**What is the Impact of Day Care on Older People with Long Term Conditions: A Systematic Review**

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**Data Availability Statement**

Data is available on request from authors

**What are Outcomes of Day Care Attendance on Older People with Long Term Conditions: A Systematic Review?**

**Abstract**

There is a lack of robust evidence regarding outcomes for day care use amongst older people living with long term conditions (LTCs). Day care is provided by independent, private and voluntary and charitable sectors. This systematic review aims to establish current evidence of outcomes for older people with LTCs attending day care services and outcomes on carers, across all service models. Narrative synthesis of quantitative and qualitative data was undertaken. The review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA). A systematic literature search was carried out across eight electronic databases and reference lists of key journals between 2004 and October 2020 were searched. Searches returned 1202 unique titles. Forty five articles from 16 countries met the criteria on review of title, abstract and full article. There is limited evidence suggesting improved levels of perceived psychological health, quality of life, perceived general health, physical health and functioning for older people attending day care who have LTCs. The respite function of day care resulted in positive outcomes for carers. Studies evaluating outcomes for participants or carers were limited in quantity and quality. There is limited information regarding outcomes for day care attendance for older people with multiple LTCs from existing literature. Further research focusing on LTCs and day care attendance would benefit this field.

KEYWORDS: Day Care, Long Term Conditions, Older People, Outcomes, Ageing, Community Services

**What is known about this topic?**

Day care provides opportunities for older people with Long Term Conditions to socialise with others but little is known regarding outcomes

Day Care attendance anecdotally provides valuable respite for carers but again little is known regarding carer outcomes

Day care models are wide and varied creating difficulties in the replication of outcomes in an international context.

**What this paper adds?**

Despite the prevalence of long term conditions in the older population, there is a lack of studies reporting multiple long term conditions in the literature.

Within day care research respite for carers and outcomes for older people living with dementia are most commonly reported.

Studies focusing on the individual needs of older people with LTC and outcomes for day care attendance requires further research

**Introduction**

Day care for older people provide opportunities for social contact and social support (Lecovich & Biderman, 2012) and can support health, nutritional and daily living (Anderson, Dabelko-Schoeny & Johnson et al 2012). Perceived benefits are associated with improved mental health, socialisation, physical function and quality of life (Orellana, Manthorpe and Tinker et al 2018).

Day care models are mixed and often involve complex arrangements (Gridley, Brooks & Glendinning, 2012). Internationally, access to day care may be linked to national insurance schemes for those who require long term care with services based on either social or medical models (Kuzuya, Masuda, Hirakawa et al 2006; Tomita, Yoshimura, Ikegami, 2010).The lack of a standardised definition of day care has meant that effectiveness can be difficult to assess (Fields, Anderson & Dabelko-Schoeny et al, 2014). The increasing ageing population (UN, 2015), a narrowing of life expectancy gap between men and women (ONS, 2017) and a projected increase in the oldest old (Eurostat, 2017), has resulted in a changing demographic and at the same time wider austerity policy has seen local authority spending on community services for older people reduced (Ismail, Thorlby, Holder, 2014).

LTCs are conditions for which there is no cure, are life long and require ongoing drugs or treatment to be managed (Goodwin, Curry, Naylor et al, 2010). Diagnosis of LTCs is more common with increasing age (Melzer, Delgado, Winder et al, 2015) and with an increasing ageing population, it is suggested that the number of older people with at least one LTC will rise by 3 million to 18 million in the UK by 2025 (Mathers, Roberts, Hodkinson et al, 2011). Older people with LTCs have reduced life expectancy and suffer poorer health (Witham, 2020). Periods of illness and frequent contact with multiple health practitioners across a range of services are common and increase with more than one diagnosis.

People with high impact multiple LTCs which are difficult to manage, experience repeat hospital admissions and investigations (Foster, Jordan & Croft, 2006). However, systems are designed around a single disease approach (Barnett, Mercer, Norbury et al, 2012). For example, the UK government guidance for the management of LTCs was specific only to Neurological Conditions (DH, 2005). In contrast Taylor et al (2014) produced a list of 77 LTCs. It was expected that this review would explore a range of LTCs encompassing both physical and mental health, for example, Anxiety, Arthritis, Dementia, Depression, Parkinson’s Disease, and Stroke.

Multiple LTCs are associated with higher health care costs (Maregoni, Angelman, Melis et al, 2011). Multiple medications may increase the risk of problems associated with ageing such as cognitive impairments and falls (Hajjar, Cafiero, Hanlon et al, 2007). In addition there is growing evidence that over the age of 70 years, expenditure outside traditional health systems increase (Oliver, Foot, Humphries, 2014). It is perceived that day care services promote independence and autonomy for older people who do not require full care in a residential setting but do need require support to continue living independently (Clark, 2001). However, day care is a neglected area of research (Lunt, Dowrick, Lloyd-Williams, 2018; Manthorpe & Moriarty, 2014; McVicker, 2004; Orellana, Manthorpe & Tinker, 2018) and there is a paucity of research into interventions to improve outcomes for multiple LTCs across health and social care (Smith, Soubi, Fortin et al 2012).

Day care provision within the UK finds itself at the juncture of key government policies affecting its funding and sustainability. The number of older people is rising however the number receiving publicly funded social care is falling (NICE, 2019). Nationally, access to day care services are embedded in the government’s wider personalisation agenda, whereby individuals who qualify for support have more control over the support they access.

Subsequently the landscape in which UK day care services operate has been affected by policy initiatives (NHS England, 2017) and those more recently introduced such as Caring for our Future (HM Government, 2012) and the Care Act (UK Government, 2014). In addition a green paper for social care on older people in England (UK Parliament, 2018) is expected to be published (Jarret, 2018) however has seen subsequent delays. Prior assumptions, that individuals are assessed prior to accessing day care are not applicable to all UK models, with many previously local government managed services outsourced or decommissioned.

Different diseases experience differing disease trajectories with peaks and troughs of symptoms. Charmaz (1997) suggests that over time older people living with LTCs experience a decline whereby they relinquish former activities leading to the shrinking of their social world. In England, the levels of depression are seven times higher in older people with two or more long term conditions (NICE, 2019). It is common for authors of day care studies not to report population groups or service types in published findings (Manthorpe & Moriarty, 2014). Summarising study participants with cognitive impairment is too far reaching for findings to be applied. For example, people with Parkinson’s Disease may experience issues caused by processing speed as opposed to memory loss for a person with Dementia. Dementia in itself is an umbrella term with people sometimes diagnosed with more than one type, affecting different aspects of cognition. Therefore, it is important to move beyond such generic terms in order to reflect what impact services have on people with LTCs.

There is a lack of robust evidence to substantiate whether day care improves quality of life for older people with chronic LTCs and their caregivers. Little is known regarding different models of day care and their impact on older people’s experience or whether some may be more appropriate for the future needs of people with LTCs. A previous systematic review included day care as one of a number of respite services for frail and older people with dementia focusing on outcomes for carers only (Mason, Weathely, Spilsbury et al, 2007). Another review was designed around the provision of Adult Day Care in the US but it did not consider LTCs focusing only on the generic older population group (Fields, Anderson, Dabelko-Schoeny et al, 2014).

The recent scoping review (Orellana, Manthorpe and Tinker, 2018) focused on non-dementia day care services, added to the wider understanding of day care as a service by exploring the perceptions, benefits and purposes of day care services. As the ageing process may disguise physical, emotional and sensory needs arising from LTCs, assessing the impact of day care solely from the viewpoint of a generic older population risks ignoring the impact of day care on those living with LTCs and reinforcing ageist stereotypes and assumptions.

Day care is frequently alluded to in terms of its social function, the role that non-traditional health organisations play in supporting wider determinants of health is widely acknowledged although often overlooked when considering LTCs. As a service with the potential to support older people to live in the community for longer periods AND delaying the need for institutional care (Gitlin, Reever, Dennis et al 2006) understanding outcomes pertaining to day care services within this context will be beneficial.

The aim of this review is to examine reported outcomes for older people with LTCs and their carers attending day care services. It does not investigate the needs of older people with individual LTCs but explores the types of LTCs included in day care research. The objectives are to explore outcomes across all day care provider settings including social care models and non-cancer specific palliative day care services, and to consider outcomes reported in relation to LTCs (common in this age group) and studies of day care provision in urban and rural settings.

**Methods**

**Inclusion**

Inclusion criteria for this systematic review included day care services including private, public, voluntary and charitable sectors and evaluated outcomes for older people age 65+, with either physical, psychological or social needs. Papers from 2004 to 2020 were retrieved in order to reflect the current personalisation agenda and development of current UK health and social care policies. Studies were included if published in English, as funding was not available for translation.

**Exclusion**

Studies in palliative day care settings were excluded if cancer only due to the difference in illness trajectories between older people with cancer and chronic LTCs (Kendall, Carduff, Lloyd et al 2015) and palliative cancer day care services are provided across the age range and are not exclusively for older people.

Within international literature, some day care services were day hospitals or rehabilitation centres and participants attended for short term interventions. Papers focusing on day hospital or rehabilitation day settings were therefore excluded.

**Search Criteria /Methods**

Searches were undertaken in 2018, using the following databases: Web of Science, Pubmed, Medline, Cinahl, Psych INFO, Cochrane Review Library, Scopus and Social Care online. Charitable websites were searched for relevant articles and manual checking of article references were undertaken. Figure 1 illustrates the search terms used.

**Selection of included studies**

Searches were undertaken and titles scanned for relevance with those meeting criteria reviewed at abstract level. Studies were selected by first author with the third author undertaking non -blinded review to ensure criteria for inclusion had been met for 40% of articles selected. Discussion with the author team took place for articles whereby inclusion was uncertain. In addition, ten percent of those selected were considered by the complete author team to moderate agreed quality scores criteria.

**Data Extraction and Analysis**

Each included study was summarised and data extraction undertaken, with particular attention to the types of outcomes for older people, the types of LTCs considered by the study, and if rural or urban day care was included. Four studies (Embrey 2009A; Embrey 2009B; Lecovich, 2012 & Lecovich 2013B) by two authors reported different components from the same study. For example, Embrey (2009A & 2009B) reported participants’ view of therapeutic interventions in one paper and in another participant reported outcomes. Similarly, a case control study with 817 participants by Lecovich reported findings pertaining to loneliness in one paper (2012) and quality of life (2013B) in the other. Therefore where different aspects of the same study was described in more than one paper, each paper was scored and treated as a separate study. A wide range of interventions and settings meant that it was not possible to conduct a meta-analysis of the findings of articles in this review.

**Quality**

The quality of studies was assessed using the Hawker and Payne method for reviews (Hawker and Payne, 2002) which assesses nine components; abstract and title; introduction and aims; method and data; sampling; data analysis; ethics and bias; results; transferability and implications and practice. Each component is scored as follows good (4), Fair (3), poor (2) and very poor (1). The maximum score for quality using this method is 36 whereby all aspects of the study are assessed to be good. The quality score for articles ranged from 23 to 36. Due to the heterogeneity ofstudies the results are presented as a narrative summary. Discussions took place between the first and third author with additional discussion with second author until consensus regarding final themes was reached.

**Results**

**Search results**

The initial search terms yielded 1202 titles (not including duplicates) and further searches yielded no additional papers. In line with the search strategy the initial articles were reduced to 45that were selected for the systematic review (see figure 2 for more detail). The most common reasons for exclusion were descriptive studies (63%). The primary objective of a number of studies focused on the needs of day care users. So for example, the day care settings were used as a strategy to access the older population regarding age related issues (17%). There were also a number of studies that included respite day care and solely focused on needs of older people with cancer (23%).

**Characteristics of included studies**

Forty Five studies were selected for further scrutiny, illustrated in Table 1. Six studies were qualitative and 39 were quantitative studies from 16 countries (Canada, China, Finland, Germany, India, Iran, Israel, Italy, Japan, Korea, Netherlands, Norway, Sweden, Taiwan, USA, UK). The quantitative studies included four randomised controlled trials, two cluster randomised controlled trial, six quasi experimental studies, eleven case control studies, five cross sectional studies, one systematic review and ten cohort studies. For studies where different aspects of the research were published separately, the published studies were assessed individually, see Lecovich & Biderman, (2012, and 2013B) and Embrey (2009A and 2009B).

The majority of studies provided transport, activities and a meal for attendees. International models applied support linked to health insurance schemes and may include access to clinical or therapy services such as physiotherapy or occupational therapy services. One study included Green Care Farms in the Netherlands and another at a day care farm in Norway whereby participants take part in walks, feeding animals and gardening with their counterparts. The remainder of the studies were based in adult social care or day care centre settings providing cognitive games, music sessions and topical activities to facilitate interaction. Studies ranged from large scale quantitative studies and small qualitative studies with population size of studies ranging from 1673 frail elderly people in a prospective cohort study (Kuzuya, Masuda, Hirakawa et al 2006) and 9 older people in a qualitative study of people with Multiple Sclerosis (Embrey, 2009A and 2009B**).** Elevenstudies compared day care attendance with non-attendance (Lecovich & Biderman, 2012, 2013A & 2013B; Jacob, Abraham and Abraham et al 2007; Bilotta, Bergamaschini, Spreafico et al, 2010; Lee, Yim, Choi et al 2018; Rokstad, Engedal, Kirkevold et al 2018; Seddigh, Hazrati, Jokar et al 2010, Schacke & Zank 2006; Schmitt, Sands, Weiss et al, 2010 and Kelly, 2015). Other examples compared new interventions with usual day care (De Bruin S, Oosting S, Tobi H, et al, 2011; Pitkala, Routasa, Kautianinen et al 2009; Droes R, Breebaart E, Meiland F, et al, 2004; Horowitz & Chang, 2004).

Search criteria included several terms intended to capture LTCs and multiple LTCs in the literature. There was a dominance in studies focusing on dementia (see figure 3) and a lack of studies reporting multiple LTCs (See Figure 4). For example, a cross sectional study Bilotta, Bergamaschi, Spreafico et al, (2010) considered diseases that impact on depression with lung disease, eye disease, heart disease and arthritis reported in the study. In other studies the percentage of older people with more than one LTC was reported but without further detail as to ratios (Dabelko-Schoeny & King, 2010) or type of LTC considered (Frosch, Rincon, Ochoa et al 2010; Lin, Sung, Li et al, 2015; Tomito, 2010).

Figure 3 reports the types of LTCs reported by participants in the selected articles and figure 4 reports the number of LTCs reported in selected articles. Studies reporting nine or more LTCs were larger studies comparing day care users with either non day care users (Kelly, 2015; Lecovich & Biderman, 2012; Lecovich & Biderman 2013A and , Lecovich & Biderman 2013B) or with other day care provision type as mentioned above (De Bruin S, Oosting S, Tobi H, et al, 2011).

A large number of those studies that reported more than 1 LTC did not consider conditions beyond the description of the study sample. The large proportion of studies considering Dementia did not include additional conditions, focusing solely on the primary diagnosis, highlighting a gap in previous research in this area. Five studies reporting disability as a LTC without reference to a specific diagnosis were included as the centres were linked to Long Term Conditions Insurance schemes (De Bruin S, Oosting S, Tobi H, et al, 2011; Droes R, Breebaart E, Meiland F, et al, 2004; Horowitz & Chang, 2004; Shapira, Barak & Gal, 2007; Tomita, Yoshimura, Ikegami, 2010).

**Outcomes**

The findings were organised into themes in terms of reported outcomes. The authors were interested in the outcomes of day care services with regards to the concept of LTC as opposed to individual LTC type. The outcomes were derived following review of themes arising from the data extraction and team discussions. Outcomes were reviewed and synthesised together for the following themes reported initially by day care participant and then by carer. Psychological outcomes; Quality of Life & Perceived Health; Physical Health & Functioning; Self-Management of LTC; Service Utilisation; Respite; Carer Burden, the latter two themes reported as carer outcomes. Findings are reported below initially by outcomes for day cay attendees and then by outcomes for carer.

**Outcomes for day care attendees**

**Psychological Health outcomes.**

Two randomised trials (Boen, Dalgard & Johansen et al, 2012, Cheung, Binyu, Lung et al 2020), one quasi experimental (Haeften-van Dijk; Hattink, Melland et al, 2017) six case control studies (Horowitz & Chang, 2004; Jacob, Abraham and Abraham et al 2007; Lecovich & Biderman, 2012; Mosello, Caleri & Razzi et al, 2008; Schmitt, Sands, Weiss et al, 2010 and Shapira, Barak, Gal, 2007), **two** cross sectional study (Fitzpatrick, Gitelson, Andereck et al, 2005 & Seddigh, Hazrati, Jokar et al 2020, one cohort study (Lee, Yim, Choi et al 2018 ) and four qualitative studies (Dabelko-Schoeny & King, 2010; Embrey 2009A; Embrey 2009B; Karania, 2017) investigated psychological benefits for those attending day care. Statistically significant improvements were reported in perceived psychological health (Fitzpatrick, Gitelson, Andereck et al, 2005; Jacob, Abraham and Abraham et al 2007 and Mosello, 2008) and a reduction in the levels of depression (Dabelko-Schoeny & King, 2010; Horowitz 2004; Shapira, Barak & Gal, 2007), with two studies observing a significant decrease in the levels of depression for those attending day care (Shapira, Barak & Gal, 2007 & Seddigh, Hazrati, Joker 2020) A further trial reported that depression increased in both those attending day care and the control group (Boen, Dalgard & Johansen et al, 2012).

A randomised controlled trial established improved cognitive abilities(Steinbesser, Schwarzkopf, Graessel 2020) and another study reported less cognitive decline for those receiving day care compared with home care (Lee, Yim, Choi et al 2018 ). Participants valued the emotional support they received at day care (Haeften-van Dijk, Hattink, Melland et al, 2017), participants reported positive results for improved overall mental health (Horowitz, 2004), improved emotional scores (Schmitt, Sands, Weiss et al, 2010), reported a more positive mood (Embrey 2009A, Embrey 2009B) and reported feeling more relaxed (Embrey 2009A, Embrey 2009B and Karania 2017). A small case control study reported a statistically significant reduction in the levels of loneliness following four months attendance at day care (Shapira, Barak & Gal, 2007) however a larger study of 817 respondents reported no statistically significant differences between day care and non-day care users (Lecovich & Biderman, 2012).

Two of the studies reporting statistically significant results included similar components within their service design (Jacob, Abraham and Abraham et al 2007 and Mosello, 2008). For example, staff providing support included a multidisciplinary team providing individual plans for those attending day care. In addition to recreational sessions attendees had access to counsellors, therapists and nursing staff ensuring personalised activities designed around the needs of their LTCs. A multi-professional team was the setting for the 16 day care programs taking part in the comparative study of day care and non-day care users (Schmitt, Sands, Weiss et al, 2010) and comparison of meeting centre program and home care support (Haeften-van Dijk, Hattink, Melland et al, 2017). Horowitz 2004 intervention included occupational therapy sessions for those attending day care. Fitzpatrick, Gitelson, Andereck et al, (2005) attributed results from caregiving, friendship and advice of staff at the centre.

Shapira, Barak & Gal, (2007) attributed the statistically significant results to the sense of empowerment felt by taking part in computer training intervention whereby participants were encouraged to converse with each other outside of day care, however the small size of the sample is a limitation. Activities that supported participants physical ability despite the limitations of LTC were highlighted along with those that encouraged interaction amidst the group that reported improved psychological outcomes (Cheung, Binyu, Leung, 2020**,** Dabelko-Schoeny and King, 2010; Embrey, Embrey, Fitzpatrick, Gitelson, Andereck et al, 2005; Haeften van 2016; Jacob, Abraham and Abraham et al 2007; Karania, Schmitt, Sands, Weiss et al, 2010; Shapira, Barak & Gal, 2007).

**Quality of Life and Perceived Health**

Four case control studies (Lecovich & Biderman, 2013B; Jacob, Abraham and Abraham et al 2007, Schmitt, Sands, Weiss et al, 2010 and Shapira, Barak & Gal, 2007), two cross sectional studies (Bilotta, Bergamaschini, Spreafico et al, 2010, Ibsen, Kirkevold & Patil, 2019), two cohort studies (Higgins, Koch, Hynan et al 2005 & Orellana, Manthorpe & Tinker, 2020) and two qualitative studies (Embrey 2009A & Embrey 2009B) reported changes in the quality of life of those attending day care. Attendees reported improvements to their quality of life (Embrey 2009A, Embrey 2009B, Orellana, Manthorpe & Tinker, 2020 and Schmitt, Sands, Weiss et al, 2010) and findings were statistically significant for four studies (Bilotta, Bergamaschini, Spreafico et al, 2010, Jacob, Abraham and Abraham et al 2007, Lecovich & Biderman, 2013B and Shapira, Barak & Gal, 2007). One study reported decreased quality of life but there was no control group included to compare non-attendees at day care and a 43% attrition rate from a sample of 37 participants (Higgins, Koch, Hynan et al, 2005). A trial and a case control study reported improved subjective health following attendance at day care (Pitkala, Routasa, Kautianinen et al 2009 and Horowitz & Chang, 2004) with the trial reporting statistical significant improvement.

Improvements to perceived quality of life and subjective health were found in settings whereby participants had access to multi-disciplinary teams of staff and personalised plans pertaining to LTCs (Bilotta, Bergamaschini, Spreafico et al, 2010; Horowitz & Chang, 2004; Jacob, Abraham and Abraham et al 2007; Lecovich & Biderman 2013B). One study did not report statistically significant findings (Horowitz & Chang, 2004). A cross sectional study reported an association between quality of life and social support received with more time spent outdoors (Ibsen, Kirkevold & Patel, 2019) Providing activities associated with participants abilities and interests were reported in studies reporting improvements in quality of life and subjective health (Embrey 2009A; Embrey 2009B; Pitkala, Routasa, Kautianinen et al 2009; Shapira, Barak & Gal, 2007). Although the latter two studies reported statistically significant results, only one had a reasonable sample size of 235 participants (Pitkala, Routasa, Kautianinen et al 2009) as opposed to 22 participants (Shapira, Barak & Gal, 2007). Methodological limitations mean that study designs restrict an inference of effectiveness where statistically significant results are present (Bilotta, 2010).

**Physical Health & Functioning**

Eleven studies including one RCT (Park, McCaffrey, Newman et al, 2016), one cluster randomized trial (Lin, Sung, Li, 2015), three case control studies (Horowitz & Chang, 2004; Schmitt, Sands, Weiss et al, 2010 and Shapira, Barak & Gal, 2007), one cross sectional study (Fitzpatrick, Gitelson, Andereck, 2005), two cohort studies (De Bruin, Oosting, Tobi et al 2011 & Lee, Yim, Choi et al 2018 ) and three qualitative studies( Embrey 2009A; Embrey 2009B; and Karania, 2017) investigated outcomes pertaining to attendees physical health and functioning. Those receiving care at day care services reported statistically better physical health (Fitzpatrick, Gitelson, Andereck et al, 2005), with an additional study reporting improved physical health (Shapira, Barak & Gal, 2007). One study reported less physical function decline (Lee, Yim and Choi, 2018). Two studies reported improved physical function (Horowitz & Chang, 2004 and Schmitt, Sands, Weiss et al, 2010). Although the latter study reported statistical significant results, the authors highlighted that the day care building was designed for full disabled access and suggested those attending may have had a perception of improved physical symptoms as a consequence of this.

A clustered randomized controlled trial reported statistically significant improvements in physical fitness (Lin, Sung, Li et al, 2015), a gymnastics intervention reported perceived improvements in fitness levels (Karania, 2017) and a qualitative study reported perceived improved dexterity (Embrey 2009A & Embrey 2009B). A randomised controlled trial reported statistically significant reduction in reported pain (Park, McCaffrey, Newman et al, 2017). However, one study did not report any difference in physical function between those attending Green Care Farms and Regular Day Care Facilities (De Bruin S, Oosting S, Tobi H, et al, 2011). A limitation of the latter study also included high levels of attrition, a rate of 40% from a sample of 88 participants.

In addition to the support already previously described when reporting psychological, quality of life and perceived health outcomes (Embrey 2009;, Embrey 2009B; Fitzpatrick, Gitelson, Andereck et al, 2005; Horowitz & Chang, 2004; Karani, 2017; Schmitt, Sands, Weiss et al, 2010; Shapira, Barak & Gal, 2007) two studies reported positive outcomes solely related to physical health (Lin, Sung, Li et al, 2015 and Park, McCaffrey, Newman et al, 2017). Lin , Sung, Li et al (2015) suggested the Tai Chi intervention was suitable to be incorporated into the daily routine of day care. The study examining a chair based yoga program reported pain reduction improvements but these were not sustained post intervention (Park, McCaffrey, Newman et al, 2017).

**Management of LTC**

A case control study reported a statistically significant reduction in the number of medications for those attending day care (Mossello, Caleri, Razzi, 2008). A quasi experimental study reported day care attendees discussed medications with a primary care professional following an education intervention at the day care centre (Frosch, Rincon, Ochoa et al 2010). Song, Seo, Choi et al (2017) reported interventions to promote health promotion and chronic disease management amongst day care attendees. A large proportion of the sessions were delivered by medical staff as the centres were accessed via LTC insurance schemes in USA and Korea. The quasi experimental study (Frosch, Rincon, Ochoa et al, 2010) consisted of a health promotion intervention providing participants with information about LTCs and advice on self-management. The activation of self-management approaches to LTC was statically significant for those attending day care and taking part in the intervention.

**Service Utilisation**

Seven studies assessed day care centre function to support older people living in the community, reducing the time spent in institutional or hospital care. This included one RCT (Pitkala, Routasa, Kautianinen et al 2009), two Quasi-experimental studies, (Droes, Breebaart, Meiland et al, 2004 Rokstad, Engedal & Kirkevold, 2018), a case control study (Lecovich & Biderman, 2013A), two cohort (Kuzuya, Masuda, Hirakawa et al 2006; Tomita, Yoshimura, Ikegami, 2010) and one qualitative study (Molzahn, Gallagher, Mcnulty, 2009). Statistically significant delay of entry into nursing home was reported for those supported through meeting centre support programmes (Droes, Breebart, Meiland et al, 2004). However, this study reported 31% attrition rate from a sample of 80 participants.

Day care centre service use was associated with significantly lower mortality rate over a 21 month period when compared with non-day care users (Kuzuya, Masuda, Hirakawa et al 2006). There was a decreasing use of other services whilst attending a day care centre (Lecovich & Biderman 2013A; Tomito, Yoshimura, Ikegami et al 2010; Pitkala, Routasalo, Kautianinen et al 2009), with two studies comparing day care users with non-day care users. Tomito, Yoshimura, Ikegami et al 2010 reporting that those attending day care were less likely to be admitted to hospital than non-attenders (Tomito, Yoshimura, Ikegami et al, 2010). However, a quasi-experimental trial found that those attending day care were more likely to be admitted to a nursing home than those not attending day care (Rokstad, Engedal, Kirkevold, 2018) Qualitative findings revealed participants believed day care attendance provided regular interventions before a crisis developed (Molzahn, Gallagher, Mcnulty, 2009) that would in contrast require long term or institutional care. Support provided by the services that participated in the three larger studies (Kuzuya, Masuda, Hirakawa et al 2006; Lecovich & Biderman, 2013A and Tomito Yoshimura, Ikegami et al 2010) were both associated with long term care insurance scheme aimed at enabling older people to age in place in their respective countries (Israel and Japan).

**Carer outcomes**

Over a third of studies within this review include or refer to outcomes for carers resulting in respite from their caring role (Bartfay & Bartfay 2013; Droes, Breebaart, Meiland et al 2004; Embrey 2009a; Embrey 2009b; Femia, Zarit, Parris-Stephens et al 2007; Gitlin , Reever, Dennis et al 2006; Haeften-van Dijk, Hattink, Melland et al 2016; Mavall & Malmberg 2007; Mavall & Thorslund 2006; Molzahn, Gallagher & McNulty et al 2009; Mossello, Caleri, Razzi, 2008; Schacke and Zank 2006; Smeets, van Heughten, Geboers et al 2012; Zarit, Kyungmin, Femia et al 2011; Zarit, Kyungmin, Femia 2013, and Tretteteig, Vatne, Rokstad 2017).

Decline in stress levels was statistically significant for carers as a consequence of the person they cared for attending day care (Zarit, Kuyunmin, Fermia et al 2011 and Zarit. Kuyunmin, Femia et al 2013), there was a statistically significant reduction relating to stresses related to conflict regarding the carers’ other commitments (Schacke & Zank, 2006), carers’ worry and overload decline was statistically significant after four months using day care services (Mavall & Thorsland) and carer burden decreased reaching statistical significance (Mosello, Clari, Razzi et al 2008). Carers reported a statistically significant improvement in their own confidence in managing behaviours of the person they cared for (Gitlin, Reever, Dennis et al, 2006**)** and feelings of competence (Droes, Breebaart, Meiland et al, 2004). Qualitative findings revealed carers reported their ability to draw on their own resources whilst caring (Tretteteig, Vatne & Rokstad et al 2017). A further eight studies reported outcomes relating to the alleviation of pressures associated with the caring role (Droes, Breebaart, Meiland et al, 2004; Gitlin, Reever, Dennis et al, 2006; Mavall & Thorsland, 2007; Mosello, Caleri, Razzi et al 2008; Schacke & Zank, 2006; Zarit, Kyungmin, Femia et al 2011; Tretteteig, Vatne, Rokstad, 2017; Zarit, Kyungmin, Femia, et al 2013).

There were positive findings reported in five studies with reduction in depression for carers (Femia, Zarit, Parris-Stephens et al, 2007; Gitlin, Reever, Dennis et al 2006; Mavall & Thorsland, 2006; Mossello, Caleri, Razzi, 2008 & Zarit, Kuyunmin, Fermia, 2013). A day care program with emphasis on supporting or training carers reported statistically significant improved wellbeing for carers (Gitlin, Reever, Dennis et al 2006). Qualitative studies reported positive day care benefits for carers (Embrey 2009a; Embrey 2009b; Molzahn, Gallagher & McNulty et al 2009). Caregiver wellbeing was associated with sense of mastery (Smeets, van Heughten, Geboers et al 2012) and emotional support from day care staff was valued (Haeften-van Dijk, Hattink, Melland et al 2016). Statistically significant improvement in the quality of life was not established for carers using day care services (Bartfay & Bartfay, 2013; Mavall & Malmberg 2007; Mavall & Thorslund 2007; Smeets, van Haughten, Geboers et al 2012). Comparison of carers of older people with Alzheimer’s Disease and those caring for older people with other LTCs at a non-Alzheimer’s Disease specific day care centre, reported similar outcomes suggesting that day care services can target the multiple needs of caregivers (Bartfay & Bartfay, 2013).

**Urban / Rural**

We were unable to find any studies comparing day care models in rural or urban areas. Whilst Jacob, Abraham and Abraham et al (2007) focused on a day care centre in rural India, the rurality of the service was not described or referred to in the paper itself. The papers exploring outcomes at Day Care Farms (De Bruin S, Oosting S, Tobi H, et al, 2011 and Ibsen, Kirkevold & Patil, 2019,) provides useful findings for services considering this approach in rural settings but the study did not consider rural or urban variables within its analysis.

**Discussion**

This systematic review found limited evidence for improved levels of perceived psychological health, quality of life, perceived general health, physical health and functioning for older people with LTCs attending day care services. The respite function of day care resulted in positive outcomes for carers and there is evidence of evolving programs aimed at supporting carers of older people attending day care. This adds to previous day care systematic reviews (Mason, Weathely, Spilsbury et al 2007) by encompassing service models beyond that of respite.

This review also confirmed that despite LTC’s in this population group, it is often overlooked within the current literature. It has been reported in the UK that one in three people havemultiple LTCs, with one in three people admitted to hospital having five or more conditions (BMJ, 2020). Despite this, as demonstrated in Figure 4, just 22% of the articles in this review included five LTCs or more. There is recognition that Older People are more likely to experience loneliness due to bereavement increasing impairment and independence due to declining health (Hagan, 2020). To overlook LTCs increases the risk of isolation for those experiencing physical or cognitive impairment associated with multiple diagnosis.

There is increased anxiety common around prospective physical and mental decline within this age group (Layton, 2009). A case review of older people who had been labelled as “unable to cope” due to consequences of ageing, revealed multiple LTCs diagnosis culminating in further support available and more positive outcomes (Dyer, Ryan, O’Callaghan, 2018). Such attention of LTCs within the day care setting would enable more focus on alleviating physical and psychological challenges associated with multiple diagnosis. There is an understanding of the impact of LTC diagnosis on an individual’s identity (Charmaz 1997) and the burden of treatment on people managing and coordinating their own care (May et al 2014). This review provides an overview of the outcomes associated with day care in supporting people adapting to decline in physical or cognitive abilities, associated with particular LTC diagnosis and promoting psychological health, wellbeing and quality of life.

There is evidence of some psychological benefit for those attending day care, with three studies reporting statistically significant improved psychological health, four studies reporting a reduction in depression and six studies reporting improvements in mental health, emotional wellbeing and another reporting a decline in the level of loneliness. Activities whereby adaptations were made for any LTC related physical limitations, interaction between participants was encouraged and activities that facilitated a sense of empowerment were all described in studies reporting improved outcomes (Dabelko-Schoeny and King, 2010; Embrey 2009A; Embrey 2009B; Fitzpatrick, Gitelson, Andereck et al 2005; Haeften-van Dijk, Hattink, Melland et al, 2017; Jacob, Abraham, Abraham et al 2007; Karania, 2017; Pitkala, Routasalo, Kautianinen et al, 2009; Schmitt, Sands, Weiss et al, 2010; Shapira, Barak, Gal, 2007).

Despite higher prevalence of disability due to LTCs the majority of elderly people prefer to stay in their own homes (Tomita, Yoshimura, Ikegami 2010). Therefore, day care offers a multi-component intervention supporting older people to age in place. Eight of the nine studies examining quality of life outcomes for participants attending day care services, reportedpositive outcomes with two studies reporting improvement in perceived health outcomes. Ten of the eleven studies investigating physical and functional outcomes demonstrated positive findings, with two trials reporting significant reduction on pain levels. The intervention for the latter studies were designed specifically with needs arising from participants’ LTC at the forefront of the design. As were two studies promoting self-management of LTCS in terms of understanding medication. In addition three larger studies reported older people utilising day care services were less likely to be admitted to hospital and a fourth reported attendance significantly delayed entry into nursing homes.

The consideration of LTCs heighten the understanding and applicability of findings regarding outcomes for older people accessing support at day care. However this review also highlights a dominance of studies examining the role of day care services supporting people with Dementia with 49% of studies including Older People with this diagnosis.

Carer outcomes were reported by 38% of studies included in this review. Support for carers from day care services was largely provided in the form of respite enabling a break from caring duties with two studies based on multi-professional services enabling carer needs to be addressed across the provision. The impact of day care on carers subsequently resulted in a reduction of stress, carer burden and feelings of worry. There were positive outcomes for carers, with a decline in the levels of depression and improved mood reported.

Despite the growing population of this age group and increased LTCs, little attention has been paid previously to this area and the review provides an understanding of the role of day care in enabling older people with LTC to remain supported in the community. Previous findings have reported on gender differences as a characteristic of day care users in the UK (AGE UK, 2011 and Manthorpe & Moriarty, 2014) and in the Netherlands (De Bruin S, Oosting S, Tobi H, et al, 2011). The addition of LTCs as a characteristic may enable further gaps in services or interventions to be better understood and addressed.

Studies reporting improvements in psychological well-being, quality of life, subjective health and physical functioning for older people attending day care refer to support required due to LTCs (Bilotta, Bergamaschini, Spreafico et al, 2010; Haeften-van Dijk, Hattink, Melland et al, 2017; Horowitz & Chang, 2005; Jacob, Abraham, Abraham et al, 2007; Lecovich & Biderman, 2012; Mosello, Caleri, Razzi et al, 2008; Schmitt, Sands, Weiss et al, 2010). Support from multi-disciplinary professionals may be part of Long Term Insurance Schemes but may not reflect provision in other countries for example the UK.

Targeted interventions provided for carers yielded positive results in terms of competence as a carer (Droes Breebaart, Meiland et al 2004), confidence in managing behaviors of the person they cared for and a decline in levels of depression and improved wellbeing (Gitlin, Reever, Dennis et al 2006) and ability to utilize their own resources whilst caring (Tretteteig, Vatne & Rokstad et al 2017). Previously evidence has suggested that day care can reduce utilisation of other services (Wanless, 2006). Building on the findings by Droes, Breebaart, Meiland, et al (2004) there is evidence that a meeting centre support programme at day care for carers reduces placement into long term care facilities. There is the potential whilst providing respite to prevent crisis for family caregivers and thus admissions into hospital.

**Strengths of review**

This review is the first to consider the outcomes of day care for older people with LTCs. It summarises the evidence between 2004 and 2020 acting as a reference for further studies investigating outcomes for older people with LTCs. This review illustrates the diversity of the day care sector that should be considered in future studies.

**Limitations of review**

A range of interventions, populations and settings meant that a combination of results was not possible. The review focused on studies published in English. International models of health and social care presented some challenges when assessing day care models. Heterogeneity of service provision and outcome measures chosen presents challenges to reviewing the evidence.

**Implications for future research**

Future research should investigate outcomes for day care for particular groups of older people, particularly in view of the expected increase in multiple LTCs. The current rise in the numbers of older people is greater in rural areas and there is a lack of research within this area. There may be the assumption that LTCs are a natural consequence of ageing and therefore not reported in current day care studies. Studies with larger sizes and control groups are needed.

**Conclusion**

This systematic review revealed that despite the expected prevalence of LTCs within this age group, more attention should be given to the role of day care in supporting older people with LTCs. This review supports earlier findings that there is a dearth of research, both quantity and quality with respect to day care across all providers, social, palliative and voluntary. Whilst the findings regarding the impact of day care suggests an improvement in some physical and psychological outcomes for day care users and potential benefits for carers, the lack of description regarding activities, models of care and location of settings such as the provider’s sector or environment, do not allow outcomes to be fully measured and findings applied in practice. In addition, closer examination of the setting (rural or urban) and more description about service providers would benefit the future application of research findings.

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**Figure 1. Key Search Terms**

Population: ‘older people’ or ‘elderly’ or ‘seniors’ or ‘pensioners’ or ‘elderly frail’

Intervention Condition: (‘long term conditions’ or ‘chronic conditions’ or ‘complex conditions’ or ‘comorbidity’ or ‘multimorbidity’ or ‘dual diagnosis’).

Outcome: ‘day care’ or ‘day service’ or ‘day centre’ or ‘social day care’ or ‘palliative day care’ or ‘Voluntary day care’ or ‘senior centre’ or ‘respite care’

Additional searches were undertaken for common single LTCs such as respiratory disease and heart failure. Reference to long term settings were excluded. Keywords were added for day care for older people in rural or urban settings.

**Figure 2. Article selection overview**

Articles identified through database searching

(N= 1831 )

Records excluded because of duplicates:

(N=629)

Title & Abstracts screened for relevance:

N=1202

Records excluded based on title / abstract

N=1104

Records included for full text retrieval:

N= (98)

Number of full text articles excluded:

N= (53)

No outcome measures (32)

Cancer only study (12)

Ageing study – day care used for recruitment only (9)

Full text articles included in review:

N=45

Figure 3

Long Term Conditions considered by articles within the review

|  |  |  |
| --- | --- | --- |
| LTC | Number of Articles | Articles |
| Dementia (including Alzheimers Disease). | 22 | Bartfay & Bartfay, Cheung, Dabelko-Schoeny & King, De Bruin, Droes, Femia, Gitlin, Haeflen-van, Higgins, Ibsen, Karania, Kelly, Lee, Mavall and Thorslund, Mavall & Malmberg, Mossello, Rokstad, Schacke & Zank, Steinbeisser, Tretteteig, Zarit (2 studies) |
| Hypertension | 12 | Dabelko-Schoeny, De Bruin, Fitzpatrick, Kelly, Kuzuya, Lecovich (3 studies), Lin, Pitkala, Seddigh, Song |
| Sroke | 12 | Gitlin, Kelly, Kuzuya, Lecovich (3 studies), Lee, Pitkala, Seddigh, Hazrati, Joker, Orellana |
| Diabetes | 11 | Dabelko-Schoeny & King, De Bruin, Gitlin, Horowitz, Kelly, Lecovich (3 studies), Pitkala, Seddigh, Song |
| Arthritis | 9 | Bilotta, Dabelko-Schoeny & King, Fitzpatrick, Gitlin, Lecovich A & B, Park, Pitkala, Song |
| Depression (Mental health but not specified) | 8 | Bilotta, Boen, Horowitz, Orellana, Schmitt, Seddigh, Shapira, Jacob |
| Coronary Heart Disease | 8 | Bilotta, Dabelko-Schoeny & King, De Bruin, Kelly, Kuzuya, Lecovich (2 studies) Seddigh. |
| Respiratory Disease | 7 | Bilotta, De Bruin, Horowitz, Kelly, Lecovich (3 studies) |
| Physical Disability | 6 | De Bruin, Droes, Horowitz, Orellana, Shapiro, Tomita |
| Renal Disease | 6 | Dabelko-Schoeny & King, Kelly, Lecovich (3 studies) Seddigh, |
| Cancer | 5 | Kelly, Kuzuya, Lecovich (3 studies) |
| Hyperthyroidism | 4 | De Bruin, Lecovich (3 studies) |
| Osteoporosis | 4 | Fitzpatrick, Lecovich (2 studies), Seddigh. |
| Heart Failure | 3 | De Bruin, Kelly, Juzuya |
| Cognitive Impairment | 3 | Molzahn, Schmit, Steinbeisser |
| Gastric Condition | 2 | Lecovich (2 studies) |
| Multiple Sclerosis | 2 | Embrey (2 studies) |
| Sensory Loss (Vision or hearing) | 4 | Bilotta, de Bruin, Orellana, Seddigh, Hazrati |
| Musculoskeletal | 2 | De Bruin, Seddigh |
| Acquired Brain Injury | 1 | Smeets |

\* Frosch et al 2012 reported numbers of LTC rather than type and Lin 2015 level of LTC in respect to Long term condition insurance system.

Figure 4 – Number of LTCs reported in Articles

|  |  |
| --- | --- |
| Number of LTCs reported | Number of Articles |
| 1 | 21 |
| 2 | 2 |
| 3 | 2 |
| 4 | 3 |
| 5 | 2 |
| 6 | 1 |
| 7 | - |
| 8 | - |
| 9 or more | 5 |

**Table 1: Systematic Review – Table of Selected Studies**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Author & Year | Country | Title | Method | Sample Size | Population | Summary  **Findings** | Quality Score |
| ***Randomised Controlled Trial*** | | | | | | | |
| Boen H, Dalgard OS, Johansen, R et al (2012) | Norway | A randomised controlled trial of senior centre group support programme and preventing depression in elderly people living at home in Norway | Quantitative – RCT compared with no d.c. | 138 | Age 65+  Mild depression | RCT comparing senior centre intervention compared with control group to examine the effect on comparing depression, increasing social support and self-related health and satisfaction with life.  **Social support increased in both groups but greatest in intervention group. Level of depression decreased in both groups but more so in control. Decrease in life satisfaction in both groups, largest decrease among controls.** | 36 |
| Park J, McCaffrey R, Newman D et al (2016) | USA | A Pilot Randomised Controlled Trial of the Effects of Chair Yoga on Pain and Physical Function Among Community-Dwelling Older Adults with Lower Extremity Osteoarthritis | Quantitative | 131 | Mean 75 years | Two arm randomized control trial. Participants assigned to chair yoga or health education program  **The chair yoga group showed greater reduction in pain interference during intervention sustained through 3 months.** | 31 |
| Pitkala, KH, Routasalo P, Kautianinen H et al (2009) | Finland | Effects of psychological group rehabilitation on health, use of health care services and mortality of older persons suffering from loneliness: a randomised controlled trial | Quantitative | 235 | Mean age 80yrs | Randomised Controlled Trial comparing those assigned into group activities designed around therapeutic interventions with usual day care.  **2 years survival was 97% in the intervening group and 90% in the control group. The intervention group showed significant improvement in subjective health, this resulting in significantly lower health care costs during follow up.** | 35 |
| Cheung, Bingyu, Leung et al (2019) | China | Cognitive Stimulation Play Intervention for Dementia: A Feasibility Randomized Controlled Trial | Randomised Controlled Trial (feasibility) | 30 | Mean 83 years | Older people from 2 day centres compared impact of cognitive stimulating Play intervention on cognitive functions with usual day care.  **Significant difference in memory storage and retrieval functions with the intervention group scoring higher than the control group post-test.** | 33 |
| ***Cluster Randomised Controlled Trial*** | | | | | | | |
| Lin, SF, Sung HC, Li TL et al (2015 | Taiwan | The effects of Tai Chi in conjunction with resistance exercise on functional fitness and muscle strength among community-based older people | Cluster randomised control trial | 138 | Mean 74 years | Older people assigned to an exercise group or control group, twice weekly for 16 weeks.  **After receiving Thera-band resistance exercise, interventions participants displayed a significant increase in muscle strength of upper and lower extremities.** | 33 |
| Steinbeisser, Schwarzkopf, Graessel (2020) | Germany | Cost effectiveness of a non-pharmacological treatment vs care as usual in day centers for community-dwelling older people with cognitive impairments | Cluster Randomised control trial | 433 | Mean age 81 years | Comparison of a multicomponent intervention for older people and those receiving usual day care.  **Improved cognitive abilities for those using the intervention.** | 35 |
| *Quasi Experimental Study* | | | | | | | |
| Droes R, Breebaart E, Meiland F, et al (2004 | Netherlands | Effects of meeting centre support programme on feelings of competence of family carers and delay of institutionalisation of people with dementia | Quantitative | 54 | Carers of people with mild to moderate dementia | Quasi experimental design – pre-test/ post-test control group with matched groups comparing meeting centres (MC) and regular day care (RDC) centres.  **After seven months the carers in the MC compared to the RDC showed a moderate positive effect of the feeling of competence.** | 34 |
| Femia, E, Zarit S, Parris Stephens MA et al (2007) | U.S. | Impact of adult day services in behavioural and psychological symptoms of dementia | Quantitative | 133 | Dementia Pts and Carers | Quasi experimental design to compare group of people with dementia attending day care and those not using these services.  **Relationship between day care use and caregivers’ report of fewer nighttime sleep-related problems for their People with Dementia.** | 36 |
| Frosch DL, Rincon D, Ochoa S et al (2010) | U.S. | Activating Seniors to improve chronic disease care: results from a pilot intervention study. | Quantitative | 116 |  | Two group quasi experimental study examining impact of video screening on health activation, one group incentivised to attend.  **At 6 month follow up, participants from either center who attended three or more group screenings reported significantly greater activation.** | 35 |
| Gitlin LN, Reever K, Dennis MP et al (2006) | U.S. | Enhancing quality of life of families who use adult day services: short and long term effects of the adult day services program | Quantitative | 129 | Carers | Quasi experimental design comparing and enhanced form of day care (DCplus) supporting carers and regular day care.  **At 3 months Dcplus carers reported less depression, improved confidence managing behaviours and enhanced wellbeing compared with controls.** | 36 |
| Haeften-van Dijk AM, Hattink BJJ, Melland FJM et al (2017) | The Netherlands | Is socially integrated community day care for people with dementia associated with higher user satisfaction and a higher job satisfaction of staff compared to nursing home-based day care? | Quantitative | 179 | People with dementia  Carers  Staff | Survey  **People with Dementia were more positive about the communication and listening skills of staff and the atmosphere and activities at the community based centre than the nursing home day centre. Caregivers valued the communication and expertise of staff at the community based centre.** | 31 |
| Rokstad, Engedal, Kirkevold et al 2018 | Norway | The impact of attending day care designed for home dwelling people with dementia on nursing home admission: a 24 month controlled study | Quantitative | 257 | People with dementia mean age 82 years | Comparison of people with Dementia using day care or not using day care and admission to nursing home.  **People accessing day care more associated with Nursing Home admission.** | 32 |
| ***Case Control Study*** | | | | | | | |
| Bartfay E & Bartfay WJ (2005) | Canada | Quality of life outcomes among alzheimers disease (AD) family caregivers following community based intervention. | Quantitative | 62 | Carers for alzheimers and non alzheimers patients | Cross sectional comparative design to examine the impact of 2 community based interventions on carers qol; carer support groups and adult day care.  **Caregivers of AD clients who use community based interventions enjoyed similar levels of qol as caregivers of non-AD clients.** | 36 |
| Horowitz BP & Chang PF, 2004 | U.S. | Promoting well- being and engagement in life through occupational therapy life redesign: a pilot study with adult day programs | Quantitative | 28 | Mean age 74.3 yrs | Randomized comparison of 16 week group orientated program and day care examining its impact on physical functioning and wellbeing  **No statistical differences were found between groups at follow up. Experimental group showed favorable results on role functioning, bodily pain and general health.** | 27 |
| Jacob, Abraham, Abraham et al 2007 | India | The effect of community based daycare on mental health and quality of life in rural south India | Quantitative | 41 | Mean 70 yrs | Comparative study of the impact of day care on quality of life and cognitive impairment for users and non-users of day care.  **There was significant reduction in psychiatric morbidity and improvement in quality of life scores at 3 months for subjects who attended the program.** | 27 |
| Kelly R, 2015 | Canada | The effect of adult day program attendance on emergency room registrations, hospital admissions and days in hospital: a propensity-matching study | Quantitative | 812 | Mean 81 yrs | Comparison of attendance at hospital who attend day care compared with non-attendance at day care  **Analysis revealed significantly lower mean 100- day rates of emergency room registrations, hospital admissions and days in hospital for attendees compared to matched non attendees.** |  |
| Lecovich E & Biderman A 2012 | Israel | Attendance in adult day centers and its relation to loneliness among frail older adults. | Quantitative | 817 | Mean 78 yrs | Case control study examining loneliness of day care users and non- users.  **No significant differences were found between users and non-users of day care centers in the level of loneliness.** | 36 |
| Lecovich E & Biderman B 2013A | Israel | Use of adult care centers: Do they offset utilization of health care services | Quantitative | 800 | Mean 78yrs | Case control study examining utilisation of services of user and non- users of day care.  **Utilization of health care services was connected with morbidity rather than day care use.** | 34 |
| Lecovich E & Biderman B 2013B | Israel | Quality of life among disabled older adults without cognitive impairment and its relation to attendance in day care centres | Quantitative | 817 | Mean 78 years | Case control study examining quality of life for users and non-users of day care.  **Quality of life was found to be significantly related to the use of day centres but length and frequency of attendance were insignificant in explaining quality of life among users of day care centres.** | 31 |
| Mossello Caleri, Razzi et al, 2008 | Italy | Day care for older patients with dementia: favourable effects on behavioural and psychological symptoms and caregiver stress | Quantitative | 60 | Dementia | Case control study comparing users of day care and non-users of day care on behavior and psychological symptoms and caregiver stress.  **NPI score significantly reduced in day care with a reduction in psychotropic drugs prescription but increased in home care.** | 32 |
| Schacke C & Zank SR, 2006 | Germany | Measuring the effectiveness of adult day care as a facility to support family caregivers of patients with dementia | Quantitative | 77 | Carers Dementia  Mean age 59yrs | Longitudinal study comparing users and non-users of day care.  **Use of day care significantly reduced conflicts between caregiving and job requirements, caregiving and family needs and recreational constrictions.** | 31 |
| Schmitt EM, Sands LP, Weiss et al 2010 | U.S. | Adult Day Health Centre Participation and health related quality of life | Quantitative | 124 | Age 55yrs + | Case control prospective study comparing user and non-users of day care.  **Physical scores for day care attendees improved compared with the non-users. Emotional scores improved for day care attendees but declined for non-attendees.** | 36 |
| Shapira N, Barak A, Gal I, 2007 | Israel | Promoting older adults’ wellbeing through internet training use. | Quantitative | 22 | Mean age 80yrs | Quasi experimental research design comparing the impact of those utilising computer training and those not on their wellbeing.  **Significant improvement among participants in the intervention group in all measures except physical functioning whereas deterioration in all measures was detected in the comparison group.** | 32 |
| ***Cross sectional Studies*** | | | | | | | |
| Bilotta, C Bergamaschini, L, Spreafico S et al, 2010 | Italy | Day care (DC) centre attendance and quality of life in depressed older adults living the community | Quantitative | 149 | Age 70+ yrs  Depressed older adults | Cross sectional study to find out whether the attendance at day care was associated with quality of life in community dwelling older adults suffering from a depressive order without dementia.  **Participants attending DC at least once per week had a higher mean EuroQol VAS score than non-attendants.** | 31 |
| Fitzpatrick TR, Gitelson J, Andereck et al 2005 | Canada | Social support factors and health among senior center population in southern ontario, canada | Quantitative | 186 | Mean age 72.5 yrs | Self-administered questionnaire with people attending day care, examining the impact the support role that friends or staff played on perceived mental and physical health.  **Caregiving is significantly related to physical health, how respondents feel in general and happiness with personal life.** | 32 |
| Ibsen, Kirkevold & Patil, (2019) | Norway | People with Dementia attending farm-based day care in Norward | Quantitative | 94 | People with Dementia  Mean age 76 years | Cross sectional design study exploring the association between individual & farm based day care and quality of life.  **Quality of life associated with the experience of having social support, a low score on depressive symptoms and spending time outdoors on the farm.** | 33 |
| Smeets, van Haugten, Geboers et al 2012 | Netherlands | Respite care after acquired brain injury: the wellbeing of caregivers and patients | Quantitative | 108 | Paired patient and carers Acquired Brain Injury | Cross sectional cohort study of patients with Aquired Brain Injury attending day care.  **Caregiver well-being was positively correlated with a high sense of mastery of caregivers and patients and low passive coping of the patient.** | 35 |
| Seddigh, Hazrati, Jokar et al (2020) | Iran | A comparative Study of Perceived Social Support and Depression among elderly members of Senior Day Centers, Elderly Residents in Nursing Homes & Elderly Living at Home | Quantitative | 315 | Mean age 68 years | Cross sectional study comparing levels of depression of people using day centres compared with people living in nursing homes and at home.  **Increasing social support resulted in decrease in depression which was statistically significant for group in nursing home and day care.** | 32 |
| ***Cohort Study*** | | | | | | | |
| De Bruin, Oosting, Tobi et al 2011 | Netherlands | Comparing day care green care farms and at regular day care facilities with regard to their effects on functional performance of community-dwelling older people with the dementia. | Quantitative | 88 | Age 65+  Older people with dementia | Observational cohort study comparing Green Care Farms with Regular Day Care.  **No significant change over time in functional performance, the number of diseases and the number of medications was observed** | 32 |
| Higgins, Koch, Hynan et al 2005 | U.S. | Impact of an activities based adult dementia care program | Quantitative | 37 | Dementia Mean age 77 | Longitudinal study examining the impact of educational program at modern day care facility on quality of life.  **Patients reported no change in quality of life.** | 32 |
| Kuzuya, Masuda, Hirakawa et al 2006 | Japan | Day care service use is associated with lower mortality in community dwelling frail older people | Quantitative | 1673 |  | Prospective Cohort examining day care use and mortality in community dwelling frail older people.  **Multi-variate cox regression model showed that day care service use was associated with reduction in mortality.** | 35 |
| Lee, Yim, Choi et al (2018) | Korea | Day Care vs Homes Care: Effects on functional health outcomes among long-term care beneficiaries with dementia in Korea | Quantitative | 832 | Mean age 79 years | Retrospective Matched Cohort study comparing changes in cognitive function, behavioral symptoms and physical function people with dementia using day care or home care.  **People using day care associated with less cognitive decline & less disability progression compared with home care.** | 33 |
| Mavall and Thorslund 2007 | Sweden | Does day care also provide for the caregiver? | Quantitative | 51 | Mean age 79yrs  Dementia or memory probs. | Comparative study of carers residing with or not residing with the person with dementia, who attended day care.  **Non co-residing caregivers whose relative dropped out of day care had higher level of depression, worry, overload and role captivity than the caregivers whose care recipient continued in day care.** | 31 |
| Mavall & Malmberg 2007 | Sweden | Day care for persons with dementia | Quantitative | 51 | Mean age 79yrs  Dementia or memory probs. | Prospective 12 month study examining the impact of those attending and those that dropped out of day care.  **One third of people discontinued within 4 months and another third dropped out within 12 months. People with behavioural problems and those who needed assistance with dressing and toileting discontinued earliest.** | 29 |
| Orellana, Manthorpe & Tinker (2020) | UK | Day centres for older people, attender characteristics, access routes and outcomes of regular attendance: findings of exploratory mixed methods case study | Mixed Methods Exploratory | 23 |  | Exploration of role of day centers, characteristics of attenders and outcomes.  **Day care attendance enhanced quality of life for people with mobility restrictions and at risk of declining independence** | 32 |
| Tomita, Yoshimura, Ikegami, 2010 | Japan | Impact of home and community based services on hospitalisation and institutionalisation among individuals eligible for long terms care insurance in Japan | Quantitative | 1020 | Mean age 71yrs | Retrospective cohort study comparing users of various community services, including day care and non-users with regards to hospitalisation and institutionalisation.  **Users of home and community based services were less likely than non-users to be hospitalised or institutionalised.** | 33 |
| Zarit, Kyungmin, Femia 2013 | U.S | The effects of adult services on family caregivers’ daily stress | Quantitative | 173 | Carers of people with dementia | Telephone interviews with carers who used day care for respite, comparing stress on day care attended day and non-attended days.  **Day care use lowered anger and reduced impact of non-care stressors on depressive symptoms.** | 36 |
| Zarit, Kyungmin, Femia 2011 | U.S. | Effects of adult day care on daily stress of caregivers: w within person approach | Quantitative | 121 | Carers of people with dementia | Telephone interviews and daily diaries with carers who used day care for respite, comparing stress on day care attended day and non-attended days.  **Total exposure to stressors and stress appraisals decreased significantly over time at day care days compared with non-day care days.** | 36 |
| ***Systematic Review*** | | | | | | | |
| Song, Seo, Choi, 2017 | South Korea | Seniors centre-based health intervention programmes in the US and South Korea a systematic review | Systematic Review | 22 Studies |  | Systematic review of health programmes provided at day centres  **Health interventions resulted in positive effects on senior centre participants knowledge, health behaviours, clinical indices and hospitalization rates.** |  |
| ***Qualitative Study*** | | | | | | | |
| Dabelko-Schoeny & King 2010 | USA | In their own words: Participants Perceptions of the impact of adult day services. | Qualitative | 28 | Mean age 78yrs  Absence of severe cog. Decline. | Semi structured interviews to gain an understanding of the experiences of older people after attending day care for 3 months.  **Participants experience at day care associated with perceived improvements in psychosocial well-being and a perceived decrease in burden or dependence on the caregiver.** | 35 |
| Embrey 2009A | UK | Exploring the lived experience of palliative care for people with MS part 2 | Qualitative | 36 | MS | Phenomenological approach, non- probability sampling with grand tour approach sampling, open ended interviews.  **Patient’s views of therapeutic interventions in day care alleviated symptoms, enabled achievement, fun and distraction from symptoms and optimism.** | 32 |
| Embrey 2009B | UK | Exploring the lived experience of palliative care for people with MS part 3 | Qualitative | 36 | MS | Phenomenological approach, non probability sampling with grand tour approach sampling, open ended interviews.  **Feeling relaxed positive and self-confident, put yourself back in the world but also leave your own life away.** | 27 |
| Karania, 2017 | UK | Evaluation of Age & Dementia Friendly Gymnastics Programme | Qualitative | 64 |  | Evaluation of an impact of a bilaterally asymmetric gymnastics-based programme on older people participating in a care home and day centre setting  **Older people participating in the programme showed a demonstrable improvement with aspects of their physical, emotional and cognitive ability. Older people with mild to advanced forms of dementia appeared to benefit the most.** | 23 |
| Molzahn, Gallagher & McNulty 2009 | Canada | Quality of life associated with adult day centers | Qualitative | 20 | Pts & carers  Pts 60-92 yrs  Carers 50-82 yrs | Semi structured interviews with pairs of attendees at day care and their carers.  **Major categories emerged include physical health, well-being, social networks/relationships, aging in place, safety, respite, activation, respect, activation, respect and inclusion.** | 34 |
| Tretteteig, Vatne, Rokstad 2017 | Norway | The influence of day centres designed for people with dementia on family caregivers | Qualitative | 17 | Carers of people with dementia | In-depth interviews  **Day care gave the carer a feeling of freedom and increased time available to be spent on their own needs, to be social and to work or do practical tasks undisturbed.** | 32 |