavioural and psychosocial indices. In the present study the cumulative effect of such variables would be less pronounced, given the physical and occupational status of the sample majority The effectiveness of such a study and the ability to make clinical comparisons are thus tempered when consideration of a more chronic, physically disabled and psychologically distressed population of patients is made (eg Nicholas et al 1992).

The recruitment of suitable clients is another problematic issue in comparative studies of pain management programmes. Clients are often self-referred, media generated volunteers (Turner and Clancey 1988) or individuals referred via pain clinics (Nicholas et al 1991, 1992). By contrast patients who are excluded are often those with unresolved compensation or disability claims as well as failed surgery patients (Phillips 1987).

Another difficulty in comparative research concerns the total length of treatment and associated clinical input. Treatment studies vary between five one hour sessions (Nicholas et al 1991), five ninety minute sessions (Turner 1982), ten one hour sessions (Kerns et al 1986), nine ninety minute sessions (Phillips 1987), eight two hour sessions (Turner and Clancey 1988) and a twenty hour programme (Henrich et al 1985).

Hence comparative research whilst addressing an important issue in relation to the efficacy of pain management programmes is largely equivocal in terms of outcome evaluation. The lack of clear conclusions can be attributed in part to a number of significant methodological shortcomings of studies in this area.

2.8 Detailed Reviews of Pain Management Programmes

Flor et al (1992) in a meta analysis of sixty five studies which address the efficacy of multidisciplinary pain management programmes argue that intervention is overall of therapeutic value to patients. At long term follow up, patients who had been treated in a pain clinic were 'functionally better' than 75% of a sample which was either untreated or exposed to conventional medical intervention. Such conclusions are supported by Malone and Strube (1988) who in a similar but larger (n=109) meta analysis review comment

> 'The overall pattern which emerges from this analysis supports a uniform efficacy of treatments despite differences in pain treated, dependent measures used, inpatient or outpatient status or patient characteristics'.

Flor et al (1992) found that conventional physical therapy was of greater therapeutic value than no treatment or medical intervention. Similarly, the most efficacious intervention was the multidisciplinary approach, which involves significant psychological and behavioural treatment dimensions. Detailed reviews therefore clearly support the role of multidisciplinary rehabilitation programmes. Studies are particularly effective when compared with effect sizes obtained from other disciplines. Malone and Strube (1988) found effect size estimates ranging from 0.46 to 2.74. This compares favourably with estimates of 0.21 to 0.83 obtained by Miller and Berman (1983) in a general review of cognitive behaviour therapies and -0.10 - 2.94 obtained in a review which evaluated the efficacy of psychotherapeutic intervention (Shapiro and Shapiro 1982).

Flor et al (1992) report similarly impressive pre/post treatment results which represent an overall effect size of 1.35, and thereby express an overall patient improvement of 56%. In addition, evidence indicates that intervention is effective not only in reducing functional disability, illness behaviour and indices of psychological distress but also in important social/economic parameters such as return to work or decreased use of health care resources. Flor et al (1992) found that individuals treated in a multidisciplinary pain clinic return to work twice as often as those in control or unimodal intervention programmes.

Evidence as to the effectiveness of such multimodal interventions may be attributed not so much to specific intrinsic treatment factors (which have yet to be demonstrated) but more as a composite of non specific variables which are mutually shared (Pearce 1986).

The overall value of multimodal interventions is noted by Flor et al (1992) who recognise the challenge facing therapists addressing this complex client population. The efficacy of any intervention must clearly consider and evaluate results in terms of the multifaceted nature of pain, the length of painful episodes and the qualitative impact upon physical and psychosocial functioning. Flor et al (1992) comment that although

> 'it might be argued that over one half of the patients treated in pain clinics do not return to work, the duration of pain (over seven years) the magnitude of the problem, extent of disability ...... and the tremendous cost of disability payments suggest that a 43% saving for this intractable pain population would save ..... billions of dollars not to mention the incalculable reduction in suffering of the patients and their families'.

CHAPTER 3

Implications of Research on Pain Management Programmes

3.1 Methodological considerations/problems

Methodological problems are evident in much of the research conducted on populations of chronic pain patients. Questions and concerns have long been raised regarding the heterogeneity of patient samples studied, particularly in terms of location of pain, severity of impairment and referral source. Other considerations which clearly temper research findings include the inadequacy or absence of control procedures, an overall lack of outcome measures which possess sound psychometric properties and a failure to evaluate rehabilitation programmes over extended periods of time (Flor et al 1992; Nicholas et al 1992; Keefe et al 1986; Trifiletti 1985; Turk and Rudy 1990).

The problems in using a heterogeneous group of patients become evident when consideration of both assessment and evaluation procedures for chronic pain is made. Those defined as suffering from chronic pain are often treated as a single group, which clearly and unwisely fosters the 'myth of homogeneity' (Fordyce 1976). Thus a very heterogeneous patient sample is perceived as having identical problems and thus equal opportunity for treatment gain. Important physical and psychosocial variables associated with patients disability are therefore overlooked in evaluating rehabilitation programmes. Patients by virtue of their chronicity are viewed as homogeneous. Keefe et al (1986) similarly note that the behavioural dynamics of a patient with chronic headaches are qualitatively different from those with phantom limb pain, resulting in differences being obscured when 'diagnoses are lumped together'.

A further methodological problem associated with research on chronic pain concerns the role of control groups which are rarely and inappropriately employed. Flor et al (1992) in their review of multidisciplinary pain management programmes argue that the majority of studies failed to use an adequate control condition. Keefe et al (1986) argue that whilst the prolonged history of pain, failed intervention and global disability of chronic pain patients provide a baseline against which the effects of an intervention programme can be compared, - the status and value of research demands that more effective control procedures are employed. Flor et al (1992) found that even when control groups were used, they were not suitable and typically consisted of a group who either dropped out of treatment, whose insurance company failed to provide cover, or patients who failed to enter, for reasons which are rarely stated. Turk and Rudy (1990) argue that the nature of referral patterns and allocation to treatment conditions represent 'neglected factors' in the literature of chronic pain, which 'somewhat humble' research findings.

There may be important differences between those who accept treatment and those who decline or are refused. Such factors Flor et al (1992) argue are likely to inflate effect size. Keefe et al (1986) note the ethical problems inherent in assigning patients with longstanding physical and psychosocial problems to a condition where they are either forced to wait or denied treatment - yet recognise that the status of research depends upon evaluating treatment effectively.

A further methodological consideration is the role of financial factors influencing whether patients are offered treatment. A number of studies have indicated that between 20% and 50% of patients who are offered a rehabilitation programme will be denied access because of an inability to secure third party insurance (eg Simmons et al 1988). Deardoff et al (1991) report that out of a total sample of 85 eligible participants, twenty three were unable to enter the programme due to lack of insurance cover. The reasons for refusal are rarely specified, yet as Turk and Rudy (1990) note, it is unlikely that accepted or refused groups can be classed as equivalent.

Patients who enter treatment programmes may display greater motivation, less dysfunctional behaviour and have an overall better prognosis. These factors may have influenced insurance company decisions to pay for pain rehabilitation services. Similarly individuals denied insurance cover may not only be less motivated, but also less willing to report that they have improved physically and psychologically following intervention. Such groups may perceive that future disability payments will be jeopardised (Turk and Rudy 1990). The role of third party insurance represents therefore a major influence on subject participation leading to non-comparable groups of refused-insurance subjects serving as controls.

Results of studies, particularly in the American literature, which employ such criteria, are clearly questionable as important physical and psychosocial differences may exist between such groups. Ultimately, rehabilitation programmes reject approximately 30% of suitable subjects because of financial considerations. A large body of research may therefore be reporting on a more motivated, middle class and less dysfunctional population of patients, with better long term prospects.

3.2 Group v individual treatment and pain management programmes

One particular feature of research on chronic pain is the overriding and exclusive preference for group therapy. Whilst a number of researchers offer detailed accounts of individual therapeutic work with pain patients (eg Halzman et al 1986; Turk et al 1987), to the authors' knowledge only one study has directly evaluated the relative effectiveness of group v individual treatment.

Spence (1989) compared the effectiveness of group v individual cognitive-behavioural therapy in the rehabilitation of chronic occupational limb pain. Forty-five subjects were randomly assigned to one of three conditions - individual, group and a waiting list control condition. Significant benefits were found for both therapeutic conditions on measures of anxiety, depression, coping strategies and distress caused by pain. Minimal differences were found between both treated groups - although patients rated individual therapy more favourably. The relative effectiveness of both forms of intervention however remain to be demonstrated, particularly for a homogeneous group of low back pain patients. Methodologically this study is problematic in that the majority of subjects continued to receive other medical treatments both during the programme and at follow up.

Yalom (1986) identified a number of therapeutic factors which are unique in a group environment. Positive dynamics of a group encounter include the instillation of hope, group cohesiveness, altruism, vicarious learning, guidance and identification. Thus, group therapy has historically provided a positive mode of addressing the psychopathology of chronic low back pain - namely depression, avoidance behaviour and catastrophising pain experience. For example, loneliness, despair and suicidal ideation are recurring clinical themes of patients with chronic low back pain. Whilst the efficacy of pain management programmes is well documented, the superiority of one treatment mode (eg behavioural v cognitive-behavioural) over another has yet to be demonstrated. Non specific factors have therefore been advocated as instrumental in fostering psychological change in patients. One very powerful, yet unexplored factor is the role of group dynamics.

Patients are both physically and psychologically disabled by their pain. The bonding, solidarity and ability to share and reflect upon common experiences with other equal members, represents 'a powerful reinforcer of change' (Erskine and Pearce 1989). Such factors may contribute to the positive outcome currently reported in the literature (eg Flor and Turk 1992). Timmermans and Sternbach (1974) note the 'interpersonal alienation' of chronic pain patients, eg feelings of hopelessness, anger and loss of control. Group treatment however provides a new and much needed source of social support that competes with the sense of alienation. As Erskine and Pearce (1989) note

> 'The positive impact of finding yourself 'in the same boat' as other people should not be underestimated ..... groups provide invaluable opportunities for modelling and observational learning'.

Interventions for chronic pain have expanded from a strict behavioural model embracing more cognitive and affective dynamics. Education, counselling and explicit cognitive therapy are common components of group therapy.

Yet, whilst treatment is increasingly focusing upon psychological consequences of chronic pain, research has yet to explore the powerful dynamics of the group.

Intuitively there are therefore a number of clinical reasons for considering pain groups as a primary technique for helping patients with chronic pain . Groups represent an economical mode of therapeutic resources, provide a means of 'ameliorating the abiding sense of social isolation and alienation' (Gentry and Owens 1981) and offer the patient credible feedback from other individuals with similar experiences.

Pain management programmes have exclusively focused upon group treatment as a therapeutic mode for addressing the psychopathology of chronic pain. Prima facia this has provided an effective and economic means of rehabilitating populations of disabled patients. The reported therapeutic gains are many (eg Peters et al 1992). However, the exact role and power of the group dynamic remains unexplored. In the author's experience 'the group' is a powerful and most effective therapeutic variable; empirical research has yet to address this question. However, this is a particularly pertinent consideration in view of the attendant psychological overlay which develops as a secondary consequence of chronic pain. It could be argued that many of the reported psychological gains which patients report are group specific, ie groups promote the concept of 'universality .... provide a forum for shared catharsis .... a place of learning and sharing specific skills and instill a new or renewed sense of hope' (Gentry and Owens 1981).

An alternative school of thought might hypothesise that individual treatment is a more effective treatment strategy - thereby enabling the therapist to individually taylor the programme. Additional advantages of individual therapy concerns clients with complex psyhchological problems for which the group situation may not be an appropriate environment. In the author's experience, a number of clients disprove of the group situation, have difficulty articulating their feelings in front of others and thus fail to contribute or complete the full programme (see review by Turk and Rudy 1990). Thus the relative efficacy of group v individual therapy remains unexplored. To the author's knowledge only Spence (1991) has directly explained the relative value of both types of intervention.

3.3 Psychometric instruments and chronic pain: reliability and validity

A major criticism of many psychological interventions for chronic pain patients concerns the role, psychometric properties and ultimate value of various outcome measures which are employed in order to asses and evaluate the efficacy of pain management programmes. Questions have been raised regarding the reliability and validity of a large number of widely used psychometric instruments (eg MMPI. McGill Pain Questionnaire, Eysenck Personality Questionnaire). Significant methodological questions concerning various instruments used in pain research involve poor discriminatory power, problems with statistical structure, ambiguities with clinical interpretation and overall level of sensitivity. This indicates that many questionnaires are used for purposes for which they were never originally designed and additionally have not been subjected to the kind of rigorous statistical appraisal which is demanded by any research inquiry (Main and Parker 1989; Main et al 1992; Ghadiali 1987).

The failure to adequately assess the true nature of psychological factors in chronic low back pain can be attributed to the historical distinction between organic and functional/psychogenic pain. Such a dichotomy indicates a division between individuals with true physical pathology and those with a major psychological overlay. Such individuals have been variously described as the 'dissatisfied back pain patient', 'malingerers' and 'low back losers' (Sternbach 1974; Slade 1984).

Thus as Turk and Rudy (1986) note pain patients are treated in a dichotomous fashion - there is either true pathology and the patients pain, subjective report and behaviour are consonant with pathological information. Alternatively, if organic findings are absent or the patients behaviour and affective response are dysfunctional then patients are catorgorised as 'psychogenic' - that is their pain is unreal and attributable to emotional dynamics.

The third edition (revised) of the Diagnostic and Statistical Manual III-R (1980) illustrates this approach in its classification of psychogenic pain as a somatoform disorder. The diagnostic criteria for this disorder include the following (a) no organic pathology; (b) the pain complaint is grossly in excess of what would be expected from the physical findings; (c) psychological factors are judged to be etiologically involved in this pain; and (d) pain enables the individual to avoid some activity that is noxious to him/her. The model makes a number of questionable and 'uncharitable' assumptions (Rose et al 1993), namely that medical evidence has to be present in order to determine that there is an organic basis for the pain and further, that current medical diagnostic procedures are capable of identifying all sources of pain reported by the patient. Yet as Waddell (1987) argues, in the majority of patients it is simply impossible to identify any pathological information:

> 'In most patients with low back pain .... we have neither the biomechanical nor pathological understanding to identify any definite pathologic process nor even the anatomic source of pain'.

Other research has tried to identify a 'pain prone personality' and to include it alongside the depressive disorders (eg Kane 1977). A number of authors have, in an attempt to understand the perplexing nature of chronic pain, offered a psychodynamic interpretation. Here the individual is perceived as being especially vulnerable to the effects of a physical stressor. According to such views chronic patients are perceived as predisposed to developing 'psychogenic' pain as a form of masked depression (Bluer and Heilbronn 1982). Yet empirical data in support of a pain prone individual is 'inadequate and largely non existent' (Turk and Rudy 1989).

The inability to objectively identify (in the majority of low back pain patients) pathological information, so that the exact aetiology can be identified has consequently led to the development and employment of many psychometric instruments which (a) were originally developed on psychiatric populations; (b) attempt to identify 'pain prone personalities'; and (c) fail to address and evaluate the true psychological dynamics of low back pain (eg Main et al 1992). Such observations have historically been based upon a disease centred model of pain, Déscartian views of mind and body and an overemphasis on the elimination of pain alone as the primary social role of the physician (World Health Organisation 1976).

Many psychiatric instruments (eg SCL-90) as well as psychiatrically orientated assessment procedures (eg Low Back Cognitive Distortion Scale - Lefebvre 1981) have been employed in an attempt to identify subgroups of pain patients. The MMPI is a case in point.

The Minnesota Multiphasic Personality Inventory or MMPI (Dahlstrom and Welsh 1960) which includes scales designed to measure hysteria and hypochondriasis, is designed to identify a more psychiatric and in this case 'neurotic' population of patients. Historically, in the literature on chronic pain, the 'neurotic triad' (depression, hysteria and hypochondriasis) identified by the MMPI has been interpreted as a sign of malingering, gross psychological overlay and evidence of minimal physical pathology. Evidence suggests that this is clearly not the case (eg Waddell 1987). Thus Main and Parker (1989) argue that while the MMPI is clearly capable of identifying a measure of distress in patients with low back pain, this may be no more than anxiety attributed to a learned helplessness situation involving physical and psychosocial disruption. The MMPI is a personality inventory; yet attempts to diagnose, describe and predict the low back 'personality' have not been successful (France and Krishnan 1985). As Main and Parker (1989) note on the overall clinical value of the MMPI for chronic pain groups:

> 'It lacks both diagnostic and descriptive accuracy ..... even the most elegant statistical superstructure is rendered vulnerable by weak theoretical foundations'.

The MMPI has been strongly criticised because of its length, lack of patient compliance, dated original norms and the overlap of physical symptoms that are part of chronic pain with some of the MMPI scales. Other personality questionnaires which have historically been employed as descriptive and diagnostic measures of low back pain include the Eysenck Personality Questionnaire or EPQ (Eysenck and Eysenck 1975), the Symptom Checklist - 90 or SCL 90 (Derogatis 1977) and the Illness Behaviour Questionnaire or IBQ (Pilowsky and Spence 1975). The latter instrument has undergone a series of revisions and expanded from a three scale index of hypochondrial beliefs (bodily preoccupation, disease conviction and disease phobia) to a comprehensive questionnaire which evaluates patients attitudes and beliefs about illness, perceptions of significant others and appraisals of current psychosocial situation (Pilowsky 1977). The scales have been widely used in studies of pain patients and in general appear to discriminate populations of pain patients from other groups. More recently, evidence has indicated that there are major statistical problems with the psychometric properties of the modified IBQ including reliability and validity, as well as its overall factor structure and predictive power (Main and Waddell 1987).

Self report questionnaires generally fall into two categories. Firstly, those which can be defined as general and attempt to standardise and replicate a broad clinical history; and secondly formally constructed, statistically valid psychometric questionnaires which attempt to measure specific aspects of illness, eg low back pain. Examples of heterogenous questionnaires include the MMPI, IBQ, General Health Questionnaire, EPQ and SCL-90.

Thus much research directed towards the evaluation of pain management programmes is severely constrained by the employment of heterogeneous questionnaires for purposes for which they were never originally intended - resulting in measures being insensitive and inappropriate as diagnostic, predictive and evaluative instruments. Problems with discriminatory power and overall psychometric properties have focused recent research on measures that reflect the true physical and psychosocial nature of chronic low back pain and have additionally been developed on low back pain groups (eg Main et al 1992).

A number of studies have identified the main clinical elements of low back disorders as pain, disability, physical impairment, psychological distress and illness behaviour (Waddell 1987; Rose et al 1993). Such findings have an intuitive appeal, recognising both the complex nature and interdependence of physical, social and psychological parameters of pain. Hence chronic low back pain patients are not 'malingerers' and the hysteria and hypochondriasis which early studies have identified, can be viewed as distress in response to increasing disability, restricted function and as each intervention fails, learned helplessness.

Therefore research which views pain and outcome in terms of strict physical and behavioural variables, eg level of disability, return to employment, level of pain reported and medication use are not identifying important psychological aspects of chronic pain (eg Peters et al 1992; Altmairer et al 1992).

3.4 Magnified illness behaviour and distress in chronic low back pain

For low back pain patients a set of inappropriate responses to physical examination have been identified and incorporated within an overall assessment of the patient (Waddell 1987). The rationale behind such responses is that the presence of certain clinical features during assessment (eg overreacting to examination and little pain free experience in the past year) can be viewed as a magnified or more emphatic presentation of a physical probelm (Fig. 1.4). Thus inappropirate signs and symptoms provide an overall assessment of magnified or abnormal illness behaviour. The utility of such variables in relation to physical dynamics of low back pain is noted by Main and Parker (1989)

> 'In general those signs and symptoms are vague, ill localised and lack the expected relationships with time, physical activity and anatomy. They are best interpreted as signs of distress'

A large body of work has indicated that two simple and easy to administer psychological measures, namely the Modified Somatic Perception Questionnaire or MSPQ (Main 1983) and the Zung Depression Inventory (Zung 1965) describe, predict and accurately identify the kind of psychological distress commonly experienced by individuals with chronic low back pain (eg Greenough et al 1992).

Research demonstrates that psychological 'distress' (ie MSPQ and Zung) and magnified illness presentation are of greater significance than objective physical impairment in explaining patients level of disability (Waddell and Main 1984). Distress and illness behaviour have been identified as valuable predictors in terms of outcome for low back surgery use of patient medication and increase with duration of physical symptoms, number of specialists seen and amount of previous unsuccessful treatment (Waddell et al 1986). The uses of such instruments are many. They are short, easy to administer and possess high levels of compliance among patients. More specific advantages include (a) possession of sound psychometric properties; (b) development on populations of low back pain patients; (c) recognition that psychological distress is a secondary consequence of a physical disorder; (d) high predictive power (eg Main et al 1992).

A recent study has compared the relative value and predictive power of various indices of chronic pain experience. Waddell and Main (1984) examined the role of certain personality traits (eg the MMPI, IBQ,) pain ratings as measured by a visual analogue scale and measures of psychological distress and illness behaviour in a study of two hundred patients with chronic low back pain. Results indicated that after controlling for objective physical impairment, distress (as measured by the Zung Depression Inventory and the MSPQ) and magnified illness behaviour were the most powerful predictors of patients self reported disability. Personality variables and self report measures of pain together accounted for only 12% of data variance.

More recently the MSPQ and Zung Depression Inventory have been developed into a 'distress and risk assessment' manual (DRAM) which is designed to identify levels of psychological distress in patients with low back pain. Main et al (1992) identified a four patient type classification system based on data from 567 subjects. Individuals were defined as normal, at risk of developing a psychological overlay and two clearly distressed groups (depressed v depressed/somatic). The DRAM was found to have high predictive power in terms of treatment outcome (eg surgery) and to be clinically sensitive with aspects of clinical history, level of disability and current drug usage.

Thus it would appear that simple and easy to administer psychological measures are of value in explaining patients current level of disability and in predicting the outcome of treatment. Historically the failure to recognise psychological indices has resulted from a myopic and unsatisfactory model for explaining chronic pain. Patients have been viewed as hysterical or malingering, yet evidence clearly indicates that (1) psychological factors often manifest themselves as a secondary consequence of a physical disorder, and (2) indices of distress (depressive and somatic symptoms) and magnified illness behaviour are key elements of chronic low back pain which develop as a consequence of prolonged disability, failed intervention and increasing learned helplessness. Such psychological and behavioural variables may be viewed as a response and desire to convince a doctor or the NHS that treatment is required. Such behaviours or symptoms are additionally shaped by learned patterns of behaviour, iatrogenic factors and successive ineffective consultations (Waddell 1987).

3.5 The prediction of treatment outcome

Research has often been directed towards identifying physical, demographic and psychological variables that will predict treatment outcome of patients in multidisciplinary pain programmes. This is a particularly pertinent issue in view of the costs (both direct and indirect) associated with low back pain. The current cost centred ethos of the NHS is a case in point and illustrates the need to develop more effective inclusion/exclusion criteria for pain programmes.

In view of the chronicity, history of failed interventions and disruptive psychosocial dynamics of low back pain, there would prima facia, appear to be a strong case in identifying the particular variables which successfully discriminate between 'failed' and 'successful' patients. A large body of evidence demonstrates that a number of factors both physical and psychological are associated with outcome of conservative treatments including age, sex, personal and physician ratings, distress, elevated MMPI scales, duration of disability, work satisfaction and stressful life events (eg Barnes et al 1989; Bradish et al 1988; Cairns et al 1984; Dworkin et al 1986; Waddell 1981; Gallagher et al 1989; Love and Peck 1987).

Waddell et al (1987) for example analysed how physical and psychological factors interacted to effect the outcome of surgery. Results indicated that the physical outcome of surgery depended almost exclusively on physical factors - accurate diagnosis, operative findings, surgical procedure and avoidance of complications. Psychological factors (eg distress) indirectly affected surgical outcome where decisions to operate were influenced more by illness behaviour and less by objective physical findings and pathology.

Evidence, however, on the relationship between chronicity of pain and behavioural/multidisciplinary treatment outcome is equivocal (see review by Turk and Rudy 1990) thus reflecting the complex dynamic of various chronic pain syndromes and the failure of research to identify which active features of pain management programmes are responsbile for therapeutic change (eg Pearce 1986; Nicholas et al 1991). For example, whilst a number of studies have found that patients with longer histories of pain were less likely to respond successfully (eg Swanson et al 1979), an equal number have found that patients with longer histories of pain had a better therapeutic outocome (eg Block et al 1980).

The effects of age on treatment outcome are similarly mixed. Age has been found to be both an effective predictor (Puder 1988) as well as making no difference in success of outcome (Thorn et al 1986). Employment status at the time of treatment has additionally produced equivocal results. Intuitively one could expect that those who are employed at the time of treatment would respond more favourably to intervention. A number of studies have reported such findings (eg Halardf 1989). Equally however, some have noted that unemployed persons have reported greater therapeutic gains than those who are working (eg Iavikowski et al 1986). Others still have found no effect for employment status (eg Moore et al 1984).

A great deal of evidence has focused on the predictive power of various psychological measures in order to identify 'success' and 'failure' profiles and thus the development of effective inclusion/exclusion criteria for pain management programmes (Hazard et al 1991). The role of psychological variables in predicting outcome has received much attention. A large body of work indicates that elevations on various dimensions of the MMPI, namely the hysteria and hypocondriasis scales are predictive of poor outcome following conservative intervention (eg Oostdam and Duivenvvooden 1983). However, an equal number of studies have found that psychological factors have not successfully predicted treatment outcome (eg Aronoff et al 1983). Particular attention has focused upon the role of litigaton and compensation status. The widely held, orthodox view, that active litigation and compensation status are powerful variables which shape dysfunctional outcome is increasingly being questioned and challenged (eg Guest and Drummond 1992). Thus the absence of a 'uniform' relationship between the compensation/litigation patient and poor outcome has led many authors to question the efficacy of excluding patients from rehabiliation programmes simply because of their litigation status (for example Mendelson 1992). Historically many treatment programmes have excluded (and thus denied) many such individuals because of the widely held perception that litigation and active dependency upon the Welfare State shaped unsuccessful outcome.

Research into the predictive value of demographic, physical and psychological characteristics associated with outcome following treatment for low back pain, remains equivocal. Turk and Rudy (1990) note that:

> 'The empirical support for psychological tests to identify psychological distress and personality characteristics associated with treatment outcome .... remains confused and unconvincing .... the question remains if and if so what criteria should be used to select patients who are appropriate candidates for specific treatment'.

The failure to identify which variables successfuly discriminate between good and poor outcome may result from a myopic understanding of the nature of chronic low back pain, an overemphasis upon a disease v psychogenic model of pain and the employment of psychometric instruments whose properties and overall clinical value have been the subject of much empirical inquiry (eg Main and Waddell 1987). Other possible causes include, the self selection or high motivation of subjects who actually participate in rehabilitation programmes. Similarly the vast majority of research has focused upon the prediction of outcome for treatments such as surgery (eg Waddell et al 1987). To the writer's knowledge there are few studies which have attempted to predict treatment outcome with subjects who participated on a pain management programme (eg Block et al 1980; Maruta et al 1979).

3.6 Focus of the current inquiry

Chronic low back pain is both complex and perplexing, dynamic in nature and destructive in its effects, an enormous economic burden and a major challenge facing the State, the NHS and clinicians responsible for the management of back pain. Research indicates that chronic disorders such as low back pain are a function of physical, psychological and wider, socioeconomc factors (Ford 1992).

A number of themes therefore emerge from the literature on pain management programme. Empirical evidence indicates that group therapy is the exclusive/preferred mode of intervention. The relative efficacy of group v individual interventions has, to this author's knowledge, yet to be examined. The current inquiry seeks therefore to examine this question, by directly comparing the relative therapeutic value of both interventions.

The rationale for addressing this question is as follows:

a. such an inquiry will examine whether the hypothesised although as yet unproven positive therapeutic effects of group therapy are empirically supported;
b. the efficacy of individual interventions and its effectiveness in addressing the psychopathology of low back pain;
c. the active therapeutic ingredients of pain management remain unproven; thus one important feature of the current study concerns an attempted examination of discriminating features of pain management programmes which shape therapeutic outcome;
d. whether group as opposed to individual treatment is a more effective environment for working with distressed clients;
e. the therapeutic efficacy of an explicit, focused cognitive behavioural intervention for a chronic cohort of low back pain patients.

Pain management programmes were developed in order to address iatrogenic disability, avoidance behaviour, psychological distress and dysfunctional perceptions concerning pain responsibility, future potential and specific cognitive errors. Research is largely supportive of such interventions. An examination of the literature here illustrates a number of important clinical empirical and methodological themes which the current inquiry seeks to address. These concern (a) the exclusive preference for group therapy; (b) specific methodological concerns which include the reliability, validity and clinical utility of various psychometric instruments employed in pain management research; (c) lack of follow up following intervention and the absence of appropriate control procedures; (d) narrow assessment/evalaution which is often based purely on patients report of, for example, pain behaviour, and (e) an inability of past research to identify active therapeutic ingredients or predict treatment outccome.

The current study therefore examines the efficacy of a cognitive behavioural intervention of approximately eighteen hours for a chronic cohort of low back pain patients. Group and individual modes of intervention are compared and evaluated. Appropriate control and follow up procedures are employed. Instruments which are widely viewed as reflecting the true affective dynamic of low back disability are included (Main et al 1992). A number of recently developed psychometric measures addressing specific cognitive appraisals are employed. These address: (a) self efficacy beliefs (Nicholas 1989); (b) pain locus of control appraisals (Main et al 1992), and (c) specific cognitive evaluations (Boston et al 1991). A biopsychosocial model of low back disability is employed in order to examine and predict outcome more effectively. Reliability and valididity of the main psychometric instruments are undertaken.

The current study thus seeks to examine the relative efficacy of both group and individual modes of treatment for chronic low back pain patients (based on cognitive behavioural principles). In addition the current inquiry seeks to enhance knowledge concerning the prediction of treatment outcome (based on a multimodal assessment model) and strengthen the methodological rigour of research in this area.

Stressful Life Events : The Fear Avoidance Model (Section D)

The Social Readjustment Scale (Holmes and Rahe 1967) was used to assess the amount of stress which clients had experienced during the past year. Each life event is weighted according to its level of impact upon the individual. Scale one represents the total number of life events which individuals had experienced in the previous year. Scale two is designed to assess the total weighted life stress score of each individual.

The Zung Depression Inventory

The Zung Depression Inventory is a twenty-three item self-report scale developed by Zung (1965) to measure the extent to which an individual is depressed. Depression is frequently identified as an attendant consequence of chronic low back pain (eg Sullivan et al 1992). Each statement is rated according to how much the subject agrees or disagrees with it on a four point scale (where 0 = rarely; 1 = some of the time; 2 = most of the time and 3 = all the time). The Zung Depression Inventory was included as a means of measuring current affective distress. The range of possible scores for this instrument is between 0 and 69. Sample items include statements such as 'morning is when I feel best' and 'I think others would be better off if I were dead'.

The Pain Self Efficacy Questionnaire

The Pain Self Efficacy Questionnaire (PSEQ) is a ten item self report inventory developed by Nicholas (1989) to assess a chronic pain patients' perception that s/he can perform various modes of behaviour and activities. Items include such statements as 'I can do most of the household chores despite the pain' and 'I can gradually increase my activity level despite the pain'. Subjects are asked to rate their belief or level of confidence in being able to perform each of the ten activities by selecting a number on a seven point scale where zero equals 'not at all confident' and six equals ' completely confident'. The PSEQ total score is calculated by summing the scores for each of the ten items, yielding a range of scores from zero to sixty. Evidence indicates that the PSEQ possesses sound psychometric properties in terms of a high degree of internal consistency (0.93) test retest reliability (0.79) and overall factor structure as measured by principal component analysis (Nicholas 1989).

The Pain Locus of Control Questionnaire

The Pain Locus of Control (PLC) Scale devised by Main et al (1992) represents an extension of the concept of internal v external locus of control originally developed by Rotter(1966). Main et al (1991) developed a specific PLC questionnaire and validated it with low back pain patients. The PLC contains fifteen items answered on a four point likert scale from 'very true' to 'very untrue'. Two scales were devised. The first scale measures pain responsibility (A), representing an index of how far patients personally feel responsible for the management of their pain. Sample items include 'I need medication to help control my pain' and 'I am responsible for how pain effects me'. The pain control scale (B), represents an assessment of how well patients believe they can control their own pain and includes items such as 'my pain will go away if I think pleasant thoughts'.

Scale A contains ten items. Scores range from zero (highly external) to thirty (highly internal). Scale B contains five items. Scores for this scale range from zero to fifteen. The PLC scale has been specifically validated on a population of low back pain patients. Recent evidence suggests that the scale possesses sound psychometric properties in terms of reliability and validity (Main et al 1991), is sensitive to change on a pain management programme (Main and Parker 1989) and is capable of predicting future consulting behaviour (Robson 1989; Main and Wood 1990).

The Pain Cognitions Questionnaire (PCQ)

Designed by Boston et al (1991) the PCQ is a four point, twenty four item questionnaire designed to assess patients cognitions on a number of specific dimensions. All subject responses are measured on a four point likert scale from 'not at all' to 'most of the time'. Scale one, active positive coping, contains ten items which assess the level of self assurance or distraction which clients employ. Items include 'reassuring yourself that you are generally not unhappy' and 'accepting the pain to an extent'. Scale two contains five items and measures the extent to which patients express feelings of hopelessness. Scale items involve subjects expressing their level of agreement with statements such as 'not wanting to wake up in the morning' and 'find yourself thinking you're given up all hope'. Scores range from zero to fifteen. Scale three assesses the level of helplessness which clients are currently experiencing. This is a four item scale which includes statements such as 'thinking there is no one to care about you and 'thinking that further treatment will cause more pain'. Items twenty one and twenty three reverse scored (see Appendix 1). Scores range from zero to twelve. Scale four represents the level of perceived support and trust which patients receive. Once again this is a four item scale with scores ranging from zero to twelve. Sample items include 'trusting the doctors and believe they can do something' and 'reminding yourself of the support and encouragement your get from others'.

The PCQ is a relatively new questionnaire. Evidence indicates that this instrument possesses sound psychometric properties in terms of both reliability and validity (Boston et al 1991). It was decided to include this instrument in the study because it provided an index of cognitive appraisals both positive and negative which research indicates are often employed by populations of chronic pain patients (Jensen et al 1991).

Roland and Morris Disability Index

Roland and Morris (1983) developed a twenty three item questionnaire, specifically on a population of low back patients in order to assess their level of disability or performance in comparison with a fit person. Sample items include 'I am unable to climb stairs' and 'I have to rest for long periods of time'. Subjects either agree or disagree with each statement. A total score ranging from zero to twenty three represents an overall index of the subjects self reported level of disability. Subjects exercise scores are recorded daily, allowing patients to measure over the week their performance on a range of aerobic/phyiscal exercises.

Predictions/Hypotheses on the Current Inquiry

The literature on pain management programmes clearly indicates that group therapy is the preferred mode of intervention, for reasons of (a) economy; (b) perceived therapeutic benefits of shared/group work; (c) a wealth of empirical evidence demonstrating the efficacy of such interventions; and (d) a dominant behavioural model which has attempted to treat/rehabilitate chronic groups of patients. Given the preferred behavioural model adopted by therapists, it has historically been viewed that group therapy would represent the most effective/economical model of intervention.

It is therefore predicted that whilst both interventions will improve the quality of patients' lives and the additional positive features of a shared group intervention will result in further physical and psychological gains over and above that achieved by an individual intervention.

The current study employs a number of new instruments which address specific cognitive features of low back pain - namely self efficacy beliefs (nicholas 1989), pain locus of control appraisals (Main 1992) and specific cognitive schema associated with low back disability (Boston et al 1991).

It is predicted therefore, that following intervention, patients will report that they are (a) more responsible both for the day to day management and control of their pain (locus of control appraisals); (b) that they believe and feel able to do more physically, socially and in terms of work/home (self efficacy); and (c) that patients are more realistic, less hopeless and feel more positive concerning their disability and current situation (pain cognitions questionnaire).

In addition, two simple, easy to administer instruments which possess sound psychometric properties having been developed on populations of low back pain patients are employed. Distress is widely held to be the most common psychological reaction to a disabling and persistent disability. Distress in low back disability is communicated many authors argue in the form of heightened somatic anxiety and depressive symptoms as pain continues and disability disrupts other spheres of the patient's life (Waddell et al 1993). The historical view that a complex set of personality traits rendering a particular patient cohort vulnerable to developing a chronic disorder is empirically unsupported (Main et al 1984).

In the current study it is predicted that the reported depressive symptoms can be understood from a cognitive behavioural learned helplessness perspective and that somatic anxiety represents a powerful mode of illness behaviour which develops as patients try to communicate their distress and disability. It is therefore predicted that following a structured intervention, patients will report both less depressive symptoms and feel less anxious somatically.

An examination of the literature on pain management programmes indicated that pain reduction is not a stated goal of the vast majority of programmes (eg Malone and Strube 1988). Such interventions are primarily concerned with issues such as iatrogenic disability, fear governed avoidance behaviour as well as important psychological questions associated with chronic physical problems, namely depression, somatic anxiety and cognitive ideas associated with pain.

It is therefore hypothesised that patients report of pain will not significantly reduce following intervention. With respect to patients level of self reported disability and medication usage it is predicted that following intervention, patients will be able to do more, report less disability as well as requiring less medication.

Return to work is clearly a most valuable therapeutic goal and demonstrated efficacy of any intervention programme designed to ameliorate distress and disability. Many rehabilitation programmes for chronic groups of patients have demonstrated significant return to work rates for chronic cohorts of low back pain patients. Such results have however been dependent upon an adequate supply of work being available in the local economy and state agencies agreeing to withhold patient's benefits should they refuse to participate/complete the pain programme (Mayer 1986).

In the context of such information it is predicted that whilst important physical and psychological changes will be made/maintained, the current inquiry will not demonstrate significant levels of return to work concerning clients who take part and complete the full course.

CHAPTER 4

Method

4.1 Study Aim

The aim of the study was to examine the efficacy of pain management programmes for patients suffering with chronic low back pain. One hundred and twenty patients in total were referred to the study. Twenty subjects (16%) were considered unsuitable for the programme and the remaining subjects (60%) were either unwilling to take part, lacked the appropriate level of motivation or failed to attend on the necessary date of either initial interview or course starting date. Suitable clients from the Merseyside Region were recruited. The following selection criteria, put forward by Ghadiali (1987) and Main and Parker (1989) were employed in order that the stated aims of the project would be fulfilled.

4.2 Client inclusion criteria onto the Pain Management Programme

1. Constant low back pain of greater than six months duration.
2. Physical pathology of a benign nature.
3. Medical intervention has been unsuccessful and in the opinion of the consultant, no further medical procedures are indicated.
4. All investigations have been completed.
5. In the opinion of the consultant, the client would benefit from a therapeutic programme based upon educational and psychological principles.

6. A degree of unnecessary disability (ie potentially recoverable function) or excessive pain preoccupation .
7. Patients are motivated to attend and feel able to embrace a clear open minded commitment to rehabilitation.

4.2.1 Clients were excluded from the programme for the following reasons

1. If they present with serious spinal pathology or major structural abnormalities.
2. Organic brain disease.
3. Severe psychiatric disturbance.
4. Poor physical condition which would prevent participation on the programme.
5. Aged less than 18 or greater than 60.

A number of local GP practices were approached and asked if they would like to participate on the programme. A meeting was subsequently arranged. This provided an opportunity for a member of the team to clearly outline; (a) the nature of the university research project; (b) the philosophy of the pain management programme; and (c) the established therapeutic gains such an approach is able to offer a population of chronic low back pain patients.

It was clearly explained that the programme was a combination of both research inquiry and therapeutic intervention: that the project was funded by the ARC and that such programmes had enabled many disabled clients to lead physically and psychologically more productive lifestyles - fitter, stronger, less dependent and distressed individuals.

A number of GP practices agreed to participate in the project. These were:

1. Princes Park Health Centre
2. Old Swan Health Centre
3. The Elms Medical Centre
4. Maghull Health Centre
5. Old Swan Health Centre

These were on the whole (bar Maghull) health centres located within the centre of Liverpool. GPs were therefore asked to refer chronic low back pain patients who had failed to respond to traditional medical interventions, who had been through all available therapeutic interventions and who, in the doctors' opinions, would benefit from a Pain Management Programme. Clients were referred directly to the university via a referral letter from the GP. A black book was additionally left in reception in which GPs left appropriate referrals, outlining important information relating to the clients pathology, history, psychological status and current situation.

Clients were additionally recruited via the Department of Orthopaedic Surgery at the Royal Liverpool University Hospital. Once again a member of the team spoke either individually or at meetings to Orthopaedic Consultants and Registrars outlining the nature of the project and the kind of clients who were suitable for inclusion onto the programme. Again, a referral diary was left in the clinic. This therefore provided an easy and accessible mode for staff to refer clients. Many were referred direct by letter. Regular contact at both GP surgeries and Orthopaedic outpatients was maintained in order that staff were continually aware of the project. Posters outlining the project were left for both staff and patients to observe. This provided an opportunity for a patient, who feeling s/he was suitable for the project to remind their GP or consultant/registrar of the programme. A number of clients were recruited in this way.

Each client was written to and informed that their GP/consultant had referred them to the Department of Clinical Psychology as they felt they may benefit from a pain management programme. Following referral, clients were then sent a letter inviting them to attend an informal interview at the university (Appendix 2). A map of the university campus was included.

In order that the efficacy of the programme could be properly evaluated it was necessary to assess clients both physically and psychologically at four distinct points in time. These were (Figure 4.1):

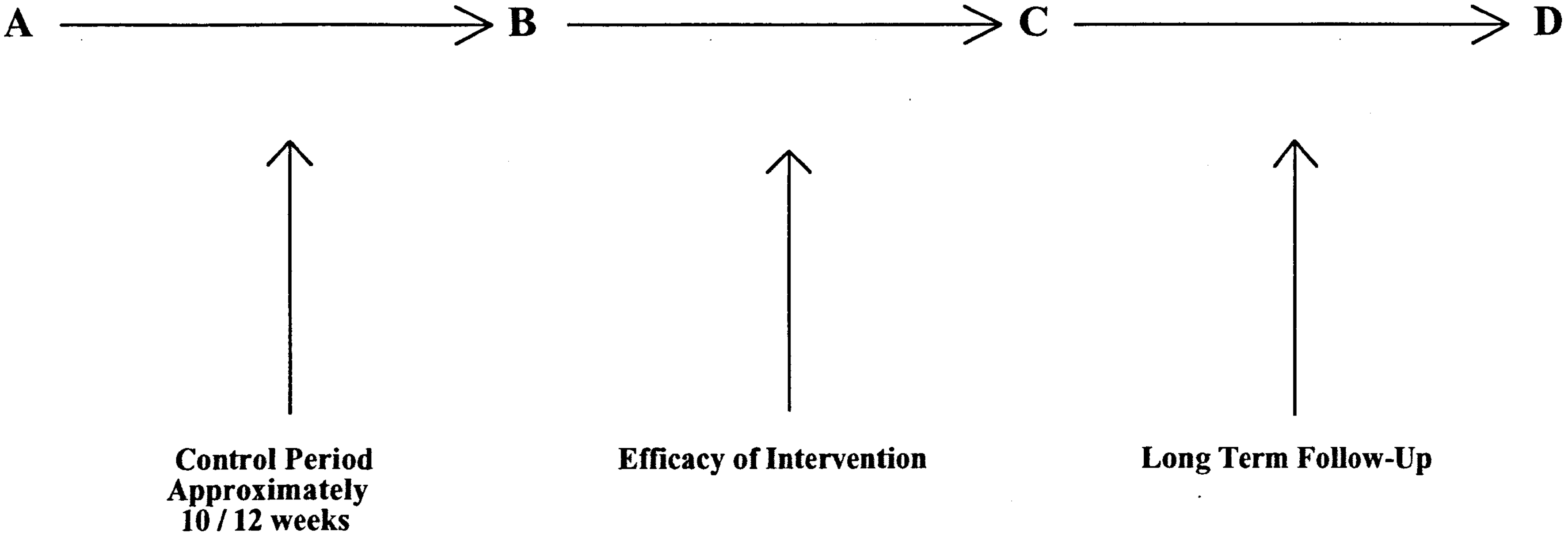
1. Initial interview - point A
2. Day of course (ten weeks later) - point B
3. Immediately following intervention - Point C
4. Six month follow-up - Point D

Each client considered suitable for the programme was asked to fill in four times a battery of questionnaires over a period of approximately eight months and at four separate intervals.

4.3. Initial Interview - Point A

Point A, represents the initial intervention. Clients considered suitable for the programme were asked to take away and fill in (independently) a series of questionnaires which illuminated physical, demographic and psychological information regarding the patients low back pain and current situation.

Figure 4.1 The University of Liverpool Pain Management Programme Desitgn of Research Programme



Assessment Point:

A = Initial Interview
B = Day of Programme
C = immediately Following Course
D = Six Month Follow Up

Clients were offered a date for the programme which was approximately 10-12 weeks following the initial assessment. Subjects were asked to return the questionnaire promptly (a stamped addressed envelope was provided).

4.3.1 Day of the course - Point B

The week before the course started, each client was written to and sent once again the same battery of questionnaires. Subjects were asked to fill in the questionnaire the night before the programme and to bring the completed form with them to the university. This letter served a number of functions. It reminded clients of the date and duration of the programme and it provided subjects with an opportunity to cancel their place. This situation would thereby enable the team members to replace the concerned client with another subject on the waiting list. Finally the letter reminded subjects of the need to bring slack clothing. The time period between initial assessment (A) and the day of the pain programme (B) was about 10-12 weeks. Subjects fill in a battery of questionnaires at both points. They received no therapeutic intervention during this time. Thus this period represents an effective control condition and a means of evaluating the efficacy of therapeutic interventions.

4.3.2 End of the pain management programme - point C

Immediately following the end of the programme, subjects are presented with a self stamped, addressed envelope which contains the relevant questionnaires necessary to evaluate the programmes efficacy. Subjects are once again asked to fill in the forms and duly return them.

4.3.3 Six month follow up - point D

Point D represents a follow up of each client at six months. Each client is written to and asked if they would, for the final time, complete the necessary questionnaires (see Appendix 1). A stamped addressed envelope is once again provided. Hence points A, B, C and D represent the four points of assessment. Point A - B comprise a control period; B - C the immediate effect of treatment, C - D six month follow up.

An important issue in the current study concerns the question of experimental control. Historically this has remained a neglected methodological issue in research on chronic low back pain. The rationale here is that because of the overall pattern of chronicity, concerning level of failed intervention, patients' reports of continual pain and longstanding psychosocial interference that control groups merely demonstrate that which is already known. Namely that patients report of pain, disability and psychological stress do not change radically over time. Control groups are thus seen as demonstrating or rather endorsing such perceptions.

An additional question over the employment of appropriate control groups involves ethical considerations in relation to clients who act as a waiting list control. Many authors question whether it is ethically justifiable that a distressed/disabled client should be placed on a waiting list in order that the methodological rigour of the study can be enhanced.

In the current study clients act as their own control. The period between the initial assessment intervention and the day of the course (representing approximately 10-12 weeks) is perceived as an adequate period in which physical and psychological features associated with low back disability can be monitored/evaluated. In addition such a procedure addresses important ethical considerations associated with waiting list controls and patients with chronic disorders.

4.4 The aims and philosophy of The University Pain Management Programme

1. Clients should understand more effectively the nature and dynamics of chronic low back pain.
2. Clients should have greater insight into the anatomy and physiology of pain as well as the role of psychosocial variables which both shape and reinforce disability.
3. Clients should understand that pain is not purely a physical/sensory experience.
4. The programme is designed to correct misunderstandings and unhelpful/incorrect ideas regarding pain as well as challenge dysfunctional cognitions regarding future possibilities and areas of therapeutic change.
5. The programme aims at behavioural change by (a) setting realistic goals; (b) increasing fitness and mobility; (c) decreasing illness behaviour and excessive disability; (d) decreasing dependency upon significant agents; these include the State, the NHS and powerful family members.
6. Fear represents a powerful factor in shaping much of the clients dysfunctional behavioural and psychological pathology. A common but important theme throughout the course is the reduction of patients excessive level of fear.

7. Another stated aim of the pain management programme is a reduction in the psychological distress (such as depression and somatic anxiety) which are attendant consequences of chronic low back pain (eg Main et al 1992).

It is ultimately hoped that the course will produce less dysfunctional individuals - both behaviourally and psychologically. The pain management programme works toward behavioural change so that clients are fitter, less dependent and less avoidant. Reduction of fear represents a strong goal.

4.5 Interview of clients at university

The selection and assessment of clients for the pain management programme was carried out in the Department of Clinical Psychology at the University of Liverpool. The purpose of this initial interview was to assess the client's suitability for the programme, pain history, motivation and insight into their pain problem. The assessment of each client is carried out by both team members (ie the author and a physiotherapist) and lasts approximately 1-1½ hours. Areas which are focused upon during this assessment include:

1. Identification and preliminary classification of the subject's pain problem (acute v chronic).
2. Classification of medical history and its impact on current expectations, goals and plans. Information is gathered regarding (a) the extent and nature of patient's past treatment; (b) whether the subject is currently receiving or in the future expecting further medical intervention; (c) the level and type of medication usage; and (d) client's current level of disability.

3. Qualification of the disruptiveness versus the benefits of the pain problem in social, marital and vocational areas. Information regarding both the social and behavioural dynamics of the individuals pain problems is made, as well as the client's drive or motivation to fully rehabilitate him/herself. Questions here relate to familial, social and financial reinforcement, avoidance issues and levels of dependency upon others (eg partners).
4. Differentiation of the situational from the sensory antecedents of pain. A classification is therefore made of particular times and situations in which pain intensity is at a minimum and maximum. Such information helps to discriminate more clearly between behavioural/psychological overlay of pain and strictly sensory dynamics.
5. An important feature of the assessment concerns the psychological status of each individual. An attempt is made to evaluate the clients pre-morbid and current levels of psychological functioning (depressive symptoms, suicidal ideation, somatic anxiety), disability (issues of reinforcement, both positive and negative are pertinent here) and cognitive appraisals. It is important to gauge the client's perceptions or cognitions regarding their situation and future. Questions are therefore directed towards clients' beliefs regarding (a) the ability to make positive life changes; (b) their personal responsibility for their pain; (c) specific beliefs regarding their pain; (d) whether or not they catastrophize their pain and current situation.

The interview is deliberately timed to last at least one hour. Many clients feel extremely anxious about being seen in a Department of Clinical Psychology and the assessment is therefore viewed as a positive opportunity to alaly their fears, correct misunderstandings and fully inform patients of the programmes philosophy and the potential benefits which such a procedure can offer. A decision regarding the patient's suitability for the programme is a composite of both the initial doctor's assessment, the interview at the university and the client's level of motivation and insight. A number of clients are extremely resistant to the notion of pain and psychology. They feel, having had a history of both failed treatment and frustrating consultations with their GP/Consultant that the medical profession believes they are imagining their pain or malingering. Many therefore see the programme as an attempt to address psychiatric or psychological disturbances. A number of clients are thus very angry, confused or resistant to the whole philosophy of psychology and pain.

It is therefore most important at this stage to inform clients of the reasons for their referral to a Department of Clinical Psychology and how the programme may be of therapeutic value. Firstly, it is necessary to illuminate and reflect back to the client, the complex, disruptive and psychosocial nature of prolonged pain, based upon the clients own personal history. Examples include (a) their level of failed intervention; (b) the associated reduction in their quality of their life; (c) how they are now unable to engage in many of the activities which used to give pleasure; and (d) the consequent distress which they currently experience. Such reflection and illumination helps illustrate the role and philosophy of pain management programmes. It is therefore clearly explained to each client that:

1. Pain management programmes represent a new, but beneficial, mode of treatment for patients with real physical problems. The programme is not suitable for people with psychiatric disturbances or those who are clearly malingering.
2. Their GP or consultant view the programme as an important adjunct to their treatment. The client should view the course as such and not as an opportunity for the medical profession to get rid of them.
3. The programmes are not designed to reduce pain. It is pointed out that the vast majority of patients still report the same level of pain following completion of the course. However, patients find that they are able to do far more, feel less distressed by pain, more positive about the future and less dependent upon GPs, medication and family members.
4. Fear is a central issue in the lives of people with chronic low back pain which shapes and regulates much of their thought and behaviour. The dual themes of educational and behavioural change are stressed and serve to illustrate both the range and depth of the programme. Commitment to the course and its demanding format is stressed. Clients are informed that they will be both intellectually and physically stretched.

Many clients express negative and fixed ideas regarding their potential and ability to change. Common statements include 'is it worth bothering?' 'my spine's crumbling, I can't exercise', and 'I've already been to physiotherapy and that hasn't worked'. Here it is pointed out that the exercise is gentle, that we know they are capable of gentle movement and that the programme is not an intensive course of physiotherapy.

The vast majority (whilst expressing a number of doubts) are very keen to participate in the programme. A date is agreed between therapist and client which is approximately ten weeks from the initial interview. Clients are informed that they will be seen in either a group or on an individual basis. Each client is shown the room where they will be seen. They are asked to call the university should their situation change. Finally, the research project and the clients co-operation with filling out a battery of questionnaires is stressed. Each client is informed that they would be required to fill out a series of questionnaires which enables people concerned with low back pain to understand more about its impact and consequences. Clients are presented with the questionnaires and asked to return them promptly.

The therapeutic programme was conducted in the following way. In order that a meaningful comparison between both conditions could be made it was predicted that at least three groups of eight patients compared with approximately twenty clients who had each received the programme individually would be required. In addition in order that an order effect could be minimized the treatment programme was organised so that both group and individual modes of intervention were interspersed from the start of the research programme until the end.

The order of treatment was thus as follows:

1. Group 1
2. First ten individuals treated
3. Groups 2 and 3
4. Second cohort of ten individuals treated

Patients were allocated to a particular intervention according to the time of referral and when they presented for interview at the university. Each client, so long as s/he fulfilled the required criteria for inclusion onto the programme was allocated to the treatment condition which the therapists were currently running. Consequently if a client was assessed around April 1991 it was explained that s/he would be seen in a group context. Patients were not offered an alternative option (of say individual therapy) to that currently in operation if it was felt that s/he may have profited from such an intervention.

The current inquiry seeks to address the relative efficacy of both group v individual mode of intervention for a chronic cohort of low back pain patients. An important question concerns whether group as opposed to individual therapy is of superior therapeutic value. The content of the intervention programme identifies that there are approximately eighteen hours of direct patient contacts, conducted over a five morning week from Monday-Friday. Each patient irrespective of either treatment modality receives exactly the same intervention over the same period, with the same therapists. Consequently, a client allocated to an individual condition receives exactly eighteen hours intervention over the Monday-Friday period. S/he will be required to attend every day from 9 am onwards. Whilst this is a most time consuming exercise, to the writer's knowledge, this method represents the most effective, methodologically sound mode of addressing the efficacy of both interventions.

4.6 Treatment programme

The pain management programme is based upon cognitive behavioural principles and recognises that for a specific population of clients behavioural, affective and cognitive variables are important dynamics in the experience and adjustment to chronic pain. The treatment programme is based upon the work of Fordyce (1976) and Turk et al (1987) who both describe in detail therapeutic interventions designed to address attendant behavioural and psychological issues in chronic pain. The programme is run by two therapists (a graduate psychologist and a research physiotherapist) in the basement of the Whelan Building at the University of Liverpool.

The programme functions, as a discrete unit, within an academic and clinical environment. Both large and small rooms are available depending upon the mode of intervention being undertaken, ie group or individual. Rooms are suitable for group discussion, relaxation, exercise and teaching. There is ample space, in the larger roms, for at least ten clients to work and be seen. All treatment takes place within one specific room. Educational equipment such as blackboards, charts, noticeboards and videos are available. Exercise apparatus (eg bikes) and mats are also used and available. Clients are responsible for all their own catering arrangements during their time on the programme.

Attendance on all aspects of the programme is considered compulsory and the full programme is to be followed. Clients who refuse to participate in specific features of the programme are not offered places. Thus it is not acceptable for patients to attend for small parts of the programme or to pick and choose which activities to participate in.

The programme in group format is designed to treat eight patients at a time. Ten are offered places. However in the author's experience, a small number of clients either fail or are unable to attend the programme. In addition, a number of clients fail to complete the full course. Individuals are randomly assigned to either group or individual format. Clients are not placed in a particular condition on the basis of their suitability or compatibility with a specific treatment modality.

The programme is conducted on an outpatient basis. Patients are expected to continue with normal living arrangements whilst attending the course. A reflection and examination of the home environment and its role in shaping responses to chronic pain is an important feature of the programme. In addition, the home environment (where the successful transfer and practice of new skills is vital) provides an opportunity for clients to both test new modes of behaviour and reflect upon past dysfunctional coping strategies. Such reflections often promote lively and valuable discussions/forums.

4.7 Staff requirements

The University Pain Management Programme is conducted by two therapists - a graduate psychologist and a research physiotherapist - who are responsible for all aspects of the programme including project design, recruitment and assessment of clients, therapeutic intervention, evaluation of treatment and follow up. A large number of GPs and orthopaedic registrars/consultants are responsible for referral of suitable clients. Close liaison is maintained with referral agents so that an individual's progress can be monitored. Administrative support is provided by a part-time secretary.

An outline of the weekly programme is shown in Table 4.1. This provides a framework for the different therapeutic interventions. All clients, irrespective of treatment modality, receive the same level of intervention. Clearly because of the nature of group v individual therapy, some aspects of treatment will differ - principally the discussion groups and its associated effects. The programme lasts about eighteen hours and takes place between Monday-Friday (9.30am - 1.00pm). In the author's experience, it was necessary to rigidly adhere to this timetable as there were numerous occasions when the programme could have overrun due to animated discussions.

Table 4.1 Timetable for 18 hours University Pain Management Programme

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9.30	Introductions	Pathology lecture/ discussion	Pain lecture/ discussion	Psychological aspects of pain (2)	Programme review
10.30	Anatomy lecture	Exercise/swimming	Exercise/swimming	Exercise/swimming	Exercise
11.45	Exercise	Cognitive Therapy (1) (Group Therapy)	Psychological aspects of pain (1)	Cognitive Therapy (2)	
12.30	Target setting	Target setting			Target Setting
1.15	Relaxation	Relaxation	Relaxation	Relaxation	Relaxation

Description of contents of programme: introductory sessions

The programme starts with a brief introductory session. This serves a number of positive functions, particularly in the group format where a large number of individuals (who don't know anything about each other and what will happen over the coming week) often feel vulnerable and unsure of both the programme and other patients and the therapists.

Each therapist introduces themselves and gives brief details of their role on the programme and experience to date. This additionally provides an opportunity for common misunderstandings and false beliefs to be cleared up. These include client's perception that the course is designed to get rid of their pain, that they will not be able to exercise and that this programme is for people with principally psychological problems. A most important point to stress is the client's commitment to the course. Therapists explain that the benefits which patients report and the associated change in attitudes towards pain are largely experienced towards the end of the week. It is therefore stressed that clients should not be too optimistic in the initial phase of the course. Each client is then encouraged to introduce themselves to the group (the same process is carried out in the individual condition). Here clients introduce themselves to both therapists and give a brief description of their history of pain, their past treatment and a summary of how pain has disrupted their lives and reduced the quality of daily living. This session is an effective method of reducing the initial anxiety of clients and helps to foster a bond (in group situations particularly) between members and therapists.

Education

A most important feature of the programme is the lectures which the patients receive. This is not however a didactic exercise. Clients are actively encouraged to participate, to ask questions, challenge therapist's knowledge and relate information to their own personal experience. The educational sessions take place each day. Lack of knowledge, incorrect information, dysfunctional levels of fear and a tendency to catastrophize both current situation and future potential are common clinical themes which have received much empirical support (eg Rose et al 1992; Main and Parker 1989; Pearce 1986). These sessions are therefore directed towards establishing more realistic attributions regarding pain and fear as well deepen knowledge regarding low back pain.

Sessions on the Pain Management Programme are directed towards the physical, psychological and social dynamics of pain experience. In the author's experience, fear of the implications of back pain and the associated unwillingness to remain functionally active is as much a result of misinformation concerning the nature of the underlying pathology as an aversion to pain itself (Rose et al 1992). One particular source of misinformation concerns the client's diagnosis and their conception of the pathological changes which have and will take place. The majority of clients catastrophize their disability. It is therefore appropriate to inform clients of both the anatomy and pathology of pain experience. The idea of these sessions is for patients to be aware that their pathology is benign, of the difficulties in making an accurate clinical diagnosis and the consequences of employing incorrect clinical labels (eg degeneration, arthritis, crumbling spine).

Patients thus become more conscious of the relationship between incomplete/inaccurate knowledge, fear and behaviour.

Anatomy of Low Back Pain

Clients receive an informal lecture regarding the structure and function of the normal vertebral column and its associated soft tissue. Particular attention is paid to the lumbar spine. Clients are actively encouraged to contribute and relate their own experiences. A plastic skeleton is passed round in order to illuminate the discussions.

Pathology of Pain

An overview of clients' current perceptions concerning the aetiology of low back pain is presented. This session includes a simple description of the inflammatory process, the formation of scar tissue, the effects of these changes and their consequences on long term mobility. A discussion of how the pursuit of total pain relief (via successive but ineffective treatments and consultations) can reinforce disability is conducted.

Specific points which are stressed here include, (1) how repeated failure of health professionals to relieve symptoms leads to increasing levels of disappointment and frustration, which in themselves constitute psychological distress; (2) how the repeated failure to relieve pain, in the context of a firm belief that benign low back pain is curable - often leads to the mistaken view that pain is a symptom of some serious condition. It is therefore extremely important to stress that the clients' pain is real, but of a benign nature, that it is futile (and can reinforce disability) to continually seek pain relief and that various diagnoses are often incorrect, helping collectively to shape/ reinforce disability. The acceptance by clients that further medical intervention is pointless and will not be offered is considered by the author to be of primary importance and a necessary prerequisite for rehabilitation. Once again the reduction of fear represents a primary goal.

Pain Theory

The principles of specificity theory and nociception are presented. Clients are encouraged to offer criticism of this theory based upon their own experience, thereby highlighting the complex, psychosocial dynamics of pain. This introduction to pain theory leads to a description of the Pain Gate Theory (Melzack and Wall 1965) which further reinforces the role and interdependence of physiological and psychological variables. Clients are informed how the gating mechanism can be opened and closed (eg opened/increased pain sensation by excessive avoidance behaviour, negative affect, catastrophizing pain experience; gate closed/reduced pain sensation by exercise, positive life style, realistic appraisals regarding pain).

Such a model recognises therefore that clients are in many ways responsible for both their life and to some extent experience of pain. The aim of this particular session is for clients to recognise that pain is complex and additionally - that far from being reactive to pain and dependent upon other agents for its relief, patients are actively responsible for their own lives, as evidenced by empirical research (ie the Gate Control Theory of Pain).

The Psychological Nature of Pain

The complex psychosocial nature of pain is expanded upon. A structured exercise programme is an important feature of the majority of pain management programmes and represents an effective method of enhancing cognitive and behavioural change. The majority of clients are however very frightened of exercise, having been taught that pain represents a warning signal to stop moving and having been prescribed rest as a mode of reducing pain. Thus it is important to highlight the physical and psychological benefits which empirical research has long demonstrated are available from exercise programmes (eg Salmon 1992).

A necessary distinction between acute and chronic pain is also made - illustrating that whilst avoidance behaviour and rest are appropriate in acute stages of pain, this is not the case with long term chronic episodes, where autonomic changes have habituated and healing has taken place. These are particularly important points to make, as exercise represents one of the most feared experiences for chronic low back pain patients.

A model of chronic pain is then presented and illustrated how pain disrupts, interferes and reduces the quality of life experience. Once again, particular reference is made to psychosocial influences which include reductions in motivation, increased avoidance behaviour, affective and cognitive consequences (eg depression, catastrophizing pain experience) and often dysfunctional family relationships. Such experiences have received much empirical support and in the author's experience are supported by clinical experience (eg Turk et al 1987).

An important point to stress here is how such psychosocial influences shape and actually reinforce physical disability, (eg long periods of rest, increased immobility, etc). and thereby increases fear which has negative consequences for cognition, affect and motivation. Once again this interdependence between physical and psychosocial parameters of pain experience is stressed. Clients are actively encouraged to contribute their own experience and knowledge, which increases both therapists' and other clients' (in group situation) understanding of pain. Exercise and behavioural change is therefore advocated as an effective way of enhancing affect and motivation as well as fostering more realistic appraisals regarding pain. A list of negative/unhelpful cognitions which clients employ in order to avoid exercising along with more realistic alternatives are presented. Examples include 'I don't want to', 'its too late the damage is done' and 'I can't be bothered'. More realistic interpretations include for example 'whether or not I don't want to, I have to realise that moving and becoming fitter and more active is better for me in the long run'. Clients are thus being asked to think more psychologically and recognise clearly how they are responsible for their rehabilitation.

Cognitive Therapy Sessions

A wealth of evidence has stressed the important role which cognitive variables play in shaping the overall experience of pain (eg Jensen et al 1991). These particular sessions (two in total) therefore focus upon specific cognitions about pain, their dysfunctional consequences and stresses more helpful/realistic views of clients current situation. Once again the active role of cognition in shaping disability is stressed. Clients are introduced to Becks

(1967) ideas on depression, as well as the concept of learned helplessness (Abrahamson et al 1978) in order to recognise that negative views of the self, world and future are implicitly involved in the development and experience of affective distress.

Both clinical experience and empirical research have enabled the authors to develop a long list of widely held, but dysfunctional cognitions which many chronic low back pain patients endorse and firmly believe (examples include 'rest is all that helps'; 'I'm getting worse'; 'my spine's crumbling'; 'I'll never work again'; 'I can't be bothered doing anything'. Each cognition is presented to clients. For example the question 'When will I be better again' is something which many clients ruminate over constantly. Clients are actively encouraged to think hard about the negative effects of asking questions which have no definite answer.

With all the listed, commonly held cognitions, clients are firstly asked to (1) consider the evidence of a particular thought; (2) examine alternative, more realistic modes of thinking; (3) question the advantages and disadvantages of thinking in a particular way; and (4) think of, in view of all the available evidence, what possible errors of thinking they may be making. This session therefore recognises and reinforces the relationship between physical and psychological dynamics of pain experience, actively encouraging patients to be more conscious of the way in which they appraise information and helps foster more positive ways for clients to appraise low back pain and its consequences. Once again this particular session is nondidactic - client contribution is actively encouraged.

Concluding Sessions

The final session represents an appraisal and reflection upon the week. All the information in cohesion with the behavioural work carried out are synthesised together in a coherent and meaningful manner. Specific emphasis here is therefore attached to clients remembering the main points of the programme.

1. Pain is complex and dynamic. Pain disrupts and reduces the quality of life in many ways.
2. Pain is a composite of physical and psychosocial variables.
3. Pain involves changes in behaviour, motivation, affect, cognition and social/family relationships.
4. Avoidance behaviour, negative affect, concrete beliefs and fear of pain represent significant issues.
5. Exercise has important physical and psychological benefits.
6. Rehabilitation is dependent upon individual drive and personal coping strategies as opposed to the role of powerful others.
7. Target setting represents an effective mode of behavioural change. Clients do have potential.

Thus the major points of the course are reiterated. Clients are asked to reflect upon the week, their experiences on the course and whether the programme has been of therapeutic value. The vast majority of clients at this stage report positive gains, whether physical, psychological or both. A number raise the important point of relapse. Here is is explained that clients need to be as independent as possible and that, in the clinicians experience, the gains which patients report are maintained at follow-up.

Target Setting

One aspect of positive behavioural change is new goal and target setting. The therapists actively collaborate with the clients in establishing specific, appropriate new goals. New goals involving work, activity, leisure, and interpersonal relationships are identified. Daily feedback sessions are included in the timetable so that clients are able to discuss their progress with the group and if necessary modify their targets.

Relaxation Therapy

The relaxation component of the programme is presented in terms of a coping strategy which clients can adopt when their back pain is severe. The physiological aspects of stress are also presented to clients and the role of relaxation in stress management is outlined. The contribution to pain experience by muscle tension is also stressed and relaxation is offered as a means of interrupting the vicious cycle of pain-muscle tension-increased pain.

Exercise Therapy

The exercise package consists of twelve exercises designed to increase the ranges of spinal and peripheral movement, strengthen spinal and abdominal muscles and increase cardiovascular fitness (all patients are 'screened' by the GP or Orthopaedic Surgeon).

Clients are instructed to do as many of each exercise as they can in two minutes and record the number of each exercise on a pre-printed sheet. Clients are encouraged to improve on the previous days exercise score. In the author's experience most clients double their overall score over five days and many increase the score by a factor of four or five.

The exercise package is presented to the clients in terms of increased joint mobility and fitness in behavioural terms. Clients are advised that their pain may remain the same over the programme but they will be fitter and less frightened. Clients also use the university swimming pool twice during the week. Aerobic exercises are designed to further increase fitness and mobility. Clients are supervised and accompanied in the pool by one therapist.

An operant conditioning approach is maintained throughout the programme. During exercise periods activity is rewarded by praise and attention. Pain complaints and illness behaviour are ignored throughout the programme.

4.6 The University Low Back Pain Questionnaire

Each client considered suitable for the Pain Management Programme was handed a booklet (see Appendix 1) containing a battery of questionnaires. In order that the stated aims of the project could be fulfilled information relating to the Fear Avoidance Model of Exaggerated Pain Perception (Lethem et al 1983) as well as important physical, psychological and socioeconomic information identified with low back pain were collected. The first page of the booklet explained the nature of the project and how the Pain management programme was funded by research and charitable organisations who were interested in understanding as much as possible about low back pain.

Section A : Demographic and Socioeconomic Information

Section A concentrated on demographic information and socioenconomic status. Questions therefore focused upon clients age, sex, marital status and referral source. Socioeconomic information was additionally recorded. Each client was asked to identify their current work status. There are essentially two groups here. Those whose work status is not affected by their back pain (full time, part time work, unemployed and those whose is - eg medically retired, not working because of low back pain, only able to work part time because of pain). Clients are asked to indicate how much time in total they have lost as a consequence of low back pain - ranging from none at all, right up to 10-20 years. This is an eleven item scale bracketed in one yearly intervals (eg between 1-2 years last work). Subjects indicate how much time they have lost in the past twelve months, specifically through low back pain (between 0-12 months) and whether or not they are receiving any form of state benefit as a consequence of their disability. There are four possible options here: (a) no benefits received; (b) invalidity; (c) mobility or (d) disability benefit. Social class concerns which social group clients belong to identified by The Registrar General's Classification of Employment (1989). There are five groups : (1) Professional; (2) Intermediate Occupations; (3) Skilled; (4) Partly Skilled; (5) Unskilled occupations. Many clients have not worked for a number of years and the answers which subjects offer is based upon their last recorded occupations.

Section B : Low Back Pain History

Section B focused upon clients history of low back pain. Patients were asked to rate the severity of their first attack of low back pain (on a visual analogue scale of 1-10, 1 represented no pain at all and 10 equalled the worst pain imaginable). Information concerning the date of clients worst attack of low back pain and the length of current episode was also recorded on an ordinal scale of 1 to 5, representing less than one year, between 1-2 years, 2-3 years, 4-5 years and greater than 5 years.

Clients were also asked to rate their current level of pain, once again on a scale of 1-10. Further information concentrated on the main physical problems of each client (ie back pain, back pain plus leg back or root pain) how pain started (gradual v sudden) whether or not clients were actively involved in litigation proceedings (past, present, planned or none envisaged) and the number of (a) operations; (b) back injuries; and (c) specialists clients had seen through low back pain. Clients were asked to identify (yes/no) and state the nature of any additional medical problems they were currently experiencing.

In order to assess the level and type of intervention which clients had experienced, information was gathered regarding various treatments and perceptions of effectiveness. Patients therefore indicated whether or not they had had the following treatments: enforced bedrest, physiotherapy, exercise, traction, corset, injections, manipulations, TNS machine, acupuncture and osteopath. The value of such interventions was evaluated on a four point ordinal scale (1 = no effect; 2 = some effect; 3 = great deal; 4 = excellent). Medication usage was assessed by asking clients whether or not they were taking various types of medications (narcotics, anti-inflammatories, anti-depressants, tranquillisers and night sedatives), how often (regularly, irregularly, exceeding maximum), their level of effectiveness (1 = no effect; 2 = little; 3 = very effective) and whether or not there were consequent side effects and if pain still continued after useage (yes/no).

The Fear Avoidance Model of Exaggerated Pain Perception

Pain History (Setion A)

Information is gathered on clients perceptions of the most painful 'internal', 'external' and 'accidental' pain they have experienced in the past. On a linear scale between 1 and 10 (where 1 = no pain and 10 represents the worst pain imaginable) each individual was asked to identify those pains which they have experienced and their level of intensity.

The pain history section has three subscales. Scale 1 consists of eight externally produced pains, for example, joint sprains and operations. Scale 2 is concerned with internally produced pains such as headache and toothache, whilst scale three focuses upon sixteen common examples of accidental pain. Examples here include cutting one's finger with a knife, being scalded by hot water or being stung by a bee.

The highest score from each section provided an index of subjects' experience and perceptions of painful situations. Information is thus available on three pain experience variables. Highest ever external pain, highest ever internal pain and highest ever accidental pain.

Pain Coping Strategies : Fear Avoidance Model (Section B)

In order to provide an index of avoidance v confrontation, subjects were asked to indicate their behavioural response to a number of commonly experienced painful situations, eg headaches, sore throats. Subjects were asked what they did in response to the worst experience of each pain in the past. Strategies are identified as either positive (ie active) or negative, (ie passive). Four options are available. Active strategies involve the client either (a) ignoring pain and carrying on; (b) taking physical exercise. Passive strategies involved (c) rest and (d) taking medication in response to pain. An overall measure of pain coping style is derived by computing the overall percentage of coping strategies which are active

$$\text{o/o of Active Strategies} = \frac{\text{Number of active strategies x 100}}{\text{Number of Active + Number of Passive}}$$

Personality Dimensions of the Fear Avoidance Model (Section C)

The Modified Somatic Pain Questionnaire (MSPQ) developed by Main (1983) was used to assess the personality dimension of the Fear Avoidance Model. The MSPQ was designed specifically on a population of low back pain patients to measure heightened autonomic or somatic awareness. The MSPQ is seen as an index of somatic anxiety and is generally understood as a form of distress. The MSPQ is a thirteen item, four point scale. Subjects are asked to indicate the extent to which they have experienced a number of physical symptoms, eg hot flushes, dizziness and nausea in the past week ranging from ‘not at all’ (no experience of symptoms in past week) ‘ some of the time’ ‘most of the time’ and ‘couldn’t have been worse’. The range of possible scores is between zero and thirty nine. The MSPQ has been shown to differentiate between acute low back pain patients and chronic low back pain patients as well as correlating with various measures of psychopathology, eg the MMPI. The evidence for the statistical properties of the MSPQ indicate that it is both a reliable and valid instrument (Main 1983). More recent research has demonstrated that the MSPQ possesses high levels of internal consistency and concurrent validity (Deyo et al 1989).

Stressful Life Events : The Fear Avoidance Model (Section D)

The Social Readjustment Scale (Holmes and Rahe 1967) was used to assess the amount of stress which clients had experienced during the past year. Each life event is weighted according to its level of impact upon the individual. Scale one represents the total number of life events which individuals had experienced in the previous year. Scale two is designed to assess the total weighted life stress score of each individual.

The Zung Depression Inventory

The Zung Depression Inventory is a twenty-three item self-report scale developed by Zung (1965) to measure the extent to which an individual is depressed. Depression is frequently identified as an attendant consequence of chronic low back pain (eg Sullivan et al 1992). Each statement is rated according to how much the subject agrees or disagrees with it on a four point scale (where 0 = rarely; 1 = some of the time; 2 = most of the time and 3 = all the time). The Zung Depression Inventory was included as a means of measuring current affective distress. The range of possible scores for this instrument is between 0 and 69. Sample items include statements such as 'morning is when I feel best' and 'I think others would be better off if I were dead'.

The Pain Self Efficacy Questionnaire

The Pain Self Efficacy Questionnaire (PSEQ) is a ten item self report inventory developed by Nicholas (1989) to assess a chronic pain patients' perception that s/he can perform various modes of behaviour and activities. Items include such statements as 'I can do most of the household chores despite the pain' and 'I can gradually increase my activity level despite the pain'. Subjects are asked to rate their belief or level of confidence in being able to perform each of the ten activities by selecting a number on a seven point scale where zero equals 'not at all confident' and six equals ' completely confident'. The PSEQ total score is calculated by summing the scores for each of the ten items, yielding a range of scores from zero to sixty. Evidence indicates that the PSEQ possesses sound psychometric properties in terms of a high degree of internal consistency (0.93) test retest reliability (0.79) and overall factor structure as measured by principal component analysis (Nicholas 1989).

The Pain Locus of Control Questionnaire

The Pain Locus of Control (PLC) Scale devised by Main et al (1992) represents an extension of the concept of internal v external locus of control originally developed by Rotter(1966). Main et al (1991) developed a specific PLC questionnaire and validated it with low back pain patients. The PLC contains fifteen items answered on a four point likert scale from 'very true' to 'very untrue'. Two scales were devised. The first scale measures pain responsibility (A), representing an index of how far patients personally feel responsible for the management of their pain. Sample items include 'I need medication to help control my pain' and 'I am responsible for how pain effects me'. The pain control scale (B), represents an assessment of how well patients believe they can control their own pain and includes items such as 'my pain will go away if I think pleasant thoughts'.

Scale A contains ten items. Scores range from zero (highly external) to thirty (highly internal). Scale B contains five items. Scores for this scale range from zero to fifteen. The PLC scale has been specifically validated on a population of low back pain patients. Recent evidence suggests that the scale possesses sound psychometric properties in terms of reliability and validity (Main et al 1991), is sensitive to change on a pain management programme (Main and Parker 1989) and is capable of predicting future consulting behaviour (Robson 1989; Main and Wood 1990).

The Pain Cognitions Questionnaire (PCQ)

Designed by Boston et al (1991) the PCQ is a four point, twenty four item questionnaire designed to assess patients cognitions on a number of specific dimensions. All subject responses are measured on a four point likert scale from 'not at all' to 'most of the time'. Scale one, active positive coping, contains ten items which assess the level of self assurance or distraction which clients employ. Items include 'reassuring yourself that you are generally not unhappy' and 'accepting the pain to an extent'. Scale two contains five items and measures the extent to which patients express feelings of hopelessness. Scale items involve subjects expressing their level of agreement with statements such as 'not wanting to wake up in the morning' and 'find yourself thinking you're given up all hope'. Scores range from zero to fifteen. Scale three assesses the level of helplessness which clients are currently experiencing. This is a four item scale which includes statements such as 'thinking there is no one to care about you and 'thinking that further treatment will cause more pain'. Items twenty one and twenty three reverse scored (see Appendix 1). Scores range from zero to twelve. Scale four represents the level of perceived support and trust which patients receive. Once again this is a four item scale with scores ranging from zero to twelve. Sample items include 'trusting the doctors and believe they can do something' and 'reminding yourself of the support and encouragement your get from others'.

The PCQ is a relatively new questionnaire. Evidence indicates that this instrument possesses sound psychometric properties in terms of both reliability and validity (Boston et al 1991). It was decided to include this instrument in the study because it provided an index of cognitive appraisals both positive and negative which research indicates are often employed by populations of chronic pain patients (Jensen et al 1991).

Roland and Morris Disability Index

Roland and Morris (1983) developed a twenty three item questionnaire, specifically on a population of low back patients in order to assess their level of disability or performance in comparison with a fit person. Sample items include 'I am unable to climb stairs' and 'I have to rest for long periods of time'. Subjects either agree or disagree with each statement. A total score ranging from zero to twenty three represents an overall index of the subjects self reported level of disability. Subjects exercise scores are recorded daily, allowing patients to measure over the week their performance on a range of aerobic/phyiscal exercises.

Predictions/Hypotheses on the Current Inquiry

The literature on pain management programmes clearly indicates that group therapy is the preferred mode of intervention, for reasons of (a) economy; (b) perceived therapeutic benefits of shared/group work; (c) a wealth of empirical evidence demonstrating the efficacy of such interventions; and (d) a dominant behavioural model which has attempted to treat/rehabilitate chronic groups of patients. Given the preferred behavioural model adopted by therapists, it has historically been viewed that group therapy would represent the most effective/economical model of intervention.

It is therefore predicted that whilst both interventions will improve the quality of patients' lives and the additional positive features of a shared group intervention will result in further physical and psychological gains over and above that achieved by an individual intervention.

The current study employs a number of new instruments which address specific cognitive features of low back pain - namely self efficacy beliefs (nicholas 1989), pain locus of control appraisals (Main 1992) and specific cognitive schema associated with low back disability (Boston et al 1991).

It is predicted therefore, that following intervention, patients will report that they are (a) more responsible both for the day to day management and control of their pain (locus of control appraisals); (b) that they believe and feel able to do more physically, socially and in terms of work/home (self efficacy); and (c) that patients are more realistic, less hopeless and feel more positive concerning their disability and current situation (pain cognitions questionnaire).

In addition, two simple, easy to administer instruments which possess sound psychometric properties having been developed on populations of low back pain patients are employed. Distress is widely held to be the most common psychological reaction to a disabling and persistent disability. Distress in low back disability is communicated many authors argue in the form of heightened somatic anxiety and depressive symptoms as pain continues and disability disrupts other spheres of the patient's life (Waddell et al 1993). The historical view that a complex set of personality traits rendering a particular patient cohort vulnerable to developing a chronic disorder is empirically unsupported (Main et al 1984).

In the current study it is predicted that the reported depressive symptoms can be understood from a cognitive behavioural learned helplessness perspective and that somatic anxiety represents a powerful mode of illness behaviour which develops as patients try to communicate their distress and disability. It is therefore predicted that following a structured intervention, patients will report both less depressive symptoms and feel less anxious somatically.

An examination of the literature on pain management programmes indicated that pain reduction is not a stated goal of the vast majority of programmes (eg Malone and Strube 1988). Such interventions are primarily concerned with issues such as iatrogenic disability, fear governed avoidance behaviour as well as important psychological questions associated with chronic physical problems, namely depression, somatic anxiety and cognitive ideas associated with pain.

It is therefore hypothesised that patients report of pain will not significantly reduce following intervention. With respect to patients level of self reported disability and medication usage it is predicted that following intervention, patients will be able to do more, report less disability as well as requiring less medication.

Return to work is clearly a most valuable therapeutic goal and demonstrated efficacy of any intervention programme designed to ameliorate distress and disability. Many rehabilitation programmes for chronic groups of patients have demonstrated significant return to work rates for chronic cohorts of low back pain patients. Such results have however been dependent upon an adequate supply of work being available in the local economy and state agencies agreeing to withhold patient's benefits should they refuse to participate/complete the pain programme (Mayer 1986).

In the context of such information it is predicted that whilst important physical and psychological changes will be made/maintained, the current inquiry will not demonstrate significant levels of return to work concerning clients who take part and complete the full course.

CHAPTER 5

Description of patient sample: Physical, demographic and psychological data

5.1 Introduction

The following tables (5.1 - 5.7) provide a summary of the total patient sample as well as a comparative description of both group and individual patient cohorts. Demographic, occupational and psychological status as well as information concerning pain history, medication usage and experience/perception of various, traditional interventions is provided. The reliability of the dependent variables used in the current study (test retest, internal consistency) and concurrent validity of three cognitive measures is additionally undertaken (Tables 5.8 and 5.9).

Table 5.1 Initial description of patients attending Liverpool University Pain Management Programme Demographic and occupational Data

Age	**Total Group:**	**Mean**	40.4	**SD**	11.3	**Range**	18-60
	Groups:	**Mean**	39.4	**SD**	11.3	**Range**	21-57
	Individual:	**Mean**	41.5	**SD**	11.6	**Range**	18-60

	Total		**Group**		**Individual**	
	N	%	N	%	N	%
Gender						
Male	18	(43%)	11	(50%)	7	(35%)
Female	24	(57%)	11	50%)	13	(65%)
Marital Status						
Single	16	(32%)	9	(41%)	7	35%)
Married	36	(63%)	13	(59)	13	(65%)
Referral Source						
G.P.	16	(38%)	8	(36%)	8	(40%)
Orthopaedics	36	(62%)	14	(64%)	12	(60%)
Work Status						
At normal work	6	(14%)	4	(18%)	2	(10%)
Not working (due to low back pain)	34	(81%)	16	(73%)	18	(90%)
Unemployed (not low back pain)	2	(5%)	2	(9%)	0	(N/A)

Table 5.2 Initial description of patients attending Liverpool University Pain Management Programme Demographic and occupational Data

WORK LOSS	**Total Sample (n=42)**		**Groups (n=22)**		**Individual (n=20)**	
	N	**%**	**N**	**%**	**N**	**%**
Total						
None	3	7	3	14	0	
6 months-1 year	9	21	3	14	6	30
1-2 years	6	14	5	23	1	5
2-4 years	16	38	7	32	9	45
4-7 years	3	7	3	14	0	
8 years +	5	12	1	5	4	20
Mean (Years)	**5.1**		**4.6**		**5.6**	
Last 12 months						
None	4	9	4	18	0	
LE 6/52	2	5	1	5	1	5
7 - 13/52	2	5	1	5	1	5
14 - 26/52	1	3	0	N/A	1	5
27 - 52/52	33	78	17	77	16	80
Mean (Months)	**9.2**		**8.5**		**9.95**	
Benefit Status						
None	21	50	14	64	7	35
Sickness	4	9	2	9	2	10
Invalidity	14	33	5	23	9	45
Disability	3	8	1	4	2	10
Social Class						
Professional	3	7	3	14	0	
Intermediate	5	12	2	9	3	15
Skilled	17	41	9	41	8	40
Partly Skilled	13	31	6	27	7	35
Unskilled	4	9	2	9	2	10

Table 5.3 **Initial description of patients attending Liverpool University Pain Management Programme. Low Back Pain History**

	Total Group		Groups		Individuals	
	N.	%	N	%	N	%
Pain Onset						
Gradual	21	50	10	45	11	55
Sudden	21	50	12	55	9	45
Major Problems						
LBP alone	17	40	7	32	10	50
LBP + leg pain	24	57	15	68	9	45
Root pain	1	3	N/A	N/A	1	5
Litigation	9	21	4	18	5	20
Pain Pattern						
Continuous/Steady	37	88	18	82	19	95
Rhythmic/Periodic	5	10	4	18	1	5
Brief/Intermitant	N/A	N/A	N/A	N/A	N/A	N/A
Pain Description						
Mild	3	7	1	5	2	10
Moderate	17	41	10	45	7	35
Severe	19	45	10	45	9	45
Very Severe	3	7	1	5	2	10

Table 5.4 **Initial description of patients attending Liverpool University Pain Management Programme. Low Back Pain History**

Patients Report of Pain and Disability

	Total Group				Groups				Individuals			
	N.	Mean	SD	Range	N	Mean	SD	Range	N	Mean	SD	Range
Pain Severity												
Level of Disability	42	16.00	4.93	0.23	22	16.00	4.94	7.23	20	16.05	5.09	0.23
Current Pain Report (1-10)	42	6.14	2.18	3.10	22	6.04	2.23	3.10	20	6.75	2.17	3.10
First Episode of Pain (1-10)	42	8.5	2.00	2.10	22	8.93	1.98	3.10	20	8.11	2.01	2.10
Worst Episode of Pain (1-10)	42	9.9	2.01	7.10	22	10.00	2.01	8.10	20	9.9	8.9	7.10
Additional Medical Problems												
No. of back injuries		1.4	1.4	0-4		1.8	1.3	0-4		1.0	0.9	1-2
No. of specialists seen		3.5	1.8	0-8		3.9	1.9	6-8		3.2	1.5	0-5

Table 5.5 Initial description of patients attending Liverpool University Pain Management Programme Psychological Data

	TOTAL SAMPLE			GROUPS			INDIVIDUALS		
Psychological Status	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**
Depression (Zung)	33.95	8.60	18-50	33.63	6.65	18-50	34.30	10.51	18-50
MSPQ	8.73	5.80	0-26	7.72	6.23	0-26	9.85	5.25	2-18
SelfEfficacy	26.64	10.65	8-52	26.36	12.40	9-52	26.95	8.65	8-44
Locus of Control (Responsibility)	6.78	4.55	0-16	5.54	4.92	0-16	8.21	3.72	2-13
Locus of Control Strategies)	6.34	3.45	0-16	5.40	3.26	0-13	7.42	3.43	3-16
Pain Cognitions Questionnaire									
a. Active Positive Coping	2.64	0.58	1.6-3.81	2.57	0.56	1.6-3.8	2.71	0.60	1.6-3.8
b Hoplessness	2.25	0.65	1.0-3.8	1.83	0.62	1.0-3.5	1.90	0.75	1.0-3.5
c. Helplessness	1.86	0.68	1.0-3.5	2.31	0.72	1.2-3.8	2.17	0.55	1.0-3.2
d. Support/Trust	2.12	0.44	1.0-3.0	2.13	0.44	1.0-3.0	2.11	0.44	1.0-2.7
Fear Avoidance Model									
Internal Pain	8.73	1.87	2-10	8.31	2.13	2-10	9.22	1.28	6-10
External Pain	7.33	2.55	2-10	7.00	2.87	2-10	7.70	2.15	4-10
Accidental Pain	7.76	2.04	3-10	7.95	1.88	4-10	7.55	2.23	3-10
Coping Strategies (Active)	1.23	1.24	0-5	0.96	0.97	0-3	1.60	1.42	0-5
Weighted Life Events	151.14	110.8	0-424	165.36	98.30	13-424	355.5	123.35	0-419

Table 5.6 Initial description of patients attending Liverpool University Pain Management Programme
Past Treatment and Perceptions of Effectiveness

	TOTAL SAMPLE				GROUPS				INDIVIDUALS			
	Previous Experience		Effectiveness (Little/No)		Previous Experience		Effectiveness (Little/No)		Previous Experience		Effectiveness (Little/No)	
	N	%	N	%	N	%	N	%	N	%	N	%
Surgery	6	14	6	100	3	14	3	100	3	15	3	100
Enforced Rest	36	86	30	85	17	77	14	82	19	95	16	84
Physiotherapy	35	83	33	94	19	86	19	100	16	80	14	87
Exercise	23	55	21	91	15	68	13	87	8	40	8	100
Traction	20	48	18	90	10	45	10	100	10	50	8	80
Corset	25	60	23	92	13	59	12	92	12	60	11	92
Injections	24	57	23	95	13	59	13	100	10	50	10	100
Manipulation	18	43	14	77	8	36	7	87	10	50	7	70
TNS Machine	11	26	11	100	5	23	5	100	6	27	6	100
Acupuncture	14	33	13	93	7	35	7	100	7	35	5	70

Table 5.7 Initial description of patients attending Liverpool University Pain Management Programme: Medication Usage

		Total Sample (N=42)				Groups (N=22)				Individuals (N=20)			
		Take Regular	Exceed Max.	Pain Cont.	Side Effects	Take Regular	Exceed Max.	Pain Cont.	Side Effects	Take Regular	Exceed Max.	Pain Cont.	Side Effects
Narcotics	%	60	5	85	45	64	9	85	45	55	0	86	45
	N	25	2	36	19	14	2	19	10	11	0	17	9
NSAID's	%	40	15	75	40	41	14	68	41	40	15	85	40
	N	17	6	32	17	9	3	15	9	8	3	17	8
Anti-Depressants	%	25	0	N/A	30	32	0	N/A	27	25	0	N/A	35
	N	25	0	N/A	13	7	0	N/A	6		0	N/A	7
Tranquillisers	%	20	0	N/A	40	18	0	N/A	40	20	0	N/A	41
	N	8	0	N/A	17	4	0	N/A	9	4	0	N/A	8
Night Sedation	%	15	0	N/A	30	18	0	N/A	25	10	0	N/A	35
	N	6	0	N/A	13	4	0	N/A	6	2	0	N/A	7

5.2 Demographic and psychosocial status of patient sample

The current patient sample is similar to data provided by other studies in relation to age, gender, marital status, referral/source and work status (Main and Parker 1989; Nicholas et al 1991, 1992). Socioeconomic data concerning work loss through low back pain (total and last twelve months) benefit status as well as information assessing pain report, disability status, litigation proceedings and number of specialists seen are broadly in line with recent research on populations of chronic low back pain patients (eg Nicholas et al 1992; Flor et al 1992). One interesting statistic concerns the number of patients who stated that in addition to low back pain, they were currently experiencing additional medical problems (N=20). Unfortunately, the nature of such problems was rarely, if ever, stated. Anecdotal evidence however indicates that patients described themselves as (in addition to low back pain) currently experiencing a range of physical and psychological problems. These included ME, depression, in one case bulimia and more commonly heart disease - illustrating the destructive, complex nature and profound disability of many low back pain patients. Patients reports of depressive symptoms, somatic anxiety, locus of control appraisals and self efficacy beliefs are almost identical to data provided by Main and Parker (1989), Nicholas et al (1992; 1991).

The socioeconomic profile or social class position of the patient sample broadly reflects that of an inner city population. This is unsurprising given that both GP and Orthopaedic referral agents were located within two miles of Liverpool city centre. To the writer's knowledge whilst research recognises the important role of the social dynamic in shaping disability, little note is made of the actual socioeconomic mix of chronic pain groups (Waddell 1987). Thus in the current study it is difficult to comment upon the representativeness of patients socioeconomic background. An alternative school of thought concerning the current data and social class position is that the low percentage or representation of 'professional' groups symbolises the experience and consequences of chronic disability. More specifically it is argued that the vast majority of people in pain cope independently and without support. Seeking help/aid is however dependent upon given social and cultural behavioural norms, learned patterns of behaviour in response to illness and powerful psychosocial variables (Mechianic 1977). A persuasive hypothesis therefore argues that disability is a function *of* the social world in which disability operates. Faced with a disabling and distressing physical problem such as low back pain, individuals who describe themselves as semi/unskilled (and who historically have experienced greater economic and educational disadvantage) would have less opportunity and motivation to fully reengage in the employment network (eg Fordyce 1976; Waddell et al 1992).

Psychological data addressing the Fear Avoidance Model (Table 5.5) is in line with recent research. Pain history, percentage of active coping strategies and weighted life events are almost identical to data provided by Rose (1993) whose work focused on acute low back pain patients. Such similar findings are somewhat surprising given that acute v chronic pain patients represent two groups whose physical and psychosocial response to disability is well documented as representing qualitatively different experiences.

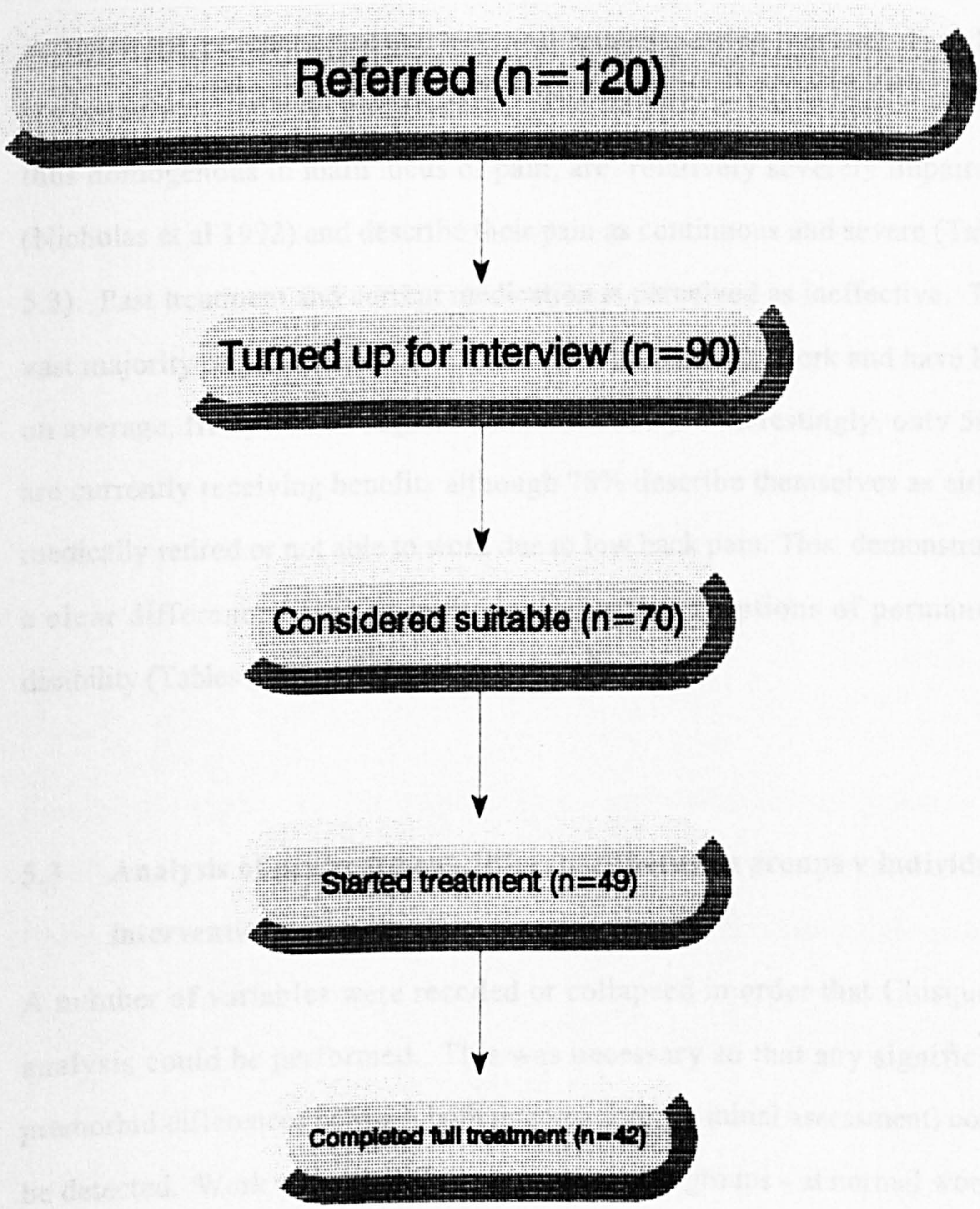
5.2.1 Medication usage and past treatment

Information concerning medication usage and experience of past treatment as well as patient perceptions of overall therapeutic effectiveness is provided (see Tables 5.6 and 5.7) illustrating the nature, extent and perceived failure of traditional interventions for low back pain. The data in the current study indicates that the vast majority of patients have had physiotherapy, been told to rest for long periods of time and asked to wear corsets - all of which have been remedial in terms of pain relief. All interventions show a similar lack of effect illustrating both the chronicity of the patient population and the futility of many traditional interventions (Table 5.6). Furthermore, a number of authors argue that powerful iatrogenic factors - rest, avoidance of activity and dependency - all of which are associated with traditional treatments and use of medication, represent a potent index in shaping overall disability experience. Anecdotal evidence (in terms of patient report) relating to the ineffectiveness of post intervention is well known. The current study documents such observations and clearly indicates the range, remedial nature and overall extent of chronic low back pain patients history of past interventions. One important goal of behavioural interventions for chronic pain groups concerns the reduction or elimination of pain medication. Common patient experiences include habituation, many negative side effects as well as wider issues concerning a reinforcement of patient dependency and associated, ever growing financial costs of providing such medication. The current study demonstrates the extent of medication usage and its remedial effect in terms of pain reduction (Table 5.7). Furthermore, many patients are in addition to anti inflamatories, taking antidepressants, tranquillisers and night sedation, illustrating the destructive nature of pain, its complex, multifaceted nature and a strong desire on the doctors part to be seen as doing something. Given that pain still continues, that there are many side effects of taking medication and that patients are aware of its toxic nature, it is somewhat surprising that patients still continue taking prescribed medicines.

5.2.2 Current patient sample

The current sample is thus made up of a total sample of forty-two patients who completed the full eighteen hours programme. In all one hundred and twenty patients were referred to the programme by GP and Orthopaedic Consultants. All were sent for interview. Figure 5.1 illustrates the referral, filtering process and attrition rate of subjects at various stages during the project. Of those sent for interview ninety attended of which seventy patients were considered suitable for the programme. The remaining twenty were excluded because (a) they were still receiving treatment; (b) they were awaiting surgery; (c) complex psychosocial issues which prevented attendance for the full week (eg single parent with small children and no carers), and (b) an overall lack of motivation or insight concerning the programme and its philosophy. Forty-two patients completed the full eighteen hours programme (seven dropped out during the course). Twenty were seen individually. Three groups were also run. In two of the groups, eight patients completed the course. In the third programme, six patients completed the full week. Hence seventy patients were offered places, forty-nine started the programme and seven dropped out during treatment. Patients dropped out equally between both interventions (group = 4; individuals = 3). Attrition of subjects is a significant issue of all psychotherapeutic interventions and is clearly a concern in the

Figure 5.1: Referral rates, level of attrition and number of patients who completed the full programme.



current study, although similar findings are well documented elsewhere (eg Turk and Rudy 1990).

5.2.3 Conclusions

The current sample of 42 patients can thus be described as a representative cohort of chronic pain patients typically seen in pain clinics. Demographic, occupational, psychological and historical data concerning low back disability are broadly in line with past research. The subjects in the current study are thus homogenous in main locus of pain, are 'relatively severely impaired' (Nicholas et al 1992) and describe their pain as continuous and severe (Table 5.3). Past treatment and current medication is perceived as ineffective. The vast majority of patients describe themselves as unable to work and have lost on average, five years through low back disability. Interestingly, only 50% are currently receiving benefits although 78% describe themselves as either medically retired or not able to work due to low back pain. This demonstrates a clear difference between individual v state perceptions of permanent disability (Tables 5.1 and 5.2).

5.3 Analysis of pretreatment differences between groups v individual intervention

A number of variables were recoded or collapsed in order that Chisquare analysis could be performed. This was necessary so that any significant premorbid differences between both interventions (at initial assessment) could be detected. Work status was thus recorded as two groups - at normal work v not working and unemployed. Benefit status was recoded as none received v currently receiving benefit (sickness, disability, inability) whilst social class was divided into two groups - professional and semi professional v skilled, partly skilled and unskilled. Litigation status was recorded as none experienced/planned v present and planned litigation. Pain description was recoded as mild and moderate v severe and very severe.

Individuals were randomly assigned between either conditions. No statistically significant differences were observed between either group v individual treatment modalities in terms of gender composition (chisquare = 0.96 $p>0.05$) marital status (chisquare = 0.15 $p>0.05$) referral source (chisquare = 0.05 $p>0.05$) litigation involvement (chisquare = 0.13 $p>0.05$) work status (chisquare 2.02 $p>0.05$) social class (chisquare = 0.83 $p>0.05$) and experience of additional medical problems (chisquare = 0.001 $p>0.05$). Further non significant differences were observed between treatment conditions concerning benefit status (chisquare = 2.43 $p>0.05$) patients description of pain (chisquare = 0.45 $p>0.05$) and nature of pain onset (chisquare = 0.42 $p>0.05$).

Two tailed t-tests were performed in order to establish whether statistically significant differences existed between both group v individual treatment modes on aspects of pain, disability and pain history recorded at assessment. Results indicate that there are no significant differences concerning age ($t=0.60$ $p>0.05$) length of present pain episode ($t= -1.33$ $p>0.05$) work loss - total and during the last twelve months ($t = 1.1$ and $t = 1.09$ respectively $p>0.05$) as well as medication usage ($t = 1.17$ $p>0.05$) number of specialists seen ($t = -0.71$ $p> 0.05$) and number of previous back injuries ($t = 0.19$ $p>$

0.05). These results therefore indicate that both treatment modes are equivalent on a range of physical, demographic and socioeconomic data recorded at initial assessment.

5.4 Reliability and concurrent validity of the major dependent variables

The reliability and validity of the major dependent variables is examined (Table 5.8 and 5.9). The rationale for adopting this procedure is as follows. Recent research (eg Malone and Strube 1988; Flor et al 1992) has criticised the overall utility, reliability, specificity and validity of many psychometric instruments used in pain research. Enhancing the methodological rigour of research is therefore paramount and to this end reliability and validity (of a number of cognitive instruments) is undertaken. This is a particularly important issue in the current study as three, recently developed instruments are employed, examining various belief systems and pain.

Internal consistency of the major dependent variables is examined using Cronbach's coefficient Alpha, whilst test retest reliability was based upon Pearson product moment correlation, between initial measurement (A) and day of the Pain Management Programme time (B). The average time period between points A and B was approximately ten weeks.

Table 5.8 Dependent variables employed in the current study:
Internal consistency (Cronbach's Alpha) and Test Retest Reliability

		Cronbach Alpha	Test Retest (Correlations)	
Dependent Variable				
Depression (Zung)		0.85	0.60	***
Disability		0.86	0.43	***
Somatic Anxiety (MSPQ)		0.81	0.81	***
Self Efficacy		0.94	0.80	***
Pain Locus of Control				
a.	Pain Responsibility	0.91	0.57	***
b.	Strategies	0.60	0.23	(NS)
Pain Cognition Questionnaire				
a.	Active Positive Coping	0.81	0.58	***
b.	Hopelessness	0.87	0.33	*
c.	Helplessness	0.75	0.43	**
d.	Support/Trust	0.40	0.61	***

*** p<0.001
** p<0.01
* P<0.05

Table 5.9 Correlations between cognitive measures and psychological measures at assessment (N=42)

		Disability	Depression	MSPQ
1.	**Pain Self Efficacy**	-0.54***	-0.40***	-0.31*
2.	**Pain Locus of Control** (Responsibility)	-0.34*	-0.19	-0.09
	Pain Locus of Control (Strategies)	-0.28*	-0.06	-0.01
3.	**Pain Cognitions Questionnaire**			
	a. Active Positive Coping	-0.29*	-0.54***	-0.36*
	b. Hoplessness	-0.22*	0.46***	0.32*
	c. Helplessness	0.24*	0.28*	0.19
	d. Support and Trust	0.11	-0.03	0.10

*** p<0.001
* p<0.05

5.4.1 Results

Results indicate that the internal consistency of the Zung Depression Inventory, MSPQ, as well as recently developed instruments, namely pain self efficacy questionnaire, pain locus of control questionnaire (responsibility scale) and scales on the pain cognitions questionnaire (positive active coping, hopelessness and helplessness) demonstrated very high internal consistency (Cronbach's Alpha range = 0.75-0.94). The support/trust scale of the pain cognitions questionnaire (Cronbach's Alpha = 0.40) and the pain locus of control. (Strategies scale, Cronbach's Alpha = 0.60) demonstrated much lower internal consistency. The support/trust scale cannot be considered, on the evidence of the current data to be a reliable instrument, although the pain strategies scale, approaches clinical significance (Robson 1988).

Test retest correlations coefficients of the major dependent variables are presented in Table 5.8 and range from 0.23 - 0.81. The pain locus of control (strategies scale) demonstrated poor test retest reliability (Pearson = 0.23 $p>0.05$). All the other instruments showed significant levels of test retest reliability.

5.4.2 Concurrent validity

Pearson product moment correlations between three new cognitive measures and a number of other assessment measures, namely disability, Zung (depression) and MSPQ (somatic anxiety) were examined. Statistically significant negative correlations were observed for the pain self efficacy questionnaire, with disability ($p<0.001$), depression ($p<0.001$) and somatic anxiety ($p<0.05$). Whilst both pain locus of control scales, correlated significantly with disability ($p<0.05$), significant relationships were not observed for depression and somatic anxiety. A number of scales on the pain cognitions questionnaire (active positive coping and hopelessness) yielded statistically significant correlations with disability, the Zung Depression Inventory and the MSPQ. The third scale - helplessness, correlated significantly with disability and the Zung Depression Inventory but not the MSPQ. The final scale of the pain cognitions questionnaire did not correlate with any of the more established instruments (Table 5.9).

5.5 Conclusions

The finding that a number of cognitive instruments (pain self efficacy, positive active coping, helplessness and pain responsibility) have high correlations with measures of disability and psychological distress provides good support for their concurrent validity. Overall therefore the pain self efficacy questionnaire, the pain responsibility scale (pain locus of control scale) and scales on the pain cognitions questionnaire (positive active coping, hopelessness and helplessness) appear to have good psychometric properties. These particular scales possess high degrees of internal consistency as judged by Cronbach's Alpha and test retest reliability. Some positive evidence for these scales construct validity is additionally provided. There is little evidence in support of the support/trust scale and the pain responsibility scale as reliable and valid instruments.

The current cohort of patient are thus typical of chronic low back pain patients seen in pain clinics. Individuals were randomly assigned betwen both treatment modes. Chisquare and t-test analysis indicates that both groups are equivalent in relation to physical and psychosocial characteristics.

CHAPTER 6

Efficacy of Pain Management Intervention. Comparison of Group v Individual Treatment

6.1 Introduction

The means, standard deviations (and number of subjects participating for both group and individual interventions) of the major variables are presented over the four assessment points (Tables 6.1 and 6.2). Separate two (Treatment) x four (Occasions) repeated measures ANOVAS were conducted on the dependent variables. These concerned, pain, disability, depression (Zung) somatic anxiety (MSPQ) self efficacy beliefs, locus of control appraisals (responsibility and strategies) medication usage, exercise scores and scales on the pain cognitions questionnaire. McNemar's Non Parametric test is employed to see if there are changes in subjects work status following interventon. McNemar's test is most useful in 'before and after' experimental designs and detects any significant changes in proportions of subjects movng from one category (eg work to unemployed) to another.

Table 6.1 Mean scores by assessment and experimental condition

Measure/Condition	Initial Assessment			Day of Course			Post Teatment			Six Months follow up		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Pain Intensity												
Group	6.04	2.23	(26)	6.61	2.13	(24)	5.81	2.13	(21)	6.59	2.36	(22)
Individual	6.25	2.17	(24)	6.05	1.91	(23)	4.70	2.08	(20)	6.21	2.41	(20)
Disability												
Group	16.04	4.90	(24)	15.76	4.39	(24)	13.36	4.39	(22)	13.36	5.33	(22)
Individual	16.05	5.09	(24)	17.31	3.11	(23)	11.15	5.65	(20)	11.05	5.70	(19)
Medication Usage												
Group	1.59	1.26	(26)	1.47	1.40	(24)	1.23	1.22	(22)	1.72	1.48	(21)
Individual	2.05	1.27	(24)	2.05	2.05	(23)	1.30	1.30	(20)	2.47	1.86	(20)
Exercise Scores												
Group	N/A	N/A	N/A	117.85	41.39	(23)	170.77	61.73	(21)	225.2	115.3	(9)
Individual	N/A	N/A	N/A	152.26	61.98	(19)	251.70	84.88	(20)	215.18	81.48	(13)
Zung												
Group	33.63	6.65	(26)	32.71	7.03	(25)	26.52	8.38	(22)	28.36	10.80	(22)
Individual	34.30	10.51	(24)	32.03	7.20	(24)	25.00	7.97	(20)	25.57	9.64	(20)
MSPQ												
Group	7.72	6.23	(26)	7.09	3.85	(24)	7.72	4.83	(22)	8.00	4.36	(27)
Individual	9.85	5.26	(24)	11.52	4.98	(24)	7.40	5.26	(20)	6.42	4.74	(20)
Self Efficacy Questionnaire												
Group	26.36	12.40	(27)	27.04	12.30	(23)	33.81	11.47	(21)	32.95	14.17	(22)
Individual	26.95	8.65	(24)	26.47	8.48	(23)	40.65	9.01	(19)	36.78	12.29	(19)

Table 6.2 Mean scores by assessment and experimental condition

Measure/Condition	Initial Assessment (A)			Day of Course (B)			Post Teatment (C)			Six Months follow up (D)		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Pain Locus of Control (A)												
Group	5.54	4.92	(26)	4.76	4.06	(24)	9.86	6.20	(22)	9.36	6.89	(22)
Individual	8.21	3.72	(24)	8.26	3.87	(23)	13.40	5.98	(20)	11.94	6.20	(20)
Pain Locus of Control (B)												
Group	5.40	3.26	(26)	5.66	4.82	(23)	8.13	3.79	(22)	7.77	3.58	(22)
Individual	7.42	3.43	(24)	7.31	2.35	(23)	10.20	2.94	(20)	9.42	3.83	(20)
Pain Cognitions Questionnare												
1. Active Positive Coping												
Group	2.57	0.56	(25)	2.14	0.22	(22)	2.83	0.61	(20)	2.79	0.51	(19)
Individual	2.71	0.60	(24)	2.49	0.56	(23)	3.20	0.50	(20)	3.12	0.55	(19)
2. Hoplessness Scale												
Group	1.83	0.62	(25)	1.87	0.95	(21)	1.58	0.60	(20)	1.76	0.59	(20)
Individual	1.90	0.75	(22)	1.94	0.80	(23)	1.53	0.54	(20)	1.61	0.61	(19)
3. Helplessness Scale												
Group	2.31	0.72	(24)	2.30	0.84	(21)	1.90	0.78	(20)	1.86	0.64	(20)
Individual	2.17	0.55	(22)	2.21	0.57	(23)	1.52	0.58	(20)	1.61	0.58	(19)
4. Support and Trust Scale												
Group	2.13	0.44	(24)	1.96	0.54	(20)	2.15	0.49	(20)	2.23	0.45	(21)
Individual	2.11	0.44	(22)	2.14	0.53	(23)	2.20	0.39	(20)	2.14	0.40	(19)

Table 6.3 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Self Reported Pain**

	SS	DF	MS	F	P
Group v individual (A)	9.69	1	9.69	0.76	0.389
Subjects within groups	459.08	39	12.75		
Time	37.07	3	12.36	5.76	0.001
Time x (A)	11.50	3	3.83	1.79	0.154
Subjects x time (within groups)	231.69	117	2.15		

Table 6.4 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Self Reported Disability**

	SS	DF	MS	F	P
Group v individual (A)	26.54	1	26.54	0.49	0.489
Subjects within groups	2009.93	39	54.32		
Time	602.34	3	200.78	13.47	0.001
Time x (A)	120.11	3	40.78	2.69	0.05
Subjects x time (within groups)	1653.93	117	14.90		

Table 6.5 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Exercise Scores**

	SS	DF	MS	F	P
Group v individual (A)	4899.56	1	4899.56	0.37	0.550
Subjects within groups	250922.76	19	13206.46		
Time	122304.34	2	61152.17	18.35	0.001
Time x (A)	25306.24	2	12653.12	3.80	0.031
Subjects x time (within groups)	126659.63	38	3333.15		

Table 6.6 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Use of Medication**

	SS	DF	MS	F	P
Group v individual (A)	7.58	1	7.58	1.40	0.244
Subjects within groups	194.89	39	5.41		
Time	12.74	3	9.25	4.55	0.001
Time x (A)	1.90	3	0.63	0.68	0.568
Subjects x time (within groups)	100.84	117	0.93		

Figure 6.1: Patients mean level of pain report. Comparison of group -v- individual treatment over four assessment points.

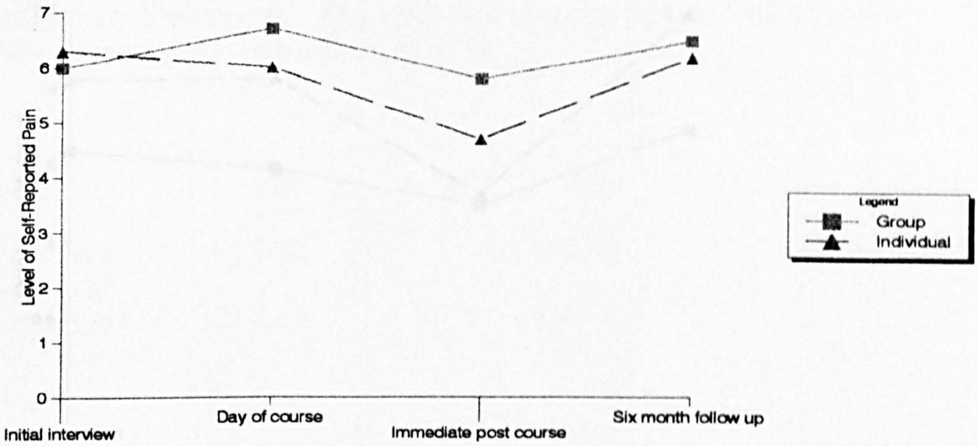


Figure 6.2: Patients mean level of self reported disability. Comparison of group -v- individual treatment over four assessment points.

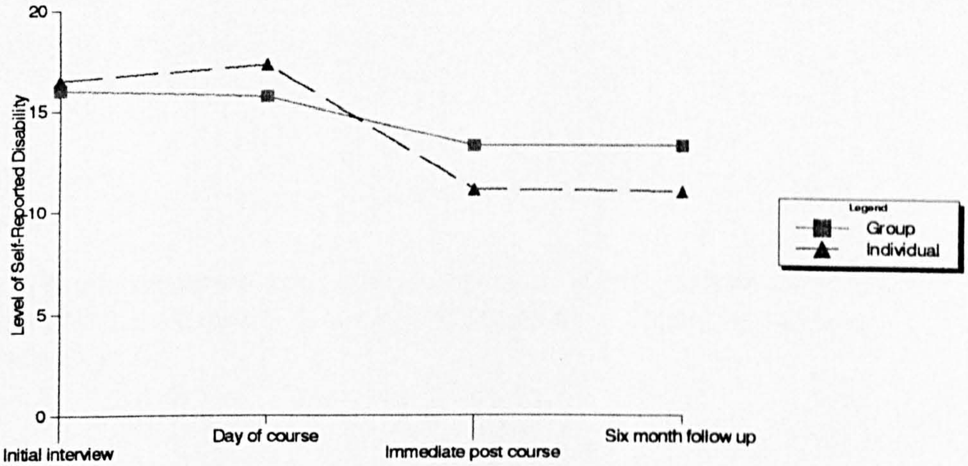


Figure 6.3: Patients mean number of exercises performed. Comparison of group -v- individual treatment over four assessment points.

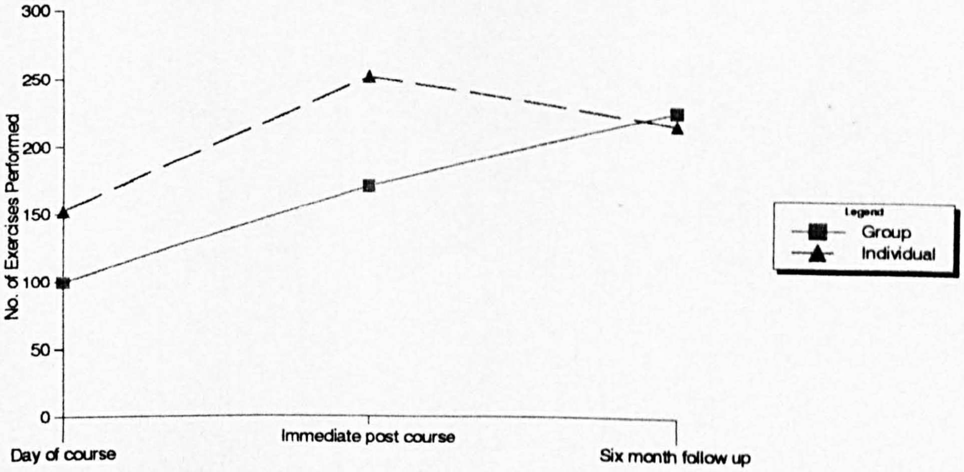


Figure 6.4: Patients mean level of medication use.
Comparison of group -v- individual treatment
over four assessment points.

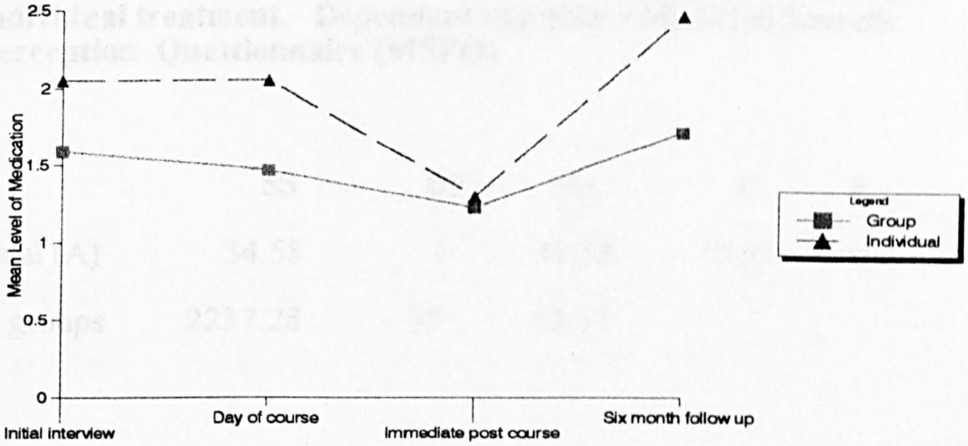


Table 6.7 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Modified Somatic Perception Questionnaire (MSPQ)**

	SS	DF	MS	F	P
Group v individual (A)	34.58	1	34.58	0.55	0.464
Subjects within groups	2237.28	39	63.17		
Time	94.50	3	31.50	3.14	0.028
Time x (A)	193.07	3	64.36	6.42	0.001
Subjects x time (within groups)	1113.02	117	10.03		

Table 6.8 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Zung Depression Inventory**

	SS	DF	MS	F	P
Group v individual (A)	120.62	1	120.62	0.66	0.422
Subjects within groups	6783.57	39	183.34		
Time	1772.46	3	590.82	15.74	0.001
Time x (A)	68.56	3	22.85	0.61	0.611
Subjects x time (within groups)	4165.50	117	37.53		

Table 6.9 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Positive Active Coping (Boston et al 1991)**

	SS	DF	MS	F	P
Group v individual (A)	2.10	1	2.10	3.42	0.077
Subjects within groups	14.09	36	0.61		
Time	7.62	3	2.54	13.58	0.001
Time x (A)	0.23	3	0.08	0.42	0.742
Subjects x time (within groups)	12.91	108	0.19		

Figure 6.5: Patients mean report of heightened somatic awareness (MSPQ). Comparison of group -v- individual treatment over four assessment points.

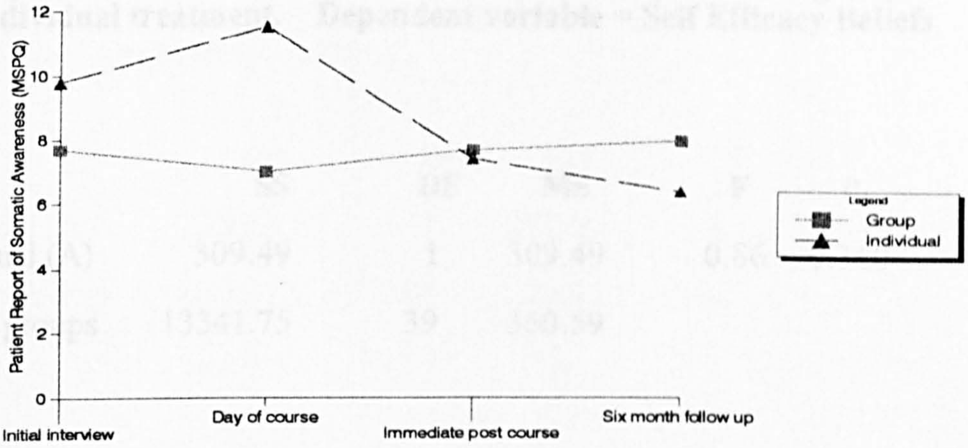


Figure 6.6: Patients mean report of depressive symptoms (Zung Depression Inventory). Comparison of group -v- individual treatment over four assessment points.

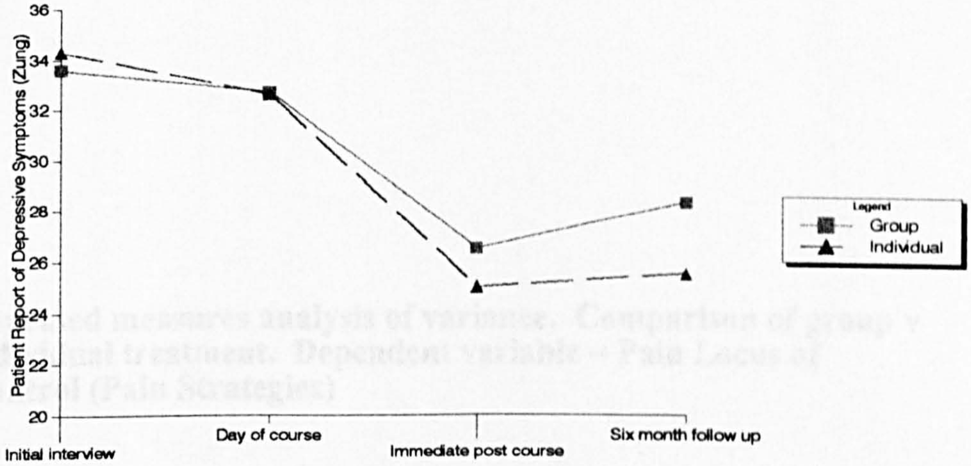


Figure 6.7: Mean active positive coping and pain (Boston et al, 1991). Comparison of group -v- individual treatment over four assessment points.

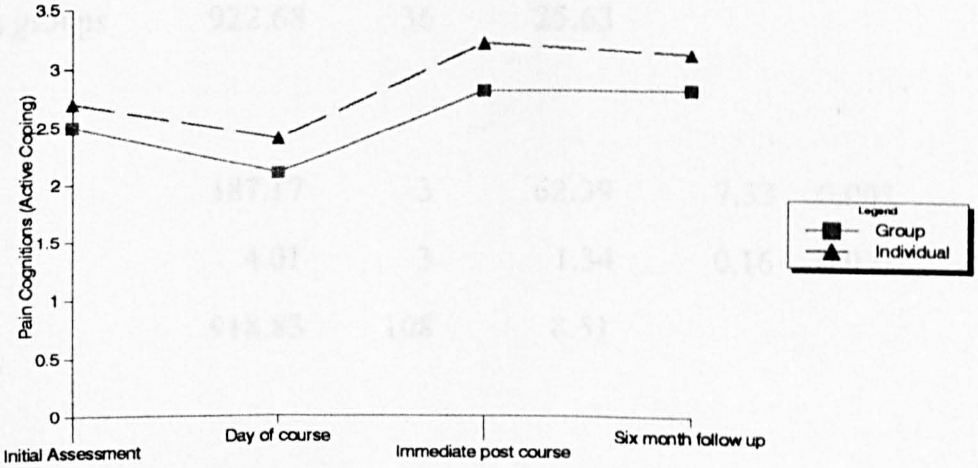


Table 6.10 Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Self Efficacy Beliefs

	SS	DF	MS	F	P
Group v individual (A)	309.49	1	309.49	0.86	0.360
Subjects within groups	13341.75	39	360.59		
Time	3473.68	3	1157.89	19.72	0.001
Time x (A)	429.52	3	143.17	2.44	0.068
Subjects x time (within groups)	6518.06	117	58.72		

Table 6.11 Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Pain Locus of Control (Pain Strategies)

	SS	DF	MS	F	P
Group v individual (A)	132.16	1	132.16	5.16	0.029
Subjects within groups	922.68	36	25.63		
Time	187.17	3	62.39	7.33	0.001
Time x (A)	4.01	3	1.34	0.16	0.925
Subjects x time (within groups)	918.83	108	8.51		

Table 6.12 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Pain Locus of Control (Pain Responsibility)**

	SS	DF	MS	F	P
Group v individual (A)	297.07	1	297.07	3.76	0.060
Subjects v Main Groups	2841.12	39	78.92		
Time	667.73	3	222.58	17.81	0.001
Time x (A)	2.52	3	0.84	0.07	0.977
Subjects x time (within groups)	1350.06	117	12.50		

Figure 6.8: Patients mean level of self-efficacy regarding current siutation. Comparison of group -v- individual treatment over four assessment points.

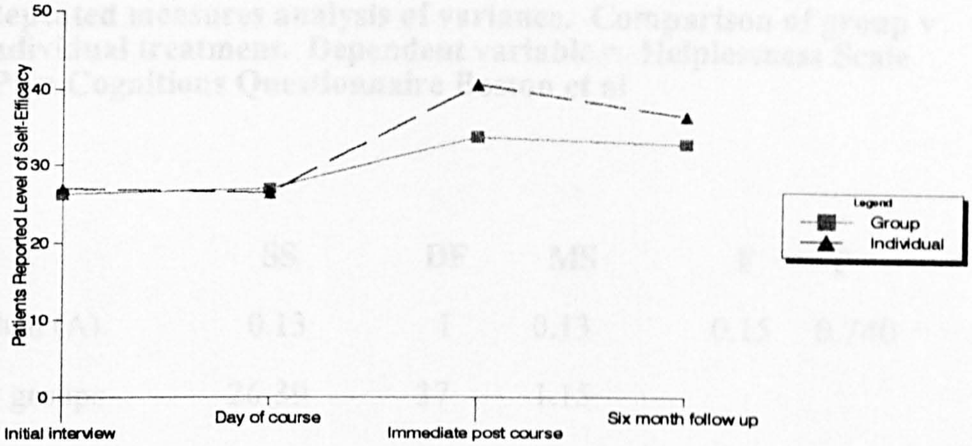


Figure 6.9: Reported level of locus of control (pain strategies). Comparison of group -v- individual treatment over four assessment points.

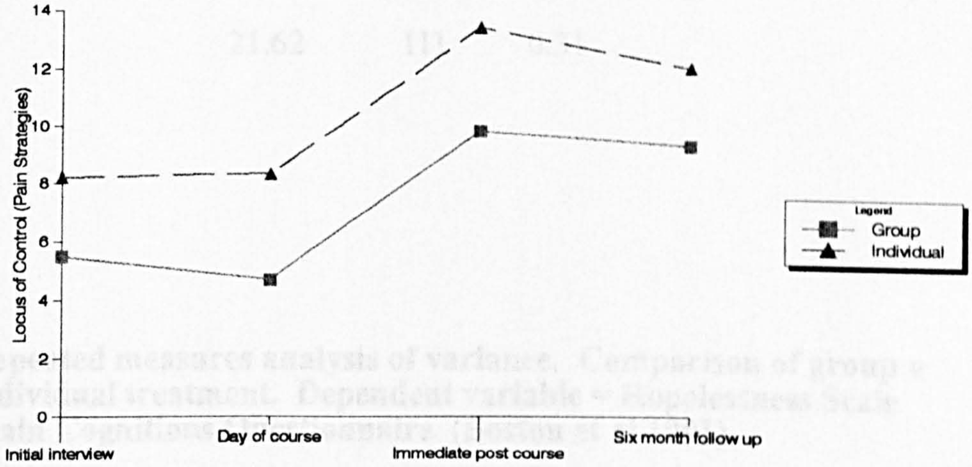


Figure 6.10: Mean reported level of locus of control (pain responsibility). Comparison of group -v- individual treatment over four assessment

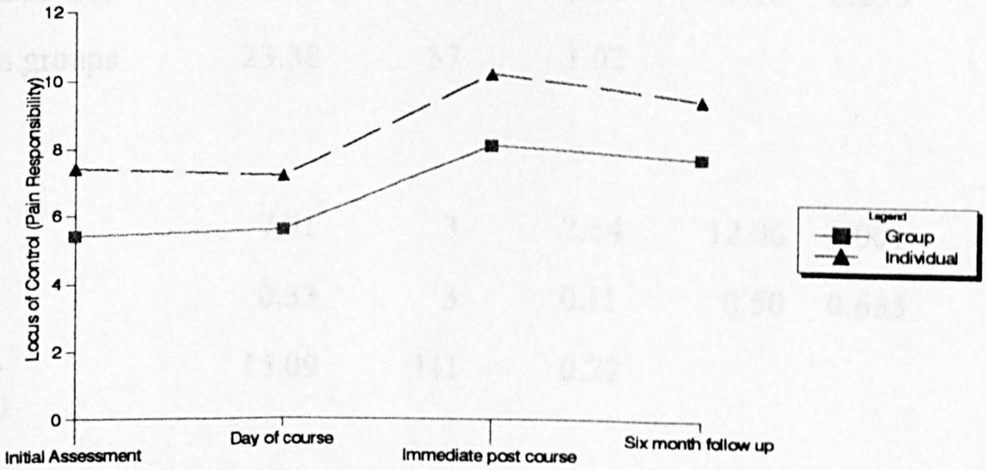


Table 6.13 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Helplessness Scale (Pain Cognitions Questionnaire Boston et al**

	SS	DF	MS	F	P
Group v individual (A)	0.13	1	0.13	0.15	0.740
Subjects within groups	26.39	37	1.15		
Time	2.36	3	0.79	2.15	0.051
Time x (A)	0.08	3	0.03	0.08	0.968
Subjects x time (within groups)	21.62	111	0.31		

Table 6.14 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Hopelessness Scale (Pain Cognitions Questionnaire (Boston et al 1991)**

	SS	DF	MS	F	P
Group v individual (A)	0.16	1	0.16	0.16	0.693
Subjects within groups	23.38	37	1.02		
Time	7.91	3	2.64	12.06	0.001
Time x (A)	0.33	3	0.11	0.50	0.685
Subjects x time (within groups)	15.09	111	0.22		

Table 6.15 **Repeated measures analysis of variance. Comparison of group v individual treatment. Dependent variable = Support and Trust Scale (Pain Cognition Questionnaire, Boston et al 1991)**

	SS	DF	MS	F	P
Group v individual (A)	0.61	1	0.61	1.17	0.291
Subjects within groups	11.93	37	0.52		
Time	0.07	3	0.02	0.15	0.929
Time x (A)	0.30	3	0.10	0.69	0.561
Subjects x time (within groups)	10.12	111	0.15		

Figure 6.11: Patients mean level of hopelessness. Comparison of group -v- individual treatment over four assessment points.

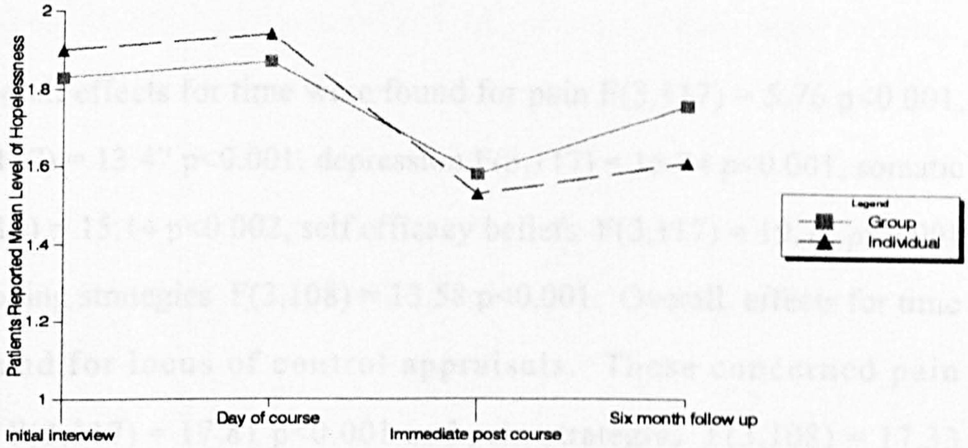


Figure 6.12: Patients reported mean levels of helplessness. Comparison of group -v- individual treatment over four assessment points.

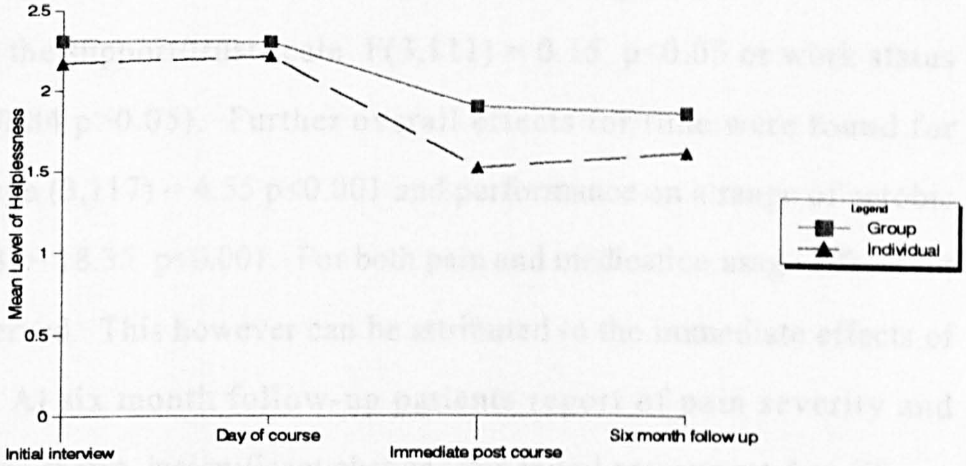
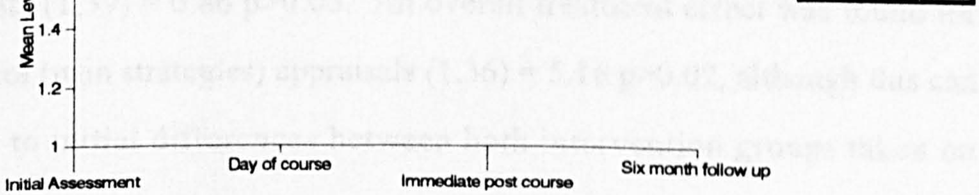


Figure 6.13: Patients mean reported level of support and trust. Comparison of group -v- individual treatment over four assessment points.



6.3 Results

Effect of time

Significant overall effects for time were found for pain $F(3,117) = 5.76$ $p<0.001$, disability $F(3,117) = 13.47$ $p<0.001$, depression $F(3,117) = 15.74$ $p<0.001$, somatic anxiety $F(3,117) = 15.14$ $p<0.002$, self efficacy beliefs $F(3,117) = 19.72$ $p<0.001$ and positive coping strategies $F(3,108) = 13.58$ $p<0.001$. Overall effects for time were also found for locus of control appraisals. These concerned pain responsibility $F(3,117) = 17.81$ $p<0.001$ and pain strategies $F(3,108) = 17.33$ $p<0.001$. Significant overall effects for time were additionally found for scales on the pain cognitions questionnaire. These addressed hoplessness $F(3,111) = 12.06$ $p<0.001$ and helplessness $F(3,111) = 2.51$ $p<0.05$. No significant effect for time was found for the support/trust scale $F(3,111) = 0.15$ $p<0.05$ or work status (McNemar = 0.84 $p>0.05$). Further overall effects for time were found for medication usage $(3,117) = 4.55$ $p<0.001$ and performance on a range of aerobic exercises $(2,38) = 18.35$ $p<0.001$. For both pain and medication usage effects for time were observed. This however can be attributed to the immediate effects of intervention. At six month follow-up patients report of pain severity and medication usage shows insignificant change from initial assessment data (Figure 6.1 and Figure 6.4).

Effects of Group v Individual membership

No significant effects for group v individual treatment membership were observed for patients report of pain $(1,39) = 0.76$ $p>0.05$, disability $(1,39) = 0.49$ $p>0.05$, depression $(1,39) = 0.66$ $p>0.05$, somatic anxiety $(1,39) = 0.55$ $p>0.05$ and self efficacy beliefs $(1,39) = 0.86$ $p>0.05$. An overall treatment effect was found for locus of control (pain strategies) appraisals $(1,36) = 5.16$ $p>0.02$, although this can be attributed to initial differences between both intervention groups taken on assessment (Figure 6.9). Further non significant differences were found for the pain responsibility scale (1,39) = 3.76 $p>0.05$ and the pain cognitions questionnaire. This included active positive coping (1,36) = 3.42 $p>0.05$, hoplessness (1,37) = 0.16 $p>0.05$, helplessness (1,37) = 0.11 $p>0.05$ and support/trust (1,39) = 1.17 $p>0.05$. Non significant treatment effects were found for patients use of medication (1,39) = 1.40 $p>0.05$ and exercise scores (1,19) = 0.37 $p>0.05$.

Treatment x Time

Non significant interactions concerning time and treatment were found for pain (3,117) = 1.79 $p>0.05$, depression (3,117) = 0.61 $p>0.05$, positive coping appraisals (3,108) = 0.42 $p>0.05$, medication usage (3,117) = 0.68 $p>0.05$ as well as locus of control interpretations. These addressed pain responsibility (3,117) = 0.07 $p>0.05$ and pain strategies (3,108) = 0.16 $p>0.05$. Further non significant interactions concerned scales of the Pain Cognitions Questionnaire. These addressed hoplessness (3,111) = 0.50 $p>0.05$, helplessness (3,111) = 0.08 $p>0.05$ and support/trust (3,111) = 0.69 $p>0.05$.

A number of significant interactions concerning time and treatment were found. These concerned somatic anxiety (3,117) = 6.42 $p<0.001$, disability (3,117) = 2.69 $p<0.05$ and exercise scores (2,38) = 3.8 $p<0.03$. Both disability (Figure 6.2) and subjects exercise scores (Figure 6.3) are positively associated with individual membership over group treatment. Similarly a reduction in somatic anxiety is also associated with individual treatment over group membership (Figure 6.5). An interaction approaching significance for self efficacy beliefs is observed. Once again this suggests that individual treatment differentially affects patients appraisals in a positive way (Figure 6.8).

A series of post hoc tests was carried out where interactions existed on particular dependent variables. In the current study three variables - disability, MSPQ and exercise scores showed interactions. The Tukey Honestly Significant Difference test (HSD) was employed in order to identify where differences lay. The critical value for the Tukey HSD for self reported disability = 3.73 (df = 39 $p<0.05$), indicating that the disability scores differed only for the "individual" condition over time. More specifically points 3 and 4 (Figure 6.2) were significantly lower than points 1 and 2. For patients' exercise scores the critical value for the Tukey HSD = 53 (df = 38 $p<0.05$) and indicate that group scores differed significantly from each assessment point to the next. Compared with data taken on initial assessment both group and individual conditions differed significantly immediately following treatment, indicating a superior group outcome (Figure 6.3). For MSPQ scores the critical value for the Tukey HSD = 3.20 (df = 39 $p<0.05$) and indicates that mean scores differed significantly within the "individual" condition over time (Figure 6.5). In addition both group and individual conditions differed significantly on the day of the course. Such a difference cannot be attributed to the effect of the intervention programme itself.

6.3 Discussion

The current study demonstrates the efficacy of both group and individual treatment modalities for chronic low back pain patients based on cognitive behavioural principles. Results indicate that there are no significant differences between either form of therapeutic intervention in terms of affective response, perceptons of pain responsibility or cognitive appraisals regarding current situation and future potention . A number of effects involving the interaction of treatment and time were observed in relation to (a) disability, (b) patient scores on a range of aerobic exercises and (c) somatic anxiety. These suggest that individual therapy is more positively associated with changes concerning behavioural features of pain and aspects of psychological distress. The current results thus indicate that individual therapy may be more effective in a limited way, in enhancing physical fitness and reducing functional disability.

A summary of the hypothesis made concerning the treatment programme can now be undertaken. Hypothesis 1, which predicted that the group intervention would have at follow up, a superior therapeutic outcome than individual treatment is not supported. Both programmes produced similar efficacious outcomes. Hypothesis 2 is supported. At follow up patients in both conditions reported significantly more responsibility for their pain, greater ability to control their pain, more positive in outlook / orientation and greater self belief in their ability to do certain tasks. Hypothesis 3 is in part supported. It was predicted that patients (following intervention) would report significantly fewer depressive symptoms and somatic anxiety as measured by the MSPQ (Main 1983). Self reported depression did reduce following intervention, although the same pattern did not hold for somatic anxiety. Hypothesis 4 is once again partly supported. At follow up reports of pain did not differ from measures initially taken at assessment across both conditions. This prediction was thus supported. Medication usage however did not reduce significantly following treatment. The specific prediction that patients would report less usage at follow up is therefore not supported. Hypothesis 5 is supported. In view of the complex, global disability of patients who present for each programme, it was envisaged that return to work - whilst a positive goal to aim for - was essentially untenable. Current results endorse such ideas.

Pearce (1986) notes how the speific effects of psychological interventions for chronic pain groups have yet to be demonstrated. This view is further endorsed by recent evidence (eg Nicholas et al 1992). Similarly Malone and Strube (1988) argue that the effectiveness of such interventions may be attributed, not to the differences between treatments, but to features they share in common. Examples here include the identification of factors which exacerbate pain, an enhancement of patient responsibility for their own care, reduction in fear governed behaviour, contact with an empathic professional and instillation of hope for relief of symptoms.

Alternatively, a number of authors note the role of self efficacy expectancies as a primary and powerful mechanism for psychological and behavioural change. One particular and positive feature of the current study is the inclusion of a new instrument designed specifically for chronic low back pain patients and based on the concept of self efficacy (Nicholas 1989). A self efficacy expectation is defined as a personal conviction that one can successfully perform certain required behaviours in a given situation. It is argued that it is an individual's belief or 'self efficacy' which predominantly determines whether a given behaviour will be performed (Bandura 1977). According to this approach the occurrence of a given coping behaviour (eg confrontation of pain) is conceptualised as being mediated by individual beliefs that situational demands do not exceed current skills. Thus self efficacy expectancies are believed to function as mediators of behaviour. Self efficacy expectancies are derived from and strengthened by four main sources of information, namely (a) performance accomplishments; (b) vicarious experiences; (c) verbal persuasion; and (d) emotional arousal. Mastery experiences gained through performance accomplishments are hypothesised to have the greatest impact on establishing and strengthening self efficacy expectancies as they produce the most information about actual capabilities. Thus Bandura (1977) argues that those techniques which enhance mastery experiences will be the most powerful tools for bringing about behaviour change.

For both group and individual interventions, self efficacy expectancies concerning the execution of certain behaviours (eg 'I can lead a fuller, more active life') increased significantly following intervention. Such observations are consistent with a cognitive-behavioural mediation model of chronic low back pain (Kerns and Haythornthwaite 1988). Here avoidance behaviour and loss of important social rewards in addition to declines in physical activity are viewed as important mediators in the development and maintenance of chronic disability. Avoidance behaviours principally in the form of rest, appear to be counterproductive and self-defeating. The current results therefore demonstrate the active role that behavioural reactions play (eg a graded exercise programme, establishment of new goals). It would thus appear that avoidance reduces self efficacy as it increases expectancies of pain consequent upon exposure. The current author supports the view put forward by Phillips (1987).

> 'In the chronic sufferer, especially one who presents with "global dysfunction" the self defeating cycle between behaviour and cognitions may become much the strongest force in maintaining the avoidance patterns".

Similarly, patients' reports of depressive symptoms decreased significantly across both conditions following intervention (Fig.6.6). Given that only one session was explicitly concerned with the experience of depression and chronic pain (by tackling/addressing dysfunctional cognitions concerning perceptions of the self, current disability and future potential) the present results can be interpreted, once again from a cognitive behavioural perspective. By encouraging repeated graded exposure to stimuli previously avoided as well as challenging clients current views concerning the effects of disability - the positive changes in affect reported following intervention seem unsurprising. Similar results are reported elsewhere. For example, Kramlinen et al (1983) reported an 88% remission rate for depression in a group of twenty five (primarily low back pain) patients following a multimodal intervention programme.

One explicit goal of rehabilitation programmes concerns the enhancement of patient responsibility for health care from a position of passivity/dependence to that of independence. The current study thus drew upon a new instrument, the pain locus of control scale (Main et al 1992) in order to evaluate patient perceptions concerning pain responsibility (internal and external) and use of cognitive strategies in order to deal with pain and disability (passive v active). Results confirm for both conditions following intervention increased patient perceptions concerning: (a) responsibility for pain management and (b) cognitive coping strategies in order to deal with pain (Fig 6.9 and Figure 6.10). These results confer with the philosophy of a pain management programme based on cognitive-behavioural principles, ie behavioural exposure, skills training and cognitive change based on educational principles. The current study therefore indicates that the enhancement of patient responsibility is clearly a desirable therapeutic goal, given the persistent disability and dependency associated with this particular client group.

The current study evaluated another new instrument - the Pain Cognitions Questionnaire (Boston et al 1991) which is designed to assess two negative and two positive factors concerning perceptions of low back disability. The authors note that a measure of pain related cognitions 'may prove to be a valuable tool for the assessment .... as well as ....evaluation of cognitive treatments for pain'. The current study endorses such a view. Perceptions of hoplessness and helplessness reduced significantly following intervention. Similarly patients endorsed more positive views concerning active coping skill. Such evaluations clearly relate to wider issues concerning changes in depression, disability, self efficacy beliefs and perceptions of responsibility following intervention. Scores on the support/trust scale did not reveal any significant changes from initial assessment position.

Patients scores on the MSPQ reveal a somewhat confusing picture which on initial inspection appear difficult to interpret (fig. 6.5). In the individual condition subject scores reduced significantly following intervention falling further at six month follow up. In the group condition however, the opposite pattern emerges. Patient scores actually increased following treatment and increased further at follow up. The MSPQ developed by Main (1983) refers to heightened somatic awareness in the face of a physical stressor. It is generally understood as a psychological variable, a form of distress in which the patient communicates, albeit in a magnified manner, anxiety regarding current disability and the failure of past treatment. One would have hoped and envisaged that somatic distress would have decreased following intervention, as patients become less frightened and more realistic regarding pain interference and future potential. One could attribute the differences to the particular condition in which subjects were treated. This however, would be difficult to interpret suggesting that group therapy causes somatic anxiety to increase, whilst individual intervention is associated with a reduction in distress. In the author's view the current results may reflect, in part a conceptual confusion between both psychological and physiological dynamics of low back pain (Deyo et al 1989). The current study focused particular attention on behavioural features of low back disability, namely active rehabilitation and restoration of physical function via a graded exercise programme, target setting and confrontation of painful situations. Sample items on the MSPQ include'feeling hot all over', 'sweating all over', legs feeling weak' and 'muscles twitching or jumping'. Given the physically based nature of the programme and its emphasis upon rehabilitation, avoidant individuals who are now engaging and relearning a new programme of behaviours may experience such symptoms, particularly as they physically recondition both back and body (Mayer et al 1992).

Primary and pressing issues in relation to the current study involve defining therapeutic success, selecting appropriate outcome instruments in order to evaluate intervention and raising awareness of different 'success' agendas concerning patient, therapist, NHS and State (Turk et al 1993). The authors note how different agents (including patients) are unable to agree about how patients improvement should be determined. This raises the question as to whether therapists v patients have very different ideas as to outcome and more importantly whether patients perceive the intervention to have been of value. Similarly health care purchasers and providers increasingly concerned at burgeoning health care costs (in particular for low back pain) may offer a different perspective and seek to address outcome criteria such as (a) health care utilisation; (b) return to work rates; (c) visits to GP; and (d) medication costs. Such issues are clearly important when one considers the current study.

Thus although patients may define substantial reductions in pain severity as evidence of treatment success, therapists (aware of the difficulty of achieving this goal) may opt for changes in behavioural and psychological functioning as evidence of treatment efficacy. The current study measured outcome in terms of behavioural, physical and psychological variables addressing patients level of pain, disability, distress and cognitive appraisals. The efficacy or value of the current study depends upon the particular perspective taken, level of specificity employed in defining 'therapeutic success' as well as the degree of subjective judgements made concerning outcome.

The author defines a positive outcome following therapeutic intervention as clients leading fuller, more productive and less disabled lives (which is maintained at follow up). The current study demonstrates across both conditions positive changes in affect, cognition, behaviour and disability. Such results would, considering the chronicity, psychological status and history of failed intervention (of chronic low back pain patients) be viewed as positive evidence of therapeutic efficacy.

Patients however enter rehabilitation programmes with, in addition to pain itself, complex psychosocial difficulties. Different individuals or organisations define the most important issues according to their values and motivation. Consider a number of important therapeutic outcomes addressed in the current study which concern different agencies associated with the management of chronic low back pain. These are (a) pain report; (b) use of medication; (c) number of patients returning to work; and (d) psychological status.

Whilst patients are told at interview that pain reduction is not a stated goal of the programme, Colvin et al (1980) noted that the vast majority of patients state that their desired goal was total and permanent pain relief. More specifically, 97% of the patients (n=287) indicated that they 'would accept' a 50% improvement in their level of pain whilst 52% reported that they would try somewhere else if the programme did not bring acceptable pain relief. Similarly Wang et al (1980) conducted a one to three year follow up of patients treated in an outpatient clinic and asked subjects to indicate whether they thought the treatment had been beneficial to them. Examination of pain severity reported at follow up revealed that 31% reported that their pain continued to be very severe or unbearable, whilst an additional 21% indicated that their pain was still fairly severe. The current study reports similar findings at follow up (table 6.1). In all, 45% of patients at six month follow up report their pain as either severe or very severe. Given that patients still desperately seek pain relief and the singular failure (impossibility) of the current study in achieving this goal, one questions whether patients perceive such an intervention to have been of value (Turk et al 1993; Flor et al 1992). An alternative, more positive appraisal of this issue is provided by Cassisi et al (1989). The authors note that 61% of patients who had completed the treatment programme reported a modest but statistically significant decrease in pain. In addition, despite the relatively modest reduction in pain (approximately 27%), 79% of this group reported that they were satisfied with the programme and 74% said they would recommend the service to a friend in a similar position.

A similar concern can be raised regarding employment status. Whilst patients may define pain relief as their primary goal, agencies concerned with the financial cost of low back pain are more likely to define successful therapeutic outcome in terms of return to work rates, use of medication and overall health care utilisation. The current study drew upon a particularly disabled cohort of patients - 75% described themselves as being unable to work due to low back pain. Analysis at follow up reveals that only a very small minority of patients had returned to part-time work (n=3). Similarly, use of medication did not reveal any significant reductions as a consequence of intervention. Such results would appear to indicate that the current study was not successful in that a range of rehabilitation programmes have demonstrated highly significant return to work rates and reductions in medication usage.

A high degree of variability exists in the literature concerning return to work rates. Return to work rates range from as low as 15% to as high as 100% (Cairns et al 1984; Duvorkin et al 1985) with an approximate average rate of 55% of treated patients returning to employment or vocational rehabilitation (eg Painter et al 1980). It appears that return to work rates may increase with longer follow up assessment periods (Tollison et al 1985). This issue clearly concerns the current study which followed patients up over a short period of time, ie six months.

Mayer et al (1986) for example drew on behavioural and psychological principles in a comprehensive activity-based programme designed to restore physical function and ameliorate excessive distress and disability. Results are highly impressive as in addition to improved physical function, less psychological distress and health care utilisation - 86% of patients who complete the programme are back in full-time work at two year follow up. Return to work is without doubt a most important criterion upon which to judge therapeutic success. Work provides meaning, order and structure, helps raise self esteem and enables important social relationships to develop. Similarly, the economic costs of supporting individuals disabled by low back pain are considerable (Office of Health Economics 1985).

It would however be unwise to attribute poor return to work rates in the current study to the programme itself and thereby judge its efficacy as unsuccessful. In the author's experience many clients reported that they would have liked to have returned to work and felt able to do so. However a combination of both high unemployment nationally (and even higher locally) plus more specific individual variables (such as age, gender, level of current skills, demand for labour in the local economy) mitigate powerfully against patients reengaging in the labour market. Such observations are endorsed by recent research (eg Greenough and Fraser 1989; Polatin et al 1989). As Turk et al (1993) note, even objective variables used to measure success rates are strongly influenced by local situational factors that are outside the control of the treatment programme. Shiekh (1987) reported that one of the few variables that predicted return to work following a pain rehabilitation programme was general unemployment in the local area. Similarly Polatin et al (1989) demonstrated that one of the best predictors of success (ie return to work) in patients followed up with low back pain was job availability. Thus the inability of the current study in returning subjects back to work can be viewed as a consequence (in part) of factors associated with both local and national employment conditions.

Medication usage is an important concern for therapist, patient, NHS and the Exchequer. The vast majority of chronic low back pain patients draw upon medication as an effective strategy for dealing with pain and take gratuitous amounts of painkillers which have little or no therapeutic value. Consequently, reducing medication represents an important and therapeutically viable goal of many behaviourist treatments for chronic pain (Malone and Strube 1988). In the current study however medication usage did not reduce over time or between conditions (fig. 6.4). This can in part be attributed to the individuals concerned with running the programme, ie a graduate psychologist and physiotherapist. Behaviourist programmes which attempt to reduce medication intake draw upon the skills of either a nurse or doctor who can supervise and are trained to monitor such withdrawal. In the present study medication withdrawal was not considered as a therapeutic goal, in view of the participating therapists' clinical background. This may therefore explain the current results.

Reductions in pain intensity, successful reengagement in the labour market and withdrawal of medication represent powerful issues and concerns in the management and rehabilitation of chronic pain groups. The present study demonstrated significant changes in disability, behaviour and psychological measures of distress, yet failed to show changes in these other important parameters. As noted elsewhere reducing pain intensity is not viewed as possible by most clinicians (eg Main and Parker 1989), return to work is dependent upon wider factors associated with the local/national economic infrastructure (Turk et al 1993), whilst medication withdrawal is only possible where appropriately skilled individuals are involved with the patients rehabilitation (Fordyce 1976).

The programme could have been evaluated in other ways. Such analysis may have illuminated important differences between both modes of intervention. These include (a) patient satisfaction with the therapeutic procedure; (b) additional use of the health care system following intervention; (c) detailed behavioural assessment; and (d) economic assessment of the programmes efficacy. Turk et al (1993) note how patient ratings of outcome represent an effective but much underemployed mode of assessing outcome. This would have been particularly pertinent in the current study in view of the qualitatively different interventions, ie patients might have perceived either group or individual treatment in very different ways (eg level of satisfaction, depth of learning, willingness to communicate complex psychological concerns).

Additional use of the health care system associated with return visits to GP/hospitals, medication and additional treatment costs (eg acupuncture) represents an effective and increasingly important method of evaluating outcome. Once again such analysis would have strengthened the current study's findings and may have demonstrated a number of differences between both interventions. Furthermore, the behavioural dynamic of low back pain is well documented (eg Phillips 1987). The reduction of pain behaviour (defined in its broadest sense as illness and avoidance behaviour as well as reinforcement contingencies associated with low back pain) represents an important clinical challenge and offers the greatest therapeutic potential for patient rehabilitation (Flor et al 1992). An index of pain behaviour in their various forms, both pre, post and at follow up, would have further strengthened the current study. Examples here include patients report of activity, level of time during the day spent lying down, amount of reinforcement available for engaging in pain behaviour, etc. Recent research demonstrates the diversity of pain behaviours, the potential for effective quantification and its value for clinicians in assessing therapeutic outcome (Waddell and Richardson 1992). Patient satisfaction with treatment received is receiving increasing attention in the Pain literature. Two subtle outcome variables which could identify patient perceptions of satisfaction with treatment concern the number of patients who dropped out of treatment and how many patients returned "thank you' letters following treatment. Analysis here, however, does not reveal any differences. Patients dropped out of both interventions in equal numbers (individual = 3, group = 4) and returned a similar number of 'thank you' letters (individual = 8, group = 7 - Appendix 3).

An economic assessment of therapeutic programmes is receiving increasing attention in the literature on low back pain (eg Turk et al 1993; Lott et al 1990; Corey et al 1989). Such analysis is clearly interdependent with outcome parameters such as return to work, additional medication usage and treatment costs, loss of potential earnings, etc. The direct cost of running such programmes has yet to be analysed. Group therapy is clearly most cost effective enabling approximately 8-10 individuals at any one time to receive treatment. In terms of direct financial cost relating to clinician input and indirect costs concerning the number of clients who are able to receive treatment - group therapy would appear to address and fulfil issues of economy and therapeutic potential. This is surely an important goal of any therapist working in an ever demanding and cost centered health care system. Clinicians must in order to develop and maintain therapeutic services demonstrate their efficiacy. Return to work rates, health care utilisation, medication costs, reductions in pain intensity and psychological/behavioural features of low back disability concern therapist, patient, NHS and State. Future research should energetically address/evaluate the above issues. Each agency depending upon their own unique agenda will approach this question in different directions. Clinicians should however ensure that treatment evaluation is addressed from all perspectives - physical, psychological, social and economic.

The current study was undertaken for a number of reasons. Firstly group therapy has been adopted exclusively as the preferred therapeutic design from which to address the psychopathology of low back pain. One suspects that group treatment has been the preferred mode of treatment for (a) reasons of economy (Main and Parker 1989); (b) perceptions of therapeutic gain which are available in a group environment (Erskine and Pearce 1989); (c) historical beliefs that behavioural features of pain represent the most pervasive feature of chronic conditions (Fordyce 1976); and (d) a wealth of literature demonstrating the efficacy of multimodal group treatment programmes (Flor et al 1992). Similarly research into chronic pain has shifted from strict behavioural assumptions to more complex biopsychosocial models. Such ideas recognise the dynamic interdependence between both affective and cognitive considerations as additional yet unique features of chronic pain. Clinical practice has mirrored this evolution (eg Sullivan et al 1992). In the author's experience low back pain patients report a wealth of psychosocial concerns which can (in part) be attributed to current disability. Many difficulties however represent issues of a long standing nature. Depression, suicidal ideation as well as issues including loss and hoplessness represent common clinical themes associated with low back disability. In addition many authors report on the perceived although unproven benefits of group therapy (eg Main and Parker 1989). Furthermore a wealth of research has been directed towards identifying active therapeutic features of rehabilitation programmes by way of comparing different interventions (eg Nicholas et al 1992). To date such research has proved equivocal.

The current study thus concerned itself with a number of research questions. These addressed (a) whether group as opposed to individual treatment is a more effective environment for working with distressed clients? (b) whether the hypothesised benefits of group intervention are long standing, ephemeral or non existent? (c) whether an evaluation of group v individual treatment can illuminate core or key therapeutic features associated with rehabilitation programmes? (d) does individual therapy work? The current study indicates that intrinsic aspects of the programme, namely the cognitive-behavioural focus of the treatment study, is responsible for therapeutic change. Group treatment is without doubt, a very powerful learning experience providing support as well as opportunities for observational learning, modelling of new behaviours and the exchange of ideas/experiences. Its role in fostering psychological or behavioural change is unsupported in the current study. One might have expected some ephemeral group effects - for example in terms of enhanced affect and self efficacy. The current study does not, however, support such findings and indicates a number of effects which are specific to individual treatment (eg reduction in disability).

Chronic low back pain is a physically and psychologically disabling experience. Results indicate that group therapy provides an effective forum for the disclosure of psychologically distressing issues, eg loss, depression, suicidal ideation. Methodologically the current study would have benefitted from the inclusion of a placebo control condition. The vast majority of research concerning the rehabilitation of chronic pain patients, fail to include a non-treatment control condition (Flor et al 1992). In the current study patients were assessed at two points before intervention, ie initial interview at the university and approximately ten weeks later - the day before the programme. During this time, clients did not receive any intervention. This period represents an effective opportunity from which to evaluate the effects of the treatment programme and strengthens the methodological value of pain management research (Malone and Strube 1988).

The role of placebo control conditions in pain research has recently received much attention (eg Turk et al 1993). The reasoning implied is that because the patient samples used have long histories of pain and disability it is unlikely that the short interval of treatment would in and of itself be sufficient to account for all the obtained results (Fordyce 1988). Flor et al (1992) note how therapist attention, due to demand characteristics is likely to make any treatment compared to a no-treatment condition appear effective. This is a particular concern given that the active therapeutic feature of rehabilitation programmes have yet to be demonstrated. Therapist attention, emphatic support, social desirability and acquiescence with perceived research demands represent inpatient features of all therapies and any research inquiry. Their therapeutic value in the current study remains unknown.

Results indicate that a pain management programme of approximately eighteen hours intervention is effective in terms of ameliorating distress and iatrogenic disability as well as enhancing self efficacy beliefs and positive perceptions concerning pain responsibility and management.. Both group and individual modes of interventions are equally effective in terms of therapeutic response. Important outcome parameters, namely pain report, medication usage and return to work did not reveal any significant changes from initial assessment position.

The current study therefore endorses the efficacy of a pain management programme based on cognitive behavioural principles for a particularly disabled cohort of chronic low back patients. Group effects or positive group dynamics played a negligible role in terms of therapeutic response. Enhancing the methodological rigour of research inquiry is an important issue (eg inclusion of placebo control conditions). Similarly future research inquiries must widen the theoretical debate and address additional dynamics of low back pain (eg economic issues).

CHAPTER 7

The prediction of outcome following cognitive behavioural intervention

7.1 Introduction

The current study seeks to examine whether it is possible to predict or identify which physical, psychosocial and demographic variables are associated with outcome. A wealth of evidence indicates that chronic disorders such as low back pain are a function of pain severity, physical impairment, disability status, illness behaviour, psychological distress and socioeconomic factors. The current study adopts Waddell's (1987) biopsychosocial model of low back pain.

Multiple linear regression is employed in order to examine the predictive power or explanatory value of variables associated with outcome. A large body of work demonstrates that behavioural and psychological measures can explain *current* levels of pain, disability and work loss at any one point in time (Main et al 1992). To the author's knowledge, studies which have attempted to predict outcome following rehabilitative pain programmes have yielded equivocal results (Turk and Rudy 1990).

Predictor and outcome variables employed in the current study

Physical, psychological and demographic variables associated with chronic low back pain are measured in a number of ways. Severity of pain is best measured on a simple visual analogue scale, whilst disability, defined as 'diminished capacity for everyday living' is evaluated using the Roland and Morris (1983) Disability Index. Three other variables associated with the physical nature of low back pain were employed as predictors - namely, age, number of surgical operations and a combined index of past treatment. The rationale for employing such variables is as follows. Low back pain causes the greatest problem at least as judged by health care utilization and time away from work in the middle working years of life, with a peak age of about forty years (Helsey and White 1980). Patients who have undergone spinal surgery and been referred to the programme have, by definition, had an unsuccessful outcome. The consequences of failed surgery are many, both physically and psychologically. Evidence indicates that failed surgery increases disability, subjective pain reports and physical impairment (Waddell et al 1989). One important definition of chronicity concerns the level and type of past intervention which clients have experienced. A combined weighted index of past treatment (including physiotherapy, enforced bed rest, traction, acupuncture, etc.) is included as an additional index. This demonstrates that continued, failed intervention is associated very powerfully with increased chronicity (Rose et al 1993).

Psychological factors represent an important feature of the overall experience and adjustment of low back pain patients. The current study draws on two important psychological instruments affective and cognitive in orientation) in order to examine their explanatory power in predicting outcome. Many authors argue that psychological distress develops as a consequence of learned helplessness as each treatment fails, pain continues and disability increases (Main and Parker 1989). Such distress can be assessed using two simple questionnaires which identify somatic anxiety/increased bodily awareness (MSPQ) and depressive symptoms, as measured by the Zung Depression Inventory. The role of patient appraisals regarding disability and future potential have recently been critically examined (for example Waddell et al 1993; Jensen et al 1991). The current study draws on three new instruments which assess cognitions associated with low back pain, namely self efficacy beliefs, locus of control appraisals and specific cognitions associated with chronic disability (Nicholas 1989; Main et al 1992; Boston et al 1991). In addition, socioeconomic variables associated with low back disability are examined: namely social class position, work and benefit status as well as total time lost from work through disability.

Outcome variables in the current study reflect the physical and psychological nature of low back disability. These are pain, and disability (physical outcome) as well as self reported depression, somatic anxiety and self efficacy (psychological status at outcome).

Given that low back pain is complex, multidetermined and dynamic in nature, multiple linear regression is employed in order to examine the relative strength, predictive power and explained/shared variance of various predictor variables (IV) on given outcome or dependent variables (DV). Multiple linear regression represents an appropriate statistical method for examining the relative or unique role of individual variables and for measuring the effects of several theoretically related factors concurrently (Schroeder et al 1986). Such a technique therefore makes it possible to extrapolate the unique contribution which an individual variable makes on a given dependent variable (eg how much does depression shape disability status?) as well as the combined effects of a theoretically driven construct (eg overall psychological distress shaping disability status?).

The procedure adopted in the current study is as follows

1. A specific hypothesis is formulated, for example 'Do psychological variables predict disability?'

2. Variables are then selected for entry into the regression equation. This is based upon past research and theoretical considerations (eg Main et al 1992; Jensen et al 1991).

3. The given dependent variable is identified - in this hypothetical case disability status at six month follow up.

4. Variables are entered into the regression equation in order to examine their predictive power. In each case the initial or baseline variable (in this case disability status on *initial assessment*) is entered first. The rationale for this procedure is as follows. The regression model in the current study is based upon *change* scores as opposed to *final* scores, at outcome. Given that patients have taken part in a therapeutic programme the regression model must take account of initial scores of the dependent variable in question. The standard regression model (final scores) is based upon the following equation: $y = a + bx$ where y= the dependent variable, b = the slope of the regression line, a = the intercept and x = the value of the predictor variable. However this ignores initial scores and is therefore unsatisfactory. In view of the fact that one is trying to predict change scores, the equation takes on the

following form: F - I = a +bx, where F = final score and I = initial scores. This is equivalent to Final Score (F) = Initial Score (I) + bx + a. The model now recognises initial scores. In each case, the initial/ assessment value of the dependent variable in question is identified as (for example see Table 7.2) 'initial disability'.

5. The overall effect of given theoretical constructs are entered into the regression equation and their predictive power examined (ie by extrapolating the combined effects of say psychological distress - MSPQ and Zung).

6. The *unique* contribution which any individual variable makes can then be examined - for example how much does MSPQ shape disability?

The current study is theoretically dirven and aims to enhance knowledge concerning the kinds of physical and psychosocial information which is associated with outcome. Order of entry in the regression analysis thus reflects a biopsychological model of low back disability (Waddell et al 1993). The following theoretical questions are examined in the current study.

1. Do physical variables predict physical outcome (pain, disability)?
2. Do physical variables predict psychological status (depression, somatic anxiety, self efficacy) at outcome?
3. Does a combined psychosocial model predict physical outcome?
4. Do psychological variables predict physical status at outcome?
5. Do psychological variables predict psychological status (depression, somatic anxiety, self efficacy)?
6. Does a combined psychosocial model predict psychological outcome?

7. Does the fear avoidance model of exaggerated perception (Lethem et al 1983) predict physical outcome (pain, disability) at follow up?

Hypothesis 1: Do physical variables predict physical outcome?

The current study views the experience of low back pain as a function of physical and psychosocial variables. Given that chronic low back pain is widely viewed as starting with a physical problem, the current study examines the role of physical variables (pain severity, disability status, age, number of surgical procedures and level of past treatment experienced) in predicting physical status (pain report and disability status) at six months follow up. One might hypothesise that individuals more disabled and physically impaired would have a less successful response to intervention given that the programme is not designed to reduce the physical nature of low back pain (Main and Parker 1989).

Hypothesis 2: Do physical variables predict psychological status?

Furthermore, given that psychosocial distress is perceived as a direct function and consequence of physical impairment, one might predict that indices of impairment would predict psychological status at follow up. For example, depression, somatic anxiety and an overall lack of belief in being able to execute behavioural change (self efficacy) might be predicted on the basis of initial physical variables (fig 1.4). Intuitively this would appear correct given that psychological distress is viewed as a direct consequence of physical impairment in Waddell et al's (1993) model of chronic low back pain.

Hypothesis 3: Does a combined psychosocial model probibit physical outcome?

Pain is complex and affects, and is affected by, the social environment in which disability operates (Waddell 1987). It is therefore hypothesised that a combined model of low back disability which addresses important social, demographic and psychological features would be predictive of physical outcome at follow up (pain, disability status).

Hypothesis 4: Do psychological variables predict physical outcome?

Analysis of the relationship between pain report physical impairment and disability status indicates only a weak relationship, which is statistically non significant. Severity of pain for example only accounted for 10% of the variance of physical impairment and disability (Waddell et al 1993). Hence disability must therefore depend on other factors than solely the severity of pain or physical impairment. Attention has therefore focused upon the role which premorbid psychosocial variables play in mediating physical adjustment (pain, disability status). The current hypothesis therefore examines the role which psychological factors (eg depression) play in shaping physical outcome.

Hypothesis 5: Do psychological factors predict psychological status?

Whilst many authors assert that distress in low back pain patients develops as a direct consequence of prolonged disability, the strongest statement others argue is that the relationship/interdependence of physical and psychological factors "is such that the two frequently coexist" (Sullivan et al 1992). The current hypothesis therefore examines the role or explanatory power which initial psychological status has on psychological functioning at follow up. One might hypothesise that a significant proportion of reported depressive symptoms at follow up can be explained by specific cognitive factors - thereby demonstrating the causal role which individual appraisals (associated with physical disability) play in shaping psychological adjustment (see Turk and Rudy 1987).

Hypothesis 6: Does a combined model predict psychological outcome?

The current hypothesis tests a psychosocial and demographic model of low back disability examining whether such information can predict psychological status at follow up, such ideas represent current thinking in relation to the dynamics of low back pain (eg Phillips 1987).

Hypothesis 7: Does the Fear Avoidance Model (Lethem et al 1983) predict physical outcome?

Pain, Waddell et al (1993) note "is one of the most powerful aversive drives in animals and humans and is closely allied to fear'. A fear avoidance model of exaggerated pain perception (Lethem et al 1983) has been developed, with recent research demonstrating that a fear avoidance construct is capable of successfully discriminating between groups of recovered v chronic groups of patients (Rose et al 1992). The current study therefore examines whether a fear avoidance model developed on low back pain patients is capable of explaining/predicting physical outcome (pain, disability) at follow up.

The theoretical constructs and individual or specific variables entered into the regression model are thus:

1. **Physical Variables**
   - pain
   - disability
   - age
   - past treatment
   - number of operations

2. **Psychological Distres**
   - Zung and MSPQ

3. **Cognitive Variables**
   - Pain self efficacy questionnaire (PSEQ)
   - Positive Active Coping Scale (APC) Boston et al ((1991)
   - Locus 1 - pain responsibility

     Locus 2 - pain strategies scale

4. **Socioeconomic Status**
   - work status
   - social class
   - benefit status
   - total lost work

5. **Psychosocial Combined = Socioeconomic status + cognitive variables + psychological distress.**

7.2 Results

Hypothesis 1 examined whether physical variables predicted physical status at follow up. The current study (Table 7.1) demonstrates that pain status at outcome could not be explained by physical characteristics associated with low back pain (eg age or past treatment). Initial pain report did predict pain status at follow up ($R^2 = 0.46$ $p<0.001$) indicating that patients who express high levels of pain at assessment report similar levels of pain at follow up. Pain report would appear to be a good predictor of pain at follow up. This is unsurprising given that pain management programmes are not designed to reduce pain (Main and Parker 1989).

Physical features of low back pain (Table 7.2) did not explain or predict disability status at follow up. A combined physical index/past treatment variable only weakly explained disability status at follow up accounting for only 12% of the data variance associated with disability at outcome ($p> 0.05$). Similarly, initial disability status did not explain or predict disability at outcome ($R^2=0.03$ $p>0.05$), illustrating its complex multivariate nature (Waddell et al 1993). This may therefore reflect the loose or non causal relationship between physical dynamics of disability (fig. 1.4).

Table 7.1

Title: **Multiple linear regression. The influence of physical variables on self reported pain at six months follow up. (Hypothesis 1)**

Dependent Variable: **Self reported pain at six month follow up.**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.554	7.42*		
Initial Pain	0.464	31.15*	0.787	0.143
Physical Variables				
Disability	0.020	1.317	-0.086	0.075
Treatment History/Age	0.154	1.206		
Past Treatment			0.168	0.200
Number of Operations			0.574	0.377
Age			0.022	0.022

* $p<0.001$

Table 7.2

Title: **Multiple linear regression. The influence of physical variables on self reported disability at six months follow up. (Hypothesis 1)**

Dependent Variable: **Self reported disability at six months follow up.**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.252	2.093		
Initial Disability	0.038	1.598	0.301	0.238
Physical Variables				
Pain	0.013	0.552	0.350	0.471
Treatment History/Age	0.123	1.709		
Past Treatment			-0.9458	0.671
Number of Operations			0.824	2.199
Age			0.067	0.076

Hypothesis 2 addressed whether physical variables predicted psychological status. Results show that physical variables (ie pain, disability, past treatment / age) did not predict depression (R^2=0.08 p>0.05 - Table7.3), somatic anxiety (R^2=0.09 p>0.05 - Table7.4), or self efficacy beliefs (R^2=0.17 p>0.05 Table7.5) To the writer's knowledge there is little or no research which has directly examined whether physical variables, associated with chronic disability are predictive or psychological status. Waddell et al (1993) postulate that distress is a function of physical impairment. Thus self reported depression at outcome would in part be explained by important physical dynamics of low back disability. The current study findings do not support such a hypothesis. This may in part be explained by non specific therapeutic features associated with the programme (Nicholas et al 1992) or the demonstrated effectiveness of pain management interventions from which all clients may benefit (Main and Parker 1989).

Table 7.3

Title: **Multiple linear regression: The influence of physical variables on self reported depression at six months follow up. (Hypothesis 2)**

Dependent Variable: **Self reported depression at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.437	3.892		
Initial Depression	0.289	15.463*	0.744	0.189
Physical Variables				
Pain & Disability	0.022	0.611		
Treatment History/Age	0.062	1.115		
Past Treatment			-0.890	0.955
Number of Operations			2.488	1.891
Age			0.019	0.108

* $p<0.001$

Table 7.4

Title: **Multiple linear regression: The influence of physical variables on self reported somatic anxiety (MSPQ) at six months follow up**
(Hypothesis 2)

Dependent Variable: **Somatic anxiety (MSPQ) at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.333	2.507		
Initial MSPQ	0.123	5.565*	0.371	0.157
Physical Variables	0.092	0.831		
Pain & Disability	0.075	1.680		
Pain			0.701	0.388
Disability			-0.178	0.210
Treatment History/Age	0.023	0.345		
Past Treatment			0.289	0.568
Number of Operations			0.863	1.011
Age			0.019	0.061

* $p<0.001$

Table 7.5

Title: **Multiple linear regression: The influence of physical variables on self reported self efficacy beliefs at six months follow up. (Hypothesis 2)**

Dependent Variable: **Self efficacy beliefs at six month follow up**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.523	5.492*		
Initial Self Efficacy	0.069	4.394	0.364	0.173
Physical Variables	0.179	2.260		
Pain & Disability	0.070	2.225		
Pain			-1.795	0.878
Disability			0.007	0.463
Treatment History/Age	0.116	2.440		
Past Treatment			2.761	1.239
Number of Operations			0.721	2.258
Age			-0.060	0.135

* $p<0.001$

Hypothesis 3 examined whether a combined psychosocial and demographic model could explain pain and disability status at follow up. Whilst the overall model predicted a significant amount of the total data variance associated with pain report at follow up ($R^2=0.68$, $p<0.001$ table 7.6) a significant feature of the explained variance could be explained by initial pain status ($R^2=0.20$, $p<0.001$). A combined psychosocial index similarly accounted for 20% of the total data variance. However, extrapolating the various effects of specific psychosocial constructs (in order to gain a more meaningful understanding of their unique contribution) yielded weak, non significant results which did not predict pain report at outcome (Table 7.6). Thus a combined socioeconomic ($R^2=10.2$ $p>0.05$) and psychological index addressing distress ($R^2=0.06$ $p>0.55$) and specific cognitive variables ($R^2=0.06$ $p>0.05$) yielded non significant results in relation to pain report at follow up.

Disability status at follow up was weakly associated with a combined psychosocial index of low back pain. Overall, the model accounted for 35% of the total variance associated with disability at follow up. The most powerful predictor was a psychosocial index of low back pain which explained 25% ($p>0.05$) of the total data variance. However, specific socioeconomic ($R^2=0.07$ $p>0.05$) and psychological variables ($R^2=0.11$ $p>0.05$) added little to the model when considered independently (table 7.7). Such results do not confer with past work which has identified important behavioural, psychological and socioeconomic features associated with low back pain as significant predictors of current disability (Main et al 1991, Main and Parker 1989).

Table 7.6

Title: **Multiple linear regression. A psychosocial model. The influence of psychosocial variables on self reported pain at six months follow up. (Hypothesis 3)**

Dependent Variable: **Self reported pain at six months follow up.**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.681	5.06*		
Initial Pain	0.198	13.100*	0.617	0.170
Psychosocial (Combined)	0.195	1.074		
Socioeconomic Variables	0.102	1.676		
Work Status			0.113	0.143
Social Class			0.447	0.347
Lost Work			-0.037	0.133
Benefits			0.500	0.321
Psychological Variables (A - F)	0.118	1.111		
Distress (A + B)	0.062	2.071		
MSPQ (A)			0.144	0.073
ZUNG (B)			-0.023	0.063
Cognitive Variables(C - F)	0.063	1.051		
PSEQ (C)			0.025	0.039
Locus 1 (D)			-0.141	0.100
Locus 2 (E)			0.021	0.097
APC (F)			0.381	0.588

* $p<0.001$

Table 7.7

Title: **Multiple linear regression. A psychosocial model. The influence of physical variables on self reported disability at six month follow up. (Hypothesis 3)**

Dependent Variable: **Self reported disability at six months follow up.**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.346	1.017		
Initial Disability	0.014	0.486	0.278	0.399
Psychosocial (Combined)	0.256	0.735		
Socioeconomic Variables	0.079	0.682		
Work Status			0.431	0.484
Social Class			0.696	1.155
Lost Work			0.209	0.440
Benefits			0.371	1.086
Psychological Variables	0.115	0.569		
Distress (A + B)	0.020	0.346		
MSPQ (A)			-0.056	0.346
ZUNG (B)			0.136	0.189
Cognitive Variables (C - F)	0.032	0.282		
PSEQ (C)			0.672	1.902
Locus 1 (D)			-0.271	0.302
Locus 2 (E)			0.295	0.322
APC (F)			-0.036	0.118

Hypothesis 4 considered whether psychological variables predicted pain and disability status (tables 7.8 and 7.9). Psychological indices addressed distress (MSPQ and Zung) and specific cognitive variables,(eg self efficacy beliefs). The model for Pain (Table 7.8) was significant ($p<0.001$) explaining 59% of the total data variance. However, once initial pain status had been controlled for - psychological variables were only weakly associated with pain report at follow up, accounting for only 8% ($p>0.05$) of the total data variance. Similarly psychological variables did not explain or predict disability status at outcome accounting for only 16% of the overall data variance (Table 7.9). Such findings do not support a large body of work by Main et al (1992) which has stressed the role of 'simple distress' in shaping physical outcome - in particular disability status. More recently, however, Waddell et al (1993) have reported similar results to the current study. Indices of distress were not associated with current disability status, pain report or amount of lost work in a sample of 184 low back pain patients. The authors argue that psychological and in particular cognitive variables addressing the dynamics of low back pain are too general and thereby fail to adequately explain the physical features of disability.

Table 7.8

Title: **Multiple linear regression. The influence of psychological variables on self reported pain at six months follow up. (Hypothesis 4)**

Dependent Variable: **Self reported pain at six month follow up.**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.591	5.06*	0.630	0.155
Initial Pain	0.239	16.423*		
Combined Psychological	0.083	0.813		
Distress (A +B)	0.021	0.720		
MSPQ (A)			0.077	0.064
ZUNG (B)			-0.021	0.054
Cognitive (C - F)	0.031	0.541		
PSEQ (C)			0.019	0.094
Locus 1 (D)			-0.071	0.071
Locus 2 (E)			-0.019	0.094
APC (F)			0.486	0.532

* $p<0.001$

Table 7.9

Title: **Multiple linear regression. The influence of psychological variables on self reported disability at six months follow up. (Hypothesis 4)**

Dependent Variable: **Self reported disability at six months follow up.**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.285	1.447		
Initial Disability	0.043	1.760	0.356	0.268
Combined Psychological	0.163	0.946		
Distress (A+B)	0.011	0.228		
MSPQ (A)			-0.124	0.202
ZUNG (B)			0.079	0.168
Cognitive (C - F)	0.045	0.460		
PSEQ (C)			-0.103	0.100
Locus 1 (D)			-0.265	0.251
Locus 2 (E)			0.223	0.301
APC (F)			0.592	1.700

Hypothesis 5: Analysis reveals that the overal model of depression at outcome was significant ($R^2=0.41$ $p<0.05$). However, the only variable which predicted depression at outcome was initial depression recorded at assessment ($R^2=0.12$ $p<0.05$). Somatic anxiety and specific cognitive variables were not predictive of depression at follow up (Table 7.10).

Similarly whilst the overall model for MSPQ at outcome was significant ($R^2=0.32$ $p<0.05$) the vast majority of such variance could be explained by initial scores on this particular variable ($R^2=0.23$ $p<0.05$). Depression ($R^2=0.001$ $p>0.05$) and specific cognitive beliefs were not predictive of somatic anxiety ($R^2=0.08$ $p>0.05$, Table 7.11). Self efficacy beliefs at initial assessment is furthermore a significant predictor of scores on this variable at outcome ($R^2=0.28$ $p<0.01$, Table 7.12) and confirms earlier findings by Deyo at al (1986). Other specific psychological variables did not however predict self efficacy at outcome, for example distress ($R^2=0.05$ $p>0.05$) and other cognitive variables such as locus of control appraisals ($R^2=0.04$ $p>0.05$).

Table 7.10

Title: **Multiple linear regressions: The influence of psychological variables on self reported depression at six months follow up. (Hypothesis 5)**

Dependent Variable: **Self reported depression (Zung) at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.413	3.019*		
Initial Depression	0.123	6.291 *	0.644	0.248
Combined Psychological (A+B)	0.022	0.230		
Distress (A)				
MSPQ	0.004	0.219	-0.127	0.277
Cognitive (B)	0.020	0.261		
PSEQ			-0.105	0.136
Locus 1			0.041	0.339
Locus 3			0.190	0.461
APC			-1.615	2.551

* $p<0.05$

Table 7.11

Title: **Multiple linear regression The influence of psychological variables on self reported somatic anxiety (MSPQ) at six months follow up. (Hypothesis 5)**

Dependent Variable: **Somatic anxiety (MSPQ) at six months follow up.**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.329	2.54*		
Initial Somatic Anxiety	0.238	11.01	0.494	0.149
<u>Psychological Variables</u>				
ZUNG	0.001	0.001	0.002	0.136
<u>Cognitive Variables</u>	0.082	0.955		
PSEQ			0.117	0.074
Loucs 1			-0.151	0.181
Locus 2			-0.174	0.243
APC			-0.240	1.393

* $p < 0.05$

Table 7.12

Title: **Multiple linear regression. The influence of psychological variables on self reported self efficacy beliefs at six monts follow up. (Hypothesis 5)**

Dependent Variable: **Self efficacy beliefs at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.466	3.750*		
Initial Self Efficacy	0.214	12.067*		
Combined Psychological (A-E)	0.120	1.127		
Distress (A + B)	0.057	0.163		
MSPQ (A)			0.193	0.366
ZUNG (B)			0.013	0.316
Cognitive (C - E)	0.044	0.838		
Locus 1 (C)			0.409	0.432
Locus 2 (D)			-0.262	0.588
APC (E)			3.553	3.250

* $P < 0.001$

Hypothesis 6 : a combined psychosocial model of low back pain was employed in order to predict psychological status at follow up (depression, somatic anxiety and self efficacy). An overall index of both psychological and socioeconomic features of disability did not explain patient reports of depressive symptoms ($R^2=0.11$ $p>0.05$ - Table 7.13), somatic anxiety ($R^2=0.14$ $p>0.05$ - Table 7.14) or specific cognitive appraisals, namely self efficacy ($R^2=0.16$ $p>0.05$ - Table 7.15). Once again, initial self efficacy was a significant predictor of scores on this variable at follow up ($R^2=0.10$ $p<0.05$) All psychosocial variables were weakly associated with outcome especially when the dependent variable in question had been controlled for.

Table 7.13

Title: **Multiple linear regression. A psychosocial model. The influence of psychosocial variables on self reported depression at six months follow up (Hypothesis 6)**

Dependent Variable: **Self reported depression (Zung) at six months follow up**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.468	2.19*		
Initial Depression	0.068	3.23		
Psychosocial combined	0.111	0.583		
Socioeconomic variables	0.092	1.090		
Work status			3.833	3.961
Social class			3.253	1.727
Lost work			-0.070	0.610
Benefits			-2.336	0.285
Psychological Variables				
MSPQ	0.002	0.117		
Cognitive Variables	0.008	0.101		
PSEQ			-0.092	0.162
Locus 1			-0.064	0.383
Locus 2			0.035	0.474
APC			0.438	2.801

* $p<0.05$

Table 7.14

Title: **Multiple linear regression. A biopsychosocial model. The influence of psychosocial variables on self reported somatic anxiety (MSPQ) at six months follow up. Hypothesis 6**

Dependent Variable: **Somatic anxiety (MSPQ) at six months follow up**

	Change R^2	**F**	**B**	**Se(b)**
Total Explained Variance	0.397	1.64		
Initial MSPQ	0.251	10.425*	0.573	0.177
Psychosocial combined	0.143	0.659		
Socioeconomic variables	0.064	0.666		
Work status			0.374	2.226
Social class			1.310	0.970
Lost work			-0.113	0.343
Benefits			-0.155	1.609
Psychological Variables	0.090	0.749		
Depression (Zung)	0.005	0.219	-0.075	0.160
Cognitive Variables	0.077	0.798		
PSEQ			0.100	0.001
Locus 1			-0.237	0.215
Locus 2			-0.099	0.366
APC)			0.120	1.574

* $p<0.05$

Table 7.15

Title: **Multiple linear regression: A psychosocial model. The influence of psychosocial variables on self reported self efficacy beliefs at six months follow up. (Hypothesis 6)**

Dependent Variable: **Self reported self efficacy beliefs.**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.533	1.936		
Initial Self Efficacy	0.103	4.900*	0.500	0.253
Psychosocial combined	0.167	0.658		
Socioeconomic Variables	0.020	0.240		
Work Status			-0.223	0.950
Social Class			-1.624	2.266
Lost Work			-0.046	0.864
Benefits			0.914	2.130
Psychological Variables (A - E)	0.070	0.557		
Distress (A + B)	0.019	0.463		
MSPQ (A)			0.358	0.459
ZUNG (B)			0.115	0.379
Cognitive Variables (C-E)	0.030	0.484		
Locus 1 (C)			0.417	0.647
Loucs 2 (D)			-0.424	0.648
APC (E)			3.405	3.875

* $p<0.001$

Hypothesis 7 : The fear avoidance model of exaggerated perception (Lethem et al 1983) was examined in order to see whether a fear avoidance construct was associated with pain and disability status at outcome. The model consists of a number of indices - namely pain history, active coping strategies, an index of stressful life events and a personality measure as measured by the MSPQ (Slade et al 1983). Results indicate that the model could not explain or predict either pain ($R^2=0.06$ $p>0.05$, Table 7.16) or disability status ($R^2=0.05$ $p>0.05$, Table 7.17) at follow up. Whilst the overall model for pain was significant ($R^2=0.57$ $p<0.001$) the vast majority of this explained variance was accounted for by initial pain status at assessment ($R^2=0.47$ $p<0.001$)

Table 7.16

Title: **Multiple linear regression. The influence of fear avoidance variables on self reported pain at six month follow up (Hypothesis 7)**

Dependent Variable: **Self reported pain at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.570	5.70*		
Initial Pain Status	0.474	33.179*	0.841	0.146
<u>Fear avoidance variables</u>	0.063	0.744		
Pain history	0.059	1.393		
Somatic anxiety			-0.034	0.049
Active coping strategies			-0.004	0.008
Weighted life events			0.002	0.002

* $p<0.001$

Table 7.17

Title: **Multiple linear regression. The influence of fear avoidance variables on self reported disability at six month follow up**

Dependent Variable: **Self reported disability at six month follow up**

	Change R^2	F	B	Se(b)
Total Explained Variance	0.184	1.00		
Initial Disability Status	0.070	2.676	0.415	0.254
<u>Fear avoidance variables</u>	0.054	0.346		
Pain History	0.043	0.548		
Somatic anxiety			-0.048	0.174
Active coping strategies			0.028	0.031
Weighted life events			0.001	0.008

7.3 Discussion

The current study was unable to identify any particular variables which would successfully predict treatment outcome for patients attending a pain management programme. There are a number of methodological and conceptual features of the current study as well as aspects of the participating clients and the intervention programme itself which may be responsible for the current findings.

Waddell et al (1993) put forward a biopsychosocial model of chronic low back pain which suggests that the main clinical elements of low back disorders are physical and psychosocial variables; namely, pain, disability, physical impairment, psychological distress and illness behaviour. Analysis of the relationship between these elements of low back pain has been used to develop a model of illness (fig. 1.4) which illustrates a number of clinical and conceptual themes adopted in part by the current study. The failure of the current study to predict treatment outcome may be attributed to (a) a number of clinical features or assumptions which the model asserts; (b) an inability to adequately assess two of the main features of the model (physical impairment and illness behaviour); (c) a failure to recognise important clinical constructs associated with chronic disability namely fear (Waddell et al 1993) and (d) other factors such as limited variation in treatment outcome.

Waddell et al's (1989) model of low back pain advocates a linear relationship between a primary physical problem and secondary psychosocial reactions which shape and determine overall assessment. With chronic low back pain. it is hypothesised that psychological distress develops as a consequence of a persistent and disabling stressor. Distress is communicated in the form of illness behaviour. Finally the social environment is perceived as an important index of adjustment. Thus low back pain does not operate within a vacuum and as disability persists features of the social environment (eg state support) acts as powerful agents of reinforcement. The current study adopted in part this model which has an intuitive and clinical appeal recognising the interdependence of physical and psychological features of physical health.

A number of clinical, methodological and conceptual features of the model demand closer attention. Such analysis may in part explain the difficulty or inability of the current study to successfully predict treatment outcome. Many clinicians argue that chronic low back pain starts with a physical problem and that illness behaviour, on examination, represents a model of communication - a magnified or more emphatic presentation of the severity of the problem The current study would clearly have profited from inclusion of these two important clinical constructs. An index of physical impairment and illness behaviour were not included in the current study because a large number of GPs and Consultants acted as referral agents and it would have been necessary to standardise assessments by employing an orthopaedic Consultant (based at the university) who would have been responsible for examining all clients referred to the project. This procedure, whilst clearly preferable to the one adopted, was constrained by the logistics of such an exercise. Assessment of the severity of low back pain is fundamental to clinical treatment, monitoring progress and providing social support. Whilst the current study assessed current levels of pain and disability, it is both unwise and incorrect to assume that they are all proportionate to the pathological diagnosis or levels of objective physical impairment (fig 1.1). Correlations between pain, physical impairment and disability are generally low. Pain (an unpleasant sensory and emotional experience), physical impairment (anatomical, pathological or physiological abnormality of structure or function) and disability (diminished capacity for everyday activities and gainful employment) are qualitatively different constructs. Whilst there is some interdependence amongst these variables, recent research demonstrates that severity of pain only accounted for 10% of the variance of physical impairment and disability (Waddell et al 1992). These results have been confirmed by Linton (1985), Waddell (1987), Riley (1988) and Slater et al (1991).

Recent research has demonstrated that it is possible to accurately measure physical impairment or 'current functional limitation' due to low back pain, even when there is little or no evidence of demonstrable structural impairment (Waddell et al 1992). However, faced with a lack of objective physical information, medical assessment and treatment is largely influenced by how patients communicate pain and disability in a clinical context, (i.e. by the level of observable illness behaviour). In the author's experience, the vast majority of clients referred to the programme were those with nonspecific low back pain. Consider the GP who, faced with such a client is required to make an assessment of the patient's disability, level of impairment and rehabilitation potential. The client presents as an individual for which past treatment has failed, the doctor is unable to make an accurate or firm diagnosis and s/he seems to be 'putting it on a bit'. Illness behaviour is the patients primary tool for which s/he can communicate their distress and misery regarding failed intervention and increasing disability. Thus a wealth of evidence indicates that once a patient reaches a physician, medical assessment is influenced more by the patient's illness behaviour than by the actual physical disorder (Main et al 1992). Medical treatment may in theory be prescribed for medical indications, but in practice, treatment for a poorly understood condition such as chronic low back pain is determined to a much greater extent than most clinicians realise by abnormal illness behaviour (fig. 2.1).

In view of such evidence an index of illness communication as measured by magnified illness behaviour (in response to the challenge of a clinical intervention) represents a powerful behavioural and psychological feature of chronic low back pain. Such information should clearly have been incorporated into the current study. Pain, disability, impairment and illness behaviour therefore represent important constructs which should be used to assess the treatment response of chronic low back pain patients. Whilst theoretically and clinically interdependent, a great deal of research indicates that there is much independence and variability amongst these variables. Recent evidence demonstrates that impairment or functional limitation can be reliably assessed in low back pain patients and that such assessment can be accurately discriminated from behavioural/non organic signs and symptoms of back pain (Waddell et al 1992; Main and Parker 1989).

In part therefore, the current study's inability to identify variables or predict treatment outcome following a pain management programme, may stem in part from methodological issues. An inability/failure to include two theoretically and clinically relevant constructs clearly associated with chronic pain. 'Illness behaviour' and 'impairment' (even with non specific low back pain) can be reliably assessed during clinical interview, feature heavily in Waddell's (1987) model of low back pain, shape disability and may therefore act as powerful discriminators of adjustment following a pain management programme.

A number of authors have recently challenged Waddell's (1987) biopsychosocial model of low back pain (eg Schofferman et al 1992; Polatin 1993; Gainsa 1990). Physical impairment represents the embryonic variable of the model, shaping psychological distress and rehabilitation potential. The vast majority of the literature on low back pain and more generally chronic pain has been a history of a number of sharply divided ideologies. Such theoretical models have attempted to understand the experience and perplexing nature of chronic pain as a function of individual psychopathology (Blumer and Heilbronn 1982; Engel 1959), of learned modes of behaviour based on reinforcement principles (Fordyce 1976), of the wider social infrastructure which shapes disability (Mechanic 1977) and more recently, cognitive behavioural principles (Main and Parker 1989).

Waddell et al's (1993) model synthesises such themes recognising the interdependence, yet dynamic nature of chronic low back pain. In identifying a sensory or physical cause such ideas explicitly state that psychological consequences are a secondary function of a disabling stressor, rejecting at once psychogenic or functional models, long subscribed to in the area of low back pain (eg Sternbach 1974).

Polatin et al (1993) challenge such views. Whilst rejecting functional models of chronicity, the authors demonstrate that a population of chronic low back pain patients entering a functional restoration programme showed significantly higher levels of lifetime psychiatric or psychological distress including major depression, substance abuse as well as personality and anxiety disorders as measured by DSM-III-R. Subjects were evaluated for current and lifetime incidence of psychiatric syndromes. All patients had been symptomatic with low back pain for at least four months and were assessed using the structured clinical interview for DSM-III-R which derives a current and complete past history of psychiatric illness. It is therefore possible to determine whether psychiatric symptoms or psychological problems preceded or followed any particular life event (eg low back pan).

Results showed that even when the somewhat controversial category of somatoform pain disorder was excluded, 77% of patients met lifetime diagnostic criteria and 59% demonstrated current symptoms for at least one psychiatric diagnosis. The most common were major depression and anxiety disorders. What is significant however, and where the authors differ from Waddell et al (1993), concerns the evolution or development of such psychological disorders. Main et al (1992) argue that simple distress is a function and direct consequence of a physical stressor. Polatin et al (1993) however report that of those patients with a positive lifetime history of psychological problems, there was an equal division between those who developed depression prior to the onset of low back pain and those whose symptoms developed as a consequence of their physical problems. In contrast substance abuse also occured at a significantly higher level than within the general population but once again had a markedly premorbid pattern of development. Anxiety disorders did not differ significantly from the population at large - but developed in a predominantly premorbid fashion.

Thus 54% of those with depression, 94% of those with a history of substance abuse and 95% of those with anxiety disorders experienced their symptoms before the onset of their pain. These are, the author notes, the first results to indicate that certain psychological disorders appear to *precede* chronic low back pain (eg anxiety disorders) whereas others (specifically major depression) develop equally before and after the onset of pain. Such results add a deeper understanding of causality and predisposition in the development and dynamics of psychological and physical stress associated with low back pain. The appeal of such ideas is the recognition of physical and psychological features of low back pain, an implicit rejection of pure psychogenic models of chronicity, and empirical support for the idea that distress can both precede and follow a physical problem (Schofferman et al 1992). Intuitively it would seem correct that those individuals who had experienced episodes of psychological stress and then develop low back pain, would have grater difficulty in adjusting or coping.

Thus the dynamic or relationship between physical and psychosocial parameters of physical health may be somewhat more complex than Waddell et al's (1993) learned helplessness model of chronicity. This may, therefore, explain the inability of the current study to accurately identify patient characteristics which predict outcome at follow up. Hence a more sophisticated assessment procedure which focuses on both current and premorbid levels of psychological stress may help future researchers to effectively identify and predict treatment outcome more effectively.

Such ideas fit, considering that the majority of the population with low back pain and disability come independently without medical support. Patients do not go to the doctor simply because of pain or the severity of pain and there is little difference between patients with low back pain who see a physician and those who cope by themselves (Consumers Association, Back Pain Survey 1986). Seeking health care appears dependent more on the person's perception and interpretation of the significance of their symptoms, on learned and cultural patterns of illness behaviour, as well as levels of emotional stress, presence of significant life events and levels of anxiety (Mechanic 1977; 1980).

A general question which a number of authors address concerns whether patients referred to pain management programmes are representative of the population of patients with long standing/persistent pain (Turk and Rudy 1990). In an epidemoogical survey conducted by Crook et al (1986; 1989) chronic pain patients referred to specialist pain clinics in comparison to persistent pain suffers in the community (who were not referred) were more likely to (a) suffer greater levels of emotional distress; (b) to have work related injuries; (c) report greater health care utilisation; (d) report more constant pain; (e) indicate more negative attitudes about the future; and (f) report greater functional impairment. Turk and Rudy (1990) argue that patients who reach pain management programmes go through a referral filtering process and tend to show greater psychosocial difficulties, impaired functioning and disability which are by definition associated with greater morbidity. The authors conclude that such patients have

> 'The most recaliztrant problems ..... specialist clinics treat the most difficult and perhaps most atypical cases. If recent surveys are any indication, the vast majority of people with chronic pain are never seen in pain clinics and may be adjusting reasonably well.'.

A number of themes documented recently in the literature therefore emerge. These include: (a) the majority of chronic pain patients cope independently without support; (b) clients referred to pain management programmes are 'atypical.... the most frustrating to treat'; (c) patients referred to pain clinics have far higher levels of psychological distress and illness behaviour than a community based sample; (d) chronic low back pain patients entering a rehabilitation programme show significantly higher levels of premorbid psychological dysfunction. Therefore measures of current distress in an atypical population of patients might not be the most useful or powerful predictors of outcome (Polatin et al 1993). Clearly one would expect that those whose distress developed as a consequence of low back pain would have a far better rehabilitation potential as opposed to individuals with more complex psychopathology (whose current distress is a function of both current disability and premorbid psychological stress). Future research directed towards addressing these questions may prove more profitable in identifying behavioural and psychosocial variables associated with outcome.

This suports research which has tried to identify which factors predict whether patients (a) enter treatment; (b) remain in treatment; (c) have successful responses to these therapeutic programmes, and (d) maintain treatment benefits achieved at the time of discharge. Turk and Rudy (1990), for example, examine in a detailed review the influence or variables such as demographic characteristics (eg age, gender, marital status), personality traits (eg hysterical, passive, hostile), psychopathological features (eg major depression) as well as medical status variables (number of surgeries), employment position and legal status on rehabilitation outcome. The authors conclude that despite the level of research activity and methodological rigour of many studies the importance of patient variables in predicting entry, drop out or success of treatment remains equivocal (eg Mendelson 1992; Melzack and Wall 1982). The current study supports such findings.

A large body of research has, however, demonstrated that various behavioural, psychological and demographic features of low back pain patients (as they present in clinical interview) are predictive of *current* levels of disability, pain and work loss (eg Main and Parker 1989). Examples here include magnified illness presentation, distress, as well as various belief systems and coping mechanisms including fear avoidance, self efficacy and catastrophising current situation (Main et al 1992; Waddell et al 1993; Jensen et al 1991). Such work clearly demonstrates that behavioural and psychological features of low back pain contribute and are able to explain *current* levels of pain and disability but are not capable of predicting *future* disability following intervention.

Additional features of research which in part may explain the current findings include (a) a myopic model of pain assessment (eg Polatin et al 1993); (b) a failure to identify 'active' therapeutic ingredients associated with rehabilitation programmes

(Nicholas et al 1992; Pearce 1986); (c) issues of attrition and homogeneity in participating clients (Turk and Rudy 1990); (d) powerful therapeutic effects of pain management programmes from which all clients can benefit (Flor et al 1992) and (e) a concentration of past research in predicting outcome following radical modes of treatment such as surgery (eg Waddell et al 1987).

For example a large body of research has indicated that premorbid psychological variables are predictive of outcome following surgical intervention (eg Schofferman et al 1992). Waddell et al (1986) conclude that the physical outcome of surgery depends almost exclusively on physical factors - namely accurate diagnosis, operative findings, surgical procedure and avoidance of complications. Thus with successful resolution of treatment, one would expect an associated reduction in impairment, disability and distress. Research confirms such hypotheses (Waddell et al 1989). Often, however, decisions about whether to undertake spinal surgery are influenced less by objective pathological information and more by the patient's level of illness behaviour. Here decisions about whether or not to operate are based more on the patient's demands and less by objective, logical decisions. In such instances, surgery is of little value, leads to predictably poor results and magnifies further affective and behavioural symptoms (Frymoyer and Douaghy 1985). Thus with surgical patients there is either a successful resolution (based on objective pathologic information) or an unsuccessful outcome (based on affective/behavioural disturbances). In one instance, impairment, disability and distress significantly reduce whilst in situation two, they become increasingly magnified. Past empirical work concerning the prediction of surgical outcome (because there are essentially two groups at outcome - successful v unsuccessful) has thus been a positive empirical and clinical exercise helping to shape current orthopaedic thought concerning the management of low back pain (Allan and Waddell 1989).

The situation with pain management programmes is however less straightforward. Intervention is not designed to reduce impairment or pain, but to enable clients to lead fuller, less dysfunctional lifestyles (Flor et al 1992). The psychopathology of the pain management patient is often qualitatively different from the surgical patient and individuals who are considered for such programmes probably represent a more homogeneous group of low back pain patients. This is likely to make prediction of outcome more difficult that it is in the case of surgery where two extreme groups are usually being compared.

The current study failed to identify variables associated with treatment outcome. Other research has demonstrated similar results (eg Brennan et al 1987). However, given thatsome studies have identified variables associated with outcome (principally by explaining current disability, outcome from surgery and prospective longitudinal work) a number of researchers have focused attention on pain programmes themselves. A large body of work has tried to identify 'active' therapeutic ingredients associated with pain management programmes (whether behavioural or cognitive behavioural) as well as non specific factors such as transference issues or group dynamics. Such analysis has, however, yielded inconclusive results, demonstrating the difficulty of identifying therapeutic effects associated with treatment outcome (eg Nicholas et al 1991; 1992). Thus a number of authors have argued that various, non specific therapeutic features common to all pain management interventions (from which all clients can benefit) may explain thefindings of studies. As Pearce (1986) notes:

> 'The specific effect of any of these treatment methods has not yet been demonstrated. It remains a possibility that certain non specific processes common to all the apparently diverse psychological methods for controlling chronic pain may play a part in any beneficial effects of the interventions.'

One area of similarity which is common to all psychological therapies for chronic pain is the need for patients to reconceptualise their current experience. This includes a shift from a strict pathology model, an embracement of psychosocial influences and fundamentally a reappraisal of current behaviour, situation and disability. Thus cognitive change may be a feature of all interventions - whether behavioural, biofeedback or multimodal. What differs is the actual method of achieving such goals which are implicitly designed to enhance self efficacy, shift locus of control and correct dysfunctional ideas via education, behavioural intervention or explicit cognitive therapy (Pearce 1986; Turk et al 1987). Other common therapeutic features include contact with an emphatic professional, instillation of hope for relief of symptoms and positive group dynamics such as shared experience (Pearce 1983; Main and Parker 1989; Malone and Stube 1988). Given therefore, that non-specific factors may account for therapeutic change following pain management intervention (and the difficulty of measuring such constructs) the difficulty in predicting outcome becomes evident.

A particular concern of the current study and other pain management programmes relates to the kinds of patient who attend such therapeutic programmes. This analysis has recently been addressed by a number of authors in an attempt to understand 'neglected factors' in pain treatment studies (Turk and Rudy 1990). Patient attrition represents a particular concern of all psychotherapeutic interventions - studies in psychiatric clinics indicate that 20-57% of all patients fail to return after their first visit (Dodd 1977). Patients can drop out of treatment at various stages, (a) not attending an initial assessment interview; (b) those considered suitable often fail to attend the programmes first day, and (c) having started the course dropping out during treatment.

This was a particularly significant issue in the current study as 14% of patients who actually started the programme failed to complete the full course and more significantly 50% of those who were considered suitable for the programme failed to return questionnaires and start the course. Furthermore a large number of individuals, approximately 75% (N=30) of the total treated group, failed to attend initial interview. In the author's experience these represent significant issues given the treatment efficacy of such programmes (Main and Parker 1989). A highly selective, motivated group of individuals, who possess strong 'rehabilitative drive' may therefore have participated in the current study. This may therefore explain (by virtue of their homogeneity) a lack of explanatory power in predicting outcome. Considerable discussion has thus focused on lack of patient motivation and secondary gain as key features of patient rejection of treatment. Such patients tend to be viewed as poorly motivated, psychologically dysfunctional, resistant, denying and having poor prognoses. Lack of motivation and refusal of treatment is thus attributed to patient characteristics (eg Ford 1992).

An alternative view is that presented by Turk and Rudy (1990) which emphasises the mismatch between patients beliefs and expectancies regarding treatment and the actual therapeutic gains available. The vast majority of patients seek treatment in the hope that their pain will be reduced/eliminated. Most programmes give the explicit message that they will help the patient 'learn to live with pain'. Turk and Rudy (1990) note that refusal of treatment may reflect

> 'A mismatch between their views of their problem and treatment goals which conflict with the rationale for the treatment offered and the expressed goals of the treatment programme.'

Both views in the author's experience can be supported. Patients perception of treatment stems in part from complex psychosocial factors, as well as a firm perception that treatment should be directed towards reducing pain. In both cases the end result is of a skewed population of patients who take part in the programme - ie highly motivated individuals with a strong personal drive to rehabilitative measures and a perception that pain relief is an untenable goal. One could argue that the current treatment study resulted in a select sample of patients who successfully completed the programme. Their representativeness is therefore limited. The efficacy of intervention is thus tempered and the ability to successfully predict treatment outcome is constrained. The prediction of outcome in the current study can be contrasted with longitudinal prospective research or studies which try and explain current disability, pain and work loss (Main et al 1992). Here heterogeneous groups of patients take part. Assessment takes place in orthopaedic clinics and follow up is measured by simple questionnaires. Rehabilitation programmes offer therapy. Perceived therapeutic potential and the nature/complexity of patients psychosocial background appear to be key factors in attendance at pain clinics. Such factors may therefore explain the current study's findings.

Questions can be raised regarding the utility of the MSPQ. Heightened somatic awareness represents, Main (1983) argues, an important feature of chronic pain and may predict therapeutic outcome. Somatic anxiety represents a key feature of Waddell et al's (1993) biopsychosocial model of low back pain and is considered a psychological construct, a form of distress in response to a physical problem. Deyo et al (1989) note however that certain scale items may reflect true pathophysiological changes as opposed to heightened somatic awareness. The authors found support for this view. The most frequently reported item (muscles in neck aching) might reflect, the authors argue, 'parsimonious muscle tension', whilst the second most frequently reported item (legs feeling weak) may also reflect actual neurological changes, ie numbness or true motor weakness. The authors found empirical support for such hypotheses - thus indicating that at least two items in the scale may reflect true pathophysiology as opposed to indices of psychological distress. This indicates that the MSPQ may reflect a hybrid of two conceptually different dynamics of low back pain which are physical and psychological in nature. In addition the authors found that the scale was not predictive of patient outcome having controlled for depression, patient education and various personality traits (MMPI). Similar concerns can be raised regarding the Zung Depression Inventory where scale items may reflect physical as opposed to psychological disability. Distress as measured by these two instruments is a key variable in Waddell and Main's (1984) model of low back disability. Their overall clinical value (as measures of psychological distress) can however be questioned (Deyo et al 1989).

Typical treatment goals of a cognitive behavioural intervention include (a) increasing activity level in general and in regard to specific exercise constraints; (b) reduction in pain behaviours associated with protective action by others; (c) prediction in health care utilisation, pain related medication; (d) reduction in fear governed behaviour. An example of the efficacy of such interventions is provided by Mayer et al (1985; 1986) who has combined these behavioural and psychological principles into a sports medicine approach. Objective functional capacity measurements were used to guide patients on an active exercise programme with an improvement in disability and function seen as desired therapeutic goals. Results are clearly impressive - 86% of participating clients return (at two year follow up) to full time work, demonstrating that the vast majority of clients who take part in such programmes benefit both physically and psychologically. Whilst the current study has in no way demonstrated similar return to work rates, the efficacy of intervention (both group and individual) is clear. Given the iatrogenic and behavioural dynamics of low back pain, clients lack of knowledge regarding disability as well as the associated physical deconditioning which is commonly experienced, all clients (in the author's experience) can benefit from such an intervention. The current study's findings could in part be attributed to the intervention programme itself - which is therapeutically powerful and from which all clients can benfit (Flor et al 1992).

7.4 Conclusion

The current study's findings can thus be attributed to a function of a number of clinical, empirical and methodological features. These include (a) a failure to understand and address the true dynamics of chronic low back pain (eg Waddell et al 1993); (b) an assumption that psychological distress is a direct consequence of a prolonged physical stressor (eg Polatin et al 1993); (c) methodological assumptions of various instruments (eg the MSPQ); (d) the inability of past research to identify active therapeutic ingredients associated with pain management intervention (Nicholas et al 1990); (e) a failure of past research to predict outcome following behavioural programmes (Brennan et al 1986); (f) specific features of clients attending the course (Turk and Rudy 1990), and (g) the effectiveness of therapy (Malone and Strube 1988).

CHAPTER 8

Discussion and Conclusions

8.1 Observations on the history, cost and treatment of chronic low back pain

Approximately 80% of the population will, at some stage in their life, experience low back pain. The vast majority of such episodes recover naturally (after 6-8 weeks) irrespective of treatment received. A small percentage will however become chronic (defined as constant pain of greater than six months duration). This is now recognised as a complex physical and psychosocial experience which disrupts and interferes with all aspects of life - economic, social, sexual, etc. (Phillips 1987). Low back pain is not new. Back pain has affected man throughout recorded history and probably long before. However, since the 1950's there has been a dramatic increase in the incidence of low back disability (in all Western countries) as witnessed by increased work loss, sickness certification, compensation/litigation procedures and overall disability payments. Low back disability is a function of the industrialised, developed world; a consequence of (a) changed medical ideas and management, (b) patient perceptions and expectations regarding total pain relief and (c) a social infrastructure which supports those disabled by pain.

In the United Kingdom between 1971 and 1990 the number of days lost from work through low back pain rose from 15.8m. to 59.6m, thereby exceeding work loss due to coronary heart disease (19.2m.) or bronchitis (12.9m.). In 1990, disability from low back pain accounted for approximately 14% of all sickness absence. Similarly, although only 10% of back pain episodes are seen by GPs, consultation rates are triple those for coronary heart disease. A wealth of evidence would therefore indicate that low back pain now constitutes the most expensive health care problem in the UK (MRC Report on Low Back Pain 1991). Medical management of low back pain is based upon a disease centred, mechanistic model of pain. However a large body of evidence indicates that disability is a dynamic experience, a composite of both physical and psychosocial parameters. Treatment should therefore reflect such experience.

The evolution of pain management programmes reflect a number of historical themes. These include increasing concern at the level of disability, distress and financial costs associated with caring for such patients, concerted efforts at rehabilitating rather than curing chronic pain groups, a recognition that psychosocial variables are instrumental in shaping overall disability and positive evidence demonstrating the efficacy of behavioural interventions (Fordyce 1976; Mayer 1985; Office of Health Economics 1985). The growth and development of pain management programmes in the last twenty years represents a recognition of the complex, multifaceted nature of chronic low back pain, an understanding of the desynchronous relationship between pain report and behaviour and an acknowledgement of treatment which addresses both physical and psychological features of pain. The aim of such programmes is to rehabilitate rather than cure patients. Goals include (a) a reduction of illness and avoidance behaviour, (b) an enhancement of self efficacy beliefs and (c) fostering more realistic appraisals concerning fear-avoidance ideas.

The current study draws together a number of clinical and methodological observations which are empirically supported (Flor et al 1992; Main et al 1992). The current inquiry synthesises such themes, thereby representing an advanced, positive appraisal of issues concerned with the assessment, rehabilitation and overall dynamics of low back pain. More specifically, an examination of specific treatment issues, methodological concerns and assessment/evaluation questions is made. These include (a) the efficacy or preferences of group v individual therapy; (b) an examination of a pain management programme based on cognitive behaviour principles; (c) the prediction of treatment outcome; and (d) an examination of a biopsychosocial model of low back disability (Waddell et al 1993).

Historically the rehabilitation of patients with chronic pain conditions has taken place in a group environment. Rehabilitation or multimodal treatment programmes are the preferred intervention offered. Such treatments are eclectic in nature and draw upon the skills and experience of a wide range of professionals. The current inquiry however sought to examine the therapeutic value of a more focused psychologically based intervention. The perplexing nature of chronic disorders has historically shaped perceptions of low back pain patients as mad, hysterical or motivated by pure secondary gain (Slade 1984). Such views have been reflected in the choice and employment of psychometric instruments which are designed to evaluate the role of psychological factors in chronic pain. Examples here include the MMPI, the SCL-90 and the IBQ which are, by and large, psychiatric inventories designed for psychiatric patient populations. The current study thus drew upon instruments which had (a) been developed on low back pain groups; (b) possess sound psychometric properties; and (c) are widely viewed as reflecting the true psychological dynamics of low back pain (Main and Parker 1989).

The current study was conducted for a number of reasons and reflects current methodological concerns, clinical impression concerning the aetiology of chronic disability and wide empirical questions relating to low back pain (Turk et al 1993). The current inquiry examined the efficacy of a cognitive-behavioural pain management programme for a homogeneous group of chronic low back pain patients. More specifically, the relative efficacy of group v individual interventions was directly assessed. Assessment took place at four specific points and addressed psychosocial, behavioural and physical dynamics of pain. A number of new instruments, cognitive in nature, were employed. These adressed perceptions of pain responsibility, strategies employed in order to deal with disaiblity, self efficacy beliefs and the endorcement of specific cognitions concerning pain experience (Main et al 1992; Nicholas 1989; Boston et al 1991). The reliability and validity of these various instruments were examined. A main question in the current study was an attempt to predict treatment outcome based on detailed assessment information.

The current study's findings demonstrate that for both treatment modalities the intervention programme is effective in terms of ameliorating psychological distress and disability as well as enhancing self efficacy beliefs and specific cognitive appraisals in relation to pain (Zung 1965; Roland and Main 1983; Nicholas 1989; Main et al 1992; Boston et al 1991). Both treatments were equally effective. Whilst there is remission on a number of variables considered, this is not a statistically significant decrease. Patients report of somatic anxiety, level of current pain, medication usage and return to work, indicate few if any changes from initial assessment position. These are clearly important outcome variables as far as the patient is concerned, yet the reduction of pain was not a stated goal of the current inquiry, return to work is largely based on the local/national economic infrastructure and medication withdrawal was not specifically targeted. Somatic anxiety (MSPQ) may reflect both a physical and psychological measure. Its efficacy, as an outcome variable following intervention, has thus been questioned by a number of authors (Deyo et al 1989). The strength/utility of this variable may lie in its ability to predict treatment outcome (Main and Waddell 1984).

The current study's findings support the efficacy of a pain management programme for a chronic, relatively impaired group of low back pain patients. Results indicate that a focused programme based specifically on cognitive behavioural principles is an efficacious procedure - fostering/maintaining psychological and behavioural change. In the author's view future research should pursue more radical therapies based on early intervention, patient mobilisation and restoration of physical function (Mayer et al 1986).

Intervention programmes should be targeted at those patients who are by definition chronic (ie between 6 months and 1 year) but because of the short duration of their disability, have not yet experienced the full impact of changed psychological, economic and social status (Slade 1984). Such intervention may prove to be a productive way of addressing important outcome variables such as return to work rates, reducing pain reports and reduction of medication. At present the efficacy of such interventions remain unexplored.

The positive features of the current study include an evaluation of behavioural, physical and psychological measures of pain as well as the employment of three new cognitive instruments which are seen as mediating the overall experience of chronic pain. Such instruments possess sound psychometric properties, were developed on populations of low back pain patients and are widely seen as reflecting the true experience of chronic pain (Main et al 1992). Additional strengths include the relative homogeneity and severity of pain complaint in the patient sample, the inclusion of an adequate control condition, minimal attrition of patients during treatment and at follow up and an intervention which is explicit in its cognitive-behavioural orientation.

The current study suffers from a number of methodological shortcomings. These include a failure to adequately assess important behavioural features of pain (such as illness behaviour) as well as patient satisfaction with treatment received and economic costs and benefits of both interventions. Additional shortcomings include a lack of control over placebo effects such as patient contact with an empathic professional and acquiesence with perceived research demands (Malone and Stube 1988). Also approximately 60% of clients referred to the project failed to attend for the initial interview at the university. Such findings clearly temper the overall conclusions of the current study.

Recommendations for Future Research

8.2 Assessment and Intervention

Chronic low back pain is a complex experience - dynamic in its nature/disruption to the individual and a function of both macro and micro influences. The current study in line with past research has failed to identify or develop theoretical knowledge regarding the kinds of physical and psychological features which are associated with treatment outcome (Turk and Rudy 1990). This may reflect issues concerning patient assessment. Recommendations for future research concerning the prediction of outcome must rcognise a number of well documented findings. For example, a large body of research has demonstrated that pain management patients are (a) atypical in terms of individual psychopathology; (b) possess strong rehabilitation drive, and (c) have realistic perceptions as to the possibility of cure. Patient attrition remains a significant issue of all psychotherapeutic research and is a particular feature of the current study.

In view of such considerations research which attempts to identify patient variables associated with outcome will be constrained by the homogeneous nature of the participating client group. Nevertheless, a number of theoretical and clinical considerations adopted by future research may enhance understanding concerning assessment and treatment issues.. These include (a) effective, comprehensive assessment of patients (Waddell and Turk 1992); (b) a thorough understanding of the dynamics of low back pain (Rose et al 1993), and (c) continued efforts towards identifying active therapeutic factors of rehabilitation programmes.

8.2.1 Patient Assessment - Pain, Disability and Functonal Limitation

Assessment of the severity of low back pain is fundamental to decisions about tratment, monitoring progress and the provision of support. Severity needs to be assessed in terms of patients report of pain, disability and physical impairment which although logically related are fundamentally different in kind. Thus correlations between pain, physical impairment and disability are low and these various elements do not statistically combine into a single score (Waddell and Turk 1992). The failure of low back surgery is an illustration of conceptual confusion concerning these clinical variables (Bond 1980). Thus, all too often, clinical impressions concerning low back pain are formulated in terms of patients pain report, on what the patient can and cannot currently do, in terms of distress and illness behaviour, etc.

Such an approach fails to address the fundamental problem that chronic low back disability and work loss may be out of all proportion to any identifiable disease of pathologic diagnosis or objective physical impairment. Both clinically and legally there remains a need for objective medical assessment of physical impairment to compare with the patient's subjective report. Nowhere is this more important than in the assessment of chronic low back pain. For example, it has been suggested that for as many as 85% of back pain episodes, the cause of pain is uncler (White and Gordon 1985). Contributing to the failure to identify the etiology may be the dubious reliability, sensitivity, specificity and utility of many common examination and laboratory tests used in the diagnosis of back pain (Bernard and Kirkaldy Willis 1987).

In recognition of such observations a number of authors have developed comprehensive assessment procedures which assess current impairment as applicable to the patient with simple non-specific low back pain (eg Von Korff et al 1992). For example, Waddell et al (1992) have developed a method of clinical evaluating impairment or functional limitation which is suitable for routine use. Twenty seven physical tests were initially considered. Permanent anatomic and structural impairments of spinal deformities, spinal fractures, surgical scanning were excluded as not relevant to the patient with low back pain. Tests which were considered unreliable or too closely related to non organic and behavioural responses were similarly excluded. In the final analysis eight tests (eg pelvic flexions, total flexion, straight leg raising and sit up) successfully discriminated patients with low back pain from normal subjects and were significantly related to self reported disability in activities of daily living. The scale, the authors conclude, provides an objective clinical evaluation that meets the criteria for evaluating physical impairment, yet is simple, reliable and suitable for routine clinical practice.

The scale is most suitable for patients with nonspecific low back pain providing an objective evaluation of current functional limitation due to pain as opposed to anatomic, pathologic or physiologic impairment. Pain, disability and functional impairment represent the main clinical and physical dynamics of low back pain. A large body of evidence indicates that these important constructs can now be reliably and quickly assessed during routine assessment. Future research and clinical inquiry must enhance the specificity of clinical assessment in low back pain. This is necessary in order that effective patient management as well as decisions relating to intervention, future care and disability payments can take place. This is a particular concern in relation to chronic patients who are considered for a pain management programme.

Clinical assessment of the patient with low back pain should provide not only a physical assessment and diagnosis but also a comprehensive evaluation of the patients pain, his or her attitudes and beliefs about the pain, the affective dimension of the pain, the pattern of illness behaviour that has developed and the disability that results. The most systematic approach is to consider each component of a biopsychosocial model of illness, sensory, cognitive, affective, behavioural and socioeconomic (Waddell et al 1993).

8.2.2 Psychological Distress - Future Recommendations for Research

There is little theoretical dispute concerning the need to address the role of psychological distress in chronic pain conditions. Nevertheless a number of authors have challenged the idea that psychological distress always develops as a consequence of a physical problem. It would not be unwise or unreasonable to adopt Polatin et al's (1993) perspective - namely that distress can both precede and follow a physical stressor. Future research should therefore recognise that the evolution of distress in low back pain is complex.

Such research should draw upon simple indices of distress which identify and measure current psychological functioning, as well as more comprehensive instruments which are capable of identifying significant premorbid stress or dysfunction. Once again, such a procedure may prove more profitable in explaining outcome.

A somewhat similar issue conerns the role or value of both the MSPQ and Zung Depression Inventory. Recent research indicates that the MSPQ (item examples include 'legs feeling weak') may in fact reflect true pathophysiological states in low back pain. The same considerations can be applied to the Zung Depression Inventory. Examples of items which may be of function of physical as opposed to psychological disability include 'morning is when I feel best', 'I have trouble getting to sleep at night', 'I tend to wake up too early', and 'I find it hard to do the things I used to'. Such statements represent common clinical themes in low back pain patients, although in the author's experience it would be unwise to attribute such observations to depressed mood itself; more realistically such reports may reflect the physical nature of pain.

Thus the significant amounts of explained variance in disability scores reported in a number of studies may be reduced if such items were controlled for or excluded (eg Main et al 1992). The writer recommends therefore that future research should include (a) comprehensive premorbid psychological assessment (Polatin et al 1993); (b) two indices of current psychological distress (eg the MSPQ and Zung Depression Inventory), and (c) an instrument such as the Hospital Anxiety and Depression Scale (Zigmond and Snaith 1983) which measures current anxiety/depression - yet controls for pathophysiological features which could be attributed to physical impairment or functional limitation.

In the writer's view, such measures therefore represent a comprehensive yet effective model of addressing the contribution of premorbid and current psychological stress to outcome as well as the unique role of individual psychopathology v physical consequences of disability.

8.2.3 Behavioural features of pain - future recommendations

A powerful feature of an indvidual's adjustment and response to chronic low back pain concerns the environment in which their behaviour operates and the level of reinforcement received. Various pain behaviours (representing observable communications of pain, distress and suffering), avoidance of activity as well as distorted posture and ambulation, shape and reinforce disability. Given the dependent status of many chronic low back pain patients, an overall index of pain behaviour may have helped predict outcome more effectively.

Illness behaviour can be measured in a variety of ways that can be combined in factor analysis (Waddell et al 1992). These include (a) pain drawing (Ransfold et al 1976); (b) behavioural signs and symptoms test (Waddell et al 1984), (c) overt pain behaviour (Keefe and Block 1982), (d) use of walking aids, and (e) amount of downtime - the average number of hours spent lying down between 7 am and 7 pm. Illness and avoidance behaviour, as well as issues of reinforcement, represent powerful issues in chronic pain. Future research should address behavioural aspects of chronic pain. Such analysis may assist the prediction of treatment outcome and ultimately provides a more comprehensive model of assessing chronic low back pain.

8.2.4 Fear Avoidance Beliefs

An important theme in understanding the nature of low back pain concerns the issue of fear and avoidance. The Fear Avoidance Model of Exaggerated Pain Perception (Lethem et al 1983) did not explain or predict patients report of pain and disability at follow up. More recently Waddell et al (1993) have recognised the role of fear avoidance beliefs, arguing that current cognitive measures are too general to explain low back disability. A fear avoidance belief questionnaire was developed, focusing upon how patient perceptions of physical activity and work affect low back pain. The questionnaire demonstrated sound psychometric properties in terms of reliability, validity and overall factor structure.

Regression analysis showed that fear avoidance beliefs about work accounted for 23% of the variance in disability and 26% in work loss, even after controlling for severity of pain. Hence specific cognitions in the form of fear avoidance beliefs appear implicit to the understanding of low back pain. This fits given the powerful iatrogenic dynamic of pain management, the reinforcing consequences of disability status and the physical deconditioning which patients experience on account of avoidance/immobility.

The writer therefore recommends the inclusion of this instrument. Its appeal lies in its clinical relevance and empirical support, as well as its recognition that a highly specific belief system can explain and predict physical and socioeconomic features of low back disability. The inclusion of the instrument may therefore enhance understanding regarding outcome given the central nature of fear in patient appraisals regarding pain.

8.2.5 The development of a rehabilitation drive construct

Physical impairment, illness behaviour, attributional style regarding disability and distress shape powerfully, individual responses to low back pain. At a more macro level, there is no doubt that the social infrastructre within which disability operates acts as a reinforcer of disability - particularly as time persists and social, economic and family relationships change (Slade 1984).

The role and contribution of macro forces should be addressed in a more comprehensive and multivariate fashion. Based on clincal experience the writer views the role of individual rehabilitation drive as a powerful factor in shaping adjustment and disability. Rather like the notion of a fear avoidance construct developed by Lethem et al (1983) an individuals level of drive and desire to actively rehabilitate themselves can lie along a continum from zero/minimal drive to maximum level of motivation to fully reengage. Clearly much of this drive will be shaped by physical and psychological issues (eg mood, low self efficacy).

In the writer's experience however, additional socioeconomic variables can shape drive or rehabilitation potential. Such drive, whilst shaped by the individual's own determination, is a function in part of factors which are outside the individual's own control. For example, consider the lack of opportunities available for a man of 50, with few skills, and a history of back pain who is hoping to reenter the labour market. His chances despite his own desire to return to work are muted by a hostile and extremely competitive labour market, high levels of unemployment and negative perceptions on the part of employers as to his employment risk (Mendelson 1992)

On an individual level rehabilitation drive is in addition shaped by issues of reinforcement, perceived level of 'satisfaction' with current status, previous job satisfaction, availability of job opportunites, level of education/vocational skills, as well as important demographic variables such as age, gender and social class. This is an entirely personal view, yet the development of an index of drive (at both macro and micro level, independent of physical impairment, mood or self efficacy) may prove a profitable and productive exercise in identifying factors associated with outcome as well as providing a deeper understanding concerning the causes of prolonged disability.

8.2.6 Conclusions

Waddell et al's (1993) Model of Chronic low back pain identifies pain, disability, impairment, fear avoidance beliefs and work loss as the main clinical elements of disability. The difficulty in being able to predict outcome may reflect issues concerning participating clients, assessment procedures and therapeutic factors associated with rehabilitation programmes. The above recommendations, reflecting physical, behavioural, psychological and social features of low back disability may enhance our theoretical and clinical understanding regarding outcome, as well as more effective patient care and management.

8.3 Therapeutic issues and future research

Directions for future research concerning the rehabilitation or treatment of chronic low back pain should address both macro and micro aspects/determinants of disability experience. Chronic disability is complex and multifaceted in nature disrupting physical, psychological, economic and social spheres of life. Future research energies should therefore be directed towards: (a) the continued enhancement of assessment decisions concerning physical impairment and disability; (b) the efficacy and evaluation of clinical intervention programmes designed to rehabilitate patients; (c) closer examination of the evolution, overall role and dynamic of psychosocial variables in shaping disability experience; (d) an understanding of macro issues concerning disability. These include cost, iatrogenic determinants of disability and ultimately an examination of ways in which the epidemic of low back disability can be reduced (Waddell 1987). Future research must therefore enhance the methodological rigour of its inquiry, widen the theoretical debate concerning low back disability and offer more radical modes of treatment for back pain. Such research will, it is hoped, lead to more effective modes of assessment, intervention and evaluation as well as enhanced understanding concerning the evolution, iatrogenic role and prevention of chronic disability.

8.3.1 Maximising benefit, minimising costs

Turk et al (1993) addresses issues concerning cost/efficiency in the administration of treatment for chronic pain groups. The authors examine the efficacy of various modes of service delivery (eg group v individual, inpatient v outpatient, home v hospital based) and conclude that research in these areas is either absent or lacking appropriate methodological rigour. Such analysis illustrates the challenge and demands facing researchers here. Specifically, providers will increasingly be called upon to produce maximal benefits at minimum costs isolating shared components of effective therapies and determining the most efficient mode of delivering them for cost effective outcomes (Simmons et al 1988; Stieg and Turk 1988; Tobin et al 1988). The current study has evaluated the clinical efficacy of group v individual intervention and found no difference between the conditions in terms of relative outcome. In the UK, only St. Thomas's Hospital London provides inpatient rehabilitation (to the author's knowledge) whilst there are no published studies or research projects which have evaluated home v hospital based pain management programmes.

Clearly this represents a specific issue of cost in which only the most developed communities (ie the USA) are able to address such interventions. Nevertheless, enhancing treatment efficacy represents an important challenge facing researchers here. An examination of the published literature demonstrates that rehabilitative programmes for chronic pain groups differ widely in terms of administration, clinical content and length of therapeutic intervention (eg Nicholas et al 1992; Flor et al 1992). A comparative evaluation of pain management programmes which address different levels of clinical interventions would address a number of themes which currently dominate the literature. These include the enhancement of clinical outcome, identification of features associated with therapeutic change and issues concerning cost of service delivery.

An examination of published research addressing rehabilitation of chronic pain groups indicates that studies which compare the efficacy of different levels of clinical intervention remains a neglected issue which has not yet been examined (Flor et al 1992). Such an evaluation would, in the author's view, be a useful and positive contribution to the current literature allowing pressing issues of cost and therapeutic benefits to be directly examined. In Liverpool, for example, the Walton Pain Relief Foundation runs an intensive four week rehabilitation programme for heterogeneous groups of chronic pain sufferers. To date, since the programme started ten years ago, approximately two thousand patients have been through the full course. Whilst there are no published studies which have directly evaluated the programme's efficacy, anecdotal evidence (eg in terms of the number of clients who return to work) suggests that the desired therapeutic goals are fully achieved. One questions therefore in terms of both cost and clinical outcome which intervention (eg the current study which involved approximately eighteen hours of treatment v the Liverpool Pain Clinic) would provide the most efficacious results. At the moment such issues remain unexplained, yet clearly worthy of investigation.

An effective way of addressing this question would be to examine the therapeutic value of say three different levels of clinical intervention (eg short, medium and long duration programmes). The educational input would remain constant across all conditions whilst specific behavioural and psychological features of chronic pain management would increase as a function of clinical condition. Therapeutic evaluation would, in addition to the assessment of physical, behavioural and psychological features of pain, focus on important economic parameters associated with low back disability (eg medication costs, visits to GP/Hospital, return to work rates) client perceptions regarding the usefulness of treatment and direct costs relating to therapist input. The merits of such an investigation are its ability to (a) examine the efficacy of intervention by enhancing the quality and depth of research undertaken; (b) comment and widen the debate concerning active therapeutic features associated with outcome; (c) recognise important economic indices associated with health care provision and outcome and (d) address issues of maximal therapeutic gain v minimal intervention costs.

Such questions represent neatly the economic and political temper of both the USA and UK. Burgeoning health costs associated with chronic pain sufferers, the development of an internal market within the NHS and the divorce of purchaser/provider roles for Health Authorities' suggest that issues of cost, value for money and maximal therapeutic gains will, now and in the future exercise great weight in terms of health care policy decisions. Effective research which addresses and evaluates such concerns will in the author's view enhance the status of pain management programmes in general and assist both in the evolution of new services and the maintenance of existing programmes (Flor et al 1992).

8.3.2 Treating depression in chronic low back pain

Descriptions of rehabilitation programmes for chronic pain sufferers are loosely termed multidisciplinary involving a variety of treatment disciplines which include anaesthesiology, psychiatry, nursing, physiotherapy and clinical psychology. Analysis of such programmes indicates that the need to address important psychosocial dynamics of pain experience represent explicit goals of such programmes. Typically the focus of psychological intervention appears to be one or more of the following targets (1) coping with pain through the use of cognitive behavioural strategies; (2) psychophysical techniques such as relaxation or biofeedback aimed at reducing tension and anxiety; (3) reducing pain behaviour by modifying reinforcement contingencies in the patients environment (Main and Parker 1989; Pearce 1986; Fordyce 1976). There are few if any discussions specifically addressing one powerful and pervasive index of chronic disability, namely the management of depressive symptomatology. The prevalence of depression in patients with chronic low back pain is approximately three to four times that reported in the general population (Sullivan et al 1992; Romano and Turner 1985). An underlying assumption in many treatment programmes is that depression is a secondary function of a physical disorder (Brown 1990). Such ideas are reflected in current psychological models where depression in chronic pain is viewed as the result of dysfunctional appraisals, maladaptive coping or reactions to functional loss (eg Rudy et al 1988). Conceptualising depression as the result of the chronic distress of pain has intuitive appeal. The empirical basis for this assumption can however be considered tentative. Furthermore recent research indicates that depression both precedes and follows chronic disability (Polatin et al 1993. As Sullivan et al (1992) note:

> 'There are indications that for a significant proportion of depressed chronic pain patients depression was present prior to the onset of pain or pain and depression occurred simultaneously'

Such observations confirm the current author's experience, that for a significant proportion of patients, longstanding psychological issues (independent of current disability) represent dominant themes in terms of current mood appraisal. Thus from an empirical perspective, there is no basis for focusing treatment on pain to the exclusion of depression. The vast majority of depressed chronic pain patients are currently not receiving any treatment for depression. At best such issues are addressed in only peripheral fashion. A number of authors argue that failure to specifically address the treatment of depression in the management of chronic pain may account for a significant proportion of the treatment failures in terms of rehabilitation outcome (eg Dworkin and Gitkin 1991). Future research explicitly addressing the treatment of depression in chronic pain patients may prove a profitable and productive exercise by enhancing overall therapeutic success and reducing depressive symptomatology in chronic pain groups. In order to maximise treatment benefit, greater effort should be directed toward (a) identifying the evolution of depression in low back pain patients, and (b) treatment modalities aimed at reducing depressive symptoms (Polatin et al 1993). A research study which explicitly identifies a depressed cohort of patients and in addition to conventional rehabilitation, specifically targets depressive symptoms, could be compared with a similar depressed group who only receive traditional intervention aimed at reducing fear and illness behaviour. In the author's opinion, targeting of depressive symptomatology deserves serious consideration as an integral part of chronic pain rehabilitation. Future research should direct its energy towards an evaluation of this debate.

8.3.3 Avoidance Behaviour: the orthopaedic principle of rest and low back pain

Rest and avoidance of activity are commonly prescribed by doctors and physicians for low back pain. The efficacy of this mode of treatment has recently been questioned by a number of authors (eg Waddell 1987) who perceive such prescribed avoidance as nontherapeutic, shaping much of the psychological dynamic and behavioural response of chronic low back pain.

Restriction of activity, rest and even bed rest represent the treatment most commonly prescribed by physicians for low back pain, apart from symptomatic analgesics (Waddell 1987). The rationale of rest, for which early advocates prescribed 'enforced uninterrupted and prolonged' inactivity (Thomas 1843-1891) is based upon the clinical observation that lying down may relieve pain, although evidence suggests that this only applies to one person in two (Consumers Association: Back Pain Survey 1986).

In addition there is little clinical or scientific evidence to support the use of rest as a mode of therapy or a way of reducing pain. Waddell (1987) argues that of four controlled research projects designed to examine the clinical efficacy of prescriptive bed rest only one study demonstrated a clear and clinically superior outcome in favour of restricted activity (Wiesel 1984). This study however suffered from a number of methodological difficulties which clearly temper conclusions (for example considerable observer bias in assessing results). Gilbert et al (1985) found no statistically significant difference between rest, exercise and a no treatment control condition whilst

Deyo et al (1985; 1986) demonstrated that there was a very brief, optimum resting period of about two days after which its therapeutic value diminished significantly.

On a similar, albeit clinically different theme, Phillips and Jahanshahi (1985) report that there is little evidence that avoidance behaviour promotes the reduction of chronic pain either on a short or long term basis. Such ideas are supported by clinical observations demonstrating that whilst reports of pain intensity may remain stable with time, avoidance behaviour (of which rest is an obvious example) increases significantly in desynchronous fashion (Rose et al 1992).

Thus the association between pain experience and pain behaviour is often weak as evidenced in studies of chronic headache patients (Phillips 1977) and chronic low back pain patients (Waddell and Main 1984). In a study of behavioural reactions to a stressful noise stimulus, avoidance led to increased sensitivity during the same assessment session. Therefore avoidance can surprisingly be conceptualised as having a short term detrimental effect upon stimulus tolerance (Phillips 1987).

Whilst there is little, if any, evidence demonstrating the therapeutic value of rest and inactivity, a large body of work indicates that prolonged rest has profound physical and psychosocial consequences. Prescriptive bed rest leads to loss of muscle strength, decreased physical fitness and may inhibit healing (Mayer 1985; Bortz 1984).

There are important psychological consequences including increased avoidance, dependency and illness behaviour as well as a firm perception that any action undertaken will have little effect for pain relief. Prescriptive and prolonged bed rest leads to depression, psychological distress (for example, somatic anxiety) and endorsement of dysfunctional cognitions such as catastrophising pain experience (Main et al 1992; Jensen et al 1991). Similarly the possibility of ever returning to work and the probability of effective rehabilitation are strongly associated with the level of prolonged rest. Here 'rest' equals less probability of ever returning to work (Strang 1985).

Evidence therefore illustrates that the oft prescribed principle of rest and inactivity is clinically non proven. Rest does not appear to reduce pain and its therapeutic value appears to be greatest for very brief periods of time. Significantly the relationship between reports of pain and pain behaviour become increasingly desynchronous with time, thereby suggesting a greater psychosocial dimension to pain experience.

However a wealth of evidence exists which stresses both the physical and psychological benefits of activity, exercise and movement (see review by Salmon 1992). Contrary to popular belief of both patients and the medical profession, there is little evidence to suggest that for low back pain patients, activity is harmful and will aggrevate pain further (Waddell 1987). Evidence exists which demonstrates that activity and proactive behaviour increase fitness, muscle strength and endurance, enhancing endorphin levels and even reducing sensitivity to pain (Nachemson 1983).

Psychologically, there is a large body of work demonstrating the positive effects of activity in terms of cognition, affect and behaviour. Typically reported benefits include reductions in depression and anxiety, as well as avoidance behaviour and functional disability (Dolce et al 1986; Mayer et al 1986).

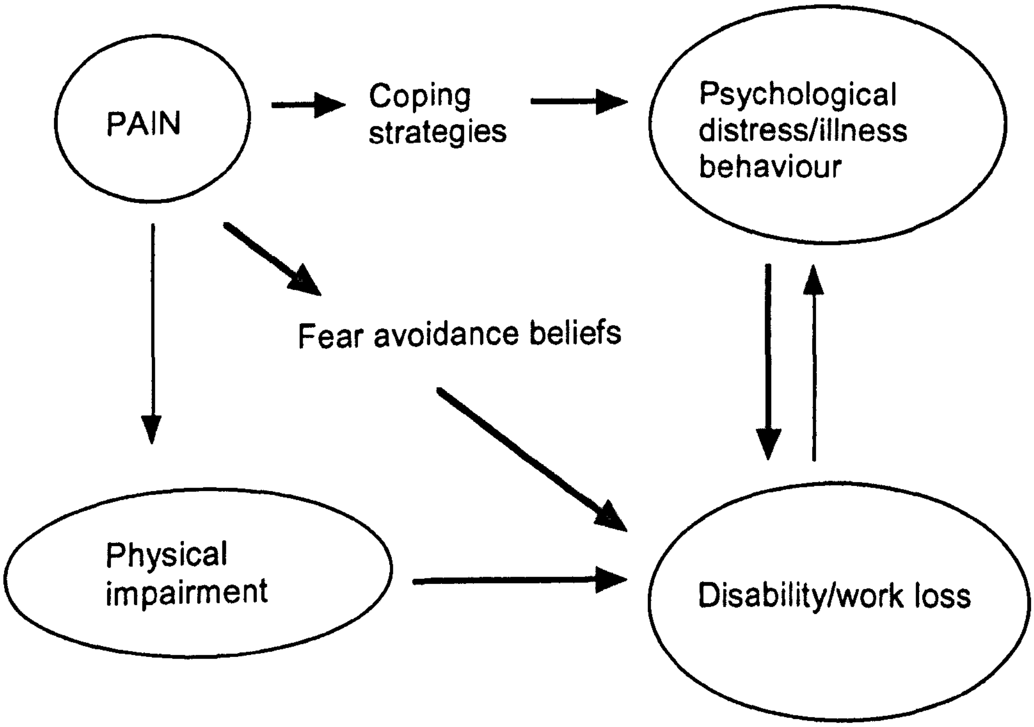
The prescription of rest for chronic low back pain represents one of the main modes of treatment advocated by physicians. Such prescription is however based upon questionable and unproven clinical grounds, in particular for chronic low back pain. Very brief periods of rest would appear to be of value to patients. However there are profound physical and psychosocial consequences for extended periods of rest. Avoidance and illness behaviour, alongside other attendant consequences of chronic low back pain such as depression, represent common experiences and a well recognised clinical picture of chronic low back pain.

Recent statistics indicate that between 40-50,000 low back pain patients are each year admitted to hospital (thereby permanently occupying two thousand NHS beds) for enforced periods of rest (Waddell 1987). Rest is clearly favoured as a therapeutic strategy, yet its efficacy is unproven. The fashion for rest is based upon a mechanistic model of pain. For the patient there are often profound psychological consequences of which fear and catastrophizing current experience represent common clinical themes. In addition the social dynamic changes; rest is by definition associated with a weakened work habit, as well as poorer job opportunities and employability -

thereby resulting in reduced potential for effective rehabilitation (Figure 8.1). Rest and the prescription of inactivity represent powerful factors in explaining the pervasive and complex nature of avoidance behaviour in chronic low back pain patients.

The above discussion ties in with a number of well documented empirical themes which dominate the current literature on low back pain. In the author's view, such observations should be the focus of future research inquiry. The primary aim of clinicians and researchers here is to ameliorate iatrogenic disability, reduce overall economic and health care costs associated with this particular client group and rehabilitate patients to positions of physical and psychological well being. Thus the following observations about low back pain and disability are well documented and empirically supported. Low back disability has risen inexorably since the 1950's and is now described in apocalyptic terms as an 'epidemic' (Waddell 1987). The economic costs associated with low back disability are staggering. Recent statistics demonstrate the low back pain now constitutes the most expensive health problem in the UK exceeding by far costs attached to say coronary heart disease (office of Health Economics 1985). An historical perspective of low back disability indicates that the current situation can be attributed to iatrogenic factors (Allan and Waddell 1989). Chronic pain is a complex experience which interferes with and disrupts psychological, social and economic spheres of life (Slade 1984). Medical decisions concerning the assessment and management of a poorly understood condition such as low back pain are based less on objective pathologic information and more on

Figure 8.1 **The major cognitive affective and behavioural pathways postulated between low back pain and disability (Waddell et al 1993)**



psychological variables such as affective distress, illness behaviour and adesire on the doctor's part to be seen as 'acting' on the patient's behalf. Rest and avoidance of activity represent the favoured therapeutic strategies for treating low back pain. The rehabilitative value of rest remains unproven. In addition, a number of authors argue that rest represents the most powerful iatrogenic variable associated with chronic disability, note that only low back pain is today treated with prescribed rest (Hirst 1975) and point to the therapeutic efficacy of studies which advocate rehabilitation and restoration of physical functions (Mayer et al 1986).

8.3.4 The role of early intervention for low back pain

Synthesising such themes suggests that future research inquiries should focus on the effects of early intervention (ie in the early stages of low back pain). Such an intervention would stress/evaluate physical reconditioning, exercise and restoration of function closely linked to overcoming fear avoidance beliefs with current practice or no treatment. Approximately 80-90% of attacks of low back pain recover in about 6-8 weeks irrespective of the administration or type of treatment experienced (Consumers Association Back Pain Survey 1986). A small percentage of patients however do not recover, become chronic and experience both physical and psychological disability. This small cohort of patients is clearly the clinical group of interest. However, given that 90% of patients recover irrespective of clinical interventions received, a large group of patients would need to be assessed and treated in order that both modes of intervention (active or passive) could be properly evaluated. Essentially one is trying to deduce how many patients between either conditions become chronic.

The merits of such an inquiry are its ability to examine many empirical and clinical themes which are seen as important features in terms of the evolution of low back disability. These include (a) the iatrogenic dynamic of low back pain; (b) the efficacy of early intervention based on restoration of function; (c) direct economic costs of both therapeutic strategies; (d) the role of psychological variables (eg illness behaviour) in terms of clinical decision making concerning assessment and management of patients and (e) an examination of the role, evolution and explanatory power of pain, impairment and illness behaviour in terms of overall chronic experience.

The rationale for conducting such an inquiry has a strong clinical appeal, given that pain management programmes and multidisciplinary rehabilitation courses are based on a philosophy of remobilising physical function, reducing avoidance behaviour and challenging fear avoidance beliefs via exercise, confrontation of painful situations and establishing new behavioural goals. Intuitively therefore, such a philosophy of care based on early intervention and active rehabilitation would appear efficacious given that rest for low back pain 'may be the most harmful treatment ever devised and a potent source of iatrogenic disability' (Waddell 1987).

Consideration of the above observations suggest that if remobilisation and restoration of physical function is appropriate and of therapeutic value for chronic groups of low back pain patients then it should have similar positive consequences for patients in the very early stages of pain and disability (Mayer 1992). Such ideas gel with the current NHS philosophy of patient care and management. Here increasing emphasis is now attached to treatment costs, the prevention of illness and disease represent the key to a healthy nation and multidisciplinary models of patient management are viewed as the preferred model of client care (Butler 1992). It remains to be proved whether a policy of active remobilisation and early return to work can be put into widespread clinical practice. Yet as Waddell (1987) notes:

> 'The following questions can no longer be avoided: rest or rehabilitation? rest or restoration of function? rest or recovery?'

In addition the writer feels that pain management programmes could play an even more valuable role if patients were treated much earlier - before the whole social and economic dynamic has changed for the worse, before patients become progressively deconditioned physically, before avoidance and dependency become dominant issues in the patients' lives. A patient who starts the programme after six months of constant pain and disability (who is by definition chronic and unlikely to ever experience permanent pain relief) has a far better therapeutic potential than an individual who has had constant pain for fifteen years and a history of treatment which has been remedial in its effect. Thus both early intervention and targeting patients for early entry into pain management programmes may prove profitable in terms of reducing chronicity in low back pain patients. Future research should address these questions.

8.4 The enchancement of research into pain: methodological considerations

Basic methodological features associated with any research inquiry need to be addressed when evaluating pain management programmes. As Flor et al (1992) note:

> 'methodological concerns are always raised, each review concludes with the old bromide - more and better research is needed before definite conclusions can be drawn'.

Methodological conclusions include the role or rather absence, of control groups in the vast majority of research conducted, issues concerning third party insurance cover of many suitable patients, attrition of subjects observed over the course of treatment and questions concerning the narrow focus of treatment evaluations (eg pure behavioural). Other limitations include the 'overall quality of studies and the reactivity of measures employed' (Malone and Strube 1988; Turk et al 1993). Malone and Strube (1988) note in a meta analytic review of multidisciplinary treatment centres how only a minority of studies provided descriptions of the patient sample included, as well as information on study design and analysis. This represents a particular concern, given the reported therapeutic efficacy of many programmes, particularly those which report success in rehabilitating patients back into the employment network (Deardoff et al 1991). Future research which seeks to evaluate pain management programmes, must consider such issues in order that meaningful conclusions can be made.

8.5 Conclusions:

Observations of natural history and epidemiology suggest that low back pain should be a benign self limiting condition and that low back disability as opposed to pain is a relatively Western epidemic. The rise in low back disability can be attributed, many authors argue, to powerful iatrogenic factors, a social and economic infrastructure which by right supports disability and patient perceptions concerning the ability of medicine/the NHS to relieve pain (Main et al 1992). Over emphasis on patients' report of pain, over dependency on a disease centred model of pain and over-prescription of rest appear to be major causes of iatrogenic disability. Furthermore, one cannot divorce such issues from the wider political and economic dynamic. Low back disability is a twentieth century experience, a feature of every industrialised nation and a product of the developed world. Legislation designed to protect workers who are unable to work would appear instrumental in shaping the current epidemic (Main and Parker 1989).

Pain management programmes were developed in response to such observations and represent a multidisciplinary approach to patient rehabilitation. The current inquiry has evaluated the value of a focused cognitive behavioural intervention for low back pain patients. Results support the efficacy of such an intervention, although there were no differences between group and individual conditions. Attempts at predicting treatment outcome based upon a biopsychosocial model of low back disability did not prove successful. Future research directed towards an examination of pain programmes should focus upon the detailed assessment of clients, the process of therapeutic change and an evaluation of treatment based upon economic, physical and psychological factors. The enhancement of methodological considerations remain paramount. The writer recommends (a) an evaluation of different levels of clinical intervention; (b) the inclusion of specific psychotherapeutic treatments (eg therapy for depression); (c) an examination of the role of early intervention; (d) detailed examination of the characteristics of patients who reject treatment; and (e) continued inquiry addressing the evolution of psychological distress in low back pain.

Pain management programmes represent a valuable and economic mode of addressing patient rehabilitation. However, patients are typically referred to such programmes after all conventional intervention has failed. By definition patients are distressed, dependent and resistant to the idea of remobilising function. Given that rest appears to be a powerful variable in shaping disability, that long periods of time away from work bode ill for rehabilitation and that fear avoidance beliefs develop as a function of chronicity - future research and clinical practice should consider the efficacy of early intervention based as a philosophy of exercise and restoration of physical function. Thus current medical advice and treatment for low back pain, particularly unjustified restriction of activity, prescription of rest and sick certification by rote could be major factors in the evolution of disability. Prevention by way of early intervention tackles inappropriate fear avoidance beliefs, reconditions patients physically and fosters responsibility as opposed to dependency. The efficacy of such intervention is, however, unexplored. Such an evaluation may enhance clinical knowledge concerning disability and offer an alternative efficacious mode of preventing chronicity.

Equally and more importantly the whole approach to low back pain must be changed. Many authors argue that low back disability must be viewed as an illness not a disease (Allan and Waddell 1989). Clinicians must distinguish between pain and disability, distinguish the signs and symptoms of psychological distress and illness behaviour from those of physical disease and direct treatment towards the restoration of function as well as relief of pain (Waddell et al 1993; Main et al 1992; Fordyce 1986). Assessment in clinical practice must recognise the main features of disability and use such information to guide intervention. Any empirical inquiry will benefit from an inclusion of these important constructs.

Low back pain is extremely distressing and disabling for the patient, an enormous economic burden for the State and a major clinical challenge for therapists concerned with the management and care of such patients. Pain management programmes provide an effective and useful therapeutic adjunct to traditional treatment methods. A reduction in the incidence of low back pain remains the goal of all individuals and disciplines here. This requires changes in medicine's approach to low back pain, a change in patient perceptions concerning pain and disability as well as a wider reappraisal both economic and political which ultimately fosters effective patient rehabilitation.

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APPENDICES

ID No.........

Liverpool University

Low Back Pain Questionnaire

Name .... **Age** ....

Date...........................

Please return to
Mr J Reilly
Back Pain Management Programme
The Ground Floor
Whelan Building
The Quadrant
Liverpool University
PO Box 147
Liverpool L69 3BX

Introduction

The Pain Management Programme here at the University is designed to help you lead a more productive life. It has been made possible by money provided by charitable organisations. In return for this money we have promised to gather information about people with low back pain so that we can increase our knowledge and continue to help others in the future.

We would therefore be very grateful if you would complete the following questionnaires. Try and finish it all in one go, and please do not ask for help from your family!

Anything you tell us will be kept secret so please be as honest as possible in your answers.

Please return the form as soon as possible.

We hope that your time on the Pain Management Programme will be enjoyable and helpful.

Do you have any medical problems (other than back pain?)
Yes/No

If yes, what is the condition?........................... ....

Have you had any of the following because of back pain?

Bed rest at home ....Yes/No
Bed rest in hospital...............................Yes/No
Physiotherapy..Yes/No
Traction in hospital...............................Yes/No
Corset..Yes/No
Injections..Yes/No
Manipulation under anaesthetic...........Yes/No
Acupuncture... .Yes/No
Osteopathy/Chiropractic..................... .Yes/No
Surgery..Yes/No

How long have you had back pain for? ....years

Are you involved with a legal claim because of back pain?

Yes/No/was but claim settled

Are you receiving any benefits? Yes/No

If yes what are they? sickness/invalidity/mobility/other

If no have you applied but been refused? Yes/No

Are you working? Yes/No

If yes what is your job?...

If no please say why?...

If no what was your last job? ....

How much time have you lost from work because of back pain?

Drug information

Are you taking any medication at the moment Yes/No

If yes, please complete the following table:-

Name of drug	How many per day	Does it help?

Severity of present pain

Please rate on a scale of 0 to 100 (0 = no pain and 100 = the worst pain imaginable) how bad your pain is today...............

Please describe how you have felt during the PAST WEEK by ticking the appropriate box. Please answer ALL questions

SENSATION	NOT AT ALL	A LITTLE/SLIGHTLY	A GREAT DEAL/ QUITE A BIT	EXTREMELY/ COULD NOT BE WORSE
Feeling hot all over				
Sweating all over				
Dizziness				
Blurring of vision				
Feeling sick				
Stomach pain				
Churning in stomach				
Dry mouth				
Neck muscles aching				
Legs feeling weak				
Muscles twitching				
Tense feeling across forehead				

Please indicate for each of these questions which answer best describes how you have been feeling recently. *Please answer all the questions.*

	Never	Now and then	Quite often	Most of the time
I feel downhearted and sad				
Morning is when I feel best				
I have crying spells or feel like it				
I have trouble getting to sleep at night				
I feel that nobody cares				
I eat as much as I used to				
I still enjoy sex				
I notice that I am losing weight				
I have trouble with constipation				
My heart beats faster than usual				
I get tired for no reason				
My mind is as clear as it used to be				
I am restless and can't keep still				
I feel hopeful about the future				
I am more irritable than usual				
I find it easy to make a decision				
I feel quite guilty				
I feel that I am useful and needed				
My life is pretty full				
I feel that others would be better off if I were dead				
I still enjoy the things I used to				

Rate how confident you are that you can do the following things at present, despite the pain. Circle ONE of the numbers on the scale for each item, where 0 = "not at all confident' and 6 = " completely confident.

Example:

Not at all confident 1 2 [✓ 3] 4 5 6 Completely confident

Remember, this questionnaire is not asking whether or not you have been doing these things, but HOW CONFIDENT YOU ARE THAT YOU CAN DO THEM AT PRESENT, DESPITE THE PAIN.

I can enjoy things despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can do most of the household chores (eg tidying up, washing dishes etc) despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can socialize with my friends or family as often as I used to despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can cope with my pain in most situations

Not at all confident 1 2 3 4 5 6 Completely confident

I can do some form of work (including housework, paid and unpaid work) despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can still do most of the things I enjoy doing, such as hobbies or leisure activities despite the pain.

Not at all confident 1 2 3 4 5 6 Completely confident

I can cope with my pain without medication

Not at all confident 1 2 3 4 5 6 Completely confident

I can accomplish most of my goals in life despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can live a normal lifestyle despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

I can gradually become more active despite the pain

Not at all confident 1 2 3 4 5 6 Completely confident

This is a questionnaire to find out how you see the causes and control of your pain. Each statement is followed by four answers.

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

Please rate each statement by circling which answer best describes how you feel at the moment.

I need my medication to control my pain

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

My pain will go away if I let myself relax physically

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

I can make my pain decrease if I concentrate on pain-free parts of my body

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

I need the help of others to control my pain

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

Only I can help myself with my pain

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

My pain level will go down if I remain passive and don't respond to it

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

Sometimes I can reduce my pain by not paying attention to it

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

I am responsible for how pain affects me

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

I can make pain go away by believing it will go away

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

My pain will decrease if I think of things going on around me

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

Being in pain is never my choice

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

I can reduce pain if I imagine a situation in which I have been painfree in the past

VERY TRUE SOMEWHAT TRUE SOMEWHAT UNTRUE VERY UNTRUE

Medication helps me control my pain

VERY TRUE	SOMEWHAT TRUE	SOMEWHAT UNTRUE	VERY UNTRUE

My pain will get better if I think of pleasant thoughts

VERY TRUE	SOMEWHAT TRUE	SOMEWHAT UNTRUE	VERY UNTRUE

My pain is out of control

VERY TRUE	SOMEWHAT TRUE	SOMEWHAT UNTRUE	VERY UNTRUE

Just slowing down and regulating my breathing pattern often helps my pain

VERY TRUE	SOMEWHAT TRUE	SOMEWHAT UNTRUE	VERY UNTRUE

WHITTINGTON HOSPITAL PAIN MANAGEMENT PROGRAMME

PAIN COGNITIONS QUESTIONNAIRE

There follows a list of thoughts which patients have reported thinking when in pain. Please indicate how often *you* have had these thoughts at the time of your pain over the last week.

Please indicate, using the scale below, how often you have each thought.

1	2	3	4
Not at all	**Sometimes**	**Often**	**Most of the time**

1. Find yourself thinking you have given up all hope ___
2. Think of something pleasant rather than concentrate on the pain ___
3. Trust the doctors and believe they can do something ___
4. Want not to wake up in the morning _ _
5. Take a hopeful view of things ___
6. Think that further treatment will cause more pain ___
7. Think it is unfair that you can't do the things you used to do ___
8. Reassure yourself that you can get used to being in pain ___
9. Remind yourself about the support and encouragement you get from other people ___
10. Think that you might become a burden to your family and friends ___
11. Think that others pressurise you to do things you can't ___
12. Think that even your close friends are no help ___
13. Think that there is no-one to care about you ___
14. Think that the doctors might start to dislike you ___
15. Remind yourself that you have to be positive about the pain ___

WHITTINGTON HOSPITAL PAIN MANAGEMENT PROGRAMME

PAIN COGNITIONS QUESTIONNAIRE (cont'd)

1	2	3	4
Not at all	**Sometimes**	**Often**	**Most of the time**

16. Reassure yourself that you can cope now because you have coped in the past ___
17. Make a conscious effort to think the pain away ___
18. Think anxiously about the things that might bring on the pain ___
19. Think that you won't let the pain get the better of you ___
20. Ask what you have done to deserve this pain ___
21. Blame the doctor (or hospital, or operation) for your condition ___
22. Tell yourself that you must be optimistic ___
23. Tell yourself that there is no point in sitting around crying ___
24. Think that people patronise you because of your condition ___
25. Wish the pain would go away ___
26. Accept the pain to an extent ___
27. Expect there to be no relief at all ___
28. Think of things to do to help ___
29. Think about not being able to go on putting up with the pain ___
30. Reassure yourself that you are not generally unhappy ___

Please read the following questionnaire and tick the statements which APPLY TO YOU TODAY. If they do not apply to you today, leave them blank.

Tick here

I stay at home most of the time because of my back ……………

I change position frequently to try and get my back comfortable ……………

I walk more slowly than ususal because of my back ……………

Because of my back pain I am not doing any of the jobs that I usually do around the house ……………

Because of my back pain I use a handrail to get upstairs ……………

Because of my back I have to hold on to something to get out of an easy chair ……………

Because of my back I try to get other people to do things for me ……………

I get dressed more slowly than usual because of my back ……………

Because of my back I only stand up for short periods of time ……………

Because of my back I try not to bend or kneel down ……………

I find it difficult to get out of a chair because of my back ……………

My appetite is not very good because of my back ……………

I have trouble putting on my socks (or tights) because of my back ……………

I only walk short distances because of my back ……………

I sleep less well because of my back ……………

Because of my back I get dressed with the help of someone else ……………

I sit down for most of the day because of my back ……………

I avoid heavy jobs around the house because of my back ....

Because of my back pain I am more irritable than usual ....

Because of my back I go upstairs more slowly than usual ....

I stay in bed most of the time because of my back ....

SECTION A

NAME .... DATE OF BIRTH .... MALE / FEMALE *

ADDRESS ....

....

PRESENT EMPLOYMENT .... IF UNEMPLOYED, PREVIOUS EMPLOYMENT.......................

MARRIED: SINGLE: DIVORCED: WIDOWED: SEPARATED: OTHER *

DO YOU SMOKE? YES: NO: EX: * If YES, HOW MANY?

HAVE YOU EVER HAD BACK PAIN BEFORE? YES / NO *

WHEN WAS THE <u>FIRST</u> ATTACK OF BACK PAIN YOU CAN REMEMBER? .... (Month) .... (Year)

WAS IT CAUSED BY AN INJURY? YES / NO *

HOW BAD WAS THE <u>FIRST</u> ATTACK? PLEASE RATE BY TICKING THE APPROPRIATE BOX BELOW:

NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGI

WHEN WAS THE <u>WORST</u> ATTACK OF BACK PAIN YOU CAN REMEMBER? .... (Month) .... (Year)

HOW BAD WAS THE <u>WORST</u> ATTACK? PLEASE RATE BY TICKING THE APPROPRIATE BOX BELOW:

NO PAIN AT ALL											WORST PAIN IMAGI

SECTION C

HAVE YOU EVER HAD ANY OF THE FOLLOWING ACHES OR PAINS? IF SO, RATE THE WORST PAIN YOU CAN REMEMBER BY TICKING ONE OF THE TEN BOXES FROM 'NO PAIN AT ALL' TO 'WORST PAIN IMAGINABLE'. IF YOU HAVE NOT EXPERIENCED THE PAIN SPECIFIED, TICK THE N.A. BOX.

1.	HEADACHES	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
2.	MIGRAINE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
3.	MENSTRUAL PAIN	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
4.	CHEST PAIN	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
5.	SORE THROAT	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
6.	STOMACH ACHE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
7.	TOOTHACHE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
8.	OTHER (SPECIFY)	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.

SECTION B

HAVE YOU EVER EXPERIENCED PAIN FROM ANY OF THE ACTIVITIES DESCRIBED IN THE FIRST COLUMN? IF SO, RATE THE WORST PAIN YOU CAN REMEMBER BY TICKING THE APPROPRIATE BOX OPPOSITE. IF YOU HAVE NOT EXPERIENCED THE PAIN SPECIFIED, TICK THE N.A. BOX.

1. FRACTURES (BROKEN BONES)	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
2. CHILDBIRTH	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
3. JOINT SPRAINS	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
4. DENTISTRY	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
5. OPERATIONS	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
6. SPORTS TRAINING	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
7. INJECTIONS	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
8. OTHER (SPECIFY)	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.

SECTION D

If you have had any of the pains listed below please indicate what you did in response to the worst attack you remember by putting a tick (✓) or a cross (X) under each of the five headings.
(N.B.: for each symptom more than one heading may apply.

	NO EXPERIENCE	(a) TOOK PAIN KILLERS	(b) TOOK PHYSICAL EXERCISE	(c) WENT TO DOCTOR	(d) IGNORED IT AND CARRIED ON	(e) RESTED
1. HEADACHES						
2. MIGRAINE						
3. MENSTRUAL PAIN						
4. CHEST PAIN						
5. SORE THROAT						
6. STOMACH ACHE						
7. TOOTHACHE						
8. OTHER (SPECIFY)						

ANY RELEVANT COMMENTS:

SECTION E

In this section we would like you to estimate the amount of pain which 'common pain situations' can produce by ticking the appropriate box on the scale from 'no pain atall' to 'worst pain imaginable'. If you have not experienced the pain specified, tick the N.A. box.

1.	BANG THUMB WITH HAMMER	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
2.	BANG ELBOW (FUNNY BONE) ON DOOR	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
3.	BANG HEAD ON BOOKSHELF	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
4.	BANG SHIN ON TABLE LEG	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
5.	CUT FINGER WITH SHARP KNIFE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
6.	GRATE THUMB ON CHEESE GRATER	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
7.	PRICK FINGER WITH PIN	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
8.	KNEEL ON DRAWING PIN	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.

9.	SCALD (BURN) HANDS IN BOILING WATER	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A
10.	BURN HANDS ON LIGHTED CIGARETTE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
11.	BURN HANDS ON HOT IRON	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
12.	BURN TONGUE ON BOILING SOUP	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
13.	CRUSH LITTLE FINGER ON CAR DOOR	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
14.	DROP BRICK ON BIG TOE	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
15.	GET STUNG ON FACE BY WASP	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.
16.	GET ELECTRIC SHOCK FROM FAULTY PLUG	NO PAIN AT ALL	1	2	3	4	5	6	7	8	9	10	WORST PAIN IMAGINABLE	N.A.

LIFE CHANGE QUESTIONNAIRE

Did any of the following occur to you in the YEAR PRECEDING your pain?

EVENT	YES
1. Change in responsibilities at work	...
2. Gain of new family member	...
3. Change in financial state	...
4. Outstanding personal achievement	...
5. Death of spouse	...
6. Marriage	...
7. Taking on a mortgage or loan over £10,000	...
8. Change in sleeping habits	...
9. Business readjustment	...
10. Divorce	...
11. Change to different line of work	...
12. Vacation	...
13. Trouble with boss	...
14. Marital separation	...
15. Son or daughter leaving home	...
16. Change in residence (over 50 miles)	...
17. Change in recreation	...
18. Pregnancy	...
19. Personal injury or illness	...
20. Taking on a mortgage or loan less than £10,000	...
21. Trouble with in-laws	...
22. Spouse got a new job or lost one	...
23. Death of a close family member	...

LIFE CHANGE (CONT)

EVENT	YES
24. Fired at work...	...
25. Change in religious beliefs..	...
26. Retirement...	...
27. Foreclosure of mortgage or loan...................................	...
28. Change in number of family get-togethers......................	...
29. Change in residence (same area)..................................	...
30. Sex difficulties..	...
31. Change in living conditions...	...
32. Traffic ticket..	...
33. Marital reconciliation..	...
34. Change in eating habits..	...
35. Change in hours or conditions......................................	...
36. Revision of personal habits...	...
37. Change in health of family member...............................	...
38. Death of close friend..	...
39. Change in schools..	...
40. Change in number of arguments with spouse..................	...
41. Change in social activities...	...
42. Finding a breast lump..	...
43. Other...	...

The University of Liverpool
Low Back Pain Project

Mr MJ Rose
Mr JP Reilly

Whelan Building
PO Box 147
Liverpool L69 3BX
Telephone 051 794 5535/Fax 051 794 5537

13/8/93

Dear

We have been asked if we would see you about your back pain. We run a programme here at the University which is specifically designed for people with long standing pain.

At the moment I am uncertain as to the nature and severity of your pain. In order to assess your suitability for the course I would be grateful if you would attend an informal interview here at the University.

We are situated on the University campus within the clock tower (i.e. the Quadrant) and you can reach the Department if you come up Ashton Street or Brownlow Street. On foot we can be found via Brownlow Hill. I enclose a map to help you.

Your appointment is on **I would be grateful if you could telephone the department (794 5535) if you are unable to attend** or have any problems finding where we are.

We apologise for the delay, but unfortunately our waiting list is long and this is the earliest appointment we are able to offer. We look forward to seeing you.

Yours sincerely,

JAMES REILLY

The University of Liverpool
Low Back Pain Project

The Department of Clinical Psychology
Whelan Building
PO Box 147
Liverpool L69 3BX
Telephone 051 794 5535/Fax 051 794 5537

Mr MJ Rose
Mr JP Reilly

7th May 1992

Dear

It is now about six months since you came on the programme. I hope you are well. As you know, an important part of our work is the research that we are conducting alongside the Department of Orthopaedic Surgery at the Royal Liverpool Hospital. This work has been kindly supported by the Sir Jules Thorn Charitable Trust who are concerned about the effects of low back pain on people.

Would you kindly fill in the questionnaire (the last time, I promise!). It is a little different in parts - do fill in all the pages. (A stamped addressed envelope is enclosed for you to return it to me).

Thank you for your help, without your goodwill and assistance our work would not be possible.

With kind regards and good wishes.

Yours sincerely,

JAMES REILLY

The University of Liverpool
Low Back Pain Project

The Department of Clinical Psychology
Whelan Building
PO Box 147
Liverpool L69 3BX
Telephone 051 794 5535/Fax 051 794 5537

Mr MJ Rose
Mr JP Reilly

2nd June 1992

Dear

BACK PAIN PROGRAMME - QUESTIONNAIRE

I recently sent a questionnaire following your particaption in the treatment programme. We stressed at the time that the completion of this questionnaire was vital to the research. I would be very grateful if you could return the questionnaire by return of post in order that I can complete the data collection.

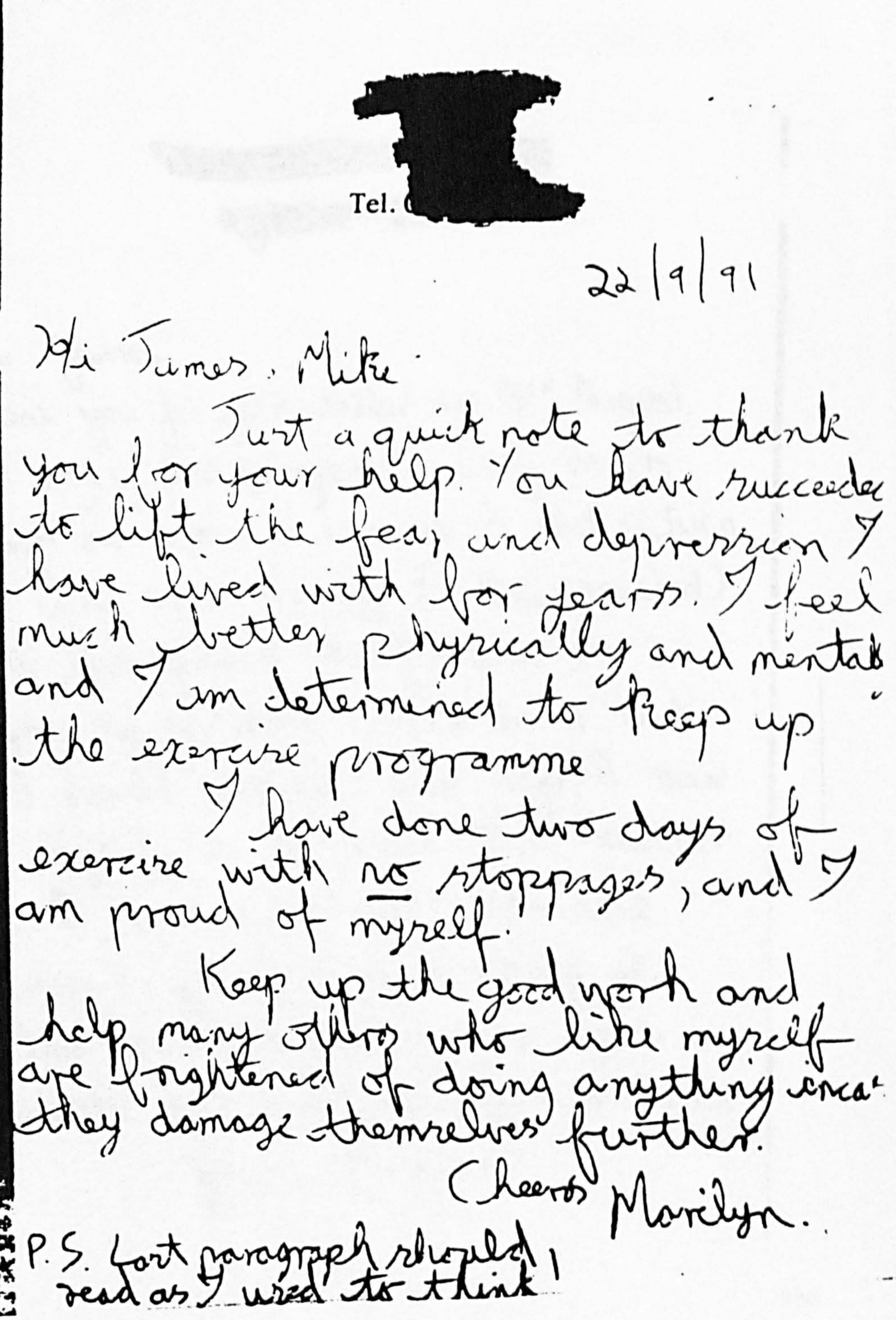
Without the questionnaires our research will be inconclusive and incomplete and charitable trusts like the Sir Jules Thorn Trust may not be willing to fund further research in this area.

If you have mislaid the questionnaire, please telephone us on **794 5535** and we will forward another one to you.

May I thank you so very much for your participation to date, and I look forward to receiving the questionnaire.

Yours sincerely,

CAROL FOREMAN (MRS)
RESEARCH COORDINATER



[redacted]

Tel. [redacted]

22/9/91

Hi James, Mike.

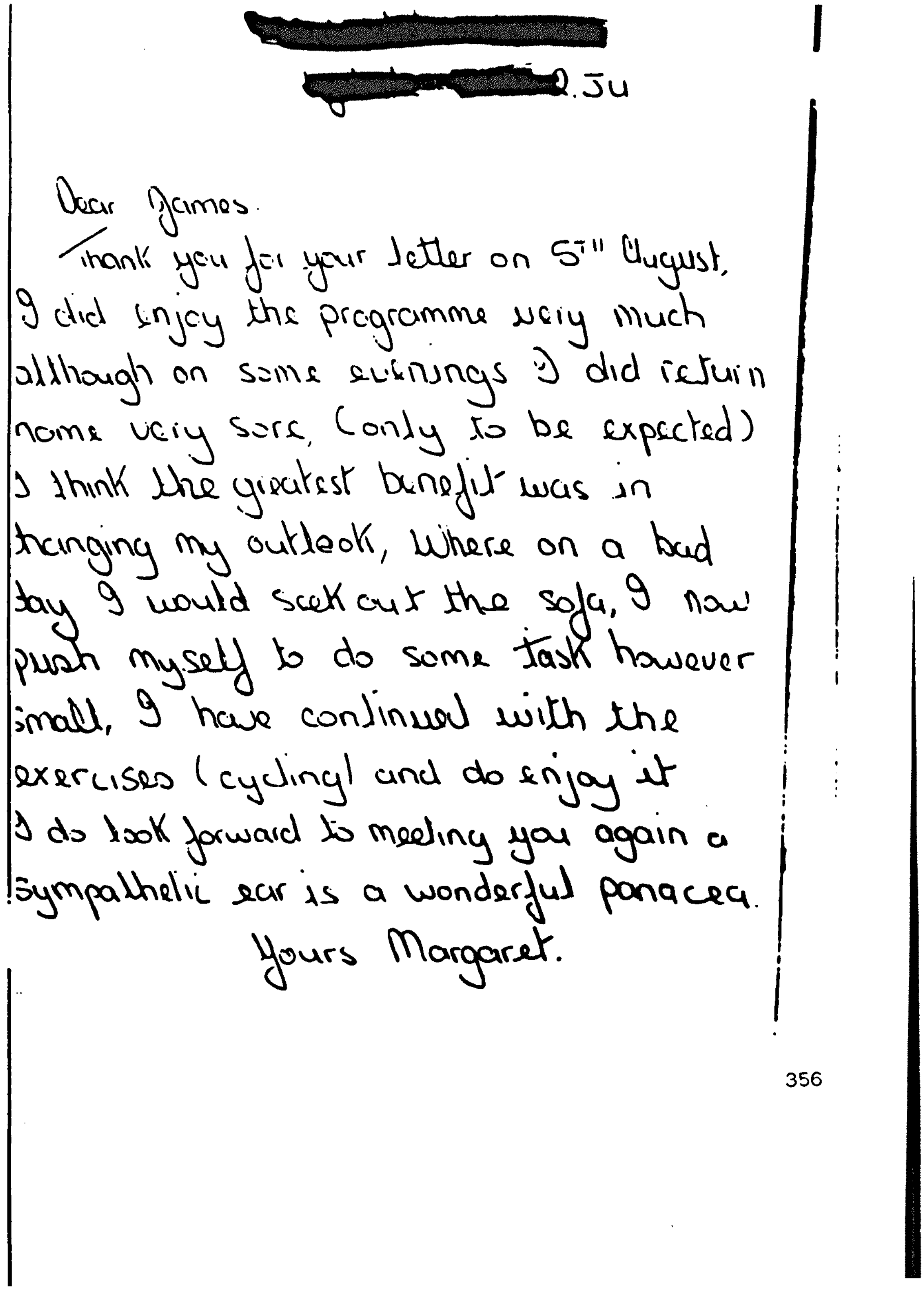
Just a quick note to thank you for your help. You have succeede to lift the fear and depression I have lived with for years. I feel much better physically and mentall and I am determined to keep up the exercise programme.

I have done two days of exercise with no stoppages, and I am proud of myself.

Keep up the good work and help many others who like myself are frightened of doing anything incas they damage themselves further.

Cheers Marilyn.

P.S. Last paragraph should read as I used to think!



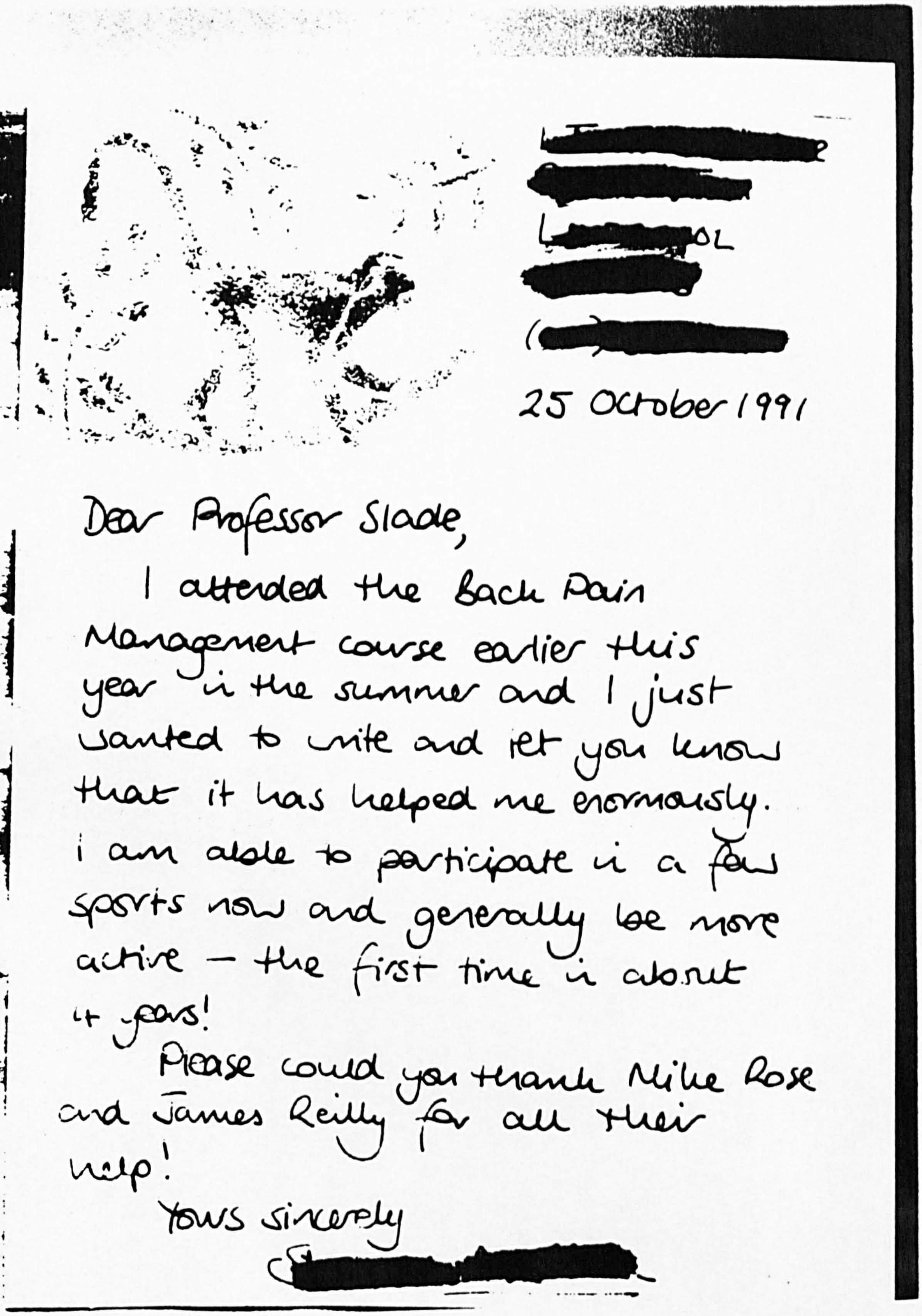
[redacted]

[redacted].Ju

Dear James.

Thank you for your letter on 5th August. I did enjoy the programme very much although on some evenings I did return home very sore, (only to be expected) I think the greatest benefit was in changing my outlook, where on a bad day I would seek out the sofa, I now push myself to do some task however small, I have continued with the exercises (cycling) and do enjoy it I do look forward to meeting you again a sympathetic ear is a wonderful panacea.

Yours Margaret.



[redacted]
L[redacted]OL
[redacted]
([redacted]

25 October 1991

Dear Professor Slade,

I attended the Back Pain Management course earlier this year in the summer and I just wanted to write and let you know that it has helped me enormously. i am able to participate in a few sports now and generally be more active – the first time in about 4 years!

Please could you thank Mike Rose and James Reilly for all their help!

Yours sincerely

[redacted]