RESEARCH

An analysis of the impact of visual impairment on Activities of Daily Living and Vision-Related Quality of Life in adults with visual impairment

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**Conflict of interests**

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**Background**: Previous research has shown that people with visual impairment are more likely to be malnourished and have reported to have difficulty shopping for, preparing and eating food. They are also reported to have a poor quality of life. The present study aims to investigate the impact of visual impairment on activities of daily living and Vision-Related Quality Of Life (VR-QoL) in a sample of adults with visual impairment who are living in the UK.

**Method**: A 37 question survey evaluating the nutritional status and the activities of daily living; cooking and shopping was disseminated to adults with visual impairment who were 18 years and older. VR-QoL was also assessed using the validated, Questionnaire of Vision-Related Quality Of Life Measure (VCM1).

**Results**: Participants reported that being visually impaired made it difficult to shop for, prepare, and cook meals and this correlated significantly with level of visual impairment. The VCM1 score of ≥2.1 was reported by 74% of people with visual impairment revealing vision related quality of life is more than a little of a concern for most of the participants. The mean VCM1 score for females was 2.9±0.98 and 2.5±1.1 for males. Level of visual impairment was not found to influence the VCM1 scores. This indicates even those with visual impairment below the level required for sight impairment registration, report a reduced VR-QoL.

**Conclusion**: It is the responsibility and duty of society to support people with visual impairment or other disabilities rather than blaming them for not ‘integrating’. Among other things this can be done by incorporating norms into the marketing. These norms might help to raise and increase the awareness of suppliers to the needs of consumers with visual impairment. Furthermore, such norms may contribute to our ongoing efforts for a more inclusive and accessible environment.

**Key Words**

Visual impairment, Activities of Daily Living, Vision-Related Quality of Life, Nutritional status, Shopping, Cooking

**Introduction**

In the United Kingdom there are almost two million people living with sight loss. ([choices, 2015](#_ENREF_7)). Of these there are 360,000 people registered severely sight impaired or sight impaired (representing a prevalence of one in thirty) ([RNIB, 2016b](#_ENREF_35)). Nearly two thirds of those that are living with sight loss in the UK are female ([RNIB, 2016a](#_ENREF_34)).

Visual impairment has been shown to impact on individuals' nutritional status ([Acil & Ayaz, 2015](#_ENREF_2); [Baker, 2006](#_ENREF_4); [Bilyk, Sontrop, Chapman, Barr, & Mamer, 2009](#_ENREF_5); [de Faria, da Silva, & Ferreira, 2012](#_ENREF_10); [Gladstone et al., 2017](#_ENREF_17); [Gopinath, Liew, Burlutsky, & Mitchell, 2014](#_ENREF_18); [Jones & Bartlett, 2018](#_ENREF_20); [Kostyra, Zakowska-Biemans, Sniegocka, & Piotrowska, 2017](#_ENREF_21); [Magdalena, Urzedowicz, Motylewski, Zeman, & Pawlicki, 2016](#_ENREF_23); [Montero, 2005](#_ENREF_24); [Muurinen et al., 2014](#_ENREF_26); [Nakamura et al., 1999](#_ENREF_27); [Pardhan, Latham, Tabrett, & Timmis, 2015](#_ENREF_30); [Roebothan, 1999](#_ENREF_37); [Smyth, Spicer, & Morgese, 2014](#_ENREF_39); [Vági, Deé, Lelovics, & Lakatos, 2012](#_ENREF_45)). For example, females with sight loss are more likely to be undernourished than females without visual impairment ([Muurinen et al., 2014](#_ENREF_26); [Stevens R., 2015](#_ENREF_41)) and have reported being unsure about what foods they should consume for optimal eye health ([Stevens R., 2015](#_ENREF_41)). Males and children have been reported to be overweight ([Acil & Ayaz, 2015](#_ENREF_2); [Magdalena et al., 2016](#_ENREF_23); [Roebothan, 1999](#_ENREF_37)). The cost of malnutrition in the UK is reported to be 19.6 billion pounds annually ([Trust, 2017](#_ENREF_43)), with 16 billion pounds being related to being overweight or obese ([foundation, 2017](#_ENREF_14)). Malnourished adults account for 30% of hospital admissions and 35% of care home admissions in the UK ([Trust, 2017](#_ENREF_43)). Nutritional interventions save the National Health Service 172.2-229.2 million pounds due to reduced health care use ([Trust, 2017](#_ENREF_43)).

Poor nutritional status is often linked to problems with buying, preparing, and eating nutritionally rich foods. Past research shows that people with visual impairment have difficulties with both shopping for ([Bilyk et al., 2009](#_ENREF_5); [Kostyra et al., 2017](#_ENREF_21); [Yu, Tullio-Pow, & Akhtar, 2015](#_ENREF_50)) and eating meals([Pardhan et al., 2015](#_ENREF_30)) and they also have an aversion to cooking ([Bilyk et al., 2009](#_ENREF_5); [Kostyra et al., 2017](#_ENREF_21)). It has been reported that this restriction may directly impact reports of life satisfaction as well as nutritional status. ([Kostyra et al., 2017](#_ENREF_21)).

It has been reported visual impairment significantly affects QoL ([Brown & Barrett, 2011](#_ENREF_6); [Esteban et al., 2008](#_ENREF_13); [Tseng, Liu, Lou, & Huang, 2018](#_ENREF_44); [Vu, Keeffe, McCarty, & Taylor, 2005](#_ENREF_46)). There is no universally accepted definition of QoL and its meaning can very much depend on the context it is used in; for example, in the field of economics it can refer to how wealthy a person is, or their standard of living. In medicine it has been described as the ratio of health to illness ([Susniene & Jurkauskas, 2009](#_ENREF_42)). The World Health Organisation (WHO) refers to QoL “as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment”([Organisation, 1995](#_ENREF_28)).

 In fields of research such as optometry and ophthalmology Vision-Related Quality of Life (VR-QoL) is evaluated. VR-QoL is defined as the patients subjective reports of concern about their QoL in the presence of eye disease ([Ang, Man, Fenwick, Lamoureux, & Wilkins, 2018](#_ENREF_3); [Roh, Selivanova, Shin, Miller, & Jackson, 2018](#_ENREF_38); [Xu, Gupta, Bae, & Sharma, 2018](#_ENREF_48); [Yildiz, Toklu, & Vural, 2018](#_ENREF_49))**.**

Researchers have reported that sight loss affect an individual’s independence and mobility ([Vu et al., 2005](#_ENREF_46); [Welp A, 2016](#_ENREF_47)) as well as their ability to carry out activities of daily living ([Pardhan et al., 2015](#_ENREF_30); [Welp A, 2016](#_ENREF_47)). Those with sight loss are also more likely to report depressive symptoms and be functionally impaired than those that have normal vision ([Vu et al., 2005](#_ENREF_46)).

The aim of this study is to carry out an analysis to determine if visual impairment impacts the activities of daily living; shopping and cooking. VR-QoL in this sample of adults with visual impairment will also be evaluated.

**METHODS**

**Sample size**

There are two million people living with visual impairment in the UK, of these 360000 are registered sight impaired and severely sight impaired ([choices, 2015](#_ENREF_7)). A confidence level of 95% and confidence interval of 10 was set for this study. A sample size of 96 participants was required for this study.

**Participant recruitment and setting**

101 people with visual impairment were recruited from October 2017 to January 2018 from across the United Kingdom. Advertisements were placed with the Macular Society, the Royal National Institute for the Blind (RNIB), and Visionary: a membership organisation for sight loss charities. Participants were recruited by being approached at Focus, Aston, low vision clinics, and Sight Concern in the West Midlands. They were also recruited from New Outlook, a sheltered accommodation in Birmingham, designed specifically for people with visual impairment. Individuals who were interested in the study were invited to participate in a thirty minute structured telephone survey.

**Inclusion criteria**

Participants that were not driving due to poor sight when fully corrected (visual acuity ≥6/12) were eligible for the study. Those that were eligible to be registered as sight impaired or severely sight impaired, as certified by an ophthalmologist were also invited to take part. In the UK, certification for visual impairment is determined by an Ophthalmologist. A VA of less than 6/60 with reduced visual field is the guidance for certification as severely sight impaired or blind ([RNIB, 2016c](#_ENREF_36)) . A VA of less than 6/18 but better than 6/60 is the guidance for certification as sight impaired or partially sighted. It has been reported that 1.3 million have a visual acuity of less than 6/12 but better than 6/18, below certification level and yet their vision still significantly affects day-to-day activities ([RNIB, 2016c](#_ENREF_36)).Participants that were aged 18 years old and over were eligible to take part in the study.

**Exclusion criteria**

Those that had particular dietary restrictions, such as people restricting their intake of gluten due to coeliac disease were not eligible for the study. Those that were unable to communicate in English, or unable to hear well over the telephone were also excluded.

**Ethics**

The procedures followed were in accordance with the ethical standards of the Aston University Ethics Committee on human experimentation that conform to the Declaration of Helsinki 1975.

**Survey design**

Following a review of the literature ([Jones & Bartlett, 2018](#_ENREF_20)) and using relevant items selected from previous studies ([Gopinath et al., 2014](#_ENREF_18); [Kremer, Holthuysen, & Boesveldt, 2014](#_ENREF_22); [Stevens R., 2015](#_ENREF_41)), we designed a cross-sectional survey with 37 questions to evaluate the impact of visual impairment on nutritional status. The survey was designed to be administered over the telephone to a sample of people living with visual impairment in the UK. As the questionnaire was exploratory it had both open questions where participants were able to talk about their experiences such as shopping and cooking and closed questions where responses were graded. The survey covered participants’ age, gender, employment status, and ethnicity. The survey also asked participants about their abilities to carry out activities of daily living i.e. shop for, cook, and prepare meals. A three day food diary was included in the survey as part of nutritional intake analysis. Participants’ eating habits i.e. what foods they ate and why they liked or disliked the foods they did were explored. These questions and the food-diary data are beyond the scope of this article and are discussed in a future article.

The questionnaire was validated through face and content validity by being piloted on in a focus group of six people who were registered as either sight impaired or severely sight impaired. This form of ‘face and content validity’ was the only means of establishing validation due to lack of other instruments to compare the results with ([Stevens, Bartlett, Walsh, & Cooke, 2014](#_ENREF_40); [Stevens R., 2015](#_ENREF_41)). The focus group took part in two stages. First the participants answered the questions of the survey. A moderated and voice recorded informal discussion then took place whereby participants commented on the clarity, relevance and wording of question items. The participants responses were transcribed and coded through a process of thematic analysis ([Rabiee, 2004](#_ENREF_31)) and the questionnaire was then refined according to participant responses. Redundant question items were removed, new questions were added and existing question item measures were expanded to ensure all possible answers to the questions were covered. Wording of items was also changed to improve clarity. The questionnaire was then disseminated to the cohort.

Questionnaire of Vision-Related Quality Of Life Measure (VCM1)

Vision-Related Quality of Life (VR-QoL) was assessed using the validated ([de Boer et al., 2004](#_ENREF_8)) Questionnaire of Vision-Related Quality Of Life Measure ([N. A. Frost et al., 1998](#_ENREF_16)) (VCM1).

 The VCM1 (Frost et al, 1998, 2001) is designed for persons with visual impairment. The findings of ([de Boer et al., 2004](#_ENREF_8)) was that in the category of questionnaires for people with visual impairment, out of 31 questionnaires, the VCM1 showed high psychometric properties with good content validity and reproducibility ([de Boer et al., 2004](#_ENREF_8)).

The VCM1 composite score acts as a global measure of concern about vision and is strongly correlated with responses to a wide range of quality of life issues such as mobility, reading, and leisure. The VCM1 was derived primarily from patients own definition of quality of life; it was developed through consultation with people with visual impairment, professionals and a literature review ([A. Frost et al., 2001](#_ENREF_15)). It evaluates two dimensions: psychological (cognitive function, emotional status, well-being, satisfaction and happiness) and social (social contact and interpersonal relationships) of the four QOL scales distinguished by ([Aaronson, 1988](#_ENREF_1)); the other two being functional (self-care, mobility, activities of daily living) and physical (disease symptoms and their treatment). Generic QOL questionnaires usually include items in all four domains: however, disease-specific QOL instruments usually do not ([de Boer et al., 2004](#_ENREF_8)).

The VCM1 has 10 items and six response categories. The ten items relate to physical, social, and psychological issues, see table 1. The items are scored from 0 (does not affect my life at all), 1 ( affects my life rarely), 2 (affects my life a little of the time), 3 (affects my life a fair amount of time), 4 (affects my life a lot of the time) and 5 (affects my life all of the time). The VCM1 deals with how visual impairment evokes feelings of concern about personal safety, ability to carry out activities people enjoy ([Murphy et al., 2007](#_ENREF_25)). It explores if visual impairment causes feelings of embarrassment, frustration, sadness and isolation and it also measures how much they feel their visual impairment interferes with their life in general.

Rasch analysis has shown the VCM1 reliably measures quality of life related to sight loss ([de Boer et al., 2006](#_ENREF_9)). It is worth noting that the VCM1 is designed to be administered over the telephone, making it appropriate for use in the present study.

Table 1 Question items for the Questionnaire of vision-related Quality of Life Measure (VCM1)

|  |
| --- |
| In the past few months how often on a scale of  0 (vision does not affect my life at all), 1 (affects my life rarely), 2 (affects my life a little of the time), 3 (affects my life a fair amount of time), 4 (affects my life a lot of the time) and 5 (affects my life all of the time) have you…. |
| Felt concerned about your safety outside of your home |
| Felt concerned about your safety inside your home |
| Felt your eyesight has stopped you from doing the things you want to do |
| Felt embarrassed because of your eyesight |
| Felt frustrated because of your eyesight |
| Felt lonely/isolated because of your eyesight |
| Felt sad/low because of your eyesight |
| Worried your eyesight might get worse |
| Concerned about coping with everyday life |

**Procedure**

Participants that responded to the advertisements call for recruitment provided their contact details to the researcher NJ via email and telephone. NJ then called the participant and read out the participant information sheet and asked all potential participants whether they are able to drive with their current level of visual acuity. Those that had a visual acuity that met driving standards were excluded at that point. NJ then arranged a convenient time and date to deliver the telephone survey. Verbal consent was taken at the start of the telephone survey and was voice recorded. Participants were reminded that they would remain anonymous and could withdraw without giving any reason at each phone call. The telephone survey lasted on average 20 minutes including the responses for VCM1. Participants were also given the opportunity to openly elaborate on the scores they gave for each VCM1 question item and this response was recorded.

**Data analysis**

Microsoft Excel was used to collect data and produce graphs. The data was also exported into IBM SPSS, version 23 for further statistical analysis. Descriptive statistics such as means and percentages were calculated for demographic variables such as age, level of visual impairment, gender, and employment status. Chi-square analysis was used to determine if there was a significant difference between the number of males and females participating in the study as well as differences in ability to cook and shop and level of visual impairment. Kruskal-Wallis H was used was used to determine if there was a relationship between the severity of sight loss and duration. Decision tree analysis (DTA) using the chi-squared automatic interaction detection (CHAID) method was applied to determine the hierarchical influence of the composite VCM1 scores for quality of life (dependent variable) on the nominal independent variables gender, age reports of health satisfaction. Both DTA and CHAID have been previously used to carry out multivariate analyses in the field of optometry ([Dunstone, Armstrong, & Dunne, 2013](#_ENREF_12); [Guillon & Maissa, 2005](#_ENREF_19); [Pancholi & Dunne, 2018](#_ENREF_29)).

**RESULTS**

67 females and 34 males were included into the data analysis of this study, see table 2. As the expected ratio of females to males in the UK living with visual impairment is 2:1 when calculated adjusting for expected Chi-square ratio, no significant difference was found in the number of females and males participating (χ2 0.00 p >0.05). The mean age of participants was 71.4 ±17.5, median 76 years old and range 19-96 years old. 58% of the participants reported they were happy with their current health.

Different causes of sight loss were reported including congenital e.g. blindness due to measles, neurological causes such as stroke, retinal disease such as diabetic retinopathy and macular degeneration. Genetic causes such as macular dystrophies, and retinitis pigmentosa were also reported as well as corneal degenerations and optic nerve head disease such as glaucoma as well as sight loss due to trauma.

Participants were asked to report their category of visual impairment. Those that were registered as severely sight impaired (SSI) or sight impaired (SI) were grouped accordingly. Those that were not registered were asked whether they had been told that they were eligible for registration, and were grouped accordingly. The remaining participants were asked to confirm that they were not eligible for registration, but were also experiencing a level of visual impairment that precluded driving. Therefore, participants were categorised as not driving, SI or SSI. Visual impairment duration correlated with the severity of visual impairment significantly, Kruskal–Wallis H, 14.1 p= 0.001.

Table 2 Demographic characteristics of participants

|  |  |  |
| --- | --- | --- |
| Characteristic  | Characteristic  | Percentage of participants (%) |
| Gender | FemaleMale | 6633 |
| Living | Living on ownLiving with family Living in sheltered accommodation  | 47495 |
| Ethnicity | BlackSouth Asian White  | 2890 |
| Level of visual impairment  | Not driving due to poor sight when fully corrected (VA<6/12)Eligible for sight impaired registrationEligible for severely sight impaired registration  | 233345 |
| Employment | StudentUnemployedEmployed Voluntary Employed Retired  | 26151760 |

**Activities of daily living**

**Shopping**

Level of visual impairment significantly affected ability to shop with more severely sight impaired and sight impaired people falling into the category of being unable to do so compared to those whose vision precluded driving Fishers Exact Test 11.895 p= 0.017**.**

90% of participants reported that they found shopping difficult due to their visual impairment. Living arrangements did not affect ability to shop χ2 9.8 p=2.7. Participants mainly shopped for food at the supermarket, online or at the local grocer, other sources given were butchers, markets or using home grown foods, see figure 1. A third shopped independently with over two thirds requiring some support or not being able to shop, see figure 2. A third did not shop with either family, friends, neighbours or carers shopping for them.

Figure 1 where participants (%) sourced their food

Figure 2 Ability of participants (%) to shop

Participants stated that they learned or memorised a shopping routine. They went to the same shops, used the same brands, from the same aisles. They stated they found it extremely disorientating when large supermarkets changed a shop layout, which they reported occurred frequently. They also disliked when well-known brand items were rebranded. The layout of shops was problematic particularly when every-day items were on top or bottom shelves and not at eye-level.

They stated shops had such poor lighting, that they resorted to taking torches along with them when shopping. Labels were a particular obstacle with people stating they used magnifiers. Some stated they felt that the labels were such poor contrast, to the point they felt that they were discriminated against. An example of this given was foods on offer with red writing against a white background. They also stated writing on labels and packaging particularly related to nutritional information, expiry dates and weights of products did not cater for people with visual impairment. Participants, for example, would buy long life milk or avoid buying fresh foods and dairy because they could not see expiration dates.

They reported that sighted people could be ignorant to their presence and they felt at risk of being knocked over or falling. Participants also planned shopping by calling stores ahead of when they were going shopping. This was to ensure the shops would cater to their needs i.e. calling up for assistance. Despite doing this, they still found the experience of shopping frustrating. They reported the shop assistants assigned to help them did not seem to have any training or were unaware of their needs. Participants stated the assistants were incapable of supporting them. The shop assistants shopped too fast and participants reported feeling rushed by the assistants. Handling money in shops was also highlighted as an obstacle; with people unable to differentiate one coin from another or being unable to identify notes. They also stated cash machines in banks and card machines in stores were difficult to see, card machines of screens which have a background colour to it such as brown were reported as particularly challenging. They reported online shopping as difficult due, simple things such as lack of support to help change size of print on screens as well as lack of support available to help participants engage with, and be knowledgeable about technological advancements limited their food choice.

Over 75% of participants made food choices based on preference, almost a third stated they made food choices depending on how the food affected health, a quarter stated cost of food played an important part in their food choices. Other reasons given were how practical the food was to cook and how predictable it was to acquire, for example, if foods a person would normally purchase were moved to a different location they would not buy that food on that particular occasion.

**Meal preparation and cooking abilities**

Ability to cook was also significantly correlated with level of visual impairment with a higher frequency of those being registered severely sight impaired being unable to cook Fishers exact test 15.76, p≥ 0.01.

65% of participants stated that their visual impairment made cooking difficult. Other reasons for not cooking or not wanting to cook were physical impairment, motivation, practicality and convenience. For example if someone was living by themselves they lacked motivation and felt it was impractical or inconvenient to cook for themselves only. Ability to cook was affected significantly by living arrangements with those living in sheltered accommodation and with family being unable to cook or not cooking compared to those who lived on their own Fishers exact test 54.7 p =0.01.

Participants reported that they lacked confidence and were concerned about their safety when cooking because of their visual impairment. Reasons given were a lack of spatial awareness and depth perception i.e. when cutting. They reported boiling and cutting tasks to be dangerous and difficult. They were worried about hygiene, i.e. not being able to see dirt on vegetables, expiry dates, and mouldy foods and undercooking meats. They used visual aids when cooking such as magnifying glasses to read the display on the microwaves. Some also stated they memorised how to use the kitchen utilities and where cooking utensils were.

 19% reported they would be unable to cook a hot meal if it was required or would only be able to do so with support. Over a half of the participants stated they cooked with help from a family member or other help i.e. a carer or friend or they did not cook. Of these over a third stated that a family member cooked or they did not cook, but ate in restaurants, pubs and purchased takeaways or ready meals instead, see figure 3.

Figure 3 Ability of participants (%) to cook

 In particular, relating to restaurants over a third of participants stated they actively avoided drinking and they ate less when eating out. This was mainly because they had trouble getting to the bathroom on time or had difficulties locating bathroom facilities due to signage they were unable to see. Over a third replied they had difficulty getting to the bathroom on time. Bathroom locations in pubs and restaurants were a great obstacle, particularly if participants had to climb flights of stairs. They did not report having difficulty toileting in their own homes and this did not affect food or drink consumption as they were familiar with their surroundings.

**Knowledge of healthy eating**

Knowledge of healthy eating was explored through the question “Can you name the five food groups for a balanced diet” only 17% of participants were able to do so. Over 30% reported they were unable to and the remaining replied they could but when asked to name them were unable to do so. 17% of participants stated that they disagreed that the foods we eat affect our health.

**Vision-Related Quality of Life (VR-QoL)**

The validated VCM1 which was designed to assess vision-related quality of life was used to measure VR-QOL. The items are scored from 0 ( does not affect my life at all), 1 (affects my life rarely), 2 (affects my life a little of the time), 3 ( affects my life a fair amount of time, 4 (affects my life a lot of the time) and 5 (affects my life all of the time).

 Cronbach’s alpha was calculated to check the reliability of the questionnaire for the current sample. Alpha was considered acceptable α=0.82, so, scores were averaged to give a composite score for each participant.

QoL scores in this study ranged from 0.3 to 4.90. The mean score was 2.72 ±1.12, and median of 2.7. The QoL score of ≥2.1 was reported by 71% of people with visual impairment, this reveals vision related quality of life is more than a little of a concern in the majority of the people in this sample. The mean score for females was 2.9±1 and 2.5±1.1 for males. Females in particular reported vision affects their quality of life a fair amount of the time. The mean QoL score for those that did not drive when fully corrected was 2.5± 0.99, those that were sight impaired had an average score of 2.75±1.0 and those that were severely sight impaired had a slightly higher average score of 2.81 ±1.2. The results convey that level of visual impairment does affect quality of life although this was not statistically significant. The median age of 76 years old was used to separate participants into two categories older and younger. Those >76 years old were designated older and those <76 years old were designated younger. Older participants living with visual impairment reported a lower average QoL score of 2.6±1.0 and those younger reported an average score of 2.9±1.2. Those living with family reported a better QoL score 2.68±1.1 than those living on their own 2.7±1.1 or those living in sheltered accommodation 3.00±1.5. Decision tree analysis was used to determine if the independent variables age, gender, reports of health satisfaction, influenced QoL however no correlation was found.

As well as providing each statement with a score to calculate a global composite score participants were also given the opportunity to describe any concerns related to the question items and their two dimensions: psychological and social, of the VCM1 this is described below.

Psychological dimension

Participants reported feeling embarrassed about their eye sight for a variety of reasons. For example, they reported not being able to recognise people when out and about and people taking offence. They felt having Charles Bonnet syndrome was embarrassing as they worried people would have concerns about their mental health or treat them differently. Participants reported using a white cane made them stand out from society and made people avoid them. They also reported being patronized or shouted at as people assumed they were deaf and dumb as well as poor sighted.

 They reported strong feelings of frustration due to lack of employment, support and accessibility at work and in society. They also reported to not being able to do things they used to find simple such as dressing in the right coloured clothes or doing the gardening as frustrating.

 Participants reported feeling isolated due to people paying attention and talking to their guide dogs and ignoring them. They felt reduced mobility made them able to socialise less, with reduced access to friends and family members. They reported being ignored at social events. They felt having reduced body language and facial expressions also reduced effective communication.

Participants reported feeling sad because they could not personally send cards and gifts to family members. They reported not being able to see grandchildren’s faces, missing out socially and losing the use of employment skills as depressing. They also mentioned poor professional attitudes in the work place made them feel low.

Participants scored their vision affecting their life in general quite highly mainly because they reported it affected them every day in one way or another. Most reported that they did not worry about their eyesight getting worse as they were either severely sight impaired or importantly those who had a family history of a progressive disease, for example, retinitis pigmentosa reported they did not worry because they witnessed family members and therefore prepared themselves practically and mentally. They reported that preparation is key to progressive sight loss.

Social dimension

Participants reported feeling fearful of falling over when travelling outside of their homes, crossing roads and depths of pavements were reported as concern or when travelling somewhere new i.e. abroad.

Participants mostly reported feeling very safe at home as it was a familiar environment. They did however express concerns about security and inviting in people that they did not know such as builders, this was because they could not monitor them as appropriately as they would like.

In terms of being prevented from doing things they wanted to participants mainly expressed the loss of their driving licence as debilitating. They felt it led to loss of independence and isolation from family and friends. They reported the inability to participate in hobbies that kept them entertained such as sewing or watching TV affected their lives. Those of working age reported missing work colleagues if they were no longer employed. If they were employed they felt they were treated in a condescending manner by other employees, with employees shouting, patting and making noises of sympathy. They repeatedly reported other members of society would exclude, avoid or lacked empathy in day to day situations; an example given of this was one when a person was excluded from a group holiday as other members assumed they would be unable to participate in activities.

**CONCLUSION**

It has been previously reported that the needs of disabled people in the UK are not being met ([DisabledGo, 2014](#_ENREF_11)). The results of this study support these findings, the activities of daily living; shopping, online and in store and cooking are major obstacles for people with visually impairment with many being unable to do so or requiring support from family members. As reported previously in other studies ([Bilyk et al., 2009](#_ENREF_5); [Kostyra et al., 2017](#_ENREF_21)) it was found UK shoppers with visually impairment also shop predictably but this study has found they are also prevented from buying items altogether if items location is changed. People with visual impairment also need help with information such as weights, amounts, and types of foods available to them. Supermarkets are the main source of food for people living with visual impairment, providing staff assistants who have been trained and who can inform the participants of food freshness, nutritional information and help to guide them with expiry dates would be ideal. Supermarkets could also evaluate the ergonomics of their stores and adapt these so they are more user friendly for those with visual impairment.

Skills training and rehabilitation for shopping both online and in store and cooking for people with visual impairment is also required in the UK. Currently the government does not offer cooking classes however low vision clinics and charities could perhaps help to arrange these at a local level. Skills training for shopping and cooking could contribute to encouraging diet variation and opting for healthier food choices.

The VCM1 has revealed that sight loss impacts QoL more than a little of the time for most participants. Participants open ended responses have also revealed lack of inclusion in society is also a key factor affecting the QoL of lives of people with visual impairment. Applying a holistic model ([Raphael, Brown, Renwick, & Rootman, 1996](#_ENREF_32); [Renwick, Myerscough, & Schorman, 1996](#_ENREF_33)) to the findings of this study highlights the people with visual impairment in this study cannot ‘belong’ (connections with one’s environment), or ‘become’ (achieving personal goals, hopes and aspiration) and are hindered from ‘being’ (who one is) if society excludes them. This not only impacts the health and QoL of the individual person but society as a whole.

This study has found accessibility and support for people with visual impairment living in the UK is lacking. It is the responsibility and duty of society to support people living with visual impairment or other disabilities rather than blaming them for not ‘integrating’. Among other things this can be done by incorporating regulations and norms into the marketing. These norms might help to raise and increase the awareness of suppliers to the needs of consumers with visual impairment or other disabilities. Furthermore, such norms may contribute to our ongoing efforts for a more inclusive, ergonomic and accessible environment.

**Strengths & Weaknesses**

A strength of this study is that it was nationwide; the participants were recruited from locations across the United Kingdom. Both qualitative and quantitative data were collected for this study. Although an attempt was made to include people of visual impairment of all ages and ethnic backgrounds, very few participants under the age of 55 years old, not Caucasian or not retired volunteered. Future studies should evaluate the BMI and activity levels of people living with visual impairment.

**REFERENCES**

Aaronson, N. K. (1988). Quality of life: what is it? How should it be measured? *Oncology (Williston Park), 2*(5), 69-76, 64.

Acil, D., & Ayaz, S. (2015). Screening of Visually Impaired Children for Health Problems. *Asian Nursing Research, 9*(4), 285-290. doi:10.1016/j.anr.2015.06.004

Ang, M., Man, R., Fenwick, E., Lamoureux, E., & Wilkins, M. (2018). Impact of type I Boston keratoprosthesis implantation on vision-related quality of life. *British Journal of Ophthalmology, 102*(7), 878-881. doi:10.1136/bjophthalmol-2017-310745

Baker, S. M. (2006). Consumer normalcy: Understanding the value of shopping through narratives of consumers with visual impairments. *Journal of Retailing, 82*(1), 37-50. doi:10.1016/j.jretai.2005.11.003

Bilyk, M. C., Sontrop, J. M., Chapman, G. E., Barr, S. I., & Mamer, L. (2009). Food Experiences and Eating Patterns of Visually Impaired and Blind People. *Canadian Journal of Dietetic Practice and Research, 70*(1), 13-18. doi:10.3148/70.1.2009.13

Brown, R. L., & Barrett, A. E. (2011). Visual Impairment and Quality of Life Among Older Adults: An Examination of Explanations for the Relationship. *The Journals of Gerontology: Series B, 66B*(3), 364-373. doi:10.1093/geronb/gbr015

choices, N. (2015). Blindness and vision loss. Retrieved from [www.nhs.uk/conditions/Visual-impairment/Pages/Introduction.aspx](file:///C%3A%5CUsers%5Cjonesn5%5CDesktop%5Cwww.nhs.uk%5Cconditions%5CVisual-impairment%5CPages%5CIntroduction.aspx) (last accessed 16/02/2017)

de Boer, M. R., Moll, A. C., de Vet, H. C., Terwee, C. B., Volker-Dieben, H. J., & van Rens, G. H. (2004). Psychometric properties of vision-related quality of life questionnaires: a systematic review. *Ophthalmic Physiol Opt, 24*(4), 257-273. doi:10.1111/j.1475-1313.2004.00187.x

de Boer, M. R., Terwee, C. B., de Vet, H. C. W., Moll, A. C., Volker-Dieben, H. J. M., & van Rens, G. (2006). Evaluation of cross-sectional and longitudinal construct validity of two vision-related quality of life questionnaires: The LVQOL and VCM1. *Quality of Life Research, 15*(2), 233-248. doi:10.1007/s11136-005-1524-9

de Faria, M. D., da Silva, J. F., & Ferreira, J. B. (2012). The visually impaired and consumption in restaurants. *International Journal of Contemporary Hospitality Management, 24*(4-5), 721-734. doi:10.1108/09596111211237264

DisabledGo. (2014). DisabledGo Study 2014. Retrieved from <http://www.disabledgo.com/blog/2014/12/disabledgo-study-shocks-the-government-with-evidence-of-inaccessible-british-high-streets/#.WJNnZeKLTIU> (accessed 29/01/2017)

Dunstone, D., Armstrong, R., & Dunne, M. (2013). Survey of habits and attitudes to retinoscopy by optometrists in the UK. *Optometry in Practice, 14*(2), 45-54.

Esteban, J. J. N., Martinez, M. S., Navalon, P. G., Serrano, O. P., Patino, J. R. C., Puron, M. E. C., & Martinez-Vizcaino, V. (2008). Visual impairment and quality of life: gender differences in the elderly in Cuenca, Spain. *Quality of Life Research, 17*(1), 37-45. doi:10.1007/s11136-007-9280-7

foundation, T. f. (2017). UK and global malnutrition the new normal. Retrieved from <https://foodfoundation.org.uk/wp-content/uploads/2017/07/01-Briefing-Malnutrition.vF.pdf>

Frost, A., Eachus, J., Sparrow, J., Peters, T. J., Hopper, C., Davey-Smith, G., & Frankel, S. (2001). Vision-related quality of life impairment in an elderly UK population: Associations with age, sex, social class and material deprivation. *Eye, 15*, 739. doi:10.1038/eye.2001.241

Frost, N. A., Sparrow, J. M., Durant, J. S., Donovan, J. L., Peters, T. J., & Brookes, S. T. (1998). Development of a questionnaire for measurement of vision-related quality of life. *Ophthalmic Epidemiol, 5*(4), 185-210.

Gladstone, M., McLinden, M., Douglas, G., Jolley, E., Schmidt, E., Chimoyo, J., . . . Lynch, P. (2017). ‘Maybe I will give some help…. maybe not to help the eyes but different help’: an analysis of care and support of children with visual impairment in community settings in Malawi. *Child: Care, Health and Development*, n/a-n/a. doi:10.1111/cch.12462

Gopinath, B., Liew, G., Burlutsky, G., & Mitchell, P. (2014). Age-related macular degeneration and 5-year incidence of impaired activities of daily living. *Maturitas, 77*(3), 263-266. doi:10.1016/j.maturitas.20l3.12.001

Guillon, M., & Maissa, C. (2005). Dry eye symptomatology of soft contact lens wearers and nonwearers. *Optom Vis Sci, 82*(9), 829-834.

Jones, N., & Bartlett, H. (2018). The impact of visual impairment on nutritional status: A systematic review. *British Journal of Visual Impairment, 36*(1), 17-30. doi:10.1177/0264619617730860

Kostyra, E., Zakowska-Biemans, S., Sniegocka, K., & Piotrowska, A. (2017). Food shopping, sensory determinants of food choice and meal preparation by visually impaired people. Obstacles and expectations in daily food experiences. *Appetite, 113*, 14-22. doi:10.1016/j.appet.2017.02.008

Kremer, S., Holthuysen, N., & Boesveldt, S. (2014). The influence of olfactory impairment in vital, independently living older persons on their eating behaviour and food liking. *Food Quality and Preference, 38*, 30-39. doi:10.1016/j.foodqual.2014.05.012

Magdalena, W., Urzedowicz, B., Motylewski, S., Zeman, K., & Pawlicki, L. (2016). Body mass index and waist-to-height ratio among schoolchildren with visual impairment A cross-sectional study. *Medicine, 95*(32). doi:10.1097/md.0000000000004397

Montero, P. (2005). Nutritional assessment and diet quality of visually impaired Spanish children. *Ann Hum Biol, 32*(4), 498-512. doi:10.1080/08014460500142744

Murphy, C., Greiner, K., Heissigerova, J., Andrew Frost, N., Forrester, J., & Dick, A. (2007). *Validity of using vision-related quality of life as a treatment end point in intermediate and posterior uveitis* (Vol. 91).

Muurinen, S. M., Soini, H. H., Suominen, M. H., Saarela, R. K. T., Savikko, N. M., & Pitkala, K. H. (2014). Vision impairment and nutritional status among older assisted living residents. *Archives of Gerontology and Geriatrics, 58*(3), 384-387. doi:10.1016/j.archger.2013.12.002

Nakamura, K., Otomo, A., Maeda, A., Kikuchi, S., Motohashi, Y., Tanaka, M., . . . Yamamoto, M. (1999). Evaluation of complex activities in daily living of elderly Japanese with visual impairment. *Aging-Clinical and Experimental Research, 11*(2), 123-129.

Organisation, W. H. (1995, 2018). Health statistics and information systems. Retrieved from <http://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/>

Pancholi, B., & Dunne, M. (2018). Virtual Patient Instruction and Self-Assessment Accuracy in Optometry Students. *Optometric Education, 43*(Winter-Spring).

Pardhan, S., Latham, K., Tabrett, D., & Timmis, M. A. (2015). Objective Analysis of Performance of Activities of Daily Living in People With Central Field Loss. *Invest Ophthalmol Vis Sci, 56*(12), 7169-7178. doi:10.1167/iovs.15-16556

Rabiee, F. (2004). Focus-group interview and data analysis. *Proceeding of the Nutritional Society, 63*, 655-660.

Raphael, D., Brown, I., Renwick, R., & Rootman, I. (1996). *Assessing the Quality of Life of Persons with Developmental Disabilities: Description of a New Model, Measuring Instruments, and Initial Findings* (Vol. 43).

Renwick, R., Myerscough, T., & Schorman, A. F. (1996). The Quality of Life Model. Retrieved from <http://sites.utoronto.ca/qol/qol_model.htm>

RNIB. (2016a). Key information and statistics. Retrieved from <http://www.rnib.org.uk/knowledge-and-research-hub/key-information-and-statistics> (accessed 29/06/2017)

RNIB. (2016b). RNIB STATISTICS. Retrieved from <https://help.rnib.org.uk/help/newly-diagnosed-registration/registering-sight-loss/statistics> (accessed 31/01/2017)

RNIB. (2016c). State of the Nation Eye Health Report. Retrieved from <https://www.rnib.org.uk/sites/default/files/RNIB-State-of-the-Nation-2016-APDF%20format.PDF> (accessed 02/02/2017)

Roebothan, B. V. (1999). Preliminary assessment of nutritional status in a group of persons with visual impairments. *Nutrition Research, 19*(12), 1731-1740. doi:10.1016/s0271-5317(99)00128-1

Roh, M., Selivanova, A., Shin, H. J., Miller, J. W., & Jackson, M. L. (2018). Visual acuity and contrast sensitivity are two important factors affecting vision-related quality of life in advanced age-related macular degeneration. *Plos One, 13*(5), 12. doi:10.1371/journal.pone.0196481

Smyth, C. A., Spicer, C. L., & Morgese, Z. L. (2014). Family Voices at Mealtime: Experiences With Young Children With Visual Impairment. *Topics in Early Childhood Special Education, 34*(3), 175-185. doi:10.1177/0271121414536622

Stevens, R., Bartlett, H., Walsh, R., & Cooke, R. (2014). Age-related macular degeneration patients' awareness of nutritional factors. *British Journal of Visual Impairment, 32*(2), 77-93. doi:10.1177/0264619613519341

Stevens R., B. H., Cooke R. (2015). Dietary Analysis and nutritional behaviour in people with and without age-related Macular disease. *Clinical Nutrition, Vol. 10* (3), p. e112–e117

Susniene, D., & Jurkauskas, A. (2009). *The concepts of quality of life and happiness - Correlation and differences* (Vol. 3).

Trust, U. H. S. N. F. (2017). The cost of malnutriton in the UK economic report. Retrieved from <http://uhs.nhs.uk/ClinicalResearchinSouthampton-Biomedical-Research-Centre/Ourresearchimpacts/impactcasestudies/ThecostofmalnutritionintheUKeconomicreport.aspx>

Tseng, Y. C., Liu, S. H. Y., Lou, M. F., & Huang, G. S. (2018). Quality of life in older adults with sensory impairments: a systematic review. *Quality of Life Research, 27*(8), 1957-1971. doi:10.1007/s11136-018-1799-2

Vági, Z., Deé, K., Lelovics, Z., & Lakatos, É. (2012). Nutritional status of blind and visually impaired patients. *Z Gastroenterol, 50*(05), A82. doi:10.1055/s-0032-1312436

Vu, H. T. V., Keeffe, J. E., McCarty, C. A., & Taylor, H. R. (2005). Impact of unilateral and bilateral vision loss on quality of life. *The British Journal of Ophthalmology, 89*(3), 360-363. doi:10.1136/bjo.2004.047498

Welp A, W. R., McCoy MA, et al. (2016). *Making Eye Health a Population Health Imperative: Vision for Tomorrow*. Washington (DC): National Academies Press (US).

Xu, K. Y., Gupta, V., Bae, S., & Sharma, S. (2018). Metamorphopsia and vision-related quality of life among patients with age-related macular degeneration. *Canadian Journal of Ophthalmology-Journal Canadien D Ophtalmologie, 53*(2), 168-172. doi:10.1010/j.jcjo.2017.08.006

Yildiz, E., Toklu, M., & Vural, E. T. (2018). Vision-Related Quality of Life Before and After Deep Anterior Lamellar Keratoplasty. *Eye & Contact Lens-Science and Clinical Practice, 44*(3), 144-148. doi:10.1097/icl.0000000000000359

Yu, H., Tullio-Pow, S., & Akhtar, A. (2015). Retail design and the visually impaired: A needs assessment. *Journal of Retailing and Consumer Services, 24*, 121-129. doi:10.1016/j.jretconser.2015.03.001

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