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

Nabila Jones

Doctor of Philosophy

Aston University

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Summary

A systematic review of the literature revealed visual impairment (VI) significantly affects nutritional status. Recent UK reports stated that the needs of people with VI in the UK are not being met, with reports of inaccessibility to shops and restaurants. This is the first time that the impact of VI upon nutritional intake, activities of daily living (ADL's) and vision-related quality of life (VR-QoL) has been investigated in a UK adult population.

In all, 109 participants with VI and 50 age-matched control participants were recruited from VI support organisations and optometric practice. A 37-item questionnaire was disseminated to participants via a telephone interview, and participants completed three 24-hr food recalls. Participants with VI also completed a validated ten-item VR-QoL questionnaire. Using the findings from the questionnaire dissemination and a series of focus groups with 41 people with VI, a validated educational intervention was developed and evaluated.

This study revealed that VR-QoL is affected frequently and that being VI presents multifactorial obstacles to the ADLs shopping and cooking. Those with VI were found to be less knowledgeable about healthy eating behaviours, and consumed significantly fewer nutrients compared to the control cohort. The educational intervention received insightful evaluation from participants and proved successful, with self-efficacy significantly improving for each outcome measure.

This study highlights education is key to supporting the nutritional intake and the ability to perform ADLs of people with VI. Introducing norms into marketing is also recommended; this will help suppliers and consumers become more aware of the needs of people with VI.

Keywords: "Severely sight impaired" "Sight impaired" "Interventions" "Nutritional status" "Marketing"

To Rhys, Sara and Maya

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Abbreviations

Activities of Daily Living (ADL's)

British Association for Parenteral and Enteral Nutrition (BAPEN)

Body Mass Index (BMI)

Central Visual Field Loss (CFL)

Certificate of VI (CVI)

Chi-squared Automatic Interaction Detection (CHAID)

Decision Tree analysis (DTA)

Measure of Informedness (MoI)

Mini Nutritional Assessment (MNA)

Malnutrition Universal Screening Tool (MUST)

Nabila Jones (NJ)

Nutritional Risk Screening-2002 (NRS-2002)

Participant Information Sheet (PIS)

Quality Assessment Tool for Studies with Divers Design (QATDDS)

Quality of Life (QoL)

Royal National Institute for the Blind (RNIB)

Sight impaired (SI)

Six Steps in Quality Intervention Development (6SQuID)

Severely Sight Impaired (SSI)

Subjective Global Assessment (SGA)

Visual Acuity (VA)

Vision Core measure 1 (VCM1)

Visual Impairment (VI)

Vision-Related Quality of Life (VR-QoL)

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Chapter one: Background

1.0 Definition of VI

Visual impairment (VI) has been defined as:

"Vision not correctable by standard glasses, contact lenses, medication, or surgery that interferes with the ability to perform activities of daily living" and "a functional limitation of the eye(s) or visual system caused by a disease or disorder" (1, 2).

VI can lead to a visual disability or visual handicap (2). For example, the ocular disease diabetic retinopathy can result in a reduced visual field and visual acuity. The visual disability, in this case, could be the inability to read or drive. This, in turn, can cause a visual handicap i.e. it can cause a limitation on a person's personal and socioeconomic independence (2).

1.1 Classification of VI

The classification for VI varies worldwide (3). It has been recommended that VI that is enough to cause a disability should be referred to as low vision (3). This has been determined previously as visual acuity (VA) that is worse than 6/12 (3).

In the UK, certification for VI is determined by an ophthalmologist (4). To be certified as severely sight impaired (SSI) an individual's sight has to fall into one of the following categories, whilst wearing full optical correction (4):

- VA of less than 3/60 with a full visual field.
- VA between 3/60 and 6/60 with a severe reduction of field of vision such as tunnel vision.
- VA of 6/60 or above but with severely reduced visual field particularly inferiorly.

To be registered as sight impaired (SI) an individual's sight has to fall into one of the following categories, whilst they are wearing full optical correction (4):

- VA of 3/60 to 6/60 with a full field of vision.
- VA of up to 6/24 with a moderate reduction of field of vision or with a central part of vision that is cloudy or blurry.
- VA of 6/18 or even better if a large part of the field of vision, for example, a whole half the vision, is missing or a lot of the peripheral vision is missing.

It has been reported that 1.3 million people have a VA of less than 6/12 but better than 6/18; below certification level yet their vision still significantly affects day-to-day activities (5).

1.2 Prevalence and incidence of VI

In the UK there are almost two million people living with some degree of VI (6). Of these, there are 360,000 people who are registered as SSI or SI; (representing a prevalence of one in thirty) (7). The incidence of VI increases with age. Around 79% of people living with sight loss are aged over 64 years (8). One in every three people aged 85 years and over is living with sight loss (5). It is projected that the number of people in the UK living with sight loss will increase by a third, between now, and 2030, to more than 2.7 million (5). This figure is predicted to almost double to 4 million by 2050 (5).

1.3 Causes of and risk factors for VI

The causes of VI are numerous, including but not limited to; congenital anomalies during foetus development, acquired, for example, from trauma (9). It can occur as a part of the ageing process (10), be inherited (11) and occur secondary to systemic disease (12). It has been reported VI can also result from cerebral VI, disease and disorders of the retina and optic nerve (13).

Older adults, premature or low birth weight babies, (14) children with learning disabilities (15) or from deprived economic backgrounds (16, 17) are at higher risk of VI.

The main causes of VI in children are; cerebral vision impairment, disorders of the retina, and disorders of the optic nerve (13). The main causes of VI in adults in the UK are age-related macular degeneration, glaucoma, cataracts, and diabetic retinopathy. Age-related macular degeneration is a leading cause of VI in the UK, with a high prevalence in the Caucasian population (18). Black African and Caribbean people are at high risk of developing glaucoma and South Asian people are at higher risk of developing diabetic retinopathy (19-22). There are over 24000 people given a Certificate of Visual Impairment (CVI) each year in England and Wales (23), see Figure 1.3.

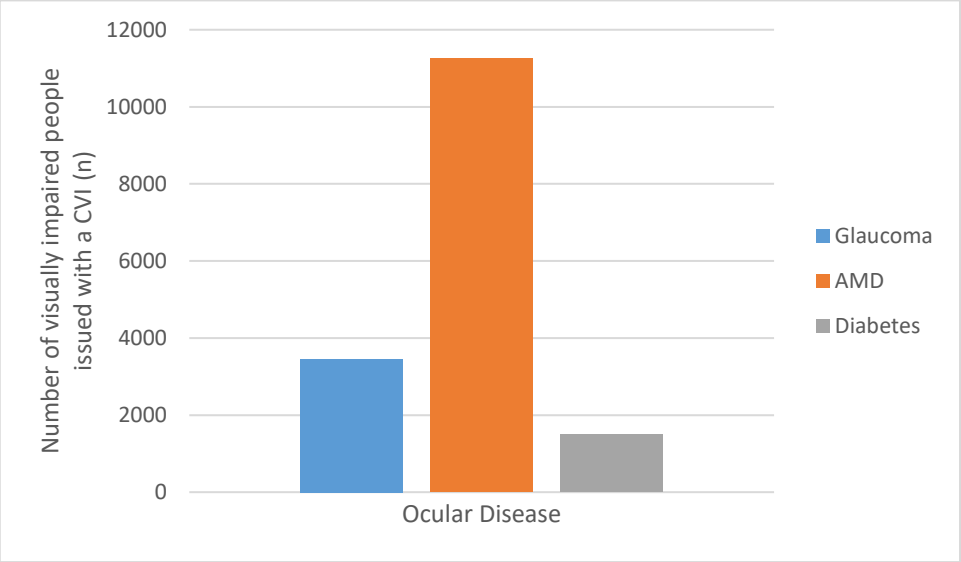

Figure 1.3 Number of people issued with a Certificate of VI (CVI) by disease 2015/2016 UK (7).

1.4 VI and Quality of Life (QoL)

It has been reported VI significantly affects QoL (24-27). There is no universally accepted definition of QoL and its meaning can very much depend on the context it is used. In the field of economics, for example, it can refer to the wealth of a person or their standard of living. In medicine, it has been described as the ratio of health to illness (28).

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"(29).

In fields of research such as optometry and ophthalmology, Vision-Related Quality of Life (VR-QoL) is defined as the patient's subjective reports of concern about their QoL in the presence of eye disease (30-33).

1.5 Vision-Related Quality of Life

It has been well documented that people with VI report a reduced quality of life. They are more likely to report depressive symptoms and be functionally impaired when compared to people without VI (24, 34, 35).

From early development, children with VI may have developmental delays in areas of fine and gross motor skills, as well as perception (36-38). As they progress to a school age, educational development can be delayed by multiple factors; for example, not being able to see the school whiteboard, books, or discriminate colour (36-38).

Studies have reported that VI is strongly associated with loss of independence, impaired mobility, and limited social interactions (39, 40). Adults with VI of working age report that they

worry about maintaining their independence, securing and maintaining employment (41, 42), and are concerned about fulfilling social and family obligations (41, 42).

For older adults vision represents life, autonomy, and being active (43). VI represents fear, death and even signifies the end of life for them (43). Loss of independence and the inability to carry out leisure activities are predominant concerns for them (42). Those with recent onset visual loss face a challenging time if their VI coincides with a decline in general health or loss of a spouse (42, 44, 45).

1.6 Malnutrition

Malnutrition has been defined as "*a disorder of nutritional status*" (46). It is a deviation from optimal nutritional status and includes energy over nutrition and undernutrition (47). Obesity is a form of malnutrition however there is a tendency to use the term synonymously with undernutrition' or being underweight (48). Advanced ageing (>80 years), starvation and disease, alone or in combination, can result in malnutrition (49, 50). Several factors need to be taken into account when diagnosing someone as at risk of being malnourished or malnourished.

These include:

- Body Mass Index; a measure to determine if a person has a healthy weight.
- Unintentional weight loss in recent months.
- Whether an illness is interfering with the body's ability to absorb nutrients from the diet.

The classifications for BMI and the different forms in which malnutrition can exist are shown in Table 1.7 and Figure 1.7.

Table 1.7 UK classification of BMI ranges (UK Parliament statistics 2017, House of Commons library).

Classification	BMI
Underweight	<18.5
Normal weight	18.5-24.9
Overweight	25.0-29.9
Obese: Class 1	30.0-34.9
Obese: Class 2	35.0-39.9
Obese: Class 3	40+

Figure 1.7 Malnutrition in all its forms, image reproduced from the WHO Global Nutrition Report. Image may be subject to copyright.

1.7 Prevalence of malnutrition

According to the recent Global Nutrition Report, (51) out of a world population of seven billion, two billion people suffer from micronutrient malnutrition and two billion adults are overweight or obese. One in twelve people are reported to have type 2 diabetes and 800 million people suffer from calorie deficiency. Out of 129 countries with data, 57 countries have serious levels of undernutrition and overweight (including obese) adults (51).

Malnutrition in developed countries exists mainly in areas of poverty, social isolation, and substance misuse. The prevalence of obesity is higher in developed countries than in developing countries of all ages (52). In developed countries, more males are considered overweight or obese than females and the opposite has been reported in developing countries.

1.8 Causes of malnutrition

In older adults, the main cause of malnutrition is secondary to a disease process (48). Micronutrient malnutrition arises from reduced dietary intake, reduced micro and macronutrient absorption, (malabsorption) or, increased nutrient loss or altered requirement (48). Reduced dietary intake is thought to be caused by reductions in appetite sensation because of changes in cytokines, glucocorticoids, insulin, and insulin-like growth factors (53).

Malabsorption occurs as a result of intestinal dysfunction in disease conditions such as celiac disease, Crohn's disease and irritable bowel disease (48). Increased nutrient loss or altered requirements occur in conditions such as enterocutaneous fistula or in burns patients where metabolism is altered (48).

Obesity does not have an exact cause. Research has found that there appears to be a complex relationship between biologic, psychosocial, and behavioural factors. These include genetic makeup, socioeconomic status, and cultural influences (54). Microorganisms, epigenetics, increasing maternal age, greater fecundity, sleep deprivation, endocrine disruptors, pharmaceutical iatrogenesis, and intrauterine and intergenerational effects have all been linked to obesity (54).

1.9 Consequences of malnutrition

Malnutrition affects the function and recovery of every organ system in the human body (48). If malnutrition is chronic, the body draws on nutrition from adipose tissue, muscle, and bone resulting in a change of the body's composition (48).

Cardio-respiratory changes are found in people with malnutrition, muscle function is affected prior to any loss in muscle mass. Reduction in cardiac muscle mass and reduced cardiac output affects renal function (48). This occurs by reducing renal perfusion and glomerular filtration rate. Gastrointestinal function relies on adequate nutrition. Changes in pancreatic exocrine function, intestinal blood flow, villous architecture, and intestinal permeability result

from chronic malnutrition (48). The colons' ability to absorb water and electrolyte absorption becomes impaired and ion secretions occur across the small and large intestine. This in turn results in diarrhoea, which is associated with high mortality in malnourished individuals (55).

Obesity has been linked to an increased risk of morbidity from diseases such as dyslipidaemia, hypertension, diabetes, coronary heart disease, stroke, gallbladder disease, sleep apnoea, osteoarthritis, and some cancers (56).

Individuals with malnutrition have reported low mood, reduced energy levels, reduced quality of life, and independence (48, 57). They experience psychosocial effects such as apathy, depression, and self-neglect and do not have the ability to carry out daily activities (58).

1.10 Malnutrition screening

Malnutrition can be screened for by using a range of validated screening tools. These are used in various settings such as hospitals and care homes (59-62). Some examples of the screening tools used are the Nutritional Risk Screening 2002 (NRS-2002) (59-62), the Subjective Global Assessment (SGA) (61, 63), the Mini Nutritional Assessment (MNA) (64-74) and the Malnutrition Universal Screening Tool (MUST) (75-84).

The screening process involves identifying those that are healthy, at risk of being malnourished or are malnourished (48). Steps are then taken to address the outcomes of the screening. The MUST screening tool, for example, recommends that if an individual is screened as low risk for malnutrition, they be monitored with a frequency according to which setting they are in i.e. hospital-based (weekly), care home (monthly), or community (annually) (85). Those at medium risk for malnourishment record a food diary, if any concerns arise these are addressed by following local policy procedures(85). Those who are at high risk or are malnourished are referred to local referral schemes. Individuals that are screened as obese are monitored and referred to local weight loss, support groups (85).

To prevent malnutrition in all forms people are encouraged to eat a healthy balanced diet. It is recommended foods are consumed from the five main food groups (86); fruits and vegetables (five servings), whole grains such as rice and wheat (three to five servings), milk and dairy products (three servings), and sources of protein such as meat, fish, and eggs (two to three servings), see Figure 1.11.

Figure 1.10 Daily portions for the five recommended food group, NHS Rotheram (2010)(87).

1.11 Research Rationale

Recent reports carried out in the UK convey that the needs of people with VI to maintain good nutritional status are not being met. A report, My Voice, stated that 61% of people with VI always or frequently need support to prepare meals (88). A UK organisation, DisabledGo, working on behalf of the government and local authorities, reported that only 23% of restaurants produce menus in large print or braille (89). They further stated that not accommodating those with disabilities is costing the economy 249 billion pounds (89). It has been reported interventions are required to support the diets and ADLs of people with VI (90-92), yet to date, very few existing interventions were found in the literature (93).

For the first time, this study will investigate the impact of VI on nutritional intake, ADLs and VR-QoL in a population of UK adults. It is proposed that a mixed-methods research design (both qualitative and quantitative data collection) is required to answer this question. A questionnaire exploring the ADLs and nutritional intake will be designed, validated and disseminated to the cohort. The questionnaire will be disseminated alongside the 10 item Questionnaire of Vision-Related Quality Of Life Measure-Vision Core Measure 1 (VCM1) (94). Many questionnaires have been developed and reviewed to measure vision-related quality of life (95, 96). The VCM1 was found to be the most suitable for the purposes of this study as outlined in chapter two.

If required, the results of the questionnaire and a series of focus groups will be used to inform the design of an intervention to improve the dietary habits of people with VI. This research attempts to make an original and significant contribution to the literature in this area.

1.12 Summary

The aim of this research is to investigate the impact of VI upon the nutritional intake, VR-QoL and ADL's. Literature pertaining to the impact of VI on nutritional status has been reviewed and a rationale put forward. The next chapter will discuss the development and validation of the questionnaire and the protocol for this study.

Chapter two: A systematic review: The impact of visual Impairment on nutritional status

The previous chapter provided an introduction and a rationale for this study. This chapter is a systematic review of the impact of visual impairment on nutritional status. This chapter has been published in the British Journal of Visual Impairment

Abstract

The aim of this review was to evaluate the literature that has investigated the impact of visual impairment on nutritional status. We identified relevant articles through a multi-staged systematic approach. Fourteen articles were identified as meeting the inclusion criteria. The sample size of the studies ranged from 9 to 761 participants. It was found that visual impairment significantly affects nutritional status. The studies reported that visually impaired people have an abnormal body mass index (BMI); a higher prevalence of obesity and malnutrition was reported. Visually impaired people find it difficult to shop for, eat, and prepare meals. Most studies had a small sample size, and some studies did not include a study control group for comparison. The limitations of these studies suggest that the findings are not conclusive enough to hold true for only those who are visually impaired. Further studies with a larger sample size are required with the aim of developing interventions.

Keywords

Activities of daily living, food experiences, eating patterns, nutrition, shopping, visual impairment

2.0 Introduction

Nutritional status is defined as the 'intake of a diet sufficient to meet or exceed the needs of the individual, that will keep the composition and function of the otherwise healthy individuals within normal range' (97). Poor nutritional status has been reported to be caused by three main factors: decreased intake of nutrients, altered utilisation, and increased requirements (97). Nutritional status is considered as an important determinant of successful ageing (98) and perception of quality of life has been reported to be affected by poor nutritional status (99).

Recent reports carried out in the United Kingdom suggest that the needs of visually impaired people to maintain good nutritional status are not being met. A report, My Voice, stated that 61% of the visually impaired, always or frequently, needed support to prepare meals (88). A UK organisation, DisabledGo, working on behalf of the government and local authorities, reported that only 23% of restaurants produce menus in large print for those with visual impairment (89) They further stated that not accommodating those with disabilities is costing the economy 249 billion pounds (89).

We previously reported that older adults with age-related macular degeneration (ARMD) consume fewer calories than is recommended for their age (100). In addition, they are unclear about what foods or supplements they should consume (100). Due to the ageing population, the number of people living with visual impairment in the United Kingdom is rising. Around 79% of people living with sight loss are over the age of 64 (8). One in every three people aged 85 and over is living with sight loss (5).

Many studies have reported the importance of the role of vision and visual cues when eating (101-107); yet the literature relating to the impact of sight loss on nutritional status is limited. To date, the impact of severe sight impairment on nutritional status has not been researched in the United Kingdom. A search for previous literature reviews, concerning the impact of visual impairment on nutritional status, using the search terms 'nutrition' and 'visual impairment' found reviews relating to how poor nutrition can contribute to ocular disease (108); however, no review has been performed to date, looking at the impact of visual impairment on nutritional status.

This review aims to evaluate and compare the findings of the literature that has investigated the impact of visual impairment on nutritional status.

2.1 Methods

Search strategy

We identified the relevant articles that evaluated visual loss and nutritional status published in journals through a multi-staged, systematic approach. In the first stage, a computerised search of Web of Science, Science Direct, Wilson, and PubMed database was performed to identify all relevant articles. Terms and words used for the search included 'visual impairment', 'visual loss', 'sight loss', 'blindness', and 'sight impaired'; these were then separately used in combination with search terms 'nutrition', 'shopping', 'eating patterns', 'activities of daily living', 'Mini Nutritional assessment (MNA)', 'food experiences', and 'nutritional screening tools'. Google scholar was also searched using the same search guidelines, and bibliographies of the retrieved articles were manually searched. Only studies conducted on human subjects were included.

In the second stage, all abstracts were examined to identify articles that

- Researched how visual impairment affects experiences of restaurant use, meal preparation, and shopping.
- Included information relating to how visual impairments affect activities of daily living (ADLs) or feeding and eating development in the young.
- Commented on the effects of visual impairment on body mass index (BMI) or on studies that carried out nutritional screening or analysed the nutritional intake of visually impaired people.

In the third stage, full-text articles were reviewed according to the inclusion and exclusion criteria shown below, and relevant articles were incorporated into the manuscript.

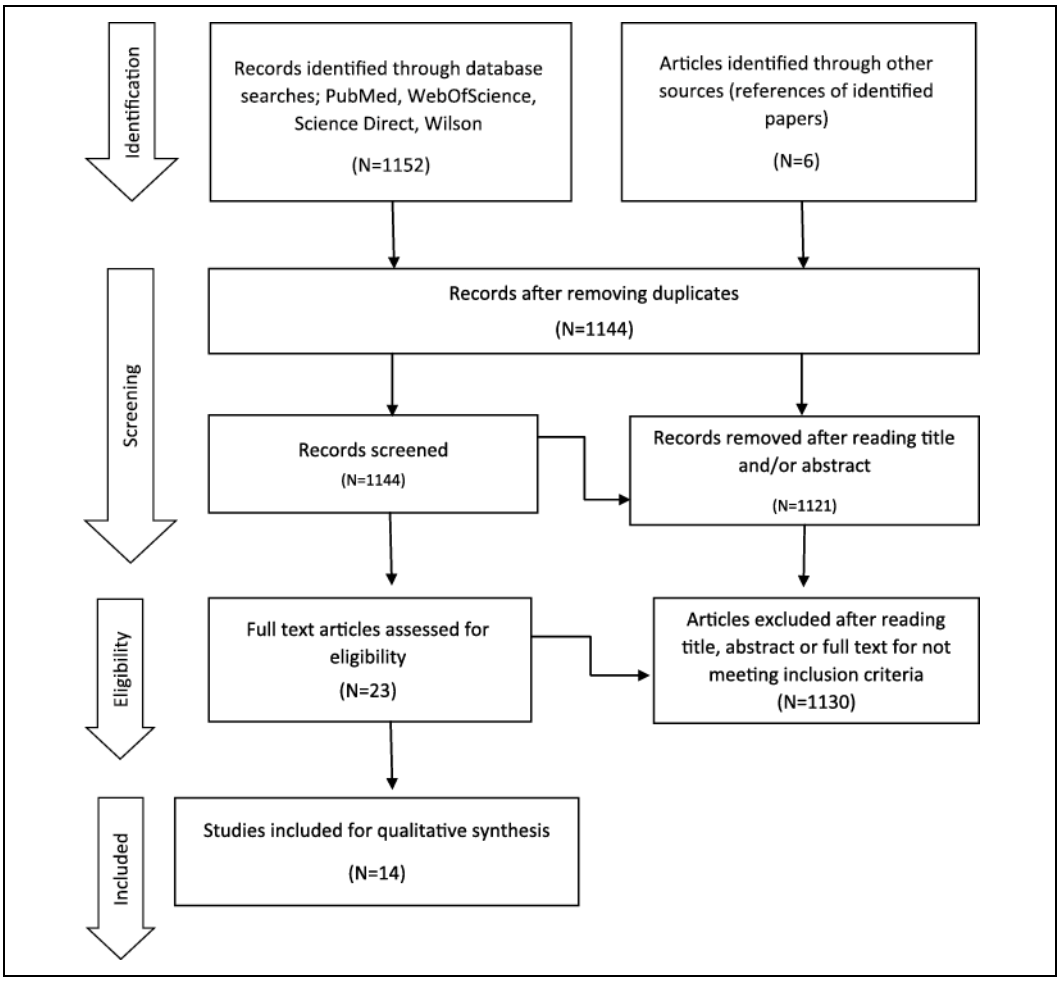

Figure 2.1 Protocol for literature review.

Criteria for inclusion and exclusion

Studies were included if they commented on factors affecting nutritional status, such as undernutrition, obesity, diet, and BMI. They were also included if they researched eating patterns/behaviours/experiences or commented on food-related obstacles for the visually impaired, such as shopping, eating, and preparing meals and restaurant use.

Letters to editors and conference presentations were excluded. Articles commenting on how nutritional status contributes to ocular diseases, such as the need for supplements for ARMD or other diseases that can cause visual impairment, were excluded. Articles that looked at how poor nutritional status can exacerbate ocular disease, such as the effects of BMI on cataract progression and type, were excluded. Fourteen articles were included in this review (see Figure 2.0).

Data extraction

We grouped the studies into two categories: those that were qualitative and those that were quantitative. We ordered the articles according to the year they were published (ascending order). The results were tabulated according to author, date, country; age; sample size (gender) (including number of visually impaired and sighted in each study); type of visual impairment; methods used; key findings; and implications for future research (see Table 2.0).

Evaluation of studies

We used the 16-item Quality Assessment Tool for Studies With Divers Design (QATSDD), designed for systematic reviews. The QATSDD complies with the preferred reporting criteria for systematic reviews Liberati, Tetzlaff, Altman, and PRISMA Group (109). It has been reported to have good validity and reliability (110). It can be applied to both qualitative (14 items) and quantitative studies (14 items). Each item can be given a maximum score of 3 with a total score of 42 (110). The percentage score of each paper was calculated by dividing the total sum of each paper by 42. We used a previously employed method to rate the quality of the paper as 'high quality ≥75%', 'good = 50%–75%', and poor <25% (109).

2.2 Results

Study characteristics

We identified fourteen articles for inclusion in this review. Six articles were qualitative and eight were quantitative (see table 1). The studies were carried out across eleven countries. Most of the studies were cross-sectional in design. It was found that most studies did not use a sample size that was representative of the population. Only six studies included more than one hundred participants (111-116), the rest of the studies included less than 60. The studies were carried out with participants with an age range of 3 months to >90 years old. The demographic range in some of the studies was also narrow, some studies (90) had a higher level of female participation (113, 117, 118). Some were restricted to a particular setting or geographical area, i.e. one school (119) therefore the results cannot be generalised to the population. The classification of visual impairment was not consistent across the studies, some used gross methods (113) to classify participants as visually impaired, others carried out sight tests or used standardised classification (117). There was a great variation in the cause of visual impairments; some reasons given were ocular trauma, optic nerve hypoplasia to condition unknown. Most studies did not use a control group as a comparison for the study and therefore it is difficult to conclude that their findings only hold true for visually impaired people.

Table 2.1 Characteristics of the 14 research articles reviewed

Qualitative studies						
Date of publication (reference) country	Age	Sample size (gender)	Type of visual impairment	Methods	Authors key findings (QATSDD score)	Implications for future research as reported by author
January 2006 (118) United States	20–80 years	21 participants (females 15, males 6)	Varying degrees of visual impairment (congenital blindness and acquired sight loss)	Interviews	Consumer normalcy is achieved through distinction in the marketplace. Four dimensions revealed as important in those with visual impairment are achieving distinction and presence in the marketplace ('I am here', 'I am me'), competence ('I am in control'), and equality ('I belong'). (**GOOD)**	Future research into the temporal aspects of consumer normalcy is warranted, that is, observation of what visually impaired consumers learn over time.

Spring 2009 (90) Canada	30+ to ≤50 years	9 (females 4, males 5)	Severely sight impaired and blind since age 5	Semi-structured in-depth interviews	Nutrition and blindness professionals must work together to reduce food-related obstacles in the visually impaired. **(GOOD)**	Social structure and skill development of the visually impaired need to be investigated according to the needs identified for shopping, food preparation, and restaurant use by this study. The implications of the dislike of cooking and physical activities need to be investigated.
December 2011 (115) Brazil	–	224 (21 for focus groups) 203 questionnaire respondents	Total visual impairment (blind)	Focus groups and questionnaire	Ideal restaurant profile for those who are visually impaired is one where menu is read by server, empathetic servers, round tables, low music, and lighting. Server should be summoned by a button. **(HIGH)**	Allows insight into the factors that need to be addressed for the visually impaired using restaurants
November 2014 (92) United States	3 months–3 years	30 (females 13, males 17)	Tactual learners (no light perception) and visual learners	Semi-structured video interviews	Improving caretaker confidence can promote independence at mealtimes, and can potentially minimise	Mainly participants of optic nerve hypoplasia were used in this study. This diagnosis can have

			(20/70 to 20/180) teller acuity		difficulties in establishing good eating habits in visually impaired children. **(GOOD)**	medical implications that affect eating abilities and need to be researched in future. Studies determining implementation protocols that promote family-centred practices need to be carried out.
June 2015 (119) Turkey	10.43 ± 2.88 years	74 (females 36, males 38)	Acquired and congenital sight loss (partial and complete)	Questionnaire and physical assessment	The children who were visually impaired were mainly obese or overweight, and they showed poor nutritional habits skipping meals (58.1%; mainly lunch). **(GOOD)**	Findings convey that health of children in the visually impaired population should be monitored. Children who are visually impaired are at higher risk of health problems than those without.
March 2017 (120) Malawi	<6 years	42 participants in total (11 females, 9 males took part in interviews) 10	Low vision and blind participants	In-depth interviews, focus groups, 10 home observations	Parents require support to meet their children's developmental needs. Professional training is required to support careers of those with visual impairment and challenge	Future research will need to analyse the feasibility of undertaking child development training packages.

		home observations (2 females and 8 males) and 22 took part in focus groups, gender[a]			community stigma. **(HIGH)**	
Quantitative studies						
Date of publication (reference) country	Age	Sample size (gender)	Type of visual loss	Methods	Authors key findings	Implications for future research
April 1999 (117)Japan	64–95 years	37 visually impaired (females 28, 9 males) 42 control subjects	physically handicapped persons handbook Grades 1 to 6	Activity of daily livings assessed by nurse using physical Self-Maintenance scale Semi-structured interview	Those with visual impairment significantly had difficulty shopping. **(GOOD)**	A larger study is required to see that there are clear significant differences between complex activities in those with visual impairment and those without.

December 1999 (121) Canada	21–80 years	25 (15 females, 10 males)	Legally blind	Three 24-hr food diaries re-called and collection of demographic and BMI data.	Visually impaired participants have a diet that is less than adequate compared to the non-disabled population. There is a higher risk of obesity and potential for ill health in the visually impaired group. **(GOOD)**	Future studies on larger numbers of subjects with visual disabilities in Canada should focus on specific factors associated with the less than adequate dietary practices in the visually impaired.
April 2005 (116) Spain	8–18 years	229 (133 boys, 96 girls)	Varying degrees of visual impairment, from blind to good vision.	Information of visual status obtained from medical records and health care workers. Face-to-face interviews: Three 24-hr food surveys. Anthropometric measurements (BMI), diet	High prevalence of being overweight and obese in children than those who are not visually impaired. High-fat intake found. Dietary consumption patterns were the same as those who are not visually impaired. **(GOOD)**	Socioeconomic conditions and family case histories may account for the findings of these results.

				quality assessment using the KIDMED index. Physical activity (hour per week recorded), hours of watching TV recorded		
March 2014 (114) Australia	60+ years	761	Central visual field loss (ARMD participants)	Face-to-face interviews, anthropometric measurements (BMI) assessment of ADLs using the OARS ADL scale.	Those with AMD have significantly more difficulty shopping and preparing meals than those without. There was no significance in eating ability in those with and without AMD. **(GOOD)**	Future studies should investigate effective rehabilitation interventions that target older adults with AMD in order for them to maintain their functional independence
May/June 2014 (113) Finland	Mean age 83 years	245	Unable to read regular print with/without spectacles	The MNA nutritional screening, tool structured	Those with vision impairment were older females. They were malnourished according to	A longitudinal study would be useful in the future to determine if there are temporal effects

				questionnaire, medical records, and anthropometric measurements (BMI)	MNA. They also had lower BMI than those without vision impairment. **(GOOD)**	of visual impairment on nutritional status.
November 2015 (91)United Kingdom	81 ± 10 years visually impaired 75 years ± 5 healthy subjects	14	Central visual field loss	Movement kinematics were compared using three-dimension motion analysis. Three tasks: eating, drinking, and turning a key in a lock were measured.	Participants with central visual field loss bring objects closer (glass to pour drink), need to make more corrections (more stabs of a fork to grasp food). They do not perform common daily living tasks as efficiently as healthy subjects do. **(GOOD)**	Further investigation is required to determine if rehabilitation can improve the efficiency of tasks for those with central visual field loss, or if they have a threshold. Further investigation is required to see if contrast effects the rate a task is conducted. The pouring task (with a clear jug), a low contrast task, needed more input from the participants' contrast sensitivity than other tasks of a higher contrast.

August 2016 (112) Poland	7–18.9 years	141 (62 females, 79 males)	Blind and partially sighted	Anthropometric data (BMI) and demographic survey	Excessive body mass and abdominal obesity are an urgent health problem in children with visual impairment. **(GOOD)**	The factors attributing to high levels of obesity such as diet and lack of exercise need to be investigated.
February 2017 (111)Poland	≥16 years	250 (153 females, 97 males)	Congenitally blind and acquired sight loss causing severe sight impairment	Questionnaire data analysed using SPSS	Meal preparation is challenging for the visually impaired. Shopping choices were affected by support in shopping, predictably and convenience, many opting for online shopping. Restaurant experiences were better when the visually impaired were supported. **(HIGH)**	The findings in this study should be used to develop solutions for nutrition-related obstacles in the visually impaired.

QATSDD: Quality Assessment Tool for Studies With Divers Design; BMI: body mass index; ARMD: age-related macular degeneration; ADLs: activities of daily living; OARS: Older American Resources and Services; MNA: Mini Nutritional Assessment.

[a]Information not provided.

Nutritional status

BMI

Visual impairment was reported to be significantly linked with abnormal BMI. Obesity in males (112, 121) and school children was reported (112, 116, 119).This was attributed to reduced physical activity in some studies (112) or excess food consumption in others (121). One study reported that the finding of obesity in males was not significant (112). Undernutrition and low body weight was in females (113, 121). It was identified in one study females were not meeting the daily recommended intake of milk products, grains, and meats. Males were also reported to consume less than adequate amounts of milk products(121). Another study reported females as overweight and obese, but found they also did not consume as much fats, carbohydrates and proteins as males (116). In this study males were mainly categorised as obese and females as overweight (116). Some studies reported a higher prevalence of obesity in the visually impaired however did not assign their findings to any gender (90, 119). The findings of high rates of obesity in males and malnutrition in females was also reported in a conference abstract which did not meet the inclusion criteria to include in the main results table (122) One longitudinal study used BMI data as part of its study, however did not report the data in their final findings (114).

Eating and meal preparation

The ease of eating meals was self-reported by the participants to be unaffected by visual impairment in two studies (114, 117). A purely objective study however reported, that when speed was measured using three dimension motion analysis, those with visual loss, eat and drink more slowly, require cutlery closer to them and make more corrections when eating and drinking (91, 114). This finding is of interest as it has been previously reported that when cutlery is closer to a person, they consume more food (106). Many studies did not research meal preparation in visually impaired people, those that did extracted similar themes (90, 111). They found meal preparation was a great obstacle for visually impaired people, to the point where they reported it as an aversion (90). They reported boiling and cutting tasks were very difficult (90, 111). The study with a larger sample size was able to provide more information (111). They reported that dinner preparation could take up to two hours, and 23% of respondents stated it could take even longer than this. They also found that visually impaired people purchased ready-to-eat products such as cheese and meat products but they rarely purchased frozen fruits and vegetables. They were also able to report tasks that visually impaired people did not find difficult, such as, sandwich preparation and washing foods.

Restaurants

Restaurant use was reported to be a great obstacle across the studies evaluated. (90, 111, 115) Those with larger sample sizes provided a detailed analysis with regards to shopping and restaurant use, and were able to extract more themes (111, 115) than those that did not (90). The studies all reported that visually impaired people felt more comfortable eating in restaurants where staff were helpful, empathic and did not treat them as a burden (90, 111, 115). In one study, over a quarter of visually impaired people stated they frequently visited snack bars (111). They reported availability of braille, large print menus or audio would also be of great help (90, 111, 115). Additionally, the possibility of being assisted by their guide dog in restaurants would helpful (90, 111). Another finding was visually impaired people prefer, low intensity light and music, round tables and being able to summon a server with a buzzer (115)

Shopping

Many studies reported shopping as difficult for visually impaired people (90, 111, 114, 117, 118). Being able to read labels, (123), being able to shop predictably i.e. buying food items from the same shelves, and staff assistance, were stated as requirements for an ideal shopping experience (90, 111). It was reported visually impaired people purchased the same brands for years (111). Food freshness, and low meat fat content, were conveyed to be very important factors in determining food choices (111). The main source of obtaining food was from the local grocers and one third of people were reported to shop online(111). One study focussed solely on shopping experiences of the visually impaired, and although the sample size was small, it was able to provide detailed qualitative analysis of the participant's needs. (118). It reported in order for visually impaired people to achieve consumer normalcy, they need to be recognised as in control, as an individual, a presence, and someone that belongs in the market place.

Development of feeding

Two studies researched the impact of visual impairment, on the feeding and eating development, of young children and infants (92, 120). They both came to the same conclusion that caretaker confidence can promote independence at mealtimes and can potentially minimize difficulties in establishing good eating habits (92, 120).

Nutritional status screening and nutrition intake analysis

Nutritional screening is normally carried out using a nutritional screening tool (124). These tools are useful, as they are used to assess those who require further nutritional assessment. Nutritional screening using the MNA nutritional screening tool was conducted in one study (113).They found that visually impaired older females were more malnourished than those that were not. Another study grossly categorised the food groups visually impaired people were consuming into milk products, meats and grains (121). They reported reduced intake of milk products in visually impaired people. Another study reported that only 36.4% of visually

impaired people consider nutritional value when making food choices (111). It was found that obese and overweight visually impaired school children were consuming higher than recommended levels of fats and fewer carbohydrates (116). Although many studies stated poor dietary habits (90, 112, 113, 117, 119) were affecting nutritional status, not many carried out or provided a detailed analysis of actual nutrition intake or the calories that were consumed by visually impaired people. One study highlighted male school children were consuming almost double the recommended intake of calories. Males were consuming 2604 kcal/day and female's 2159 kcal/day (116). In this study, it was found that 88.2 % of those with visual impairment had a very poor diet or a diet which needed improvement (116). These findings highlight the importance of the need for nutritional screening in visually impaired people.

2.3 Discussion

The studies carried convey that being visually impaired significantly impacts nutritional status. A high incidence of obesity has been reported in visually impaired people, particularly children and males. Females were found to be more malnourished and consuming less than the recommended daily intake. In some studies and in those they were reported to be overweight or obese however, they were still consuming less than their male counterparts were. Despite being carried out in different countries, settings and across different age ranges, the findings in these studies were repeatable.

Visually impaired people find shopping, meal preparation and restaurant use very difficult. It has been reported that many visually impaired people do not shop independently and prefer to purchase food online as it is convenient (125, 126). Their experiences in the market place would be improved by receiving adequate support and if they are not treated as a burden. The studies reported that visually impaired people prefer predictability, for example, that they had "learned shopping". A trend of going to the same aisles for the same foods was safe. This was highlighted as a detriment in one study as the participants were unaware that healthier options existed, such as pre-prepared salad. If knew these foods existed they would make more informed food choices.

Concerning restaurant use, more than one study reported that visually impaired people felt like a burden. In describing their ideal restaurant experience, a repeatable finding was that they would like the menu to be read to them. They also stated they would prefer a bell, round tables and large print or braille menus.

The duration of preparing meals (>2hrs) and the difficulty of boiling and cutting foods was highlighted in the studies. Eating was found to be difficult, particularly in older adults with visual impairment. A purely objective study looking at central visual field loss showed mobility and dexterity was reduced. Participants with central visual field loss (CFL) demonstrated significantly longer overall movement times. They had shorter minimum viewing distance. For

two of the three ADL tasks set (eating and drinking) they needed more corrections in movement (91). A study using the (MNA) tool found older adults with visual impairment to be more malnourished than those without (113).

High rates of obesity was found in visually impaired children of a school age, this was attributed to poor food choices and lack of exercise. An interesting finding was that visually impaired individuals did not perceive their disability as an obstacle. They believed it was their lack of motivation and exercise that inhibited them from taking care of themselves (90). One study stated that perhaps visually impaired individuals have a less negative attitude towards being overweight. It stated that they may have an innate desire towards a more robust stature (121). Another study reported that as they could not see or get any satisfaction from their appearance they were not concerned by it (90). An interesting finding was that just over a third of visually impaired people take an interest in the nutritional value of food before purchasing.

In studies that looked at younger children with visual impairment, it was reported caretaker confidence can promote independence at mealtimes, and can potentially minimize difficulties in establishing good eating habits (92) . This can be done by providing parents with professional training. They reported providing adaptations for an individual's visual needs, encouraging sensory experiences around food, and teaching developmental expectations in children is necessary (92).

From this review, it is evident that the impact of visual impairment on nutritional status is significant, it is necessary to investigate the effect of visual impairment on nutritional status in the UK population.

2.4 Limitations

The sample size of some studies was small (90-92, 112, 117, 118, 120, 121). There was sample bias in two studies in that the participants were selected from services they approached or because they used regularly (115, 120). There was gender bias towards females, in the sample selection of some studies (113, 117, 118). One study reported the use of a non-probabilistic sample (115). There was a narrow demographic range in some studies i.e. some ages, (90) and also some ethnicities were not represented due to geographic location (92). One study selected its participants from a single setting (school) (119). These findings indicate that the results of some studies cannot be generalised to the visually impaired population. Nearly all the studies were of a cross sectional design. The studies did not have similar methods and all classified visual impairment differently. There were a number of reason for the cause of sight loss cited in the studies, from congenital blindness, acquired from ocular disease to ocular trauma. One study used gross methods to define visual impairment (113). Some did not use a control group of normal sighted people, where if they had it would provide more information and support a cause-effect finding (90,

111, 121). In some studies reporting accuracy from participants (re-call bias), (121) and the researchers interpretation of what the participants reported may have influenced the results (90) and therefore accurate conclusions may not be drawn.

2.5 Conclusion

The fourteen studies evaluated in this review, convey that visual impairment significantly affects nutritional status. Most studies reported that future studies should be carried out with a larger sample size. Some stated it would be useful to see the temporal effects of visual impairment on the factors that they measured, i.e. conducting longitudinal studies (113, 118). This review has highlighted the lack of nutritional screening for those with visual impairment, both globally and in the UK.

Importantly, the studies carried out convey there is a great need to develop interventions to support the nutritional status of visually impaired people. These interventions could take the form of skill development (90), rehabilitation interventions for the elderly, to maintain independence (114), or developmental training packages to support parents of those children with visual impairment (120).

Chapter three: Questionnaire Development and Dissemination

The aim of this thesis was to investigate the impact of VI on nutritional intake, VR-QoL and ADLs in a UK adult population. In the previous study chapter, a rationale for the study was outlined and the literature pertaining to VI, malnutrition and VR-QoL was reviewed. The literature review revealed that globally the impact of VI on nutritional status is significant. This chapter outlines the stages of the questionnaire design and describes the protocol for the questionnaire dissemination.

3.0 Introduction

A systematic literature review (127) revealed that there were no existing validated questionnaires that investigated the impact of VI on nutritional status. Original question items were developed from the topics outlined in previous literature that assessed the impact of visual impairment on nutritional status and activities of daily living (127).

Original questions developed were those that:

- Assessed BMI (112, 116)
- Assessed malnutrition via nutritional screening (113)
- Assessed nutritional intake(113, 116, 121, 128)
- Assessed restaurant use (115)
- Assessed activities of daily living shopping and cooking (91, 111, 117, 118, 129)
- Explored eating behaviours (129)

Relevant existing question items corresponding to these topics were also extracted from some of the papers covered in the review to create an original questionnaire. (100, 129)

Face validity was then used to validate the questionnaire through a focus group whereby participants with visual impairment commented on each question items wording, clarity and relevance.

An evaluation of existing validated VR-QoL questionnaires was also carried out to identify the most suitable for use in this study. The most appropriate methods to record the nutritional intake of participants was also evaluated. A literature review evaluating the two nutritional screening tools, the MUST and MNA was also carried out to identify which nutritional screening tool would be most suitable for use in this study.

Participants in this study would be recruited nationwide and the experimental group in this study would be participants with VI i.e. vision below driving standards when fully corrected. Face-face interviews would be impractical for this cohort, and therefore the questionnaire was designed to be delivered as a telephone interview.

The participants in this study would possibly have difficulty with writing and reading with some having severe visual disability meaning they would be unable to read print at all. In this

instance, it was decided the best method of data collection would be directly from the participant to the researcher. The researcher would collate and log the data directly into the appropriate software.

3.1 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, revised Hong Kong 1989. A favourable decision was received by the Aston university ethics committee, ethics application #1132.

3.2 Questionnaire development

Selection of questionnaire items

The questionnaire was designed to incorporate open as well as closed question items to allow participants to share their experiences fully.

The questionnaire covered participant's demographics; gender, ethnicity and employment status. They would be asked to complete three 24-hr food recalls with prompts. The questionnaire also explored participant's knowledge of healthy eating and the ADLs, shopping, meal preparation, and cooking. The questions from the MUST nutritional screening tool were incorporated. VR-QoL was assessed using the validated VCM1 questionnaire.

A brief summary of the questionnaire topics is outlined below:

- Age/ gender/ employment status/ ethnicity/ living arrangements
- Disease type/duration/ registration status (if any)
- ADLs such as the ability to shop, prepare food and cook meals
- Self-reported height and weight and when these measurements were taken
- Knowledge of five food groups/ whether specific foods are more beneficial to health/ reports of health satisfaction
- Reports of foods enjoyed and disliked and reasons for why
- Attitudes towards diet modification and willingness to change diet
- Vision-Related QoL
- Nutritional Intake

The following sections will describe the rationale for the design of different divisions of the questionnaire.

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

Vision-Related Quality of Life (VR-QoL) was assessed using the validated (96) Questionnaire of Vision-Related Quality Of Life Measure (94) (VCM1).

It is reported that VCM1 has high psychometric properties with good content validity and reproducibility (96). The VCM1 composite score acts as a global measure of concern about vision. The score 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 VI, professionals and a literature review (130). The questionnaire evaluates two dimensions: psychological (cognitive function, emotional status, well-being, satisfaction and happiness) and social (social contact and interpersonal relationships) of four QOL scales (131); 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 (96).

The VCM1 has ten items and six response categories. The ten-items relate to physical, social, and psychological issues, see Table 3.2.

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 VI evokes feelings of concern about personal safety and the ability to carry out activities people enjoy (132). It explores if VI causes feelings of embarrassment, frustration, sadness, and isolation and it measures how much participants feel VI interferes with their life.

The strengths of the VCM1 are outlined below:

- Selection of items when constructing questionnaire involved participants.
- Item reduction was analysed i.e. the applicability to a large population, floor/ceiling effects (items that may be difficult for a large part of participants) and redundancies (high correlation with another question item).
- Yielded coherent subscales (no ambiguous or anomalous question items)
- It was rated as the best for internal consistency.
- Reproducibility of results was good (the ability to produce stable scores over time) i.e. test, re-test reliability was good.
- Low respondent burden (time to administer was <15min and rate of missing values <5%).

- Fair interpretability (The degree to which change in scores on a measure can be interpreted).
- Rasch analysis has shown the VCM1 reliably measures VR-QoL (95).
- The VCM1 is designed to be administered over the telephone, making it appropriate for use in the present study.

Table 3.2 Vision Core Measure 1 question items.

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….
1. Felt concerned about your safety outside of your home
2. Felt concerned about your safety inside your home
3. Felt your eyesight has stopped you from doing the things you want to do
4. Felt embarrassed because of your eyesight
5. Felt frustrated because of your eyesight
6. Felt lonely/isolated because of your eyesight
7. Felt sad/low because of your eyesight
8. Worried your eyesight might get worse
9. Concerned about coping with everyday life
10. Felt it interfered with your life in general

Assessment of nutritional status

Two commonly used malnutrition-screening tools used in community and hospital settings are the MUST and MNA. Following a review of the literature, it was decided the most appropriate screening tool for this study was the MUST. The literature review to identify the most appropriate screening tool for this study is described below.

In order to assess which was the most appropriate for this study relevant articles that assessed adult nutritional status using the MNA and MUST nutritional screening tools published in journals were evaluated through a multi-staged, systematic approach. A computerised search of Web of Science, Science Direct, Wilson, and PubMed database was performed to identify all relevant articles published between 1950 and 2016.

The two nutritional screening tools, the MUST, and the MNA were evaluated for use in this study for the following reasons; the MUST is designed to be used universally i.e. in all settings on adults from 18 years onwards. The nutritional screening tool the MNA has been designed to be used in an elderly population (133) ; there is a high prevalence of older adults living with age-related VI in the UK.

Researchers have proposed that a nutritional screening tool should (134, 135):

- Be consistently abnormal in patients at risk of malnutrition (sensitivity)
- Be normal in those that are not at risk of malnutrition (specificity)
- Nutrition specific (not affected by non-nutritional factors)
- It must have a high reliability, i.e. little inter-observer variation
- It must be practical, i.e. those who are going to use the tool must find it rapid, simple, and intuitively purposeful.
- It should not contain redundant information i.e. information about vomiting or dysphagia is unnecessary.

Mini Nutritional Assessment (MNA)

The MNA began its development at the 1989 International Association of Geriatrics and Gerontology (IAG) meeting in Acapulco. The MNA was validated in 150 healthy, frail and unwell people in Toulouse (133). Subsequently in 2001 a short form was validated; MNA-SF (133). In clinical practice, the MNA should be used in conjunction with the overall elements of comprehensive geriatric assessment (133). The MNA has also been deigned to be used in conjunction with anthropometric assessments. The full form MNA and short form are scored to determine if a person is malnourished, at-risk, or healthy, see Figure 3.2.

Mini Nutritional Assessment

MNA®

Nestlé Nutrition Institute

Last name: First name:

Sex: Age: Weight, kg: Height, cm: Date:

Complete the screen by filling in the boxes with the appropriate numbers. Total the numbers for the final screening score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe decrease in food intake
1 = moderate decrease in food intake
2 = no decrease in food intake ☐

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss ☐

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out ☐

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no ☐

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems ☐

F1 Body Mass Index (BMI) (weight in kg) / (height in m)^2 ☐
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater ☐

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2.
DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.

F2 Calf circumference (CC) in cm
0 = CC less than 31
3 = CC 31 or greater ☐

Screening score ☐☐
(max. 14 points)

12-14 points:	☐	Normal nutritional status
8-11 points:	☐	At risk of malnutrition
0-7 points:	☐	Malnourished

Save Print Reset

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of the MNA® - Its History and Challenges*. J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF)*. J. Geront 2001;56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.
Kaiser MJ, Bauer JM, Ramsch C, et al. *Validation of the Mini Nutritional Assessment Short-Form (MNA®-SF): A practical tool for identification of nutritional status.* J Nutr Health Aging 2009; 13:782-788.

For more information: www.mna-elderly.com

Figure 3.2 MNA nutritional screening assessment form is reproduced here with the kind permission from Nestle Nutrition Institute.

Malnutrition Universal Screening Tool (MUST)

The Malnutrition Advisory Group of the British Association of Parenteral and Enteral Nutrition (BAPEN) developed the MUST in 2003 (85). It has been designed for use in all health care settings. The MUST focusses on three indicators: a patient's body mass index (BMI), weight loss history and disease state (85). As with the MNA, the MUST can be adapted if certain anthropometric measurements need to adapted or included, see Figure 3.21.

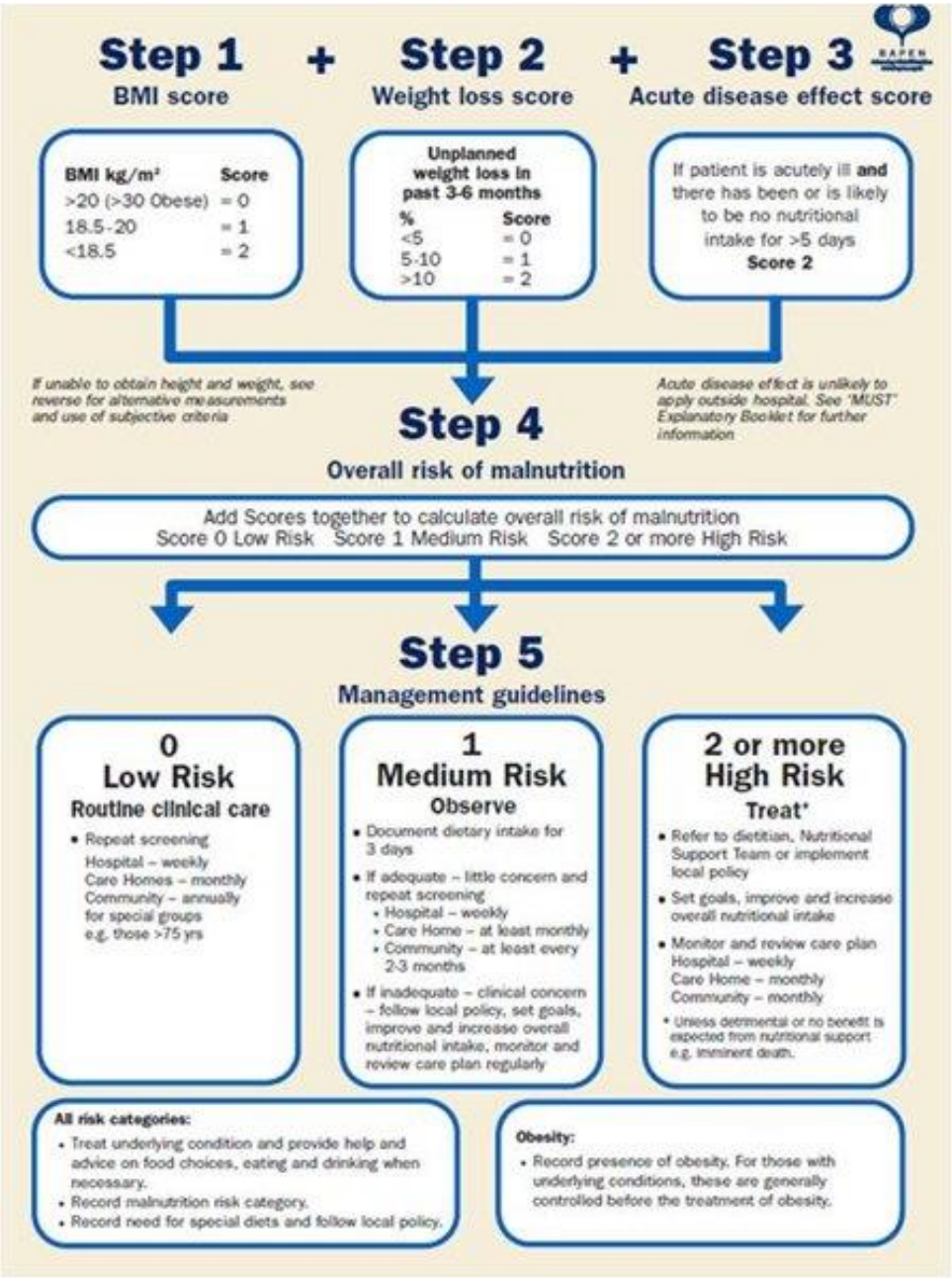

Figure 3.21 MUST nutritional screening tool is reproduced here with the kind permission of British Association for Parenteral and Enteral Nutrition (BAPEN).

The MUST was found to be the most adequate nutritional screening tool for this study. It has a rapid screening time of between <2-7 minutes (70, 136-138). The time to perform the MNA ranged from <4-mins-15 minutes (61, 70, 82, 139-141). The MUST has been reported to be more practical than the MNA, requires less training and can be conducted at a faster rate. The rapid screening time also provides a lower response burden for the population being assessed and is more economical.

The MUST is not restricted to, or designed for, the older adults as the MNA is, and thus it does not add an exclusion criterion to the sample size. In the literature, the MUST and MNA were used in the same population, in different settings. Although the settings differed i.e. hospital cancer patients, cardiac patients, elderly living at home, long-term-care residents, the MUST results have shown that it is nutrition specific and performs well in all settings when addressed with different forms of malnutrition.

The MUST had a higher Measure of Informedness (MoI) in nine out of the ten studies see Figure 3.22. The MUST nutritional screening tool is a sensitive, specific, and practical method of identifying those who require further nutritional assessment,.

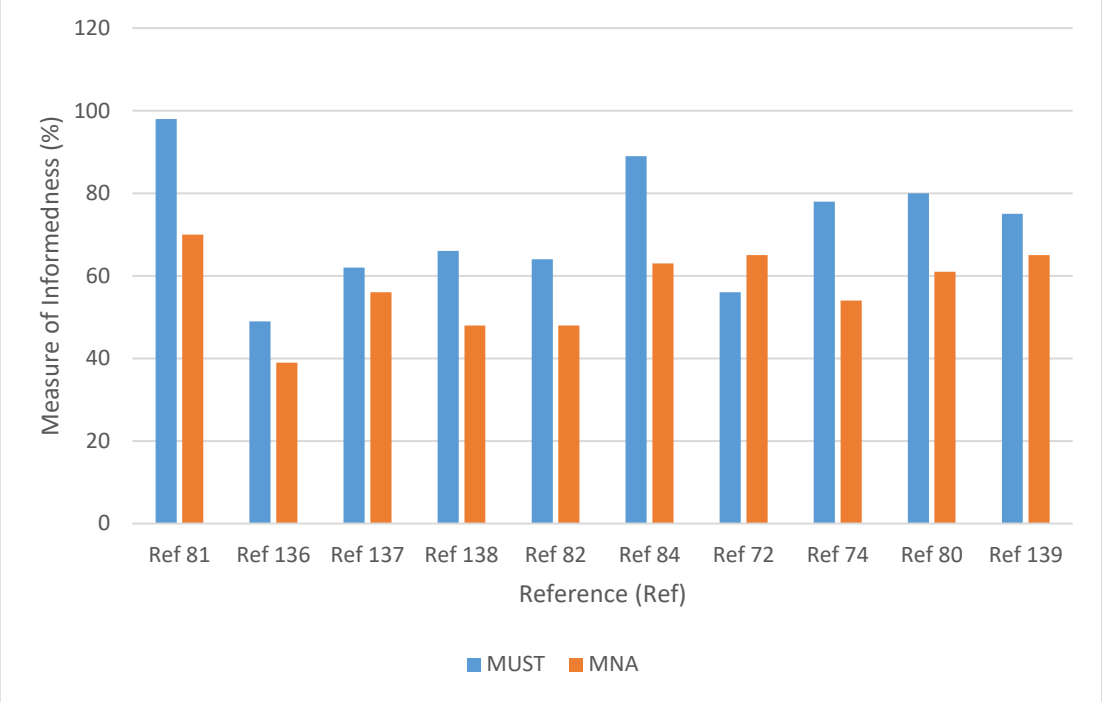

Figure 3.22 Measure of Informedness (MoI) (%) of the MUST and MNA nutritional screening tools when used in the same settings on the same population.

Importantly, research has shown when used in a geriatric/elderly setting (the setting for which the MNA was designed), the MUST repeatedly performed better as a screening tool than the MNA (80, 81, 84). For this reason, the MUST will be the most suitable to screen people with VI for further nutritional assessment.

Assessment of nutritional intake

To analyse nutritional intake of the VI cohort it was decided a 24-hr food recall would be the most appropriate method. This method has been employed in a previous study analysing the eating behaviours of people living with macular degeneration (100). Both 24-hr recalls and food frequency questionnaires have their advantages and disadvantages. 24-hr food recalls have been reported to have precision and when assessed on multiple days validity (142-144). However, multiple days increase the response burden for the participant and literacy is required from the participants for the estimation of portion sizes (142). Food frequency questionnaires have been reported to be more economical and require lower administration and economic costs (142). They have however been reported to be imprecise due to lack of detail of foods eaten (142).

As some of the participants in this study had VI severe, enough to affect their reading and writing abilities a food recall over the telephone was deemed as the most appropriate method. Three 24-hr food diary recalls were carried out to ensure validity.

Assessment of portion size

To ensure a uniform method of portion size estimation it was decided the Zimbabwe hand jive would be employed in this study. This method was developed by Dr. Kazzim Mawji in 1993 to help diabetics patients control their portion sizes (145). This method has shown to be more accurate than using household measures when measuring portion sizes in a previous study (146). This method has been successfully employed in a previous study that analysed the nutritional intake of participants with macular degeneration (100, 129).

Assessment of self-reported BMI

Telephone interviews were the chosen method of data collection for this study. Self-reported BMI was therefore the most suitable method to assess BMI status. Participants would be recruited from across the UK their location may have made in difficult to travel to Aston University to be measured. In the literature, advantages and disadvantages have been reported to using self-reported BMI. The level of education (147), ability to recall information (148) and the weight of participants have all been reported to influence self-reported BMI (149, 150). Research has shown older adults, in particular, older females ≥70 years

consistently report their height and weight inaccurately, mainly over-reporting their height and under-reporting weight (151-164). It has been reported in some studies teenagers and young adults accurately report their weight and height accurately when compared to direct measures (165-167).

3.3 Questionnaire validation

The questionnaire was piloted on six participants with VI through a focus group. As the purpose of the focus group was to check the acceptability of the questionnaire among a sample of adults with VI, a large number of participants were not recruited. The aim was not to create a validated scale, but to confirm the acceptability and clarity of the question items. The participants were asked to comment on the relevance, wording, and clarity of each question item. As this was an original questionnaire face validity, i.e. does the questionnaire measure what it intends to measure was the only means of validation possible.

Employees at Macular Society groups were contacted to ask if participants would be interested in taking part in a focus group. They were provided with a Participant Information Sheet (PIS) to read to potential participants. A focus group was arranged when enough interest was expressed and a sufficient number of participants were recruited.

At the focus group, the PIS was read out again and voice recorded verbal consent was taken for each participant. They were given a copy of the consent form and PIS to keep for their own reference.

The focus group lasted for an hour and was voice recorded. A script of the focus group has been provided in the see appendix, A1.2. The focus group took part in two stages. The participants first answered the questions of the questionnaire. A moderated and voice recorded informal discussion then took place whereby participants commented on the clarity, relevance and wording of question items.

The participant's responses were transcribed, manually coded and analysed through a process of thematic analysis (168). The questionnaire was then refined according to participant responses as follows; redundant question items were removed, new question items were added and existing question item measures were expanded to ensure all possible answers were covered. The wording of question items was also changed to improve clarity.

On completing the focus group, the participants received a debriefing sheet.

3.4 Outcomes of validation

The focus group took place at a Macular Society centre, Worcestershire, England. Initially, nine participants were recruited for the focus group, eight females and one male. Three participants withdrew from the study. One participant decided to withdraw (no reason given), one decided to withdraw, as they decided they did not wish to be voice recorded and one was having difficulties with their hearing aid and so was struggling to participate.

All remaining participants were female and had a CVI. Five participants were Caucasian and one South Asian. All participants were over the age of fifty years.

Transcript analysis

A transcript of the focus group can be found in the appendix, see A1.2. The method used to analyse the transcript is the same as that outlined in chapter six section 6.3.

The majority of the questions were well received and no questions caused concern. The focus group highlighted question items that were not applicable, made participants feel uncomfortable and that restricted responses. The analysis revealed questions that needed to be modified, clarified in terms of wording, and changed in the order they appeared in the questionnaire.

The final questionnaire, see appendix A1.2, was modified according to the responses to the transcript as follows:

- Four question items were deleted; they were reported to be not applicable.
- Four question items were reworded, as the current wording was unclear.
- It was decided that the 24-hr food recall would be the first question that would be asked to reduce recall bias. Prompts such as breakfast, lunch, dinner, and snacks consumed would be used.
- Additional question items were included to explore the participant's cooking and shopping abilities more completely.

3.5 Protocol for questionnaire dissemination

When a participant called to take part in the study or provided their contact details to the researcher a convenient date and time for the telephone interview to take place was arranged.

At the start of the questionnaire dissemination, the PIS and a consent statement were read out to each participant. The recording of the verbal consent was saved onto a digital voice recorder. The participants were also given the opportunity to ask questions about the study.

- They were asked for verbal voice recorded consent to participate in the study.
- They were informed that they would not be identifiable.
- They were informed of how their data would be used and stored.
- They were told they had the right to withdraw from the study at any point should they wish to without giving any reason.
- They were reminded that their participation was voluntary.
- Confirmation that the participant was willing to participate was ascertained.
- Alternative interview dates and times were arranged if required.
- Withdrawal from the study if required.
- The PIS was read out to the participant.
- Method of how to quantify the food they ate was described (Zimbabwe Hand Jive) and food diary for 24-hr food recall was recorded.
- The 37-questionnaire item was disseminated alongside the ten-item VCM1 question items and the responses recorded.
- 24-hr food recall responses were recorded for the other two days.

Call 1: The PIS was read out and verbal consent was recorded. The Zimbabwe Hand Jive method of how to quantify the foods they ate was described. The participant was then asked to recall all the food and drink that they consumed over the previous 24 hours. The 37-item questionnaire was then disseminated alongside the 10-question item VCM1.

Call 2: Verbal consent was recorded and the participant was reminded they could withdraw if necessary. Zimbabwe Hand Jive method was described. The participant was asked to recall all the food and drink that they consumed over the previous 24 hours.

Call 3: Verbal consent was recorded and the participant was reminded they could withdraw if necessary. Zimbabwe Hand Jive was described. The participant was asked to recall all the food and drink that they consumed over the previous 24 hours.

- The participant was given the opportunity to ask questions.
- The participant was provided with contact numbers in case any questions arose later and the debrief form read.

- The telephone interview was concluded.

3.6 Conclusion

This chapter has outlined the methods used to develop, validate, and disseminate a questionnaire to explore the impact of VI on nutritional intake VR-QoL and ADL's. In the following chapter, the results and analysis of data collected from the dissemination of the questionnaire will be described.

Chapter four: An analysis of the impact of Visual Impairment on Activities of Daily Living and Vision-Related Quality of Life in adults with visual impairment.

The previous chapter outlined the stages of development for the questionnaire used in this study. This chapter analyses the impact of VI on activities of daily living and VR-QoL of adults with VI in the UK. This chapter has been published in the British Journal of Visual Impairment.

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

4.0 Introduction

In the United Kingdom there are almost two million people living with sight loss. (169). Of these there are 360,000 people registered severely sight impaired or sight impaired (representing a prevalence of one in thirty) (7). Nearly two thirds of those that are living with sight loss in the UK are female (170).

Visual impairment has been shown to impact on individuals' nutritional status (90-92, 111-122, 127). For example, females with sight loss are more likely to be undernourished than females without visual impairment (100, 113) and have reported being unsure about what foods they should consume for optimal eye health (100). Males and children have been reported to be overweight (112, 119, 121). The cost of malnutrition in the UK is reported to be 19.6 billion pounds annually (171), with 16 billion pounds being related to being overweight or obese (172). Malnourished adults account for 30% of hospital admissions and 35% of care home admissions in the UK (171). Nutritional interventions save the National Health Service 172.2-229.2 million pounds due to reduced health care use (171).

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 (90, 111, 123) and eating meals(91) and they also have an aversion to cooking (90, 111). It has been reported that this restriction may directly impact reports of life satisfaction as well as nutritional status. (111).

It has been reported visual impairment significantly affects QoL (24-27). 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 (28). 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”(29).

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 (30-33).

Researchers have reported that sight loss affect an individual’s independence and mobility (24, 173) as well as their ability to carry out activities of daily living (91, 173). Those with sight loss are also more likely to report depressive symptoms and be functionally impaired than those that have normal vision (24).

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.

4.1 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 (169). 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

In all, 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 [(5)] . 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 (5).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 (127) and using relevant items selected from previous studies (100, 114, 174), 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 (100, 129). 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 (168) 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 (96) Questionnaire of Vision-Related Quality Of Life Measure (94) (VCM1).

The VCM1 (Frost et al, 1998, 2001) is designed for persons with visual impairment. The findings of (96) 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 (96).

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 (130). 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 (131); 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 (96).

The VCM1 has 10 items and six response categories. The ten items relate to physical, social, and psychological issues, see Table 4.1. 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 (132). 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 (95). 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 4.1 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….
1. Felt concerned about your safety outside of your home
2. Felt concerned about your safety inside your home
3. Felt your eyesight has stopped you from doing the things you want to do
4. Felt embarrassed because of your eyesight
5. Felt frustrated because of your eyesight
6. Felt lonely/isolated because of your eyesight
7. Felt sad/low because of your eyesight
8. Worried your eyesight might get worse
9. Concerned about coping with everyday life
10. Concerned about coping with life in general

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 (175-177).

4.2 Results

In all, 67 females and 34 males were included into the data analysis of this study, see Table 4.2. 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 (χ^2 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 4.2 Demographic characteristics of participants

Characteristic	Characteristic	Percentage of participants (%)
Gender	Female Male	66 33
Living	Living on own Living with family Living in sheltered accommodation	47 49 5
Ethnicity	Black South Asian White	2 8 90
Level of visual impairment	Not driving due to poor sight when fully corrected (VA<6/12) Eligible for sight impaired registration Eligible for severely sight impaired registration	23 33 45
Employment	Student Unemployed Employed Voluntary Employed Retired	2 6 15 17 60

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 χ^2 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 4.2. A third shopped independently with over two thirds requiring some support or not being able to shop, see figure 4.21 A third did not shop with either family, friends, neighbours or carers shopping for them.

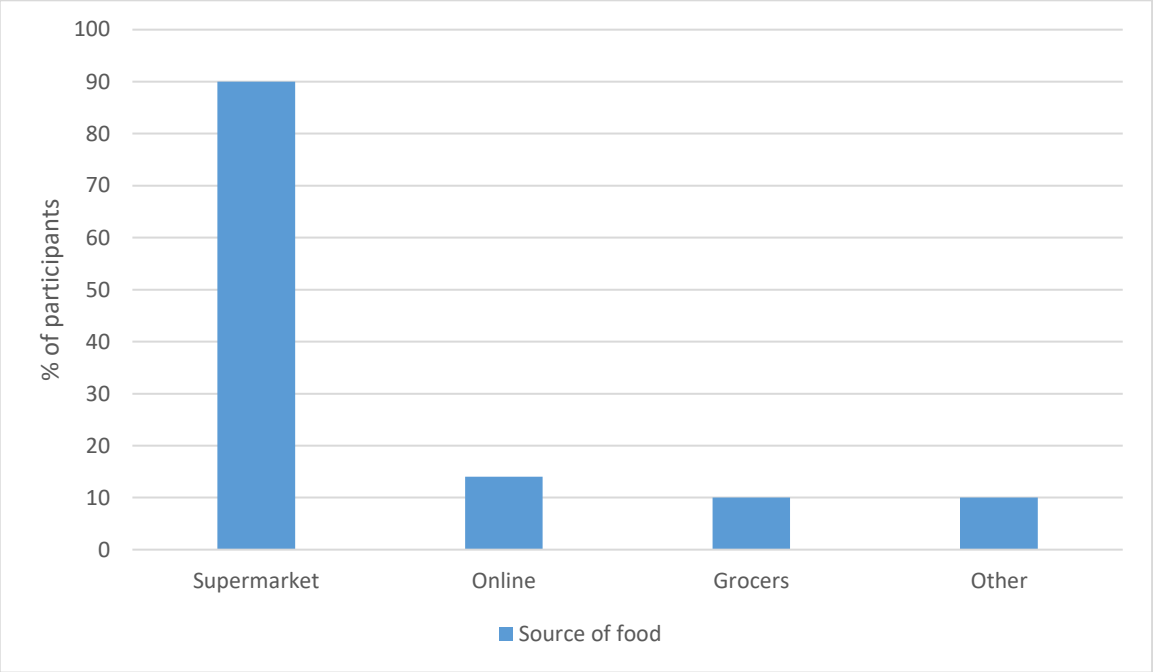

Figure 4.1 Where participants source food (%)

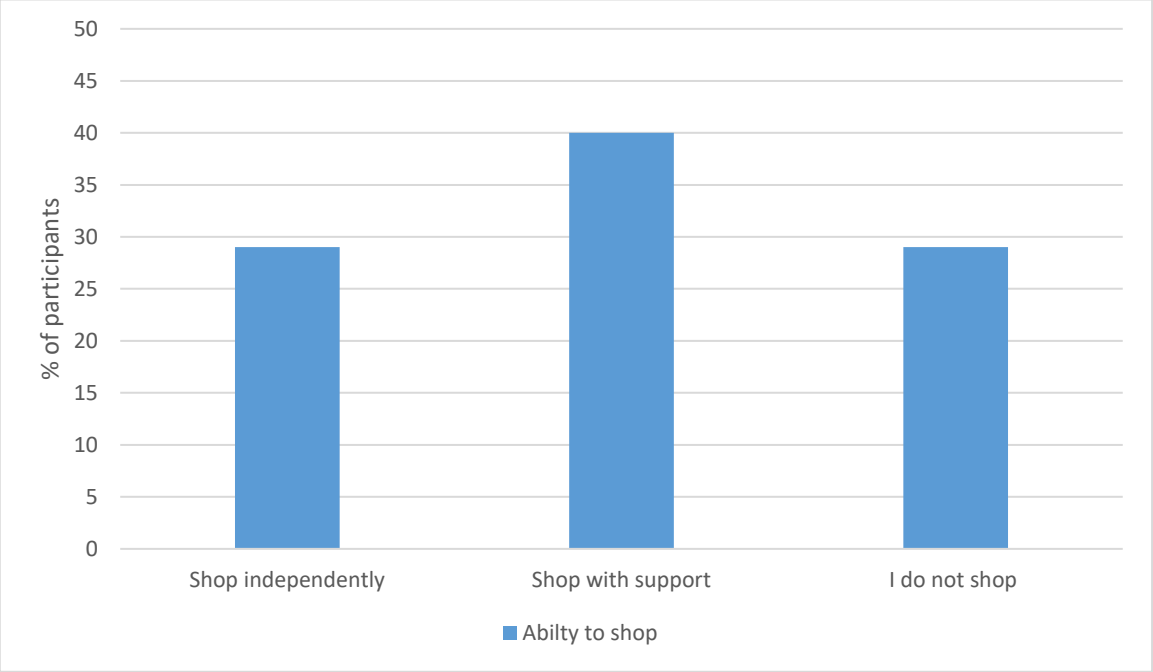

Figure 4.21 Ability of participants (%) to shop

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, $p \geq 0.01$.

In all, 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.

In all 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 4.22.

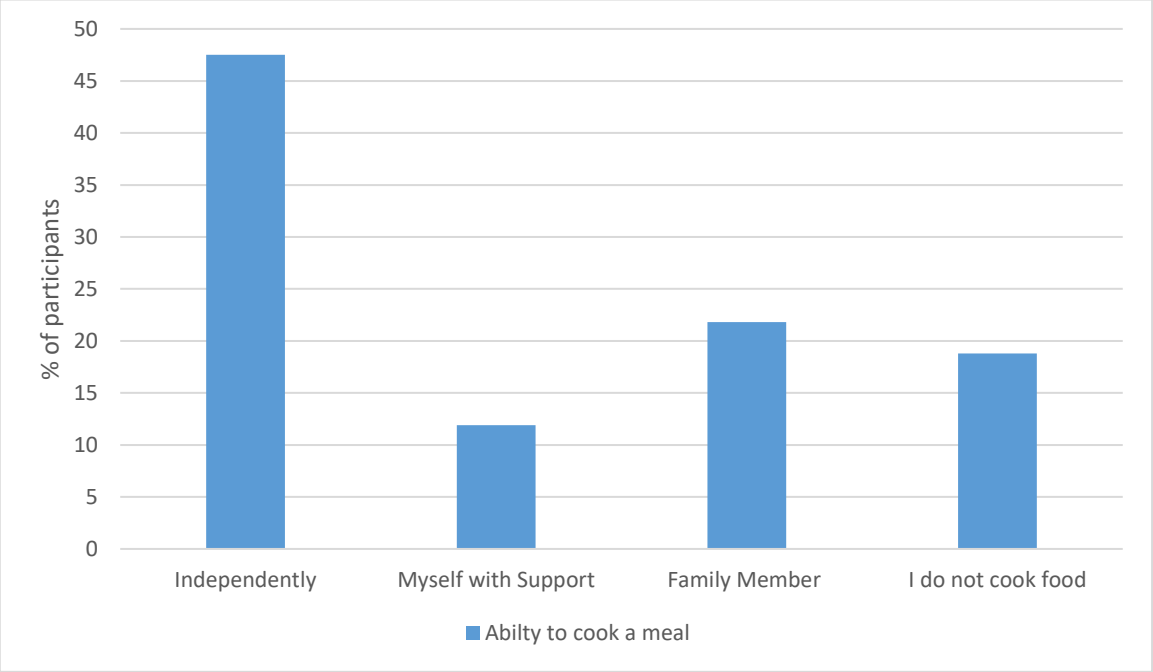

Figure 4.22 Ability of participants (%) to cook

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.

4.3 Conclusion

It has been previously reported that the needs of disabled people in the UK are not being met (89). 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 (90, 111) 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 (178, 179) 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 a code of practice i.e. 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.

4.4 Strengths and Limitations

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.

Chapter five: An analysis of the eating behaviours and nutritional intake of older adults with and without VI

The previous chapter reported the results of an investigation into the impact of VI on ADLs and VR-QoL in adults with VI living in the UK. The results highlighted that norms need to be incorporated into the marketing to create a more inclusive and accessible environment for people with VI. For the first time, this chapter will investigate the nutritional intake and eating behaviours of participants with VI in the UK compared to a control cohort. This chapter is currently under peer-review.

5.0 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, revised Hong Kong 1989. A favourable decision was received by the Aston university ethics committee; ethics application #1132.

5.1 Materials and Methods

The questionnaire design was discussed in chapter 2. The ADLs and VR-QoL elements are discussed in chapter 3. This chapter reports the nutritional intake and eating behaviours elements of the questionnaire. In order to determine the impact of VI on nutritional intake and eating behaviours this element of the questionnaire was also carried out on a normally sighted control group.

Sample size

Using previously reported nutritional analysis data (100), sample sizes were calculated for individual nutrients. The effect sizes chosen for each nutrient were based on published mean and standard deviation data (100). The minimum sample size (*n)* required for a two-tailed t-test at an alpha error level of 0.05 and a power (1-β) of 80% was calculated, see Table 5.1.

In total, 146 participants were recruited for this study. Ninety-six participants were recruited for the VI group and 50 participants for the control cohort.

For fats, saturated fats, cholesterol, vitamins C, D and E the sample size required to detect the desired effect sizes was large. This study was therefore underpowered for these nutrients at powers (1-β) 0.60, 0.3, 0.6, 0.5, 0.20, and 0.4 respectively. It would have been time consuming and impractical to collect data for these nutrients in order to detect the desired effect sizes.

Table 5.1 Sample size calculations for each nutrient.

Nutrients	**unit**	**Mean**	**Difference to Detect (DD)**	**Standard deviation (SD)**	**Effect size (Cohens d) ES=(DD/SD)**	**Sample size for each cohort; *(n)* (two tailed test, power (1-β) 80%, α error level of 0.05) $(16/(ES)^2)$**
Calories	kcal	2074	687	±870	0.8	27
Carbohydrates	g	257	82	±86	0.95	19
Of which Sugars	g	62	14	±27.8	0.5	63
Protein	g	82	27.2	±28.8	0.94	19
Fat	g	82.3	18	±46	0.39	105
Saturated Fat	g	30.5	3.6	±18	0.25	394
Fibre	g	22.4	5.8	±6.2	0.94	31
Cholesterol	g	407	148	±348	0.42	88
Vitamin C	mg	82.2	25	±73	0.35	136
Vitamin D	IU	143	32	±153.8	0.20	364
Vitamin E	mg	6	1	±3.6	0.27	205
Calcium	mg	980	306	±496	0.61	43
Iron	mg	20.4	5.1	±8.8	0.57	48

Inclusion and exclusion criteria

For both the VI and the control participants, exclusion criteria were dietary restrictions relating to conditions such as coeliac disease, inability to communicate in English, or inability to hear well over the telephone.

The VI participants were categorised as follows:

- Registered severely sight impaired (SSI) or sight impaired (SI).
- Eligible for SSI or SI registration but not actually registered.
- Not eligible for SSI or SI registration, but experiencing a level of VI that precludes driving. Or in other words, a reduction in vision that significantly impairs day to day activities (5).

For the control group, participants were aged 50 years or over, and had to demonstrate binocular visual acuity of at least better than 6/9.5; i.e. a visual acuity that would meet the level of sight required to be able to drive legally.

Participant recruitment and setting

In all, 109 participants with VI were recruited from across the United Kingdom from October 2017 to July 2018. Advertisements were placed with the Macular Society, the Royal National Institute for the Blind (RNIB), and Visionary a membership organisation for VI charities. Participants were also recruited by being directly approached by the researcher at Focus and Aston, low vision clinics in Birmingham. They were also directly approached by the researcher at Sight Concern, a support group for those with VI in Worcestershire, New Outlook, a sheltered accommodation in Birmingham, designed specifically for people with VI and local Macular Society support groups.

Participants responded to the advertisements in the Macular Society Sideview magazine. In all written information the Macular Society, use at least a size 16 font. They also produce ‘accessible’ versions of their publications in PDF form, which can be read aloud by screen readers. There are other types of text processing and screen readers available as apps as well, which people may use a mixture of. Additionally the Macular Society offer the option for people to receive audio versions of publications – they provide this as a CD for their Sideview magazine and their leaflets are available on their website as mp3 files. The study was also advertised through RNIB Connect (radio) whereby participants provided their contact details to the researcher via email and telephone. The researcher then called the participants and read out the participant information sheet and arranged a convenient time and date to deliver a structured telephone interview.

Of the 109 VI participants recruited, only 13 were aged under 50 years, and so although their data was included in the qualitative analysis (180); a decision was made to restrict the dietary analysis to a subgroup of VI participants aged 50 years and over.

In all, 50 control group participants without VI were recruited from December 2018 to January 2019. The records of patients at the Aston University Eye Clinic who had given consent for their records to be accessed and to be contacted for research and teaching purposes were reviewed. Those that met the inclusion criteria were contacted by telephone and invited to take part.

Procedure for 24 hour food recall

The method used involved asking participants to recall all the food and drink they had consumed over the previous 24 hours. Studies have shown there is high precision when using 24-hr dietary recalls for nutritional intake (181-183).

Participants quantified the amounts of foods consumed using the Zimbabwe Hand Method (145, 184-186), which has been shown to be more accurate than using household measures when measuring portion sizes (146). The method was explained to participants during the first telephone call and they were reminded of how to quantify each food as they recalled each food item. This step was then repeated at each telephone call. This 24-hr food recall exercise was carried out on two week days and one weekend day of the same week to ensure precision and validity of reporting (142-144). All data was entered directly into a spreadsheet.

The participants were asked to recall foods eaten for breakfast, lunch, and supper as well as any snacks consumed. They were also asked about fluids (water, alcohol, fruit juice, teas, coffees, milk etc.) consumed including what type of milk (full fat, semi-skimmed, and skimmed), and whether milk and sugar was added to drinks. Food quality was assessed where possible; participants were asked if spreads were cholesterol reducing and low in and fat, as well as whether foods were baked or fried, shop bought or homemade.

Recommended Daily Allowance (RDA) analysis

The three 24-hr food recalls were analysed using nutritional software called A La Calc (Red Hot Rails LLP, Doncaster, UK.). This software provided a detailed nutritional analysis for each participant based on his or her self-reported food and drink consumption. The software has been used in previous research (100) and has been designed to be used by nutritionists, schools, consultants, manufacturers, and for research purposes. The software uses McCance and Widdowson's composition of foods dataset to ensure an accurate breakdown of the nutrients contained within each food item entered. This UK nutrient database is maintained by the Food Standards Agency, and contains the nutritional information of foods commonly consumed in the UK. All calculations are also compliant to the EC Directive 90/496/EEC (187). For each participant the mean nutritional intake across the three reported days was calculated.

Data analysis

Data was collected using the software Microsoft Excel and exported to the statistical software IBM SPSS version 23 (IBM UK Ltd, Portsmouth Hampshire). Descriptive statistical analysis was carried out using the statistical software, SPSS.

The Kruskal Wallis test, (with adjusted p values, for multiple comparisons (0.05/3) $p<0.01$) was used to determine whether the nutritional intake of participants was affected by:

1) Cooking ability (do not cook, cook with support, and cook myself).
2) Level of VI (SSI, SI and DND).
3) Living arrangements (live on own, with family and sheltered accommodation).
4) Ability to shop (do not shop, shop with support and shop myself).

The non-parametric Mann Whitney U test was used to determine if there if there were any significant differences in age across the male and females in the control and experimental group. It was also used to determine differences in nutritional intake between the females and males in the experimental and control groups and the impact of living arrangements on nutritional intake within the control cohort.

Effect sizes were calculated for each statistical test using an online effects size calculator (188). The data for the appropriate test statistic i.e. Kruskal Wallis H or Mann Whitney U and the total number of participants were inputted into the calculator, which provided r^2 and the equivalent Cohens d. Cohens d was used as effects sizes are commonly relayed in this form in the literature.

5.2 Results

Demographic of VI group

Three 24-hr recalls were analysed for 64 females and 32 males with VI. The ratio of females to males in the UK living with VI is 2:1 (170) this sample is therefore representative. Adjusting for expected CHI ratio, no significant difference was found in the number of females and males participating (χ^2 0.00, $p >0.05$). Ages of those with VI ranged from 51-96 years. The mean age was 76.0 ± 11.7 years. The majority of the participants sampled were living with family members or on their own, were retired and were Caucasian.

VI in this sample was caused by multiple factors. For example, participants had congenital blindness due to measles, or lost sight due to neurological conditions such as stroke. They also reported VI due to ocular trauma and retinal diseases such as diabetic retinopathy and macular degeneration. Genetic causes were reported such as; ocular albinism, macular dystrophies, and retinitis pigmentosa as well as corneal degenerations and optic nerve head disease i.e. glaucoma.

Those that were SSI had a longer disease duration compared to the other VI participants (H 17.17, p<0.001). In all 81% of the participants were registered SSI or SI with most being SSI, see, Table 5.2.

Demographic of control group

In all, 26 females and 24 males were recruited as part of the control group. The mean age was 75.4 ± 7.2 years old. All the control participants were Caucasian and either lived with their family or on their own. In comparison to the VI group, a larger proportion of the controls were in paid employment; either full time, part time or ad hoc, see Table 5.2.

The mean age of females with and without VI was 77.0 ± 12 years and 75.1 ± 6.4 years respectively with no significant difference between groups (p = 0.07, U = 1033). The mean age for males with and without VI was 74.9 ± 11.5 years and 75.5 ± 8.26 years respectively with no significant difference between the groups (p = 0.1, U=299).

Table 5.2 Demographic characteristics of participants with and without visual impairment (VI).

Characteristic	Characteristic	Percentage of participants with VI (%)	Percentage of participants without VI (%)
Living Arrangement	on own	48	40
	with family	48	60
	sheltered accommodation	4	0
Level of visual impairment	Severely sight impaired (blind)	46	#
	Sight impaired (partially sighted)	35	#
	Not driving due to poor sight when fully corrected*	19	#
Employment status	Employed	8	20
	Unemployed	6	0
	Voluntary Employed	18	0
	Retired	68	80
Ethnicity	South Asian	4	0
	Caucasian	96	100

* These participants may have been eligible for SI registration #not applicable

Nutritional Intake analysis

Nutritional intake compared to RDA

Table 5.21 displays the three-day mean nutritional intake for females and males in each cohort. These are compared the RDA for each constituent for those aged over 74 years as reported by Public Health England (189).

Similar trends were found for the nutritional intake of participants with and without VI when compared to the recommended daily guidelines. Both cohorts were consuming fewer amounts of carbohydrates, dietary fibre, fats and vitamin D as recommended for their age group. However, they were consuming sugars, iron, protein, vitamin C and calcium in excess. Females and males without VI were also exceeded the recommended daily amounts of saturated fat intake.

Table 5.21 Mean nutrients consumed by females and males with and without visual impairment (VI) aged over 50 year compared to the recommended UK guidelines (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/618167/government_dietary_recommendations.pdf).
*data not provided

	Unit	Female VI n=64	Female without VI n=26	Mann Whitney (U) test and effect size-Cohens d comparing nutrients of Female VI and Female control group	Male VI n=32	Male without VI n=24	Mann Whitney (U) test and effect size- Cohens d comparing nutrients Male VI and Male control group	RDA Females >74 years	RDA Males >74 years
Energy	Kcal	1384	1673	U 456 p 0.001 d=0.8	1600	2023	U 138 p <0.001 d=1.3	1840	2294
Fat	g	50	67	U 543 p 0.001 d=0.6	58	77	U 196 p 0.002 d=0.90	72	89
Of which saturates	g	18	25.6	U 417 p<0.001 d=0.8	22	33	U 139 p<0.001 d=1.3	<23	<29
Carbohydrates	g	160	187	U 605 p 0.004 d=0.4	197	235	U 245 p 0.002 d=0.6	245	306
Of which sugars	g	67	75	U 707 p 0.266 d=0.2	58	77	U 277 p 0.076 d=0.5	25	31
Protein	g	59	70	U 515 p 0.005 d=0.6	65	81	U 191 p 0.01 d=0.90	46.5	53.5
Fibre	g	16	18	U 630 p 0.072 d=0.4	15	20.2	U 233 p 0.01 d=0.7	30	30
Salt	g	3.8	5	U 565 p 0.0017 d=0.5	4.4	6	U 162 p<0.001 d=1.1	<6	<6
Cholesterol	mg	167.7	285	U 442 p <0.001 d=0.8	245	264	U 313 p 0.24 d=0.3	*	*
Calcium	mg	652.1	850	U 500 p 0.003 d=0.6	788	1085	U 222 p 0.007 d=0.7	700	700
Iron	mg	9	12	U 624 p 0.063 d=0.4	9.5	13	U 212 p 0.004 d=0.8	8.7	8.7
Vitamin D	µg	3.8	3.4	U 704 p 0.29 d=0.2	2.4	4	U 304 p 0.18 d=0.4	10	10
Vitamin E	mg	6.6	8.5	U 605 p 0.0043 d=0.4	4.9	6.0	U 309 p 0.2 d=0.3	*	*
Vitamin C	mg	76.3	123	U 519 p 0.005 d=0.6	46.9	75	U 307 p 0.2 d=0.3	40	40

Nutritional intake of participants with and without VI

Females with VI consumed significantly fewer; calories, fats, saturated fats, protein, salt, calcium, cholesterol and vitamin C compared to their age-matched counterparts, see Table 5.21. Despite consuming fewer calories, the amounts of sugars, fibre, iron and vitamin D females with VI consumed did not significantly differ from aged matched controls.

Males with VI consumed significantly lower amounts of most nutrients compared to the control group see, Table 5.21. As with females with VI, despite consuming fewer nutrients the amounts of sugars, cholesterol, vitamins D, E and C they consumed was not significantly different from that consumed by males without VI.

Nutritional intake and living arrangements

Living arrangements significantly influenced the nutritional intake of participants with VI. Those who lived with family members consumed an average of 248 more calories (H: 13.7, p = 0.001) Cohen's d 0.8, 12 g more fat (H: 12.7, p = 0.002) Cohen's d 0.7 and 29 g more carbohydrates (H: 12.9, p = 0.002) Cohen's d 0.7 compared to those living in sheltered accommodation or in their own home.

Similarly, amongst the control group, those living with family members consumed an average of 223.5 more calories than those living on their own (U: 192, p = 0.03) Cohen's d 0.7.

Nutritional intake and level of VI

For the most part, severity of VI did not impact upon nutritional intake except for vitamin C, where SSI participants consumed an average of 25.7mg less than other VI participants (H: 12, p = 0.002) Cohen's d 0.7.

Eating behaviours of participants with and without VI

Foods consumed

The proportion of participants consuming five or more portions of fruits and vegetables a day over the three-day period was calculated, see Figure 5.2. On average, the frequency of participants without VI who consumed five or more fruit and vegetables a day was significantly higher than those with VI (χ^2 6.9, p = 0.008). Foods consumed were also grouped into the five main groups, and the proportion of participants consuming foods from each of these groups was calculated, see Table 5.22.

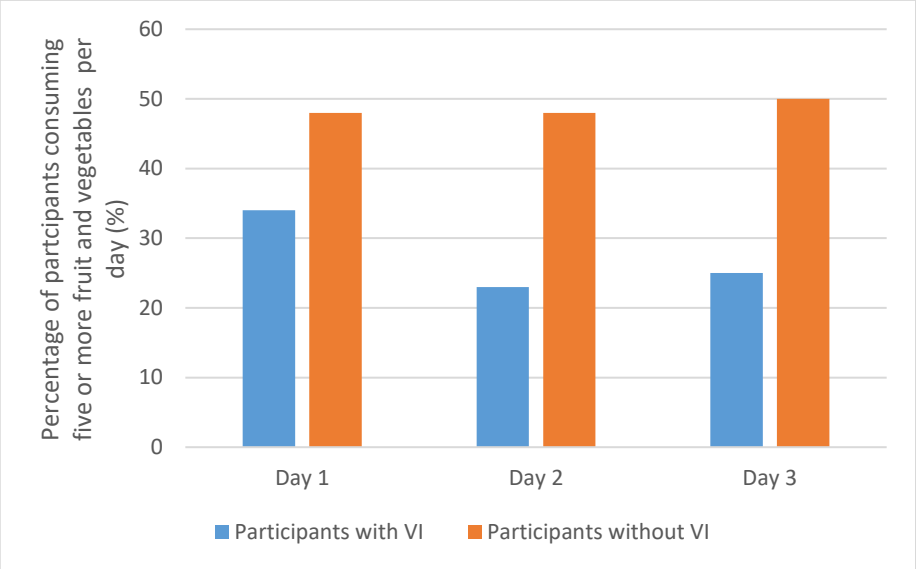

Figure 5.2 Percentage (%) of participants with and without visual impairment (VI) consuming five or more portions of fruit and vegetables per day.

Table 5.22 Foods eaten each day by percentage (%) of participants with and without visual impairment (VI).

Foods Eaten	Percentage of participants eating each food type on day 1 (%)		Percentage of participants eating each food type on day 2 (%)		Percentage of participants eating each food type on day 3 (%)	
Group	VI	Control	VI	Control	VI	Control
Meat (red and white)	64	70	63	62	67	84
Fish	30	22	25	26	31	18
Fruits	73	86	67	70	74	76
Vegetables	85	86	83	84	86	88
Wholegrains, cereals, breads	95	98	97	96	95	94
Milk/ cream (added to cereals, tea and coffee included)	100	94	97	90	97	96
Yogurt and cheese	25	58	29	34	31	42
Eggs	10	18	15	18	19	16
Other (chocolate, cakes, sweets, crisps, biscuits etc.)	41	30	29	40	40	60

Meal preparation and shopping

All participants without VI stated they had no difficulty cooking and could cook a hot meal if they were required to. The control group mainly reported no difficulty shopping, with 96% stating they shopped independently. The 4% that required support reported that physical impairments, such as arthritis, left them unable to lift heavy goods.

In contrast, 50% of the participants with VI in this sample could not cook food by themselves. They required support, relied on a family member or purchased ready meals. Ability to cook was affected significantly by level of VI with more severely sight impaired participants being unable to cook than other VI participants (Fishers Exact test: 25.9, p = 0.001). In addition, VI participants that cooked with support consumed an average of; 410.5 more calories (H: 13.7, p = 0.001), 31g more carbohydrates (H: 11.1, p = 0.004), 16.5g more fats (H: 8.58, p = 0.014), 6.68mg more vitamin E (H: 10.7, p = 0.005), and 93.6 mg more vitamin C (23.89, p = 0.001), than those who cooked by themselves or sourced ready meals.

Only 29% of participants with VI shopped independently, 42% required support and 29% did not shop but relied on family members or used meal delivery services. Level of VI significantly affected ability to shop with more participants that were SSI or SI being unable to do so or requiring support (Fishers Exact test: 11.49, p = 0.02). However, no relationship was found between reported shopping ability and nutritional intake.

When asked about food choices, participants with VI stated preference as the primary factor. A higher frequency of those without VI stated that perceived impact of foods on their health determined what they purchased, this finding was significant χ^2 8.49 $p<0.05$ see Figure 5.21.

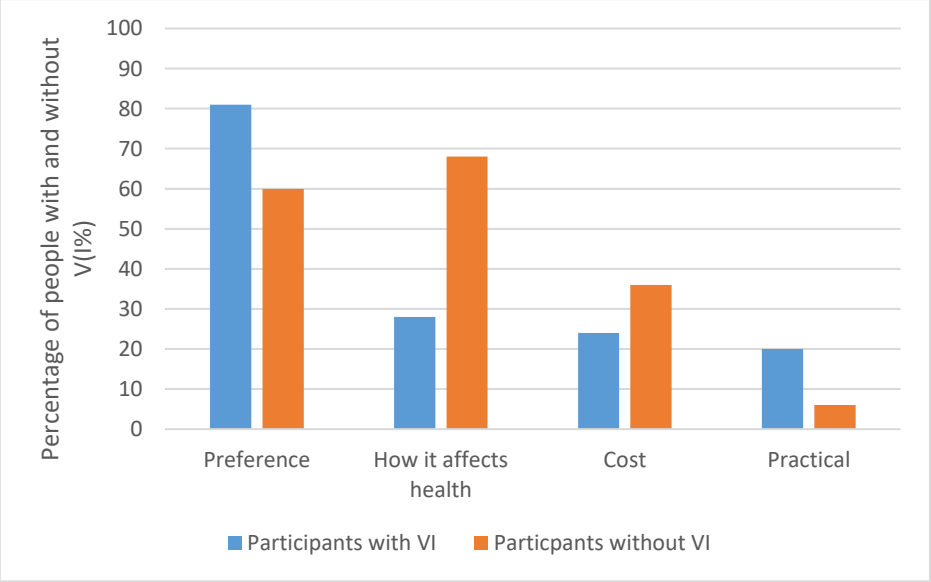

Figure 5.21 Main factors dictating the choice of foods purchased in participants with and without visual impairment (VI).

Attitudes towards diet and knowledge of healthy eating

In all, 59% of participants with VI and 94% without VI stated they were satisfied with their current health. In all, 61% of participants with VI stated they were happy with their diet, giving this as the reason for why they would not change it. The 39% that stated they would change their diets provided a variety of reasons. The reasons repeated frequently were “eat more fresh fruits, vegetables” “have a diet that was varied and be aware of foods available”, and “improve knowledge of healthy eating”. Similarly, 62% of the control cohort stated they would not change their current diet. Of these 50% believed, they had already adopted healthy eating behaviours and 12% stated they would not change their diet because they were happy with it. The 38% of participants without VI who reported they would like to change their diets frequently stated that they would mainly like to “eat healthier foods” or “be more disciplined with sugary foods”. Other reasons given were they would like to eat “more expensive foods like caviar” and would consider changing their diets if “healthier foods tasted nicer”.

Knowledge of healthy eating was explored through the question “can you name the five food groups for a balanced diet”. Significantly more of the control cohort were able to name the food groups compared to those with VI, χ^2 6.33 $p<0.05$ see Figure 5.22. All of the participants without VI strongly agreed that the foods we eat affect our health. Of the participants with VI, 18% stated that they believed that our health is not affected by the foods we eat. They stated factors such as genetic makeup determined whether a person was healthy.

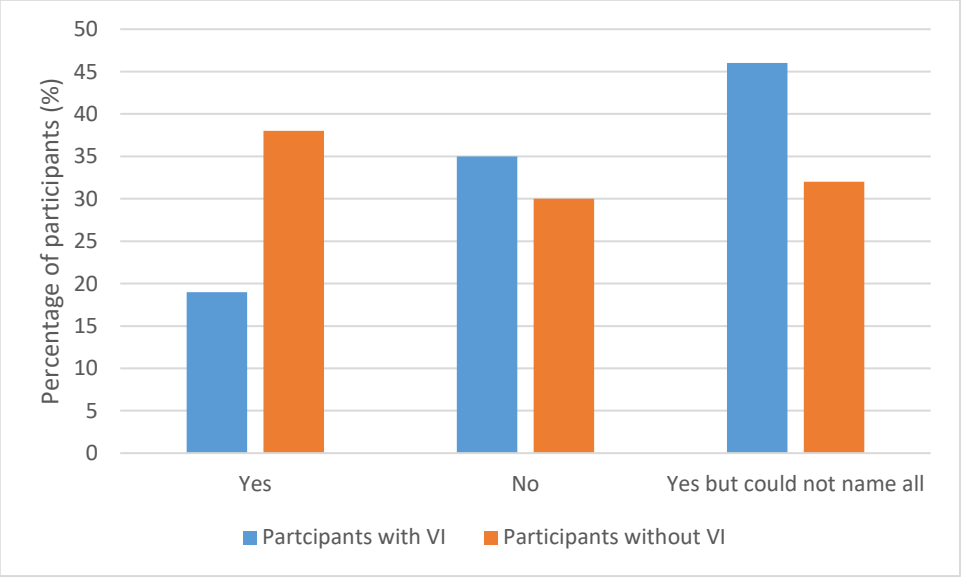

Figure 5.22 Participants ability to name the five food groups for a balanced diet.

5.3 Discussion

This study is the first to report that older adults with and without VI are not meeting the recommended daily requirements of most nutrients for their age. For the first time using detailed nutritional analysis, this study reports that people with VI are consuming significantly fewer nutrients than age-matched controls. This study supports the view that there are multifactorial obstacles that make it difficult for people with VI to maintain a health by diet. This includes difficulties shopping for, preparing and cooking food (90, 100, 111, 118) People with VI have reported having an aversion to cooking (90) and report that meals could take up to two hours to cook (111), these factors may contribute to why people with VI are undernourished.

It has been previously documented that older adults living alone have less favourable diets than those who live with family or receive support (190, 191). This study has found participants with VI that were living alone and cooking for themselves were found to be consuming significantly fewer nutrients than those with VI that received support to cook and lived with family and when compared to the age-matched control. To improve nutritional intake knowledge of where to obtain healthy ready meals, support with cooking and supporting the knowledge of the correct portion sizes of food may be helpful for people with VI.

Participants with VI in this study were also less able to recall the five food groups for a balanced diet when compared to the control cohort. The control cohort also consumed more portions fruit and vegetables a day. It was found participants were VI mainly making food choices irrespective of its nutritional value whereas those without VI made food choices based on how healthy the foods were. These results suggest that interventions are required to improve the nutritional awareness of people with VI. These could take the form of

educational interventions that relate to behaviour changes that could support healthier dietary intentions, or skills training or rehabilitation (90) to support activities of daily living.

It has been reported that people with VI feel excluded from the market place (118). They reported food labels that were small and of poor contrast were discriminatory and that changing goods locations, labels and design were obstacles that were preventing them from purchasing the foods they wanted to consume (90, 180). In order to overcome this norms should be incorporated into the marketing. These norms might help to raise and increase the awareness of suppliers to the needs of consumers with VI. Furthermore, such norms may contribute to our ongoing efforts for a more inclusive and accessible environment (180).

5.4 Strengths

Participants from across the United Kingdom took part in this study and so the study was not restricted by geographical location. The method of using 24-hr recalls has been reported to be affected by age and a trend of underreporting of foods consumed has been reported. In an attempt to reduce this bias the 24-hr food recalls were collected for three non-consecutive days as they have been reported to have precision and when multiple days are assessed validity (142). The 24-hr food recall was also the first question asked at the initial telephone call to attempt to reduce this bias.

More females with VI participated in this study than males. The ratio of females with VI to males with VI in the UK is 2:1. The ratio of the sex of the participants recruited in this study is therefore representative of the ratio of females and males with VI living in the UK.

5.5 Limitations

The aim was to recruit participants from all ages and ethnicities however very few participants who were under the age of fifty years, identified as BAME, and were in employment participated.

Measurements such as BMI, waist circumference or activity levels would be useful in future studies to evaluate the nutritional status of people with VI more completely.

Participants required notice for the 24-hr food re-calls and therefore they were not truly spontaneous; this time to prepare may have influenced the results of this study.

The 37-question item questionnaire was disseminated prior to the second and third telephone calls. The questions asked may have influenced the participants eating habits for the subsequent phone calls although the researchers did not find a significant variation in the nutritional intake reported at the follow up telephone calls.

Chapter six: Development of an educational intervention for people with VI

In chapter four, an analysis of the impact of VI on ADLs and VR-QoL was discussed. Chapter five analysed the nutritional intake and eating behaviours of participants with VI were compared to a control group. It was revealed participants with VI were consuming significantly fewer nutrients and had poorer knowledge of healthy eating behaviours compared to the control cohort. This chapter discusses the development of educational intervention for people with VI.

6.0 Introduction

People with VI have reported multi-factorial obstacles preventing them from achieving a good nutritional status, such as, difficulties shopping for (90, 111, 117, 118, 129), preparing, and cooking meals (88, 90, 111, 129). It has also been reported that people with VI struggle to physically eat compared to those who have good sight (91).

Chapter 4 reported that VI significantly restricts the ability to cook and shop both in-store and online (161). Chapter 5 reported that adults with VI in the UK who live alone were more undernourished compared to those receiving support from family. Importantly it was found that when compared to a control group, people with VI had less knowledge about healthy eating, were less willing to change their diets and purchased food mainly because of preference, i.e. irrespective of its nutritional value (180, 192).

Other studies investigating the impact of VI on nutritional status have concluded that interventions are required to support the diets and health of people with VI (90, 92, 114, 192-195). These studies suggested the interventions could take the form of skills training, rehabilitation for older adults, development-training packages for the

young or educational nutrition interventions to support the diets of people with VI (90, 92, 114, 180, 192-195).

There are existing interventions for people without VI who may be at risk of a poor nutritional status due to systemic disease (196, 197)

The need for interventions have been reported in the literature, (90, 92, 93, 114, 127). When using the terms; “visually impaired”, “nutrition”, “health”, and “interventions” in the search engines; Web of Science, Science Direct, and Google Scholar it was found there is a body of research looking to improve the function of adults with VI through physical activities (198, 199). However only three intervention studies using other health-promotion methods for adults with VI were found to date (200-202).

One of these studies concentrated on one outcome measure i.e. improvement in activities of daily living (200). This study proved successful in health promotion in elderly people with VI. The health-promotion was reported to hamper the disablement process among elderly with decreased vision by enabling them to maintain their ADL level and by reducing self-reported health problems further (200). A study investigating effectiveness of an educational intervention designed to promote healthy eating and nutritional supplementation for those with the ocular disease ARMD using a leaflet also proved to be successful (202). However this study was independent of level of visual impairment and included all participants with ARMD irrespective to whether it was early or advanced and therefore the participants with VI registered SSI could potentially have difficulties using the intervention developed from this study. The nutritional advice was also targeted towards those with ARMD and may not necessarily apply to those with VI. Another study promoting health for children with albinism was condition specific so would not be applicable to those with VI (200).

The aim of this study was to design an intervention to support the nutritional intake and ADLs of people with VI. Participants with VI, previous research, and experts in the field were consulted in the development and refinement stages.

6.1 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, revised Hong Kong 1989. A favourable decision was received by the Aston university ethics committee, ethics application #1398.

6.2 Intervention development planning

In order to improve the effectiveness of an intervention, attention is required to the design and feasibility of the intervention as well as the evaluation (203). To ensure the design of a robust and effective intervention the six steps in quality intervention development were implemented in this study (6SQuID) see Table 6.2 (204).

Table 6.2 The six steps in quality intervention development as summarised from Wight et al 2016 (204) by Pringle et al 2017(203).

6SQuID steps	Details
Step 1: define and understand the problem	Clarify the problem, using the existing research. Establish how the issues are socially and spatially situated, including any immediate or underlying influences. Diagrams may help at this point.
Step 2: clarify which causal or contextual factors are malleable and have greatest scope for change	Identify the factors that shape the problem and have the greatest scope to be changed. Diagrammatic representation in step 1 may help to establish the most effective intervention point(s) in causal pathways.
Step 3: identify how to bring about change: the change mechanism	Articulate the theory of change and mechanism(s) for incorporation into the intervention.
Step 4: identify how to deliver the change mechanism	Investigate the means and options for delivering the intervention, as well as target groups and context.
Step 5: test and refine on a small scale	Identify a means of testing the intervention in an appropriate setting, for a small sample of the target group(s), as detailed in step 4.
Step 6: collect sufficient evidence of effectiveness to justify rigorous implementation or evaluation	Gather evidence that the intervention has worked as intended in the small scale, in order to warrant larger scale application. This may include critically examining any unintended/detrimental effects.

Step 1: "*Defining and understanding the problem and its causes*".

Step 1 involved performing a systematic review in January 2017 (chapter two) (127). The review revealed the impact of VI on nutritional status and activities of daily living to be significant (chapter three) (127). Using the findings from this review a questionnaire was designed and validated and two experimental studies were carried out to explore the nutritional status, VR-QoL, eating behaviours and activities of daily living of people with VI living in the UK (chapter three) (180).

From these studies, it was found that people living with VI report a poor VR-QoL(180). They also report shopping and cooking as major obstacles (180). People with VI have poorer knowledge of healthy eating behaviours. They consumed fewer calories than recommended for their age group and when compared to an age-matched control group (chapter four).

A diagrammatic map, see Figure 6.2, was created using the findings from the literature review (127) and the previous experimental studies (180, 192). The map illustrates some of the factors that are driving poor nutritional intake in people with VI. Some these factors such as "lack of awareness of marketers" and "institutional support from the government" are not immediately malleable to change. Other factors; "lack of education" and "poor food choices" can be more easily addressed. The diagrammatic map was used to inform the design of a transcript for a series of focus groups with participants with VI. The purpose of the focus groups was to explore what participants with VI thought were the obstacles from preventing them to achieve the recommended nutritional intake. Participants were given the opportunity to provide possible solutions to these obstacles. They were also asked what form the intervention should take.

Steps two to six were addressed using the following steps outlined below:

1. Post focus group feedback and refinement.
2. Further consultation with experts in the field and people with VI.
3. Evaluation using a ten-item self-efficacy questionnaire of the intervention and informal verbal feedback from 13 participants with VI. Summarised stages of intervention planning and development

1. A review of the literature.
2. An experimental study evaluating the activities of daily living and vision-related quality of life in people with VI.
3. An experimental study analysing the nutritional intake of people with and without VI.
4. Diagrammatic map produced using information from stages one to three.
5. Focus groups with people with VI to inform the design of the intervention.
6. Liaising with low vision professional and engaging with current researchers, publications, and media to design a preliminary intervention.
7. Evaluation of preliminary design by people with VI through written and verbal end-user feedback.
8. Refinement of the intervention following feedback.
9. Evaluation of the intervention through 10 item self-efficacy questionnaire.
10. Further verbal end-user feedback provided.

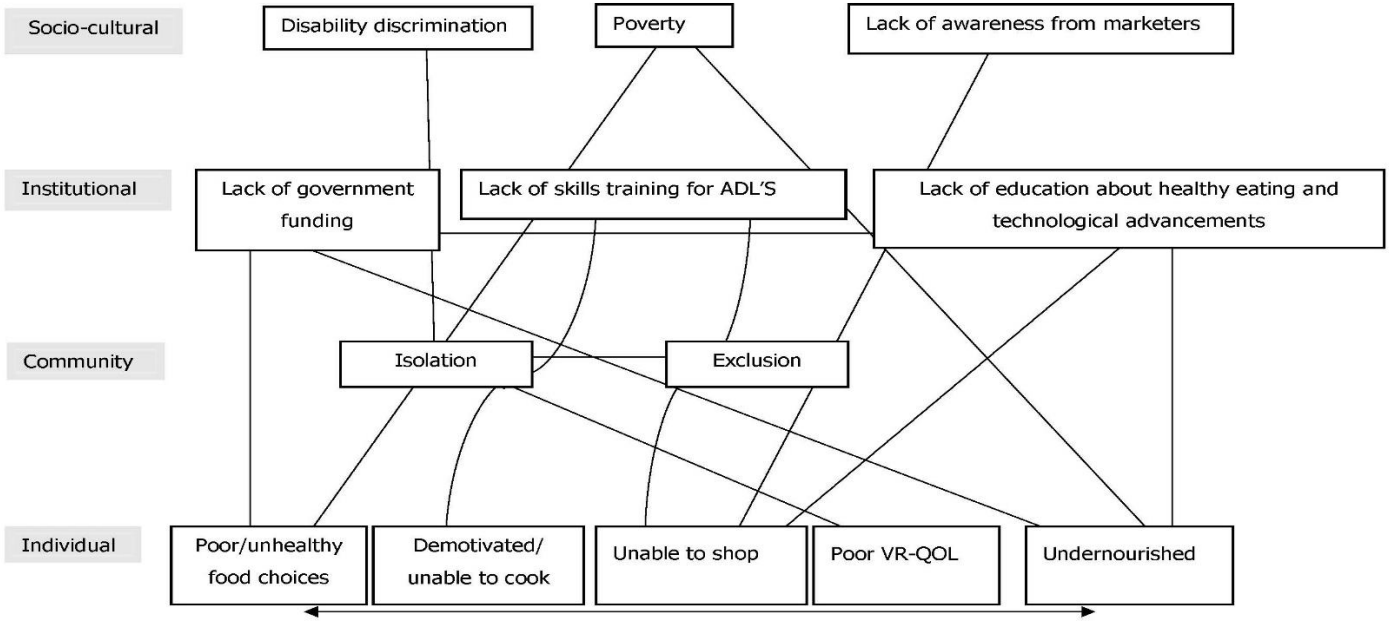

Figure 6.2 Factors driving poor nutritional status in people with VI.

6.3 Methods for focus groups

The inclusion and exclusion criteria for the participants of focus groups was the same as that outlined in chapter four section 5.1.

Participant recruitment and setting

Two focus groups were held on February 2018 and April 2018. Six members of a Macular Society support group Barnt Green, Birmingham and ten residents from a sheltered accommodation for people with VI; New Outlook, Northfield, Birmingham took part in this study. Contact with these organisations had already established before the study commenced. The researcher posted a telephone script to the employees containing information about the study to be read to the participants. Employees read the script to participants asking them if they wished to take part. If the participant did they were informed they would be contacted about a date and time for the focus group when enough people expressed an interest to participate. When the required number of participants were recruited the employees of the organisations arranged a suitable date and time for the focus groups to take place.

The focus groups were moderated discussions between the researcher NJ and the VI participants. They lasted about one hour and were voice recorded. At the end of the focus groups, a study debrief was read out and a copy of the debrief sheet was given to the participants to keep.

Following this, the voice recordings were transcribed onto a Microsoft Word document and analysed through a process of thematic analysis described in the six steps below (168).

1) The data was collected by facilitating a discussion using the selected questions.
2) The researcher NJ then listened to the tapes and read the transcript in its entirety to become familiar with the data and to identify major themes
3) A thematic framework was then identified by writing short notes of ideas and concepts that arose from the text this helped to develop categories
4) The data was then indexed and quotes sorted making comparisons both within and between cases
5) The quotes were then lifted from their original context and rearranged under newly developed thematic content
6) The final stage of analysis, i.e. mapping and interpreting was then carried out using the following headings as a framework for interpreting coded data: words; context; internal consistency; frequency and extensiveness of comments; specificity of comments; intensity of comments; big ideas.

6.4 Results

Focus groups

All participants in this study were registered as SI and SSI. In total there were 16 participants, they were all over the age of fifty and Caucasian. The participants were mainly female. The participants had a range of ocular conditions, such as retinitis pigmentosa, glaucoma, macular dystrophies and degeneration and ocular trauma. The focus groups were informal voice recorded discussions that were moderated by the researcher. A transcript was produced the focus groups and analysed through the process of thematic analysis (168).

Transcript analysis

The transcript was manually coded (168) and analysed, extracts demonstrating how the data was coded and themes emerged are shown below.

Lacking knowledge of healthy foods;

Participants asked questions related to healthy eating with “are potatoes good for you?” **(query/ seeking reassurance),**

“Could you come back and give us a talk about what we should be eating?” **(seeking reassurance/accessing support)**

“How many vegetables should I be eating” **(query/ healthy foods)**

“Cut out **(strong wording)** your fats” **(misinformed/negative associations)**

“How much water should we be drinking” **(query)**

“No I wouldn’t know that” “it’s about 2000 calories isn’t it?” **(seeking reassurance/ query)**

1. Lacking support for Activities of Daily Living; shopping and cooking.

Participants reported with frequency and extensiveness that they found cooking difficult and looked for other alternatives.

“Some of us need help crossing the road never mind cooking” **(danger/ visual /emphasising difficulty / comparison of risky tasks/unable/frustration)**

“I don’t cook” **(disability/use of negative)**

“I’d be burned” **(danger/visual handicap/risk)**

“numbers on packages are so small” **(visual handicap/obstacles)**

“when I go shopping, I have to ask somebody amount the amount and type of food I’m eating” **(seeking support/ visual handicap/disability)**

2. “Healthy food alternatives”

Do you think there should be a section of the DVD for those who can’t cook? “Yes, absolutely (strong feeling) we need (strong wording) as much (sic) alternatives as we can get” **(seeking support/inclusion)**

3. Healthy weight

   “How do we know what weight and height we should be for age?” **(Query/collective voice)**

   “Do they? **(Reassurance) (Uncertainty)** I don’t think my doctors do my BMI?” **(Query)**

   “Because I have Dry (ARMD) **(obstacle to support)**, I don’t see the doctor “(**unsupported/misinformed/confusion)**

   “They’re like great big balloons” **(observations of weight/contrasting to children)**

   “Some of the nurses are quite big” **(health professional observations/ deflecting)**

4. Inclusivity and accessibility

“I don’t like **(strong emotion/ use of negative)** to see a yellow background; I can’t **see (negative/ lack of confidence) t**o read anything on it “ **(visual handicap)**

“Yes, yes what I mean is you have to be careful **(sensitivity)** like yellow and bright green I can’t see that” **(inclusion/use of negative)**

“That’s the difficult thing **(obstacles)** I am a qualified sign maker but different conditions can be affected by different things my colour (inclusion) is white on black I can’t stand **(strong feeling)** black on yellow”

“That’s right everyone has different colours” **(inclusion/obstacle)**

“It would be costly **(obstacle)** to create aids in different colours for different conditions” **(inclusion)**

The final stage of analysis, i.e. mapping and interpreting was then carried out using the following headings as a framework for interpreting coded data: words; context; internal consistency; frequency and extensiveness of comments; specificity of comments; intensity of comments; big ideas. The focus group data as well as findings from studies in this research and other literature were used to develop the seven outcome measures described below.

Outcome measures

Key areas with which participants required support to improve their dietary consumption and ADL's of people with VI were identified from key findings from previous chapters in this study (127, 180, 192). Topics from the systematic review where researchers; assessed BMI (112, 116), nutritional screening (113), nutritional intake (113, 116, 121, 128) restaurant use (115), activities of daily living shopping and cooking (91, 111, 117, 118, 129) and explored eating behaviours (129) were also used. The topics and key findings were discussed during two focus groups and seven 'self-efficacy' outcome measures were identified. A questionnaire was produced and was scored from 0 not very confident to 10 very confident for the following statements:

a) I am confident that I have the knowledge of which foods I need to consume to have a healthy balanced diet.
b) I am confident that I am aware of the portion sizes of foods I need to consume to have a healthy balanced diet.
c) I am confident that I have the knowledge of how much exercise I should be doing a day.
d) I am confident that I have the knowledge of how or where I can get a health assessment to determine if I am a healthy weight according to my BMI.
e) I am confident that I have the knowledge of who can help support me with my cooking and shopping and where I can get funding for kitchen utilities that I need.
f) I am confident that I have knowledge of where I can source healthy ready meals if I feel I am unable to cook.
g) I am confident that I have the knowledge of how to select healthy food choices when shopping.

Intervention development

Having identified the relevant outcome measures low vision professionals from the Macular Society, RNIB and Aston University Low Vision clinic were consulted in the design of an intervention to help participants to improve their confidence for these measures.

The RNIB provided fact sheets to support the activities of daily living for people with VI. The Macular Society provided information about funding from charities for visual aids to support ADL's, for example, Turn2Us.org(205) a national charity for those struggling financially.

Information for each outcome measure was also gathered from research papers and experts in the field (202, 206, 207). Health websites such as NHS England and Diabetes UK were consulted (208-215), and media websites such as BBC Health (216-218).

A transcript of a video/audio was then produced incorporating information for the key points as described above.

Intervention refinement and user end feedback

In May 2018, 24 people with VI from the same settings as described for the intervention development stage, listened to the audio with the purpose of providing verbal end-user feedback. The participants met the inclusion criteria. They had a range of ocular conditions such as glaucoma, Best's disease, macular degeneration, retinitis pigmentosa. The transcript was also sent out by email to seven people with VI living in different locations across the UK for end-user feedback. These participants were all severely sight impaired having conditions such as VI due to measles, corneal degenerations, and stargardts disease. They provided written and verbal feedback; written extracts which were provided by email are below.

Participant A; registered SSI

"This is wonderful, I've never seen nutrition advice put so clearly! And packed with useful suggestion like the one cup kettle ...

I've listed a few observations below.

Also I've made a few suggestions in the attached script. You mention talking Microwaves which are good .However they are expensive and if they break down have to be returned to the point of sale, often a long way from the purchaser. Many blind people buy a simple microwave one with rotary controls rather than a digital display. They can then put physical marks around the dial, say at 2 mins and 4 mins. In this way they can cook for 6 or 8 mins by cooking for 2 then 4, or 4 and 4. You can of course put marks right around the dial but in many ways it's easier to just have say 3 marks and using combinations of them. You can by Bumpons or marker pens which can scribe a physical line on a surface to mark around the dial. Also these low-tech microwaves are only around £60!

You give good advice about peeling, but as an alternative to peeling vegetables many people use frozen veg, as I understand (correct me if I'm wrong) that frozen veg is just as nutritious or sometimes even more so, as it is frozen at the point of harvesting.

I like the way you illustrate the portions by saying things like, "the size of your palm" or "two thumbs". This helps a blind person picture the size of the portion of food.

Using smaller plates is not popular with totally blind folk, as it is harder to eat the food on a small plate. When cutting food it can slide off the plate, also when cutting it is harder to locate the direction of say a sausage so as to cut off the end, when the food it piled up and close together. You say use talking scales, is this aimed at just totally blind people?

If not you could include scales with a large print display. In my experience (my own included) eating often results from thinking about food and being focused on it. I'm not sure how best to achieve this but distracting yourself by doing other things might break this focus? Of course overeating has many causes but habit must be one of them. When I was working it never occurred to me to eat during the morning between breakfast and lunch. Then I moved to an office where they kept tins of biscuits which were passed around frequently throughout the day, and the damage was done ...

Anyway , if I can help in any way do feel free to contact me, either by email or phone. And I'd love to see the video when it's made!"

Participant B; registered SSI

"Have had a good read through and this seems very useful. I wonder if is ok to mention in the introduction, about looking better if you have a healthier weight. Some people are very body-conscious, and it's important to be positive about body image, so long as someone is healthy. Not sure if I am right, but thought it was worth a mention.

Also, you don't need to be registered as sight impaired or severely sight impaired to have a rehab assessment and available funding for equipment differs depending on where you live.

Would it be worth adding a couple of extra lines about foods that are particularly good for eye health?"

Participant C; registered SSI

"Well done, this is excellent reading. The measuring is so easy to follow i.e. thumb size and cupped hand. The advice is so practical and easy to follow i.e. the moving and not sitting too long as well as all the nutrition advice. However I don't encourage clients to buy ready-made meals, I try and promote independence and encourage alternatives such as local, home-made healthy food that can cooked and delivered on the days that clients are not up to cooking for themselves.

Please let me know when I can pass this to colleagues and clients."

Participant D; registered SSI

"I've just read the transcript! Some great tips! I would take out the "look better" bit. Many blind people know and are told that they don't look good because of their weight, my mother constantly used to tell me. But maybe that's just me projecting my own stuff on to it! Also, at the end, I would maybe put "thank you for watching" because blind people do still use those terms. Other than that. There's some great tips, I will keep this!"

Participant E; registered SSI

"I have read through the dietary needs transcript that you sent me, and I found it very interesting, and well-constructed without being over long.

The tips for reducing the portions of food that you consume at the end of section 1 will be a very good help for VI people, and i also liked the section where you spoke about the use of cooking aids which quite a few people may not be aware of."

Video production

The final video transcript can be found in the appendix, A 1.4.

Following comments received through end-user feedback, the transcript was refined in the ways outlined below.

- The language was changed to be more inclusive and improve clarity and wording, for example, "thank you for listening to and watching this" rather than "thank you for listening to this".
- The recording was broken into smaller sections to allow participants to absorb information more effectively.
- The order the information was received was changed to help with clarity i.e. section one became section two.

- More information was included, for example; more alternatives to cooking and peeling different types of vegetables and a range of exercises.
- Redundant information was removed, for example, the advice to use smaller plates to control portion size was removed. Participants stressed large plates were required to help grasp food and prevent spillages.

6.5 Conclusion

Once refined the transcript was recorded as a video. The video was uploaded onto YouTube so that it was accessible on the internet https://www.youtube.com/watch?v=W_JzFVUPkmY. It was also provided in a DVD format for those who were not computer literate.

The outcome measures were then used to produce an item self-efficacy questionnaire scaled from zero “I am not at all confident” to ten “I am very confident”. The purpose was not to develop a global measure for healthier eating but to identify how confidence was affected for each of the identified behavioural characteristics.

The questionnaire and intervention were then disseminated to 13 people with VI who had not seen or heard the video or audio previously and were not involved in the development or refinement process.

Chapter seven: Evaluation of an educational intervention for people with VI

Using the six steps in quality intervention development (6SQuID), an educational intervention to support the nutritional intake and activities of daily living of people with VI was developed. This chapter reports the results of the evaluation through a ten-item self-efficacy questionnaire of the education video/audio intervention.

7.0 Introduction

Recently it was reported that VI affects many areas of a person's life i.e. their vision-related quality of life, activities of daily living and nutritional status (180). It was found that the ability to cook hot meals was significantly impeded by the level of VI and people with VI were consuming fewer nutrients compared to people with good sight. People with VI also lacked knowledge of healthy eating compared to people without VI and made food choices based on preference i.e. irrespective of nutritional value (100, 180).

Participants with VI have reported being unaware of technological advancements that are available to support their activities of daily living. They also reported feeling excluded and discriminated against by marketers, particularly supermarkets (118, 180).

Following a systematic review of the literature, two experimental studies and a series of focus groups, an educational intervention was designed and validated. The purpose of the intervention was to promote healthier eating in people with VI and it provides information of how people with VI can seek support for the ADL's: shopping and cooking.

This study aimed to evaluate the effectiveness of the educational intervention through a ten-item self-efficacy questionnaire, which was, be delivered to thirteen people registered as SSI or SI. Characteristics such as having an improved self-efficacy in the ability to make healthy food choices and have knowledge about the correct portion sizes of foods were evaluated. The purpose was not to create a global measure for healthier eating but to identify how confidence was affected for each of the identified behavioural characteristics.

7.1 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, revised Hong Kong 1989. The study was given a favourable decision by the Aston University School of Life and Health Sciences Ethics Committee, ethics application #1398.

7.2 Evaluating the effectiveness of interventions

Qualitative analysis

Qualitative analysis can be used to evaluate an intervention. This type of evaluation can take the form of a focus group. Care must be taken to ensure the correct number of participants are recruited ideally six (219) or more have been suggested in the literature. A disadvantage of this method is the findings may not be generalisable to populations (220).

Quantitative analysis

Randomised control trials

Randomised control trials are the gold standard method to determine a cause-effect relation exists between interventions and the outcome (221). Two groups of subjects are randomly assigned to a control (conventional treatment) and an experimental group (receiving the intervention) (222).

Features of a well-designed RCT as outlined in previous literature are described below (222)

- The sample size should be appropriate to allow a high probability of detecting whether there is a clinical significance between the intervention and control.
- The sample will be appropriate to the hypothesis being studied so that the results are appropriately generalisable.
- Subjects should be assigned via (concealed) randomisation to the intervention/control groups (to eliminate selection bias and minimise confounding variables).
- The investigators should ideally be blinded to which groups the participants are assigned.
- Both groups will be treated identically in all respects except for the intervention being tested.
- The investigator assessing outcome will be blinded to treatment allocation.
- Analysis focuses on testing the research question that initially led to the trial (that is, according to the a priori hypothesis being tested.

Controlled before and after study

This is a study design that uses information collected on trends of the indicators measured (220). It is most useful when measuring interventions already in place or with nationwide studies such as measuring the impact of drink driving. This type of study can be used when randomized control studies are not practical.

Before-after study (no control group)

This study design is cheap and simple (220). However, without a control group this study is subject to the limitation that it is difficult to attribute with any certainty that the change in outcome is because of the intervention.

7.2 Methods

The inclusion and exclusion criteria for the participants of focus groups was the same as that outlined in chapter five, section 5.1.

Sample size

The mean 61.9, standard deviation 3.65 and minimum difference to detect of 4 from a previous study (202) to achieve an effect size of 1.09 was used. It was calculated that for a two-tailed test, at 80% power and for a confidence interval of 0.05, 13 participants would need to be recruited.

Participant recruitment and intervention delivery

Participants were recruited from the Macular Society and Aston University Low Vision Clinic, Birmingham. NJ went to Macular Society group meetings in the West Midlands and read out the PIS directly to potential participants. If they expressed an interest in the study a suitable date and time was arranged for them to participate.

To recruit participants who were eligible to take partake clinic records from the Aston University Low Vision clinic were screened for those that met the eligibility criteria. Patients who gave permission to be contacted for research and teaching purposes were called over the telephone by NJ. Participants were given the details of the study over the telephone and those interested in participating provided their contact details. Either the study began immediately or the participant arranged a convenient date and time to take part. Participants had verbal voice recorded consent taken and the PIS was read to them over the telephone at the start of the study. At each time point they were also reminded that they could withdraw at any point and that their participation was voluntary.

They were asked to complete the questionnaire, see appendix A1.3, over the telephone (time point 1). NJ read out a statement and the participant provided a score for each statement. They were then called again two weeks later and the same questionnaire was delivered to them (time point 2). The time, before time point 2, was a period of doing nothing i.e. a negative control, see Figure 7.2. This was done, as there was no existing measure available to compare the intervention. Participants were then sent a link by email to watch/listen to the audio/video intervention. For those that were not computer literate or they reported difficulty using a VDU screen a DVD was posted to their home address. They were telephoned two weeks later (time point 3) and the same follow up questionnaire was delivered for a final time. The participants were provided with a voucher as thanks for their participation, debriefed and provided contact details for NJ in case they had any concerns or further queries.

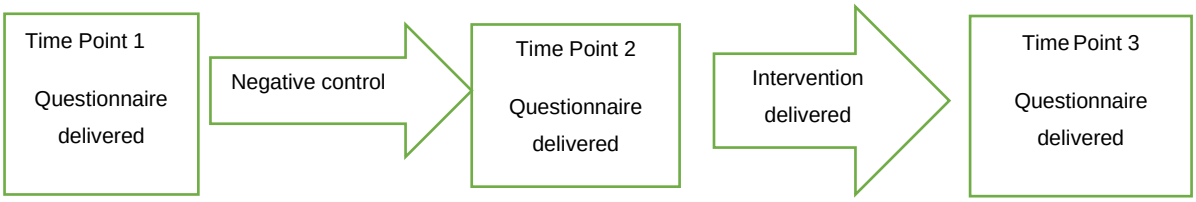

Figure 7.3 Method for delivery of educational video.

Statistical analysis

The results of the questionnaire were initially entered directly into Microsoft Excel. They were exported to IBM SPSS statistics version 23 where statistical analysis of the data was carried out. Graphs were produced in Microsoft Excel; descriptive statistics, mean age and standard deviations were calculated.

The Shapiro-Wilk test for normality that is used for smaller sample sizes revealed that not all the scores from the self-efficacy were normally distributed. To calculate if each outcome measure increased confidence the non-parametric test equivalent to a repeated measures ANOVA the Friedman test was therefore used.

To calculate if there was a statistical difference (with Bonferroni correction for multiple comparisons) between the repeated measures across the different time points and in which direction the non-parametric equivalent of a paired sample t-test; the Wilcoxon signed rank test was used. The significance level, p value was corrected to 0.025 (0.05/2) as pairwise comparisons were carried out between each time point i.e. time point 1 and time point 2.

7.3 Results

Study Characteristics

In all, 13 participants were recruited for this study, nine females and four males. The participants were mainly Caucasian, with one Asian and one Black female taking part.

All participants were registered or were eligible to be registered as SSI (10) or SI (3). They had a range of ocular diseases for example, glaucoma, macular degeneration, and ocular albinism. The average age of the participants was 71 ±18.6 years old.

Participants were asked about where they had previously received nutritional information. Participants mainly reported receiving nutritional advice from health professionals, with 31% reporting receiving information from ophthalmologists and dieticians. In all, 23% stated they had not received nutritional information and the remaining 46% stated they received advice from various avenues such as books (15%), sight loss charities (15%), college institutions (8%) or family and friends (8%).

Post-intervention evaluation

For all seven-outcome measures, there was a perceived change in self-efficacy after the intervention was delivered, see Table 7.3.

Post hoc analysis using the Wilcoxon Signed Rank test with Bonferroni correction for multiple tests revealed an increase in scores post-intervention delivery see, Tables 7.32 and 7.33. There was no significant difference between time point 1 and the negative control, time point 2, see Table 7.31.

For the self-efficacy statement A, “I am confident that I have the knowledge of which foods I need to consume to have a healthy balanced diet”; a median score of 7 was given pre-intervention. Confidence significantly increased post-intervention. Participants stated they felt reassured that they were eating some of the right foods and the intervention now identified what areas needed improvement.

Self-efficacy statement D “I am confident that I have the knowledge of how or where I can get a health assessment to determine if I am a healthy weight according to my BMI” was also given a median score of 7 pre-intervention. Post-intervention participants reported being very confident about where they could get a health assessment and how to self-monitor their weight at home with the scores increasing to a median point score of 10.

Self-efficacy statements B; “I am confident that I am aware of the portion sizes of foods I need to consume to have a healthy balanced diet” and C “I am confident that I have the knowledge of how much exercise I should be doing a day” were initially scored low with a median score of 6 this improved significantly by three (9) and four median point scores (10) respectively. Participants were particularly confident with the amount of exercise they should

be doing each day with some reporting that the intervention affirmed that they were meeting the recommended guidelines.

The self-efficacy scores for activities of daily living E “I am confident that I have the knowledge of who can help support me with my cooking and shopping and where I can get funding for kitchen utilities that I need” and F “I am confident that I have knowledge of where I can source healthy ready meals if I feel I am unable to cook” received the lowest pre-intervention median scores 3 and 5 respectively. Post-intervention these median scores increased by 6 and 4 point scores to 9. However, despite the increase in the knowledge of where they could get funding and healthy ready meals participants were concerned about the lack of accessibility due to exclusion and discrimination from marketers and means-tested support.

The final self-efficacy statement G “I am confident that I have the knowledge of how to select healthy food choices when shopping” was given the highest initial pre-intervention median score of 8. Participants reported actively choosing healthy options such as frozen vegetables and oily fish. Post-intervention median scores increased to 10. Participants again reported feeling reassured by the intervention reporting it identified areas they could improve further such as choosing vegetables of different colours.

Table 7.3 Friedman test showing a significant difference between the median scores of the self-efficacy questionnaire between time points 1 and 3 and 2 and 3.

Variable Self-efficacy	Time point 1 Median score[$]	Time point 2 Median score[$]	Time point 3 Median score	χ^2	p value
A	7	7	9	17	<0.01
B	6	6	9	20	<0.01
C	6	6	10	16.7	<0.01
D	7	5	10	16.2	<0.01
E	3	3	9	20.3	<0.01
F	5	6	9	20.1	<0.01
G	8	8	10	17.3	<0.01

*A) I am confident that I have the knowledge of which foods I need to consume to have a healthy balanced diet.

*B) I am confident that I am aware of the portion sizes of foods I need to consume to have a healthy balanced diet.

*C I am confident that I have the knowledge of how much exercise I should be doing a day.

* D) I am confident that I have the knowledge of how or where I can get a health assessment to determine if I am a healthy weight according to my BMI.

* E) I am confident that I have the knowledge of who can help support me with my cooking and shopping and where I can get funding for kitchen utilities that I need.

* F) I am confident that I have knowledge of where I can source healthy ready meals if I feel I am unable to cook.

*G) I am confident that I have the knowledge of how to select healthy food choices when shopping.

[$] p value was not significant between time points 1 and

Significance Tables for Wilcoxon Signed Rank (pairwise comparisons) between the different time points (time pointts 1 and 2) and (time points 1 and 3) and (time points 2 and 3) before and after intervention delievery.

Table 7.31 Wilcoxon Signed Rank test showing a non-statistical significance between Time Point 1 (TP1) and Time Point 2 (TP2) negative control p<0.025.

	TP1 A-TP1 2 A	TP1B-TP2B	TP1C-TP2C	TP1D-TP2D	TP1E-TP2 E	TP1F-TP2 F	TP1G-TP2 G
Z score	-1.41	-1.13	-0.27	-0.84	-0.37	-0.81	-0.90
Two tailed p sig fig. value	0.16	0.25	0.78	0.39	0.70	0.40	0.37
Effect size Cohens d	0.9	0.6	0.1	0.5	0.2	0.5	0.5

Table 7.32 Wilcoxon Signed Rank test showing a statistical significance between Time Point 1 (TP1) and Time Point 3 (TP3) p<0.025.

	TP2 A-TP3 A	TP2 A-TP3B	TP2 C-TP3C	TP2D-TP3D	TP2 E-TP3 E	TP2 F-TP3 F	TP2 G-TP3 G
Z score	-2.6	-3	-2.8	-2.8	-3	-3	-3.1
Two tailed P sig fig. value	0.007	0.002	0.005	0.005	0.002	0.002	0.002
Effect size Cohens d	2.0	3	2.5	2.5	3	3	3.3

Table 7.33 Wilcoxon Signed Rank test showing a -statistical significance between Time Point 2 (TP2) and Time Point 3 (TP3) p<0.025.

	TP1 A-TP3 A	TP1 A-TP3B	TP1 C-TP3C	TP1D-TP3D	TP1 E-TP3 E	TP1 F-TP3 F	TP1 G-TP3 G
Z score	-2.68	-2.94	-2.8	-2.8	-2.9	-2.9	-2.9
Two tailed P sig fig. value	0.007	0.003	0.005	0.005	0.003	0.003	0.004
Effect size Cohens d	2.2	2.8	2.5	2.5	2.7	2.7	2.7

Participant feedback

Participants were given the opportunity to provide informal verbal feedback about the educational intervention after providing their final scores.

They reported *"Using hands to control their portion size of food and a piece of string to measure the amount of visceral fat around there abdomen is extremely useful".*

They reported these methods *"Reduce the visual burden of self-monitoring using scales significantly".*

Participants reported although they now knew where to get funding for example Turn2Us.Org they *"Did not believe it was accessible", "mostly means tested".* They also believed that *"Without the support of carers, friends or families organisations such as these would be inaccessible"* they *"would have to navigate websites and complete forms" something* they *"would find difficult without support*".

Participants reported *"Being made aware of kitchen items"* such as a one stop shot water dispenser, and a chopping board with a funnel was invaluable" to them as they struggled with boiling and spilling water.

They reported that the video could perhaps be used in conjunction with *"face to face workshops"* which would help with *"motivation to engage with the information provided".*

They believed that the *"government should provide cooking classes for people with VI of all ages, and for both people with acquired and congenital VI"*. This they *reported "should be done as an ongoing process and not just for six weeks during education in college and should be accessible by those with acquired VI".*

Finally, they *stated "the video quality could be refined further with additional lighting to improve contrast"* and that perhaps *"a professional video editing service could help with this".*

7.4 Limitations

The design of a robust RCT was discussed in section 7.2 of this chapter. Some of the requirements outlined were not met for this study. This work would have been evidenced by using a positive control measure as a comparison for the intervention; however as this was the first study of its kind, there were no existing measure in a suitable format to compare the intervention. The RNIB and Macular Society were consulted in the development of the video and therefore any resources they had could not be used separately as this would be repeating the information already contained in the video.

As one researcher was responsible for the data collection the researcher was not masked to the allocation and the analysis of the results therefore this study is subject to investigator bias.

The study is restricted by geographical location; all participants were recruited from the West Midlands, UK. Due to the small sample size of this study test, re-test reliability was not performed on the question items in this study.

The number of participants available for this study was low due to participants who were willing to volunteer having already taken part in the previous studies. In future studies the control group should not be exposed to the survey and if possible a positive control should be evaluated instead. The use of a negative control in this study may have provided participants time to possibly research the outcome measures before the intervention delivery and thus bias the evaluation and assessment of the usefulness of the intervention.

7.5 Strengths

The sample size calculated for the desired effect size was met for this study. As the same sample was used as both the control and experimental group, it is certain the same protocol was used for both groups. A mixed method research design was used to evaluate the results i.e. informal feedback, this allowed participants to provide more information than the quantitative analysis alone.

Two-thirds of people with VI in the UK are female so although female participation in this study was higher than males the sample size is representative of people with VI in the UK. A significant improvement was seen for each of the outcome measures in this study.

7.6 Conclusion

This study has highlighted that a low-cost educational video to promote healthy eating behaviours and support ADLs significantly improves self–efficacy of participants with VI. This study has also identified key areas that need to be addressed in order to meet the needs of people with VI in the UK. Participants did not believe organisations provide funding for those who require it, such as, Turn2Us.org are easily accessible. They reported they would require support from friends, family or carers to engage with such support. This study has identified the need for cooking classes to be implemented on a national level by the government. Although people with VI appreciate the support they receive from vision rehabilitation officers, they reported receiving tactile aids to support with cooking is not enough and would prefer to participate in cooking classes that are tailored for people with both congenital and acquired VI.

This study has also highlighted that people with VI lack awareness of equipment that is readily available to support their activities of daily living, for example, one-shot water dispensers. This lack of

knowledge could stem from individuals seeking support from only one VI organisation i.e. exclusively the RNIB or exclusively the Macular Society. VI organisations should work together to encourage people with VI to engage with as many organisations as possible so that they can access all available support.

Future studies should look to address the limitations presented in this study. This research could be developed further by designing workshops to provide face-to-face information about any novel technological advancement developed to support people with VI as well as reinforce the knowledge of the educational intervention to support healthy eating and the ADLs of people with VI. Employees from VI support organisations could then be trained to implement these workshops on a frequent basis.

Chapter eight: Discussion

8.0 Study outcomes

The aim of this study was to investigate, for the first time, the impact of VI on, nutritional intake, ADLs and VR-QoL. A mixed methods research design was used in the form of focus groups and the use of a novel validated questionnaire to answer this research question. The findings of this initial study were then used to design and develop an intervention to support the nutritional status and activities of daily living of people with VI.

The impact of VI on nutritional intake and activities of daily living questionnaire

This study has revealed novel findings relating to the ADLs of people with VI. The ability to shop and cook significantly correlated with the level of VI in this cohort, with more restricted abilities in those participants registered as SSI. The impact of this visual disability was highlighted further when the VI cohort were compared to an age matched control group, who reported having little or no difficulty with shopping or cooking.

Differing attitudes, knowledge, and beliefs towards diet and healthy eating between participants with and without VI have also been revealed. The VI cohort were found to be less knowledgeable about the five main food groups for a balanced diet. More of the VI cohort believed that the foods we eat do not influence our health. The control cohort made food choices mainly based on how healthy foods were whereas the VI cohort made food choices based on preference and convenience i.e. irrespective of its nutritional values.

A three-day 24-hr food recall revealed participants with VI consumed fewer calories and other nutrients, when compared to an age-matched control group and the RDA for their age. This finding is in agreement with a previous study that investigated the effects of

macular degeneration on nutritional intake (100). In this current study, a significant finding was that those living with family or receiving support with their VI consumed more calories compared to those that had VI and were living on their own (192). Multifactorial obstacles were identified in the study that can possibly explain these differences. Participants with VI described a lack of motivation to cook when living by themselves. They lacked knowledge about healthy eating, and about the portion sizes of food that they required. A large proportion of this cohort also reported the inability to shop and cook independently, if at all (180, 192).

VCM1

The results of this questionnaire found that participants with VI felt their VR-QoL was affected for more than a little of the time. A key finding was that the level of VI did not influence participant's scores; this suggests even mild visual loss affects quality of life. This supports the advice from the RNIB having a VA of less than 6/12 but better than 6/18; below certification level still significantly affects day-to-day activities (5). It was found lack of inclusion, isolation, and discrimination on both a social and consumer level contributed substantially to feelings of frustration and depression in participants of this study. Future studies can perhaps research what steps are required to make marketing more inclusive and accessible to people with VI (180).

Educational intervention

Using the findings from the initial study (180, 192), a literature review (127) and focus groups, it was decided an educational intervention in the form of audio/video would be most appropriate to support the nutritional intake and activities of daily living in people with VI.

Low vision experts from the Macular Society, RNIB and Aston University Low Vision clinic were consulted in the design stage of the

intervention. Currently the support available from the RNIB is fact sheets to support the ADLs of people with VI. The Macular Society provide information about funding from charities for visual aids to support ADL's, for example, Turn2Us.org (205) a national charity for those struggling financially. Information for each of the identified outcome measures was also gathered from research papers, scientific experts in the field (202, 206, 207). Health websites such as NHS England and Diabetes UK were consulted (208-215), and media websites such as BBC Health (216-218). This support was used and adapted to provide more user-friendly guidance.

This low cost and effective intervention significantly increased confidence scores for knowledge of healthy eating, portions sizes of foods and the other components following the two weeks follow up period when compared to the negative control. The intervention was well received with participants providing positive feedback. In particular, participants reported the removal of the visual burden of self-monitoring using scales for weight by using string instead and hands for food portions sizes was particularly useful.

This body of work has investigated the impact of VI on patients and concluded by evidencing the effectiveness of a bespoke intervention that improves self-efficacy to perform ADLs and achieve an improved nutritional intake.

8.1 Strengths and limitations

A strength of this study is that it had nationwide participation. Participants with VI from across the United Kingdom volunteered for this study. The required calculated sample sizes was also met for initial questionnaire investigating the impact of VI on nutritional status, the VCM1 analysis, and the evaluation of the educational intervention.

The sample size for the nutritional intake analysis was met for the majority of the nutrients such as calories, protein, fats. The nutritional intake analysis also produced significant results for nearly all nutrients when comparing the VI cohort to the control. The VI and control groups were also age-matched with fair participation from both males and females in each cohort.

The 24-hr food recalls were carried out over a period of three days this adds validity to the study (142). To reduce recall bias this was also the first question the participants answered.

More females participated in this study than males, however, two-thirds people with VI in the UK are female, (7) this sample is therefore a representative one. The participants in this study were mainly Caucasian and therefore this study is limited by a narrow demographic. The leading cause of VI in the UK is macular degeneration with a higher prevalence in Caucasian people (18) this could possibly explain why fewer participants who identify as BAME were recruited for this study.

Visual acuity measures for the control group for nutritional intake analysis comparison was obtained by screening clinical records. The majority of the VI participants reported being registered SSI or SI therefore it can be confidently reported that participants with and without VI were recruited.

As the sample for this study was, mainly females aged over 70 years the self-reported BMI data was excluded from the final data analysis. It is well documented that people over >70 years old and females do not accurately self- report their weight and height (151-164). A limitation of this study is therefore, that a measure of physical activities and objective BMI data were not collected.

Only four participants in this study were identified as at risk for malnourishment using the MUST, therefore this data was excluded from the final statistical analysis in this study.

8.2 Confounding variables and future research

The impact of visual impairment on nutritional status, activities of daily living and vision-related quality of life

The gold standard for measuring BMI is using an objective method i.e. the researcher directly measuring height and weight. Due to the location of participants in this study, direct measurements were not possible. This method could be considered for use in future studies if practical. Physical activity level measurements would also provide a clearer picture of health status.

In future studies, if practical, laboratory measures could possibly be used in addition to the 24-hr food recalls to measure nutritional status. It is well documented that people of all ages under-report the amounts of foods consumed (223, 224), using biochemical measures such as measuring serum proteins would help reduce this bias.

Although an effort was made to classify individuals according to their VI, some participants that were eligible for sight impairment registration chose not to register and others were unsure if they met the eligibility criteria despite reporting very poor vision, substantial loss of visual field and surrendering their driving licenses. Due to participant locations, it was impossible to obtain visual acuity measures however, if practical, collecting visual acuity measurements would improve and enhance the results of future studies. It would be important to include those below sight impairment registration as it has been reported that 1.3 million people have a VA of less than 6/12 but better than 6/18; below certification level yet their vision still significantly affects day-to-day activities and their VR-QoL (5, 180).

Educational intervention

Participants may have researched one or more of the outcome measures, under evaluation, between the two-week period between the negative control and intervention deployment and this may have possibly increased their confidence.

This work would have been evidenced by using a positive control measure as a comparison for the intervention; however as this was the first study of its kind, there were no existing measure in a suitable format to compare the intervention. The RNIB and Macular Society were consulted in the development of the video and therefore any resources they had could not be used separately as this would be repeating the information already contained in the video.

Future studies with similar outcome measures could use this novel intervention as a comparison. In future, the video/audio could be refined further by using a professional editing service. Finally, healthy eating workshops could be designed and implemented to motivate individuals to employ the knowledge obtained from the video/audio intervention.

8.3 Conclusion

This study has reported that participants with VI are undernourished, choose food irrespective of its nutritional value and lack knowledge of healthy eating when compared to an age-matched control. Those with visual acuity levels below that required for sight impairment registration, reported VR-QoL is affected for more than a little of the time, suggesting even mild visual loss affects quality of life. Importantly it was identified that ADLs, shopping and cooking are restricted by being visually disabled and participants lack support and inclusion on both a consumer and social level. These multi-factorial

obstacles could explain the findings of reduced calorie intake in this cohort.

A low-cost educational intervention has been found to improve the self-efficacy in participants with VI to support their ADLs and aim for an improved nutritional intake. Further work is required to motivate and encourage people with VI to employ this knowledge.

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Appendices

A1.1 Information sheets for focus groups for questionnaire development and questionnaire dissemination

33 Version 23/06/201

RESEARCH PARTICIPANT INFORMATION SHEET

Title of the study: Nutritional status and visual loss

This information will be read out to the participants, who are visually impaired.

You are being invited to take part in a research project that will be conducted by researchers at Aston University and that will take place at your local support group center. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to listen to the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for listening to this.

What is the purpose of the project?

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. It is necessary to evaluate the relationship between nutritional status and visual impairment in the UK population. In order to do this we need to recruit visually impaired participants for focus groups to better understand individual's dietary habits and eating behaviours. The focus groups will be held to check the clarity of questionnaire items related to visual impairment and nutrition that are likely to be included in a questionnaire. Participants will have the opportunity to talk about whether they think the questions are easy to understand, and are relevant. They will also have the opportunity to suggest new or different questionsWhy have I been chosen?

You have been chosen because you are aged over 18 years old and you have been told by an eye care professional (ophthalmologist, optometrist) that you are visually impaired. You may have a Certificate of Visual Impairment.

Do I have to take part?

Participation is voluntary. Should you wish, you can withdraw at any time, without giving any reason and without your medical care or legal rights being affected. You can also withdraw your data following completion of the study.

What will happen to me if I decide to take part?

If you agree to take part, this participant information sheet will be read to you and given to you to keep. You will be ***read a consent form and will require to give separate verbal consent if you wish to take part, your consent will be voice recorded***. This consent will be stored securely for 6 years in a locked cabinet at Aston University which only the researchers involved in the study will have access to.

You will be invited to take part in an hour long voice recorded focus group. There will be no payment for participation. The focus group will be held at the location of your local support group center.

You will be asked to listen to a range of questions that are likely to be included in a questionnaire. You will have the opportunity to talk about whether you think the questions are easy to understand, and are relevant. You will also have the opportunity to suggest new or different questions.

Results

Your responses will be transcribed (typed onto a Microsoft Word document) and then the voice recording will be deleted. The responses of the group will be used to finalise the questionnaire and make sure that it is relevant and understandable.

The transcription of your responses will not be published in any form or made available to anyone that is not a researcher in this study without your given permission in the consent form. The hard copies of the transcript will be securely locked away in a cabinet at Aston University and destroyed after six years.

What are the possible disadvantages and risks of taking part?

The risks for taking part are low. There are no sensitive questions in the questionnaire, however if you do not want to comment on a questions clarity or relevance you do not have to.

What are the possible benefits of taking part?

By taking part your input will help us to identify the questions that will be useful to investigate the nutritional status of visually impaired people in the UK. This will help us to determine whether any dietary interventions are required for those who are visually impaired. The importance of good nutritional status in overall improvement of quality of life has been shown to be very significant.

What happens when the research study stops?

The results from the focus groups will be used refine and develop a questionnaire to determine if any dietary interventions are necessary in the visually impaired population and if so, what forms they should take. You will be given a debriefing form which will have the details of the research team should you have any concerns or queries following the study, it will also inform you of how to get a one page summary of the results should you wish to have this.

What if something goes wrong?

If you are affected in any way by this study or should you wish to raise a complaint you can contact the principle researcher: Hannah Bartlett, email: H.E.Bartlett@aston.ac.uk, telephone: 0121 204 4182.

If you feel your complaint has not been handled to your satisfaction by the principle researcher you can contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 2044869.

Will my taking part in this project be kept confidential?

Your taking part in this project will be completely confidential. You will not be identified by name in the study or in the recordings. All the information that we collect about you during the course of the research will be kept strictly confidential.

What will happen to the results of the research project and how will participant anonymity be protected?

You will not be able to be identified in any ensuing reports or publications by name. With your voice recorded consent, the results of this transcription will be published in a thesis. You will not be identified by name in this thesis. If you do not wish your results to be published they

will not be.

If you wish, you will be provided with a summary of the results. Once the responses in this study are transcribed onto Microsoft Word on a password protected desktop computer, the voice recordings will be deleted. Three copies of the transcription will be printed off. The printed copies will be kept locked securely in a cabinet at Aston University for six years and then destroyed. You will not be identified by name in any hard copies of the transcript produced from the voice recordings in this study. Hard copies of your recorded verbal consent on a voice recorder and the transcripts will be secured safely for six years at Aston University. Only the researchers conducting the study will have access to the results. No participant will be identified by name in the recordings. You will not be able to be identified in any ensuing reports or publications. No results will be published without your permission.

Who has reviewed the project?

The study has received a favourable decision from the Life and Health Sciences Ethics Committee.

Contact for further information

If you have any concerns about the way in which this study has been conducted you should contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Hazard Risk Assessment for Focus Groups

The study has been considered low risk with regard to ethical standards set out by the British Psychological Society..

Hazard type	Control measures
Participant may feel worried about their diet and health status	They will be advised to contact their GP if they have any concerns
Participant may be worried they will be identifiable	Participant will be informed no participant will be identifiable by name and only the researchers conducting the research will have access to their data and it will be securely locked away onsite at Aston University
Participant may worry about withdrawing from the study	Participants will be reassured that they are free to withdraw from the study without giving any reason or it affecting any benefits they are entitled too
Participant may be concerned about the project or the way in which it was conducted or have a complaint	They will be advised to contact the principal researcher and , Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.
Participants may not want to answer questions for whatever reason.	They will be reassured they do not have to answer any questions if they do not want to

Telephone script to be read to participants

Nabila Jones
Aston University
Aston Street
B4 7ET

Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182
Mobile: [redacted]

Dear employee,

Thank you for taking the time to help with the process of participant recruitment for this study: the impact of visual impairment on nutritional status, being carried by researchers at Aston University.
Please find attached a telephone script to go through with potential participants for this study. If a participant agrees to take part, could you please call the researcher Nabila Jones on the above telephone number who will take down their details to call them and provide inform them of the date and time of the focus group.

If you have any queries please do not hesitate to contact the research team on the below correspondence.

Principle investigator: Dr Hannah Bartlett
Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator 2: Dr Richard Cooke
Email: r.cooke@aston.ac.uk
Tel: +44 (0)121 204 4072

Investigator 3: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182

Kind Regards,

Hannah Bartlett, Richard Cooke, Nabila Jones

Phone call script for employees at centre to go through with potential participants attending the support groups.

Employee: Hello, we are calling you today to invite you to take part in a study that will be conducted by Aston University at this centre. You have been chosen because you are visually impaired and age 18 years old or over. Would you kindly take a few moments to listen to what the study is about to help you decide about whether you would like to participate?

Potential participant: (Declines)

Employee: Thank you for your time today (CALL ENDED)

Potential participant: (Agrees)

Employee: Before you decide it is important for you to understand, why the research is being done and what it will involve:

The purpose of the study is to evaluate the relationship between nutritional status and visual impairment in the UK population. In order to do this we need to recruit visually impaired participants for focus groups to better understand individual's dietary habits and eating behaviours. The focus groups will be an hour long and held at this centre. Your responses will be used to check the clarity of questionnaire items related to visual impairment and nutrition that are likely to be included in a questionnaire. You will have the opportunity to talk about whether you think the questions are easy to understand, and are relevant. You will also have the opportunity to suggest new or different questions. Participation is voluntary and you can withdraw at any point of the study should you wish. You will have complete anonymity throughout the study.

Employee: Having listened to the purpose of the study would you like to take part and allow us to pass on your details to Nabila Jones, one of the researchers involved in the study at Aston University?
She will contact you to provide you with more information and the date and time of the focus group. If you need more, time to think about your decision you can call us back on (centre number)

(Potential participant declines or will call back)

Employee: Thank you for taking the time listening to this, have a good day.

Potential participant agrees and allows details forwarded on to Nabila Jones.

Employee: If you have any questions about the study in the meantime you can contact Nabila on 0121 204 4182 at Aston University. Thank you for agreeing to participate and for your time today.

(CALL ENDED)

Participant debriefing sheet

Nabila Jones

Aston University
Birmingham
B4 7ET
Tel: 0121 204 4182
Email:n.jones5@aston.ac.uk

Dear Participant,

Thank you kindly for taking part in these focus groups for the study: **The Impact of Visual Impairment on Nutritional Status**. The results you have provided will now be transcribed onto a Microsoft Word Document and used to refine a questionnaire in terms of clarity and wording. The questionnaire will be used to investigate the impact of being visually impaired on nutritional status, if any.

Only three hard paper copies will be kept of the transcription, voice recordings and desktop computer documents will be permanently deleted. You will not be identifiable by name in the documents. Only the research team (details below) will have access to the document which will be locked at Aston University is a secure cabinet for six years. You can withdraw your data at the completion of this study or at any point should you wish.

If you would like copy of the analysis of the results, a one page summary can be provided to you. Please contact Nabila Jones on the below correspondence from the research team for further information about this, and we will be happy to post you a copy of the results.

If you have any concern about the way the study was carried out this should be relayed to the principle investigator Hannah Bartlett on the below correspondence. If you are still not satisfied then you may contact Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869. If you have any concern about your health and diet you should contact your GP.

Principle investigator: Dr Hannah Bartlett
Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator 2: Dr Richard Cooke
Email: r.cooke@aston.ac.uk
Tel: +44 (0)121 204 4072

Investigator 3: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182

Please do not hesitate to contact us if you have any further queries or concerns,

Many thanks,

Hannah Bartlett, Richard Cooke, Nabila Jones

(Before the focus group session starts, Nabila will get audio consent from each of the participants individually)

Aston University
Life & Health Sciences

RESEARCH PARTICIPANT INFORMATION SHEET

Title of the study: The impact of visual impairment on nutritional status

This information will be read out to the participants, who are visually impaired.

You are being invited to take part in a research project that will be conducted by researchers at Aston University and that will take place over the telephone. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to listen to the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for listening to this.

What is the purpose of the project?

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. It is necessary to evaluate the relationship between nutritional status and visual impairment in the UK population. In order to do this we need to recruit visually impaired participants to take part in a questionnaire that investigates the relationship between visual loss and diet and appetite.

What are the possible disadvantages and risks of taking part?

The risks for taking part are low. If you do not want to answer a question you do not have to. If you have any concerns about your health during the study you should contact your GP.

What are the possible benefits of taking part?

By taking part your input will help us investigate the nutritional status of visually impaired people in the UK. This will help us to determine whether any dietary interventions are required for those who are visually impaired. The importance of good nutritional status in overall improvement of quality of life has been shown to be very significant.

What happens when the research study stops?

The results from the questionnaire will determine if any dietary interventions are necessary in the visually impaired population and if so, what forms they should take. Should you want to have a one page summary of the results you can contact Nabila and she will post this to you.

What if something goes wrong?

If you are affected in any way by this study or should you wish to raise a complaint you can contact the principle researcher: Hannah Bartlett, email: H.E.Bartlett@aston.ac.uk, telephone: 0121 204 4182.

If you feel your complaint has not been handled to your satisfaction by the principle researcher you can contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 2044869.

Will my taking part in this project be kept confidential?

Your taking part in this project will be completely confidential. You will not be identified by name in the study or in the recordings. All the information that we collect about you during the course of the research will be kept strictly confidential.

What will happen to the results of the research project and how will participant anonymity be protected?

You will not be able to be identified in any ensuing reports or publications by name. With your voice recorded consent, the results of this transcription will be published in a thesis. You will not be identified by name in this thesis.

Why have I been chosen?

You have been chosen because you are aged over 18 years old and you have been told by an eye care professional (ophthalmologist, optometrist) that you are visually impaired. You may have a Certificate of Visual Impairment.

Do I have to take part?

Participation is voluntary. Should you wish, you can withdraw at any time, without giving any reason and without your medical care or legal rights being affected. You can also withdraw your data following completion of the study.

What will happen to me if I decide to take part?

If you agree to take part, this participant information sheet will be read to you and given to you to keep. You will be ***read a consent form and will require to give separate verbal consent if you wish to take part, your consent will be voice recorded***. This consent will be stored securely for 6 years in a locked cabinet at Aston University which only the researchers involved in the study will have access to.

You will receive a phone call over three days. The first phone call will approximately take an hour. You will be invited to answer a questionnaire that investigates the relationship between visual loss and diet and appetite. You will also be asked to re-call what you ate and drank that day. On the other two days you will again be asked what you ate, this should take about five minutes.

Should you want a one page summary of the results you can phone Nabila from the research team on 0121 204 4712/[redacted] or email her at n.jones5@aston.ac.uk and she will post/email this to you.

Who has reviewed the project?

The study has received a favourable decision from the Life and Health Sciences Ethics Committee.

Contact for further information

If you have any concerns about the way in which this study has been conducted you should contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Nabila Jones
Aston University
Aston Street
B4 7ET

Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182
Mobile: [redacted]

Dear employee,

Thank you for taking the time to help with the process of participant recruitment for this study: the impact of visual impairment on nutritional status, being carried by researchers at Aston University.
Please find attached a telephone script to go through with potential participants for this study. If a participant agrees to take part, could you please forward their contact details to Nabila Jones on 07490716278 or 0121 204 4182 or 0121 204 4712 who will contact them to arrange a suitable time to answer the questionnaire.

If you have any queries please do not hesitate to contact the research team on the below correspondence.

Investigator one: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4712
mob:07490716278

Principle investigator: Dr Hannah Bartlett
Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator three: Dr Richard Cooke
Email: r.cooke@aston.ac.uk
Tel: +44 (0)121 204 4072

Kind Regards,

Hannah Bartlett, Richard Cooke, Nabila Jones

Phone call script for employees at centre to go through with potential participants attending the support groups.

Employee: Hello, we are calling you today to invite you to take part in a study that will be conducted by Aston University at this centre. You have been chosen because you are visually impaired and age 18 years old or over. Would you kindly take a few moments to listen to what the study is about to help you decide about whether you would like to participate?

Potential participant: (Declines)

Employee: Thank you for your time today (CALL ENDED)

Potential participant: (Agrees)

Employee: Before you decide it is important for you to understand, why the research is being done and what it will involve:

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. It is necessary to evaluate the relationship between nutritional status and visual impairment in the UK population. In order to do this we need to recruit visually impaired participants to take part in a questionnaire that investigates the relationship between visual loss and diet and appetite.

Employee: Nabila will call you to arrange a convenient time to provide more information and deliver the questionnaire. The questionnaire will include re-calling what you ate over a period of three days, including one weekend day. Nabila will check on each day that you are happy to continue, give consent or withdraw should you wish to.

Having listened to the purpose of the study would you like to take part and allow us to pass on your details to Nabila Jones at Aston University?

(Potential participant declines or will call back)

Employee: Thank you for taking the time listening to this, have a good day.

Potential participant agrees and allows details forwarded on to Nabila Jones.

Employee: If you have any questions about the study in the meantime you can contact Nabila on 07490716278 or 0121 204 4712, or 204 4182 at Aston University. Thank you for agreeing to participate and for your time today.

(CALL ENDED)

Version 2 29/03/2017

COPY CONSENT FORM for PARTICIPANTS

This consent form will be read out to participants who are visually impaired

NAME OF PARTICIPANT _____ **DATE OF BIRTH:** DD / MM / YY

Study Number:

Patient Identification Number for this trial:

Title of Project: Nutritional status and visual loss

Project investigators: Nabila Jones, Hannah Bartlett, Richard Cooke

1. I confirm that I have been read an information sheet outlining the purpose of this Study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study. ☐

4. I agree for this consent to be voice recorded. I understand that this consent will be kept securely in a locked cabinet at Aston University for six years. ☐

5. I allow for a hard copy of my responses to be used in the project thesis. I understand I will not be identified by name, in any ensuing reports or publications. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent (If different from researcher)	Date	Signature
_____	_____	_____
Investigator	Date	Signature

A1.2 The impact of VI on nutritional intake and ADLs questionnaire and transcript

Version 5 28/08/2017

The impact of visual impairment on nutritional status questionnaire

1. Can you tell me what you ate and drank today for breakfast/ lunch time/ dinner?
2. Did you have any other meals?
3. Did you have eat any snacks or have any drinks between meals today such as crisps, biscuits, fruit, and tea?
4. How old are you?
5. How would you identify yourself? Male? Female? Other? (Please state)
6. How would you describe your ethnic group? (Prefer not to say?)
7. Are you employed/voluntary employment/unemployed/retired?
8. Are you registered as sight impaired/severely sight impaired? (need to know which)
9. Do you know the name of your visual impairment? (please state)
10. How long have you had this visual impairment?
11. Congenital (born with it) /Days/Months/ Years (age related)? (Please state approximately).
12. How tall are you? (cm/ feet and inches)
13. How much do you weigh in pounds or kilograms?
14. When did you last take this measurement?
15. Do you feel you have lost any weight or have been told you have by your GP or health care provider in the last 3-4 months?
16. Have you been unwell recently and had little/no food intake for the last 5 days?
17. Do you ever have trouble getting to bathroom on time?
    a. Yes or No or has a colostomy/catheter?
18. How would you describe your weight? Underweight? Normal weight? Overweight?

19. How satisfied are you with your health? Very dissatisfied, Dissatisfied? Neither satisfied or dissatisfied, satisfied, very satisfied?
20. Is your physical appearance important to you? Very important, important, don't know, not important, not at all important?

21. Do you live?
    a. In own residence
    b. In family residence
    c. In friends residence
    d. In sheltered accommodation
    e. In nursing home
    f. Other (please specify)

22. Who MOSTLY prepares your food?

    a. You
    b. You with family
    c. You with other help
    d. Partner
    e. Family member
    f. Care giver
    g. Other (please specify)

23. Who MOSTLY cooks your food?

    a. You
    b. You with family
    c. You with other help
    d. Partner
    e. Family member
    f. Care giver
    g. Do not eat cooked food
    h. Other (please specify)

24. What prevents you from preparing food? (select all that apply)

a. Visual impairment
b. Physical impairment
c. Mood/Motivation
d. Nothing
e. Other (please specify)

25. Are you able to cook a hot meal on your own?

a. Yes
b. Yes with family
c. Yes with other help
d. No

26. How often do you cook a hot meal at home?

a. Daily,
b. Every other day
c. Weekly
d. Less than weekly
e. Do not cook hot meals

27. Does anything prevent you from cooking food? (Select all that apply)

a. Visual impairment
b. Physical impairment
c. Mood/Motivation
d. Nothing
e. Other (please specify)

28. Who MOSTLY does your food shopping?

a. You
b. You with family

c. You with other
d. Friend
e. Family member
f. Care giver
g. Other (please specify)

29. Where do you get your food from? (Select all that apply)
    a. Supermarket
    b. Local grocers/corner shop
    c. Internet
    d. Meals on wheels
    e. Market
    f. Grow own food
    g. Other (please specify)

30. Does being visually impaired make it more difficult to get to the shops for food?

a. Yes (please explain why in your own words)

b. No

31. What are the most important factor(s) that dictate what you eat?

    a. Cost
    b. Preference
    c. Habit
    d. Mood
    e. Ability to cook or prepare it (How convenient it is?)
    f. Ability to acquire it
    g. How it affects your health
    h. Other (please specify)

32. Would you like to change your diet and if so, how?

a. Yes (specifies how)
b. Yes, but I don't know how
c. No, I am happy with my diet

33. What prevents you from changing your diet?

a. Visual impairment
b. Physical impairment
c. Nothing
d. Other (please specify)
e. Do not want to change diet

34. Please state how strongly you agree or disagree with the following statement: There are specific foods that can affect your health.

a. Strongly agree
b. Agree
c. Neither
d. Disagree
e. Strongly disagree

35. Are you aware of the term "five food groups for a balanced diet" e.g. Fruits, Vegetables?
36. Are there any foods you enjoy eating and why?
37. Are there any foods you avoid eating and why? (specify reason)

Transcript for questionnaire development

NJ: Firstly, I would like to thank you all for taking the time to participate today.

Your input today is very valuable to our research. Please do not think anything you have to say is not important, the purpose of this group is to understand your thoughts and feelings about these questions so we can create a questionnaire that reflects your views and your opinions.

I will ask you to comment on a question and if you could comment on:

The clarity (i.e. do you understand the question)

Wording (i.e. is the question too long/ or uses complicated words)

Your thoughts and feelings (does it make you feel uncomfortable?)

NJ:: The first question I would like ask you is: Are you aware of the term five food groups for a balanced diet?

Participants A-F: (altogether) Yes, Yes NJ: Okay so what does that actually mean to you?

Participant A: volunteers: It means proteins, fats, erm fruits, fruit…Vegetables (participant stops talking)

NJ: Yes that's not bad, the five main foods groups are fruits/ vegetables/ meats, fish, eggs/ (whole grain e.g. cereal)/ dairy (milk products) in case you are interested. Do you think this question is relevant for this study for visually impaired to see what they know about what they eat?

Participants (altogether)

yes

yes

very relevant

yes

NJ: The second question I would like you to comment on is; please state how strongly you agree or disagree with the following statement: There are specific foods that can affect your health?

Participant B: “Yes I agree “

NJ: Do you think the question is relevant?

Participant A: “Yes if it applies to eye sight”

NJ: So in terms of VI do you think its relevant for your general health

Participant A: Well that’s with anything you...

Participant B: Yes

Participant C: Yes

Participant: A ...anything you have wrong with your body

Participant: A Like if you have a digestion problem

Participant B: Yes

Participant: E Yes

NJ: The third question I would like you to ask you is, basically commenting on is it clear and do you understand it

Are there any foods you avoid eating and why?

Participant B: I avoid eating sugar because I have never liked sweet things when I was a very small child I would only ever eat fruit my grandmother said I would have indigestion I never did.

NJ: Do you think the question is clear, do you think it is relevant to everybody?

Participant B: Yes its clear but that I why I don't eat sugar

NJ: Is the question relevant to everybody

Participant B: I'm not sure if it's relevant or not it's personal

Participant C: can you read it again

NJ: Are there any foods you avoid eating and why? (Specify reason)

Participant C: Yeah, yeah it is actually

NJ: The fourth question I would like you to ask you is are there any foods you enjoy eating and why? Is it clear?

Participant A: yeah

Participant C: chocolate

(Laughs)

NJ: The fifth question I would like you to ask you is would you like to change your diet and how? Do you think that's relevant and is it clear?

Participant B: Yeah if you know how

Participant D: (yeah)

NJ: For the following question, can you comment on and do it yourself as well

NJ: Can you recall your 24 hour food diary using the portion method described by your interviewer please?

Participant A: is that an easy thing to do, recall what you have eaten in the last 24 hours

(Repeats)

Participant A: it is easy to say what i have eaten in the last 24 hours

NJ: can you do that for me now just out of interest?

Participant A: well I had Oattibix and with milk (laughs), I had a piece of toast with marmalade for breakfast. Then for lunch, I had a chicken curry and at night, I just have a sandwich or something. Last night I had a salmon sandwich out of a tin I'm afraid with cucumber on it 51

NJ: Okay

Participant A: and a yogurt afterwards

NJ so you find that quite easy to do?

Participant to B to participant A: So you eat mainly at lunch time?

Participant A : it varies I don't eat my main bit at lunch if I was going out but I will eat it at night but if I am staying in I will eat my main at lunch I do that I eat my main lunch time.

NJ: so you know what you eat and how often you it and in amounts

Participant B: I take tablets because I have epilepsy and consequently I put on four stone and as result, I have to be careful of what I eat

Participant A: Oh and as a rule, I eat three pieces of fruit every day and I did that yesterday as well

Participant B: I know E you cook a hot meal every day don't you

Participant E in reply: Yes, I cook at night everyday with all natural ingredients (all laugh)

Participant B: I think she is fabulous

NJ: okay so the next question is

You

You with help

Partner

Family member

Care giver

Other (please specify)

Who MOSTLY prepares your food?

NJ: Can you think of anyone we may have missed?

You

You with help

Partner

Family member

Care giver

Other (please specify)

Who MOSTLY prepares your food?

Can you think of anyone we may have missed?

Participant A: Me

Participant B: well I live with my daughter and son in law and my daughter and I share cooking

NJ: Do you think I have missed somebody out then or do you think that I have covered everybody?

Participant C: Yes

Participant B to participant D: you do all yours yourself?

Participant B to participant E: You do all your own cooking don't you E?

Participant E: yes

Participant to B to participant F: do you your cooking all by yourself too?

Participant F: yes

Participant B: You're amazing as well, women have too.

Participant F: I know,

Participant C: Yes (laughs)

Participant D: Yes

Participant A: Well I do mine I live in…, it's not far from here, and we have a community cafe and I meet my friends there and we can have a lovely home cooked meal for £2.95

Then you do just have to not do much yourself then. Like I will have porridge for breakfast, have one of their lunches and perhaps a banana sandwich at night

NJ: so the next question is

You

You with help

Partner

Family member

Care giver

Do not eat cooked food

Other (please specify)

Who MOSTLY cooks your food?

NJ: Can you think of anyone we may have missed?

Participant A: Yes, that's fine

Participant B: Well you nearly always cook with family

NJ: so you think it should be you with family.

Participant A: Yes, well its family that are the one that help isn't it.

Participant C: oh yes

NJ: the next question is:

VI

Physical impairment

Mood/Motivation

Nothing

Other (please specify)

NJ: What prevents you from preparing food? (Select all that apply)

NJ: is there anything that I have missed, what might stop you from cooking food that i have missed

Participant F: well I find I live on my own, my cooking practices, in the afternoon I just have a sandwich, morning I have a cooked breakfast, in the evening I cook a lot and I put in containers and freeze in it I hate going into the kitchen just cooking for one

Participant B: (in agreement) yes it better to cook three portions and freeze it

Participant F: well when I cook my children are nearby I cook a lot I am happy and it gives me pleasure to distribute it you will know as an Asian (to NJ) what we do

(All laugh)

Participant F: so I am happy then in the evening I hate cooking for one. I just hate it so I buy little packages and freeze it, so I eat pre-cooked meals, just because I do not want to cook. That's why I am silent and watching because mine is a practical reason, I either cook a lot and distribute or freeze and pull out

Participant A: yeah

Participant B: it's a valid thing isn't it, if it's practical

NJ: well the questionnaire does not cover whether cooking is practical or not so its something we might consider changing.

Participant F to NJ: is it a bad practice?

NJ: Well it's not bad I just didn't cover practicality as an issue in the questionnaire

Participant F: practicality is mine, I enjoy something if it practical

NJ: well that's added something to the research so thank you

NJ: So in the next question can you think of anyone we may have missed?

You

You with help

Friend

Family member

Care giver

Other (please specify)

Who MOSTLY does your food shopping?

Participant F: I just did mine yesterday with my daughter, I am more practical more so now with my eyes. Yesterday my daughter did mine

online for me which will be delivered just because I'm not able to drive a car now. I have to do practical things I am not a happy person with my bad eyes

Participant A: It's not good when you can't use your car

(Laughs)

Participant B: I can't drive, I've been told I can't drive. that one gone for while (points to eye) that one's going (points to other eye) but luckily just three years ago I moved just around the corner from the shops and I have every shop I want just on the doorstep. I've had nine falls in six months. I've been referred to the wobbly clinic

Participant A: (laugh) the wobbly clinic

Participant in response B: So erm (laughs) it's only my eye that's doing it

Participant C: I go off balance I do I've got no balance because my ears are bad and my eyes are bad and I have osteoporosis so I have no balance you see that's my biggest problem besides my eyes not good then.

NJ: erm so the next question is, is the question clear, can you think of anywhere else where you get your food from that we may have missed?

Supermarket

Local grocers/corner shop

Internet

Meals on wheels

Market

Grow own food

Other (please specify)

NJ: Where do you get your food from?

NJ: Is this question clear, can you think of any other we may have missed?

Participant A: well I get home grown food but I don't grow it my friends of mine husband does when they have some they pass some on

(All laugh)

In this question, can you think of any other factors we may have missed?

Cost

Preference

Habit

Mood

Ability to cook or prepare it

Ability to acquire it

How it affects your health

What is the most important factor that dictates what you eat?

Cost

Preference

Habit

Mood

Ability to cook or prepare it

Ability to acquire it

How it affects your health

What is the most important factor that dictates what you eat?

NJ: Do you think I have missed anything there at all

Participant A: no but it's not just one because I have what I like to eat but also I also have things that are good for me

NJ: So do you think maybe it should be important factors rather than just limiting it to one, more of an open question?

Participant B: Yes

Participant F: Yes

NJ: so the next set of questions are being asked because we want to know if visually impaired people have difficulty eating food or getting to the toilet on time and do they eat less because of this. Do you think these questions are clear? Would you be comfortable answering them? Do you think they are relevant?

Do you ever have trouble getting to bathroom on time?

Yes or has a colostomy/catheter

Participant B: no it's not uncomfortable and I think it should be in there because I have problem. Also to go to the question before I don't like beetroot but I eat it because I have been told its good for me I heard it's good for your heart

NJ: okay so how it affects your health

Participant A: yes

Participant F: yes, yes

NJ: okay

Participant C to participant A: beetroot affects a lot of things

Participant A: does it?

Participant B: Well I was told by the doctor it was good for me heart (laughs)

NJ: so the next question is How is your perceived chewing and swallowing ability?

Very good, good, average, poor, very poor (specify reason if possible

Participant B: well it can affect some people

NJ: do you think it is relevant as a visually impaired person

Participant B: No

Participant A No

Participant F: no not as a visually impaired person

NJ: so the next question is “do you have dentures”

Do you think this question is clear? Would you be comfortable answering it? Do you think it is relevant?

Participant A: It’s not relevant

Participant B: No, it’s not relevant

Participant F: Well i have been given dentures, but I don’t like using the molars

NJ: Is that because you are visually impaired?

Participant F: No its not, I just don’t like them. No not because I’m visually impaired, it’s not relevant. 2

NJ: We are asking the following questions so we can assess your nutritional status by measuring your BMI.

NJ: Do you think this question is clear? Would you be comfortable answering it? Do you think it is relevant?

How much do you weigh? (Any unit metric/imperial)

Participant E: No

NJ: So if it was for research purposes and no one knew you answered it?

Participant E: No, I would still be uncomfortable

Participant B: I mean I'd feel comfortable I know I have put on four stone after taking the tablet I weighed myself just before, all for the pride

NJ: When did you last take this measurement?

Could you please let me know if the question is easy to answer? Would you be able to answer the question, would you remember?

Participant A: My daughter measures me every fortnight

Participant F: Do you mean waist measurements as well

NJ: No just weight

Participant B: (laughs) last week

NJ: The next question is...

How would you describe your weight? Underweight? Normal weight? Overweight?

Could you please let me know if would you feel comfortable answering this question?

Participant B: Yes

Participant E: I would put mine as overweight

Participant A: I am overweight as well

Participant F: Yeah

Participant E: There's so many people that are overweight so saying it wouldn't really matter and you see so many young people and they are massively over weight

Participant B: Yeah

Participant C I agree

Participant A: Yeah

Participant B: Yes

Participant E: And it's awful

Partcipant E: Its awful really isn't it?

The following questions are being asked to assess the well-being of the participants in terms of vision and health so we can better understand their feelings, are these question clear, easy to understand, are these questions you would be happy to answer?

How satisfied are you with your vision presently? Very dissatisfied, Dissatisfied? Neither satisfied or dissatisfied, satisfied, very satisfied?

(Is this question clear, is it relevant)

Participant B: Well no it's not relevant if we are visually impaired we all have got trouble with our vision

Participant A: Yeah

Participant C: Yeah

How satisfied are you with your health? Very dissatisfied, Dissatisfied? Neither satisfied or dissatisfied, satisfied, very satisfied?

Participant E: Considering eyes and ears, we are definitely not

NJ: Is it relevant?

Participant A: Yeah

NJ: Is your physical appearance important to you? Very important, important, don't know, not important, not at all important?

(Is this question clear? Are you comfortable answering it?)

Participant A: Yes

Participant B: Yeah that's fine

Participant F: Yes

NJ: What would you say is your greatest challenge/obstacle, if anything about food/eating whilst being visually impaired, cooking as an example?

Participant E: Well it affects everything doesn't it?

Participant B to E: Well when I heard E, you cook you yourself a meal every day, every day since then I thought about you

NJ: Can you think of any questions that you think are relevant that I may have missed?

Participant B: Well we probably will when we get home (laughs)

NJ: Well I will give you my contact details if you can think of anything then please let me know.

Participant B: Good

Participant A: Good

Participant F: Yes that's a good idea we will

Participant B: What I find is that I have an ex-partner and whenever he comes over and I try to do something very simple. But, when my grandchildren come over obviously, there is more of them and I try to

do a cottage pie the one with the lamb mince or is that a shepherd's pie? And I tell you what it was so difficult trying to do enough for six of them plus vegetables and I had to do it with a great big pan and it was hard with my eye and that one not really good it was very difficult you know, but you just get on with it do it slowly and what I will do next time is do it in a slow cooker

Participant A: You've just got to find different ways

NJ: Well thank you so much for your time today. I will give each of you a research brief so that should you wish you can get a one page summary of these results. In the meantime if you have any questions or have anything further you would like to add please feel free to contact me from the contact details on the debrief form. You have helped change the questionnaire.

A1.3 PIS, self-efficacy questionnaire and information sheets for focus groups intervention development and the evaluation of the intervention

Version 6 19/01/2018

Aston University
Life & Health Sciences

RESEARCH PARTICIPANT INFORMATION SHEET

Title of the study: Nutritional status and visual loss

This information will be read out to the participants, who are visually impaired.

You are being invited to take part in a research project that will be conducted at your local support charity or accommodation by researchers Aston University . Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to listen to the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for listening to this.

What is the purpose of the project?

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. It is necessary to evaluate the relationship between nutritional status and visual impairment in the UK population. In order to do this we need to recruit visually impaired participants for focus groups to better understand individual's dietary habits and eating behaviours. The focus groups will be held to inform us what form a dietary support for visually impaired people should take.

Why have I been chosen?

You have been chosen because you are aged over 18 years old and you have been told by an eye care professional (ophthalmologist, optometrist) that you are visually impaired. You may have a Certificate of Visual Impairment.

Do I have to take part?

Participation is voluntary. Should you wish can withdraw at any time, without giving any reason and without your medical care or legal rights being affected. You can also withdraw your data following completion of the study.

What will happen to me if I decide to take part?

If you agree to take part this patient information sheet will be read to you and given to you to keep. You will be ***read a consent form and will require to give separate verbal consent if you wish to take part, your consent will be voice recorded***. This consent will be stored securely for 6 years in a locked cabinet at Aston University which only the researchers involved in the study will have access to.

You will be invited to take part in an hour long voice recorded focus group. There will be no payment for participation.

You will be asked to discuss in this group what form a dietary support for visually impaired people should take.

Results

Your responses will be transcribed (typed onto a Microsoft Word document) and then the voice recording will be deleted. The responses of the group will be used to develop a dietary aid to support the diet of people that are visually impaired.

The transcription of your responses will not be published in any form or made available to anyone that is not a researcher in this study without your given permission in the consent form.

What are the possible disadvantages and risks of taking part?

The risks for taking part are low. You may be concerned about your diet or health. If you are concerned about any questions asked relating to your nutritional status, your diet or health you should contact your GP.

What are the possible benefits of taking part?

By taking part you will help to develop a dietary aid for those who are visually impaired. The importance of good nutritional status in overall improvement of quality of life has been shown to be very significant.

What happens when the research study stops?

The results from the focus groups will be used to determine what form a dietary aid for visually impaired people will take.

What if something goes wrong?

If you are affected in any way by this study or should you wish to raise a complaint you can contact the principle researcher: Hannah Bartlett, email: H.E.Bartlett@aston.ac.uk, telephone: 0121 204 4182.

If you feel your complaint has not been handled to your satisfaction by the principle researcher you can contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Will my taking part in this project be kept confidential?

Your taking part in this project will be completely confidential. You will not be identified by name in the study or in the recordings. All the information that we collect about you during the course of the research will be kept strictly confidential.

What will happen to the results of the research project and how will participant anonymity be protected?

You will not be able to be identified in any ensuing reports or publications by name. With your voice recorded consent, the results of this transcription will be published in a thesis. You will

not be identified by name in this thesis. If you do not wish your results to be published they will not be.

If you wish you will be provided with a summary of your results. Once the responses in this study are transcribed onto Microsoft Word, the voice recordings will be deleted. The results of the project will be held on password protected desktop at Aston University. You will not be identified by any hard copies of the transcript, by name produced from the voice recordings in this study. Hard copies of your recorded verbal consent on a voice recorder and the transcripts will be secured safely for six years at Aston University. Only the researchers conducting the study will have access to the results. No participant will be identified by name in the recordings. You will not be able to be identified in any ensuing reports or publications. No results will be published without your permission. Any recording held will be destroyed after the six years are over.

Who has reviewed the project?

The study has received a favourable decision from the Life and Health Sciences Ethics Committee

Contact for further information

If you have any concerns about the way in which this study has been conducted you should contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Nabila Jones
Aston University
Aston Street
B4 7ET

Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182
Mobile: [redacted]

Dear employee,

Thank you for taking the time to help with the process of participant recruitment for this study: the impact of visual impairment on nutritional status, being carried by researchers at Aston University.
Please find attached a telephone script to go through with potential participants for this study. If a participant agrees to take part, could you please forward their contact details to Nabila Jones on 07490716278 or 0121 204 4182 or 0121 204 4712 who will contact them to arrange a suitable time to answer the questionnaire.

If you have any queries please do not hesitate to contact the research team on the below correspondence.

Investigator one: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4712
mob:[redacted]

Principle investigator: Dr Hannah Bartlett
Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator three: Dr Claire Farrow
Email: c.farrow@aston.ac.uk
Tel: +44 (0)121 204 5384

Kind Regards,

Nabila Jones, Hannah Bartlett, Claire Farrow

Phone call script for employees at centre to go through with potential participants attending the support groups.

Employee: Hello, we are calling you today to invite you to take part in a study that will be conducted by Aston University at this centre. You have been chosen because you are visually impaired and age 18 years old or over. Would you kindly take a few moments to listen to what the study is about to help you decide about whether you would like to participate?

Potential participant: (Declines)

Employee: Thank you for your time today (CALL ENDED)

Potential participant: (Agrees)

Employee: Before you decide it is important for you to understand, why the research is being done and what it will involve:

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. It is necessary to develop a dietary aid to support the diets of visually impaired people in the UK. In order to do this we need to recruit visually impaired participants to take part in a hour long focus group that will inform us when form the dietary aid should take.

Employee: You are invited to take part in the focus group and share your ideas as to what you think is the most appropriate mode of providing dietary support. You will be asked a series of questions which you will be invited to answer.

Having listened to the purpose of the study would you like to take part and allow us to pass on your details to Nabila Jones at Aston University?

(Potential participant declines or will call back)

Employee: Thank you for taking the time listening to this, have a good day.

Potential participant agrees and allows details forwarded on to Nabila Jones.

Employee: If you have any questions about the study in the meantime you can contact Nabila on 07490716278 or 0121 204 4712, or 204 4182 at Aston University. Thank you for agreeing to participate and for your time today.

(CALL ENDED)

Nabila Jones
Aston University
Birmingham
B4 7ET
Tel: 0121 204 4182
Email:n.jones5@aston.ac.uk

Dear Participant,

Thank you kindly for taking part in these focus groups for the study: **The Impact of Visual Impairment on Nutritional Status**. The results you have provided will now be transcribed onto a Microsoft Word Document and used to develop a dietary aid for visually impaired people.

Only three hard paper copies will be kept of the transcription, voice recordings and desktop computer documents will be permanently deleted. You will not be identifiable by name in the documents. Only the research team (details below) will have access to the document which will be locked at Aston University is a secure cabinet for six years. You can withdraw your data at the completion of this study or at any point should you wish.

If you would like copy of the analysis of the results, a one page summary can be provided to you. Please contact Nabila Jones on the below correspondence from the research team for further information about this, and we will be happy to post you a copy of the results.

If you have any concern about the way the study was carried out this should be relayed to the principle investigator Hannah Bartlett on the below correspondence. If you are still not satisfied then you may contact Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869. If you have any concern about your health and diet you should contact your GP.

Principle investigator: Dr Hannah Bartlett

Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator 2: Dr Claire Farrow
Email: c,farrow@aston.ac.uk
Tel: +44 (0)121 204 5384

Investigator 3: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182

Please do not hesitate to contact us if you have any further queries or concerns,

Many thanks,

Nabila Jones, Hannah Bartlett, Claire Farrow,

Evaluating Nutritional Information for those who are Visually Impaired

1) How old are you?
2) How would describe yourself male/female/other

3) Where have you received information about nutrition from
   a) Health professional
   b) Media (TV/newspaper/websites.....)
   c) Macula Society
   d) RNIB
   e) Low vision clinic
   f) Social services
   g) Friends
   h) Family members
   i) Other (please specify...)
   j) I have not received information about nutrition before

4) Please select an option for each row of the table to indicate how confident you feel for each of the following statements

	Select your level of confidence level Not confident										Very confident
	0	1	2	3	4	5	6	7	8	9	10
a) I am confident that I have the knowledge of which foods I need to consume to have a healthy balanced diet											
b) I am confident that I am aware of the portion sizes of foods I need to consume to have a healthy balanced diet											
c) I am confident that I have the knowledge of how much exercise I should be doing a day											
d) I am confident that I have the knowledge of how or where I can get a health assessment to determine if I am a healthy weight according to my BMI											
e) I am confident that I have the knowledge of who can help											

support me with my cooking and shopping and where I can get funding for kitchen utilities that I need											
f) I am confident that I have knowledge of where I can source healthy ready meals if I feel I am unable to cook											
g) I am confident that I have the knowledge of how to select healthy food choices when shopping											

Aston University
Life & Health Sciences

RESEARCH PARTICIPANT INFORMATION SHEET

Title of the study: Nutritional status and visual loss

This information will be read out to the participants, who are visually impaired.

You are being invited to take part in a research project that will be conducted at your home or your local sight loss support group by researchers at Aston University. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to listen to the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for listening to this.

What is the purpose of the project?

Currently within the UK, there have been no studies that have looked at nutritional status in visually impaired individuals. The importance of nutritional status in overall improvement of quality of life has been shown to be very significant. We are providing nutritional information to help support the diets of visually impaired people. We would like to determine if this information influences you to make healthier food choices.

Why have I been chosen?

You have been chosen because you are aged over 18 years old and you have been told by an eye care professional (ophthalmologist, optometrist) that you are visually impaired. You may have a Certificate of Visual Impairment.

Do I have to take part?

Participation is voluntary. Should you wish you can withdraw at any time, without giving any reason and without your medical care or legal rights being affected. You can also withdraw your data following completion of the study.

What will happen to me if I decide to take part?

If you agree to take part this patient information sheet will be read to you and given to you to keep. You will be ***read a consent form and will require to give separate verbal consent if you wish to take part, your consent will be voice recorded***. This consent will be stored securely for 6 years in a locked cabinet at Aston University which only the researchers have access too. You will be asked to complete a short survey lasting five minutes. You will then watch/listen to a video/audio containing information about eating a healthy balanced diet, support for cooking and shopping and alternatives for those who cannot cook.

You will be called again in two weeks and another five minute short survey will be delivered to see if the video/audio has influenced your food choices. There will be no payment for participation.

Results

Your responses will be analyzed by the researchers at Aston university. They will help us to evaluate the effectiveness of nutrition information you were given.

What are the possible disadvantages and risks of taking part?

The risks for taking part are low. You may be concerned about your diet or health. If you are concerned about any questions asked relating to your nutritional status, your diet or health you should contact your GP.

What are the possible benefits of taking part?

By taking part you will help us evaluate if the information we have provided influences healthier eating in people that are visually impaired. The importance of good nutritional status in overall improvement of quality of life has been shown to be very significant.

What happens when the research study stops?

The results will be analysed and recorded into a project thesis.

What if something goes wrong?

If you are affected in any way by this study or should you wish to raise a complaint you can contact the principle researcher: Hannah Bartlett, email: H.E.Bartlett@aston.ac.uk, telephone: 0121 204 4182.

If you feel your complaint has not been handled to your satisfaction by the principle researcher you can contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Will my taking part in this project be kept confidential?

Your taking part in this project will be completely confidential. You will not be identified by name in the study or in the recordings. All the information that we collect about you during the course of the research will be kept strictly confidential.

What will happen to the results of the research project and how will participant anonymity be protected?

You will not be able to be identified in any ensuing reports or publications by name. With your voice recorded consent, the results of this study will be published in a thesis. You will

not be identified by name in this thesis. If you do not wish your results to be published they will not be.

If you wish you will be provided with a one page summary of your results. Hard copies of your recorded verbal consent on a voice recorder and the transcripts will be secured safely for six years at Aston University. Only the researchers conducting the study will have access to the results. No participant will be identified by name in the recordings. You will not be able to be identified in any ensuing reports or publications. No results will be published without your permission. Any recording held will be destroyed after the six years are over.

Who has reviewed the project?

The study has received a favourable decision from the Life and Health Sciences Ethics Committee

Contact for further information

If you have any concerns about the way in which this study has been conducted you should contact the Director of Governance for the Life and Health Sciences Ethics Committee, Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869.

Nabila Jones
Aston University
Birmingham
B4 7ET
Tel: 0121 204 4182
Email:n.jones5@aston.ac.uk

Nutritional education for the visually impaired

Dear Participant,

Thank you kindly for taking part in the evaluation of the nutritional information we have provided. The results you have provided will now be analyzed by the research team.

If you would like copy of the analysis of the results, a one page summary can be provided to you. Please contact Nabila Jones on the below correspondence from the research team for further information about this, and we will be happy to post you a copy of the results.

If you have any concern about the way the study was carried out this should be relayed to the principle investigator Hannah Bartlett on the below correspondence. If you are still not satisfied then you may contact Professor John Walter, on j.g.walter@aston.ac.uk or telephone 0121 204 4869. If you have any concerns about your health and diet you should contact your GP.

Principle investigator: Dr Hannah Bartlett
Email: H.E.Bartlett@aston.ac.uk
Tel: +44 (0) 121 204 4182

Investigator 2: Dr Claire Farrow
Email: c.farrow@aston.ac.uk
Tel: +44 (0)121 204 5384

Investigator 3: Nabila Jones
Email:n.jones5@aston.ac.uk
Tel: 0121 204 4182

Please do not hesitate to contact us if you have any further queries or concerns,

Many thanks,

Hannah Bartlett, Claire Farrow, Nabila Jones

Version 1 04/07/2018

Advertisement for intervention evaluation

Aston University would like to invite participants aged 18 years and older who are visually impaired to use and evaluate nutrition information that is in video/audio form that is aimed at encouraging healthier eating. The video/audio also provides other information such as how to get support for cooking, shopping, your health and alternatives to cooking for those who feel they are unable.

In order to take part in this study your vision should be below driving standards. You may be also be eligible or registered as sight impaired or severely sight impaired.

If you are on a restricted diet or informed by your health professional to follow a certain diet you will not be eligible to take part.

If you would like to participate, you will be asked to complete a short five minute survey over the telephone. You will then be sent a link to watch/listen to a video/audio. We will then call you after two weeks to take another short five minute survey to determine whether the contents of the video/audio have influenced the food choices you make. If you are interested in taking part, please get in touch by emailing n.jones5@aston.ac.uk or telephone Nabila Jones on 07490716278. If the line is busy please leave a message with your name and number and she will get back to you.

A1.4 Transcript for development of intervention

Focus groups transcript

The transcript below has responses combined for each question from the two focus groups that were held in February 2018 and April 2018.

Main Session Part 1 The first question I would like you answer is... What do you think of when you hear the word nutrition? Please feel free to discuss this question amongst yourselves as well as with me.

“Food.” (All)

“Greens.”

NJ laughs, “Is that unanimous food?”

“Yes.” (All)

“So what about food is it that you think of? Is it what the food is made out of?”

“Healthy food.”

“Without salt and sugar.”

“Not necessarily without salt and sugar in my case I need it.”

“No what I meant was not the amount that it’s in now.”

“Hidden or added salts and sugars.”

“Next, I would like you to share... What comes to your mind when you think of changing eating habits? Is it food amount, food type, how often you eat?”

“Diet.”

“Yes, it’s your diet.”

“Changing eating habits is changing your diet the foods and amounts.”

“Okay so changing eating habits is changing your diet the foods and amounts.” (NJ)

“Yes.”

“Next, I would like us to discuss... What type and amount of information would be helpful to receive about changing your diet?” (NJ)

“Quantity of foods.”

“Do you know what you’re supposed to be eating?” (NJ)

“I have a fair idea.”

“I eat cereals for breakfast.”

“So when you break down your diet do you know what you should be mainly eating?” (NJ)

“Well you get your greens your vegetables fruit.”

“I eat more fruit.”

“I love my fruit.”

“I eat frozen vegetables I get them from Sainsbury’s and they are wonderful you can eat everything on your plate its none of that urgh (sic) I’ve had enough of that.” (sic)

“I can’t cook no I’d be burnt.”

“I couldn’t see what was on the boxes when I went shopping.”

“X gave me a light and it’s fantastic.”

“He gave me the small one.”

“You get to a point you can use recipe book but you get to a point where you can’t. “

“Yes.”

“Yes.”

“Again coming back to what you should be eating your protein your carbohydrate yours fats.”

“Cut your fats outs.”

“Well certain types of fat you have to eat.”

“Oh yes you’ve got eat some.”

“Is it easy to think of food in terms of “portion size” if not what term would be easier for you to understand? Like if I was to say one portion do you understand what that means?” (NJ)

“So for example, what would be one portion of meat?” (NJ)

“About 40 ounces.”

“Would everyone else know that?” (NJ)

“I wouldn’t know.”

“No, I wouldn’t know.”

“I think, as you get older you have in your mind you’re not going to glutton again like when you’re at work.”

“So for example, this morning I only had cereal and toast.”

“I just put my hand in the box and take a bit of cereal out.”

“And so how many times did you do that?” (NJ)

“Every morning.”

“No I meant how many times did you put your hand in the box?” (NJ)

“Only twice.”

“Okay so that’s two portions.” (NJ)

“Yes, I know but I couldn’t care less.”

“Yeah I know but it’s not enough when you’re moving around.”

“Of course that’s a very important point if you’re active then you balance it out I was saying to Steve that if you’re visually impaired you’re 1.5 time more likely to be overweight or obese”. (NJ)

“So if you’re not moving around as much because of your VI you need to know your portion sizes.” (NJ)

“I get carrots and stuff from Sainsbury’s and it’s all good stuff it’s not the cheap stuff.”

“I think we’ve taken a step backwards here I think measuring aids would be good for porridge and cereal.”

“The amount of cereal and porridge is different just something simple to have to hand.”

“How many people would say they would you use that?” (NJ)

“I just use my hand.”

“Yeah I would just use my hand.”

“The same with diabetes you have to have small measures at certain times a day don’t you Steve?”

“I’ve cut my down now to have little meals because I am a diabetic.”

“Little but often.”

“But if erm (sic) like if you’re at work you have to eat at set time.”

“You slow if a bit (sic) if you get older.”

“We were in exercise this morning.”

“I’ve slowed a lot.”

“I don’t know if measuring comes in to it porridge... I just eat porridge.”

“Well you can just use your hand.” (NJ) “So for example, a piece of chicken should just be the size of your hand red meat the palm it doesn’t need to be complicated you can just use your hand.” (NJ)

“So butter for example you should just use half a thumb as a portion of butter.” (NJ)

“A lot of people on their own they don’t tend to cook right they fill up on carbohydrates they don’t cook for one.”

“You can’t actually cook can you X?”

“Just like (sic) this lady just said, you can’t cook because of your impairment.”

“You can have meals delivered can’t you?”

“If you go for Wiltshire farms foods, they have all the nutritional information on the pack the Macular Society foods weren’t very food for me because I’m a vegetarian.”

“I wanted to eat healthily but went too far and lost weight. I’m not advertising Wiltshire farms foods but i just eat those meals and avoid anything that is red.”

“I can’t have anything with iodine in cos I have an underactive thyroid so I can’t have kale.”

“Who likes kale anyway?”

“You are going to use foods that are easy.”

“Yes, bananas are easy to eat but biscuits are just as easy.” (NJ)

“Should the state provide cooking classes?”

“Some people need help crossing the road never mind cooking.”

“Easier to get the things you put in the microwave.”

“Next, I would like you to share... What comes to your mind when you think of changing eating habits? Is it food amount, food type, how often you eat?” (NJ)

“Stop eating nice things.”

“Very rarely do I eat chocolate.”

“I did eat two boxes of chocolates over mothering Sunday shocking isn’t it?”

“You will be surprised...inaudible.”

“Next, I would like us to discuss... What type and amount of information would be helpful to receive about changing your diet?” (NJ)

“Calories, sugar, and salt.”

“I won’t be able to see.”

“When I go shopping, I have to ask somebody amount the amount and type of food I’m eating.”

“How about the healthy eating plate do you have one of those?”

“That’s what you need it tells you exactly what you should eat.”

“The plate is large.”

“There’s too much on there, you need it simple.”

“I had to study it, I am vegetarian, but I had to eat a bit of chicken.”

“We need to know what foods are better for us in terms of sugar.”

“Is there anybody that comes here that tell you what is healthy or not?”

“Couldn’t you come back and give us a talk?”

“Surgeries have dieticians.”

“I would now like us to discuss... What do you think it is about visual impairment that may cause unhealthy eating? Is it lack of information and education, is it poor motivation, is its poor food choices, is it practicality i.e. the ease of how to cook food or shop? Is there something I have missed?” (NJ)

“The younger ones when you see them on telly they are like great big balloons they walking around like (mimics puffed out cheeks, arms wide) we’ve been young ourselves we’ve run it off doing our jobs but when they’re on the telly they’re like great bloody balloons.”

“When you go into hospital, you find the nurses are quite big.”

“Yeah, that’s true.”

“I think the reason for that is the access to instant food that is readily available to eat.”

“Is that for visually impaired people you’re referring to?” (NJ)

“Yes, because it’s easier to buy that then prepare foods yourself.”

“Ready meals healthy ones would be good things ones with additives taken out.”

“Everyone goes to Mc Donald’s even when they’re out shopping.”

“I mean every cafe you go by they’re full.”

“That’s it the access to that sort of food.”

“Do any of you go to Mac Donald’s?”

“I can’t go up the road now.”

“No I can’t afford it.”

“I went to the garden centre and you can’t even get seats to sit down.”

“All these young people with babies and older people and packed out all time.”

“Some of them must be out all the bloody time.”

“Like I say everywhere you go now foods readily available.”

“It takes the incentive to cook away from people.”

“A lot of them get what they want when they can’t see from somebody they always get support.”

“When you get older you slow up with your food anyway don’t you.”

“Yes you do.”

“I do anyway.”

“Another thing as you get older your metabolism slows down.”

“Yeah your metabolic (sic) slows.”

“Eating the right portion of food for you age.”

“So this dietary aid is a prototype for something that may be used universally will be used across the UK so do you think informing people what they should be eating for their age is useful?” (NJ)

“Yes.”

“Yes, definitely.”

“When I was younger, I would go for curries steaks and god knows what else.”

“Drinking and that but I would burn it off.”

“Yeah you run it off.”

“But when you’re older and you slow down you can’t do that.”

“Can I tell you about X we were in the bake house in Cadburys in the kitchen? She was among the cakes and cream.”

“She not only ate the cakes but the cream as well!”

“That explains the smile.”

“She would eat a cake and a cup of cream.”

“Not now.”

“That’s what I mean as you get older you grow up.”

“That’s what I mean for someone over the age of 40 you need to know how much of things you should be eating.”

“Yes there are different amounts for different ages so if your 50 and over, and female it’s 1800 calories.” (NJ)

“Politely it’s up to you how much you eat.”

“Of course, these are just guidelines to inform you what you need to be healthy.” (NJ)

“It also depends on your job like if you’re a builder at my age 62.”

“I hardly eat anything.”

“I beg your pardon?!”

“She hardly eats anything, she has a dinner she eats puddings as well!”

“You’ve surprised me you have!”

“Who?”

“You!”

“Don’t tell X any secrets.”

“She whispered I hardly eat anything, and she’s a diabetes as well!” (sic) “Aren’t ya ?”(sic)

“Yeah I’m diabetics.”(sic)

“You like puddings as well.”

“I like my pudding and custard.”

“She hardly eats anything.” (laughs)

“I went to yoga and this morning and ate some biscuits and had some tea.”

“I think we’re getting a bit off track here…”

“It could be money as well.”

“It’s not that we don’t know what to eat we just need confirmation that what we are eating is the right foods.”

“How much water are we supposed to drink?”

“About 8 glasses?”

“I think we don’t drink enough fluids.”

“We can make it up with tea though can’t we?”

“Well tea is a diuretic so can be dehydrating.”(NJ)

“Fruit can have loads of sugar.”

“How many vegetables should we be eating?”

“Are potatoes good for you?”

“You need bulk in your diet.”

“How do we know what weight and height we should be for age?”

“Don’t you go to for your doctor’s annual appointment and get the check up?”

“You’re doctors do it.”

“Do they? I don’t think my doctors do my BMI?”

“Because I have Dry (ARMD), I don’t see the doctor.”

“She means for your health, not your eyes.”

“Do you know how many calories you should you be eating per age?”

“It’s about 2000 isn’t it?”

“If you’re female and 50 or over it is approximately 1800.”(NJ)

“So how much are we supposed to drink?”

“Numbers are so small on packaging.”

“What form do you think the dietary support should take? Should it be a poster? (Please raise your hand if you agree) For those of you that said YES, what colour and size should the print be? How much detail do they think is necessary? What format should the poster be; text only, pictures, a combination, should it be in braille? Would you be able to follow diagram or flowcharts? If you do not like the idea can you now please share why?” (NJ)

“I think it should be all formats.”

“I think one group that tend to get overlooked are those with Ushers syndrome the deaf blind.”

“It’s difficult.”

“How do you communicate the information to them?”

“You have to use your hands.”

“Yes you have to use sign language.”

“So someone who can communicate the information or translate the information as well?” (NJ)

“Yes.”

“How much information do you think is necessary?” “How much detail is required?” (NJ)

“Erm (sic)… not so much that it confuses people.”

“Don’t use large confusing words, plain speak but not overload.”

“Do you think say if it was a leaflet or poster it would require pictures?” (NJ)

“Yes if you’re doing posters than a visual representation is required, it’s handy but for people that can’t see at all it’s a waste of time.”

“Let’s say we make something audio?” (NJ)

“Yes, it should be audio.”

“Yes.”

“How long should it be?”(NJ)

“How long would you be willing to sit and listen to it for?”

“I would do it in sections.”

“I would say 15 mins max.”

“What’s that?”

“How long would you listen to something that come to you?”

“I said 15 minutes.”

“Yeah I agree if you have something too long I forget I get too muddled up.”

“In terms of braille, do you think braille would be useful?” (NJ)

“I think maybe I know enough people that have some sight that use braille.”

“What words should be used to get the information across?” (NJ)

“Do not use words like do and don’t.”

“What about a plate designed for you to hold?” (NJ)

“What do you mean?”

“Like a tactile plate you can hold with different sections for vegetables fruit etc.” (NJ)

“Hmmm…”

“Or would that be confusing?” (NJ)

“Erm, don’t know.”

“It would be confusing.”

“I’d be confused.”

“What we talking about the five food groups?”

“If you had to read what was in those sections it would be too much, braille would be need to be on there as well and if you had pictures...erm I would say stay away from that one.”

“What about colours?”

“It varies.”

“Some like red, blue or even a yellow.”

“I don’t like to see a yellow background; I can’t see to read anything on it.”

“So if it was black and yellow would that be okay?” (NJ)

“Yes, yes what I mean is you have to be careful like yellow and bright green I can’t see that.”

“That’s the difficult thing I am a qualified sign maker but different conditions can be affected by different things my colour is white on black I can’t stand black on yellow.”

“That’s right everyone has different colours.”

“It would be costly to creates aids in different colours for different conditions.”

“So excluding ushers syndrome do you think it should be mainly audio instead?” (NJ)

“Yes, audio may be better.”

“Rather than producing something, the size of a newspaper that would be costly print and send out audio would be better in most cases.”

“A poster would be good poster, font should be 16.”

“Yes, we can stick the poster in the kitchen on the fridge.”

“I’m partially sighted font size 16 would be good for me.”

“I can’t read when we go shopping we have to ask someone around what is this what colour is it.”

“There is way around it you know no body has thought about it.”

“You have to be careful with colours as well I see colours differently.”

“Yes, you lose your perception of it.”

“Sometimes when I see blue, I see green or purple.”

“Numbers 3, 6, 8, and nine are difficult.”

“Red is easy to see.”

“Strong contrasting colours.”

“Like yellow and black?” (NJ)

“Yes”

“Bold it definitely needs to be bold.”

“You could have an eye as if top of the eye is good a tear at the bottom could be bad .”

“How about numbers next to the traffic light colours on packaging?”

“Pictures are better they tell a story.”

“Flowchart would be too complicated”

“Keep it simple.”

“I can just about manage my emails.”

“Yeah a bit of both, to help reinforce it.”

“Should it be a DVD?” (NJ)

“Yeah that would be good.”

How long should the DVD be? (NJ)

“20 minutes I’ve got have one of the calibre books.”

“Me too they’ve changed my life.”

“Don’t mind 30 minutes.”

“Do you think there should be a section of the DVD for those who can’t cook?” (NJ)

“Yes, absolutely we need as much alternatives as we can get.”

“Oh yes!”

“Should the audio be able to be accessed on the computer and would that be easy to use?” (NJ)

“No it’s too complicated.”

“No.”

“Thank you do you have any questions for me?” (NJ)

“I will give each of you a research brief so that should you wish you can get a one page summary of these results. In the meantime if you have any questions or have anything further you would like to add please feel free to contact me from the contact details on the debrief form or through the employees of this centre.” (NJ)

A1.5 Transcript of intervention

Transcript for educational intervention

Introduction

Did you know research has shown that being visually impaired means you are almost twice as likely to have an unhealthy weight compared to those who can see?

It is very important to eat healthy foods and maintain a healthy weight because not only will it make you feel better but it can also reduce your risk of chronic diseases.

The following video and audio will outline steps you can take to improve your diet and maintain a healthy weight. It may also answer some questions you may have about the amounts and foods you should be eating.

PAUSE

The video and audio is made up of three sections:

Section one provides information about how you can check if you are a healthy weight. It also explains what calories are and what they mean.

Section two informs you about which foods help to form a balanced healthy diet.

Section three discusses where to get funding and support to help you cook safely and provides healthy alternatives for people who are unable to cook.

PAUSE

Section one

Health professionals may refer to eating the rights amounts of calories and being a healthy weight. Sometimes it can all get a bit confusing. This section explains what calories are and how you can find out if you are healthy weight.

What are calories and why do they matter?

The amount of energy in the food we eat is referred to as calories. They matter because if you eat more calories than your body needs your body stores it as fat. This fat makes you

overweight and can lead to developing health problems such as diabetes, cardiovascular disease, and certain cancers.

PAUSE

How many calories are recommended as a guideline for my age?

The amount of calories you need per day differs depending on your age, gender, and activity levels. There are recommended guidelines for those who are over 50 for example that suggest that women should consume 1800 calories and men a little more: 2200 calories. Those 50 and under would require more calories, so that's 2000 for women and 2500 for men.

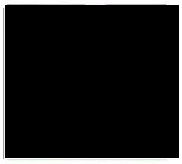

Image sourced from: https://www.englandrugby.com/news/real-rugby-stories-meet-the-year-old-rugby-player/ (image may be subject to copyright)

PAUSE

How can I tell if I am a healthy weight?

The simplest way to do this is at your doctors' surgery. Your GP can measure your weight and height and tell you if you are a healthy weight for your age and gender.

Image sourced from:

https://www.shutterstock.com/video/clip-7445398-mexican-doctor-weighing-chinese-patient
(image may be subject to copyright)

This is called measuring your Body Mass Index. Your Body Mass Index is an indicator of whether your health is at risk and applies to most people.

A Body Mass Index in normal range a good indicator that you are not eating too much or too less for most people. If your GP finds you are underweight, they may provide nutritional support and refer you to a dietician. If they think, you are overweight or obese they will advise lifestyle and nutrition changes.

PAUSE

How can I measure my weight at home?

A friend, family member, or carer could also check at home to see how much unhealthy weight you may be holding around your tummy using a piece of string.

Only try this if you are steady on your feet and are able to walk. They should place a piece of string at the base of your heel and bring it up to your head; that is they are using the string to measure your height. Next, the string should be folded in half. The folded string can then be placed around your waist near the belly button area like a belt.

If the two ends of the folded string do not meet, it means you have unhealthy fat around your tummy. The good news is this fat called visceral fat quickly disappears with a healthy diet and exercise. Thirty minutes of exercise can make a big difference: you could do a bit of gardening for 10 minutes, some hoovering around the house for 10 minutes or even a brisk 10 minute walk to a coffee shop.

You can also buy electronic scales that can calculate your BMI and body fat percentage for you just by you standing on them. This option may require a help of a sighted friend, family member or carer to read the scales.

PAUSE

This is the end of section two before you take a break or move onto section three here are some top tips to help maintain a healthy weight

Try and exercise for 30 minutes a day, remember even going for a walk or doing a bit of gardening counts.

Consult your GP before starting any new intense exercise regime

Reduce your sitting time; try not to sit for long. Experts suggest standing up for a minimum of two hours a day. You could break this up into just 10 minutes every hour!

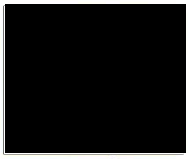

Image sourced from:

https://www.hartman-group.com/newsletters/1622195115/as-snackification-in-food-culture-becomes-more-routine-tra (image may be subject to copyright)

Keep a meal routine, eating the same time each day. Avoid eating in the evenings. Research has found that if you eat later in the day your body does not use up sugar effectively and so more may get stored as fat.

Eating breakfast is very important eat something like wholegrain bread with eggs. Meals like this for breakfast are healthy can help you avoid snacking and keep you full for longer.

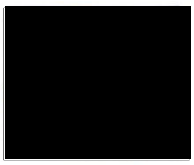

Image sourced from: https://blog.supplementler.com/wp-content/uploads/2015/08/tam-tahıllı-ekmek-ve-yumurta.jpg (image may be subject to copyright).

Section two

The following information applies to most people however if you are on a restricted or modified diet as advised by your doctor or health professional, for example, you may have Crohns disease then consult your GP before following this advice.

PAUSE

Please note this video describes portion sizes using hands and fingers. The portions sizes described are specific to your hands. If someone else makes food for you and they have bigger or smaller hands than yours they should take the difference in hand sizes into account before serving your meal.

PAUSE

What foods should I be eating and how much do I need to eat a healthy balanced diet?

Fruits and Vegetables "Eating your five or more a day"

Fruits and vegetables are high in fibre, vitamins, minerals and they are low in fat. Research has shown eating five or more portions of fruit and vegetables day can lower the risks of certain cancers and cardiovascular disease.

PAUSE

You may have heard the term five portions of fruits and vegetables, but what does that actually mean?

Each serving represents one of your five a day.

So do five apples give you five a day?

Image sourced from: https://www.vizpark.com/wp-content/gallery/apples_images/five-single-apples.jpg (may be subject to copyright)

The answer is no, each fruit or vegetable counts as one as they all provide different nutrients.

So one of your five a day could be one medium sized apple. Another could be a handful of grapes, a pear, or banana. Even a handful of dried fruit or a cup of canned fruit counts as one portion

Image sourced from: https://www.bupa.co.uk/health-information/nutrition-diet/portion-size (may be subject to copyright)

Three to four spoons of peas or sweetcorn would count as one portion of vegetables. Three to four spoons of beans and pulses would also be counted as one portion.

Image sourced from: https://www.bupa.co.uk/health-information/nutrition-diet/portion-size (may be subject to copyright)

You could have also have a cupped hand of shop bought ready to eat salad that counts as one of your five a day.

PAUSE

Eating vegetables and fruits of different colours is beneficial to your health. Red fruits and vegetables such as tomatoes, red peppers, and cherries are a good source of antioxidants and they reduce cholesterol.

Image sourced from:

http://4.bp.blogspot.com/dW6v3AvwNVI/Th8cA_kHgxI/AAAAAAAABPc/2qWocFK18oQ/s1600/tomato.jpg (may be subject to copyright)

Orange and yellow fruits and vegetables contain beta carotene which is used to produce hormones and help keep your eyes healthy. Some examples of these foods are carrots, sweet potatoes, and sweetcorn.

Image sourced from: https://www.allthatgrows.in/products/carrot-orange (may be subject to copyright)

Green vegetables such as kale, broccoli are good for the eyes and research has linked them to having a protective affect against blood vessel damage and some cancers.

[redacted]

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

Blue fruits and vegetables such as blackberries and beetroot; also have antioxidant effects protecting cells from damage [redacted]

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

PAUSE

If you find including "five a day" into your diet difficult, start gradually. For example, have some fruit in your cereal one day. Perhaps add a banana to your lunch the next day. Then add some

vegetables in your evening meal that the next day. You'll soon be incorporating your "five a day" into your week!

PAUSE

Starchy foods and carbohydrates

How many carbohydrates can I eat a day?

Eat a small amount of carbohydrates with each meal.

For example you could start your day with a bowl of porridge have one cupped hand. This is one serving. Be sure to choose cereal options low in salt and sugar.

Image sourced from: https://www.bupa.co.uk/health-information/nutrition-diet/portion-size (may be subject to copyright)

You could have a wholemeal bread sandwich for lunch that counts as your second serving.

As a base for your evening meal, you could have one medium potato equal to the size of your fist.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

That's right you heard that correctly, potato is counted as a carbohydrate and not a vegetable. You could have pasta or rice instead of a potato. You should measure one cupped hand.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

PAUSE

Protein

How much protein helps towards a healthy balanced diet?

Aim for 8-9 portions of protein each week for example you could have one egg a day.

Limit red meat to no more the size of the palm your hand only.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

Alternatively, you can have cooked white meats or the size and weight of a chicken breast... ask your butcher or a shop assistant if you are not sure about the size.

Try to eat two portions of fish each a week, ideally one should be an oily fish like salmon, mackerel or tuna. . For oily fish, one portion would be approximately size of your palm.

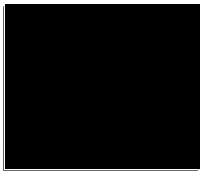

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

A portion of non-oily fish such as cod or haddock would be the same size as your hand from top of fingers to the base of your palm.

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A handful of nuts is also a good source of protein and counts as one portion. You could eat this when you are on the go or as a snack! 

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PAUSE

Dairy

Eat two or three portions of dairy a day

For example you could have a piece of cheese, that's the length and breadth of two thumbs,

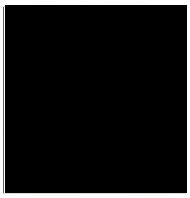

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

200ml milk or 125 ml of yogurt are one portion each.

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Choose low fat and low sugar alternatives

PAUSE

Fats

Should I avoid Fats? The answer is NO! A small amount of fat is an essential part of a healthy balanced diet. Fat helps to absorbs essential vitamins such as vitamins A, D and E. Aim to eat no more than two to three portions of fat a day.

Try to eat unsaturated fats such as sunflower, rapeseed, and olive oils.

A serving of peanut butter, butter and oils and spread is one teaspoon or the length of your thumb.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

What foods should I limit that are high in saturated fats?

Foods high in saturated fats are meat products like sausages, hard cheese for example cheddar, baked goods for example, biscuits, cakes and pastries and you guessed it chocolate confectionary.

PAUSE

Fluids

Drink up to eight glasses of water a day, this can include teas and coffees. A glass is eight ounces or 227 ml.

Teas and coffees with caffeine can be a bit dehydrating so maybe try decaffeinated alternatives or even herbal or fruity teas.

PAUSE

What should I limit in my diet?

Limit fruit juices to only 150ml per day or one glass.

Image sourced from: https://www.bupa.co.uk/health-information/nutrition-diet/portion-size (may be subject to copyright)

Avoid eating foods high in salt, like salted nuts and crisps try to aim for no more than 4 g of salt per day.

Avoid foods high in sugar such as milk chocolate and cakes. If you give into a temptation, an appropriate portion size of chocolate would be the length of your index finger.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

An appropriate cake treat would be the length and width of two fingers.

Image sourced from: https://www.dailymail.co.uk/health/article-3331095/Handy-guide-portion-sizes-Never-know-food-Use-formula-figure-right-eat.html (maybe subject to copyright)

Try to buy alternatives such as dark chocolate with no added or reduced sugar or low fat and sugar biscuits.

Ask for assistance when out shopping about food packaging. The shop assistant, friend, or carer should look at the traffic light colours on packaging if they have them. Red means the product may be high in saturated fat, sugar, or salt.

PAUSE

Alcohol can increase your appetite and cause dehydration so try to limit the amount you drink and avoid exceeding the advised amount of 14 units per week.

Image sourced from:

https://scienceblog.cancerresearchuk.org/2016/01/08/new-alcohol-guidelines-to-help-cut-cancer-risk/ (image may be subject to copyright)

We have now come to the end of section two before you take a break or move onto section three there are some top tips for reducing your portion size:

Keep tempting food out of sight and try less calorific alternatives

Ask someone about the portion size of your food, or if you have talking weighing scales you can use these to ensure you are eating the right amounts

Image sourced from:

https://www.nrshealthcare.co.uk/eating-drinking-aids/food-preparation/talking-kitchen-scale-with-easy-to-see-measuring-jug?fee=19&fep=39761&msclkid=96735403ecd119ab027708f456fb9a98&utm_source=bing&utm_medium=cpc&utm_campaign=Moo%20-%20SH%20(1H)%20-%20All%20Products%20-%20Not%20Selling&utm_term=4582352151673595&utm_content=Eating%20Drinking%20Aids%20%3E%20unranked%20%3E%20under70%20%3E%20P01389 (image may be subject to copyright)

Be mindful of what you are eating. Make sure you chew your food fully and chew slowly.

Image sourced from: https://www.wikihow.com/Eat-Slowly (may be subject to copyright)

It takes 20 minutes for your brain to register that you are full so wait at least that long before moving from a meal to dessert, you may find you don't want it!

Stick to three meals per day and if you do have snacks make them healthy ones like fruit or a low fat yogurt

Eat a large portion of fruit and vegetables they will keep you fuller for longer

PAUSE

Section 3

Cooking for yourself and maintaining your independence is encouraged wherever possible however if you are not able to, you find cooking difficult and need healthy meal alternatives or need help with cooking this section is for you.

PAUSE

I feel I am unable to cook where can I source healthy ready meals and how much do they cost?

Home delivery services are run throughout the UK for example companies such as, Oakhouse foods, Wiltshire Farm Foods, Lodge Farm Kitchens, and the Royal Voluntary Service deliver frozen food to your home. You can request a brochure by calling, online or by post. The menus have a large variety of different foods, be sure to opt for the healthier options such as low fat if you are unsure you can call the companies and they can advise you appropriately.

PAUSE

You can also source and stock up on healthy ready meals from some of your local supermarkets, for example, a healthy living range, Ask the shop assistant for support to locate these items, their cost may vary depending on the item but in both stores, the average price does not exceed £3.50 per meal. You should check with your local supermarket, pub or cafe in case they also do a healthy range of ready meals.

PAUSE

If you struggle to shop on your own go with a friend or shop online for older adults Age UK provide a supermarket shopping service.

PAUSE

You can also buy foods that do not need to be cooked but are healthy for you; for example, pre-prepared ready to eat salad is one of your five a day. Wholemeal bread can be used to make up sandwiches, for example, you could buy some smoked salmon and have it with cucumber. A low fat, low sugar yogurt with chopped up or tinned fruit can make a tasty pudding.

PAUSE

I would like some visual aids to help me cook but I can't afford them, who can help me?

Many charities, organisations, and social care can provide you with help to get grants for items you may not be able to afford. Ask a friend, family member, carer to help or yourself if able to check what grants you may be able to access on the Turn2Us website at www.turn2us.org.uk. Turn2Us has a database of over 3,000 charitable funds (national, regional and local) that may be able to provide financial assistance or services depending on your individual circumstance.

If you are ex-service (men and women) some veteran charities may also be able to help you get support to buy certain equipment such as talking microwaves in some circumstances.

PAUSE

I am struggling with my sight or I am registered sight impaired, or severely sight impaired who can support me with cooking and help me to use my kitchen utilities?

If you need, support with cooking or your kitchen equipment to make them more accessible contact your doctor or even pop into your local high street optician. They can both refer you to a low vision service provider and for a needs assessment.

The social services should get in touch within a month.

Make a list at home of all the things you need help with or maybe get a friend or family member to help with making the list. Keep the list in a safe place.

The social services have a sensory team who will call you up and ask about the difficulties that you may be having. This is called a needs assessment. Be sure to let them know what you have difficulties with; this is when the list you made comes in handy. They provide one to one support to help you adapt your kitchen utilities and can provide funding for equipment under £1000 to help you live more independently. They also give you advice on lighting in your kitchen and how to make the most of contrast with cutlery to help you cook safely.

PAUSE

Unfortunately, the government do not currently provide cooking classes, however, there may be colleges in your local area for people of all ages that do. Ask your low vision service provider who may be able to direct you to the most appropriate organisation.

PAUSE

Before we finish here are some top tips from the RNIB to cut and peel safely

Make the best possible use of lighting. The closer the light source is to the task, the lighter it will be.

Avoid using surfaces or utensils that reflect light or create glare.

Use the right knife for cutting and slicing. A blunt knife isn't safer than a sharp one because you need to exert more pressure and the knife might slip.

You can buy already chopped vegetables such as onions, pre-prepared salads or frozen vegetables

Keep your knuckle against the side of your knife as a guide – this way you can also measure the thickness of the slices you want.

A chopping board with a funnel end is very useful when directing food into a pan or bowl.

It is helpful to use a "D" design peeler with a free moving blade or you can avoid peeling by scrubbing vegetables thoroughly – especially as some vegetables have more nutritional value with their skins left on 

Image sourced from: https://www.amazon.co.uk/OXO-Good-Grips-Y-Peeler/dp/B00004OCIU (image may be subject to copyright)

PAUSE

Here are some top tips from the RNIB to boil foods safely

You can avoid having to drain hot liquids by cooking vegetables in a chip basket or vegetable steamer then simply lift it out of the pan on to a plate when cooked.

You can also buy pasta pans with lock down lids. They have two handles and this allows you to tip the whole pan up knowing that the lid is locked secure and the water is poured out through a drainage hole. You can use this pan for pasta and vegetables.

Liquid level indicators are useful when pouring hot liquids. This gadget either vibrates or gives an audible signal when the glass or cup is almost full with liquid.

If you're worried about using a kettle to make a cup of tea or coffee, you might like to try a hot water dispenser instead. You can make hot drinks easily using a "one-cup" kettle. These

kettles automatically dispense a mug's worth of boiling water straight into your mug.

Image sourced from: http://i.ebayimg.com/images/i/152543568605-0-1/s-l1000.jpg (image maybe subject to copyright)

When boiling vegetables, you can place a water boil alert at the bottom of the pan to help detect when the water is bubbling.

Image sourced from: https://shop.rnib.org.uk/water-boil-alert.html (image may be subject to copyright)

Using a microwave to cook vegetables is often easier and safer. You can also fry chips and other food using an air fryer. These often require just one tablespoon of oil, and fry the food in a sealed container which doesn't get hot to the touch.

When stir-frying use a bigger pan than a sighted person would use as it gives more room to stir vegetables around without losing them from the pan.

If you are concerned about using a hot hob or oven, a slow cooker can be helpful. A slow cooker is like a casserole pot with a small electric heater that slowly cooks your food. Put all your ingredients into the cooker on your work surface whilst the cooker is cold and then leave them to cook in the enclosed pot.

Image sourced from :https://www.argos.co.uk/product/7194816 (image may be subject to copyright)

PAUSE

If you are unsure about using equipment because it is new to you or you are unsure of the technology please ask a friend, family member, carer for help. This equipment such as slow cookers and one shot water dispensers have been designed to be easy to use so don't be afraid to give them a go!

Conclusion

This is the end of section three. Remember making gradual changes to your diet for example maybe adding a fruit at lunch or one portion of oily fish to start with a week are small steps that will make a big difference to eating healthier and a healthier you! Also, if you are able, try to exercise for half an hour a day remember a 10 minute brisk walk, 10 minutes of gardening and even 10 minutes of stretching is your 30 minutes done, it really is that easy!

Image sourced from: http://florencesweigh.blogspot.com/2016/07/motivation-monday-hacks-to-get-30.html (maybe subject to copyright)

Thank you for listening to and watching this video.