DEVELOPMENT OF NUTRITION EDUCATION SUPPORT MATERIAL FOR THE SOUTH AFRICAN ELDERLY FOOD BASED DIETARY GUIDELINES FOR isiXHOSA AND seSOTHO SPEAKING COMMUNITIES

Dissertation submitted in fulfilment of the requirements of the Master of Applied Science in Food and Nutrition in the Department of Food and Nutrition: Consumer Sciences, Faculty of Applied Sciences at the Durban University of Technology

By

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October 2023

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DECLARATION

I, Ms. M.L. Nteleza, student number 21125886, declare that this study entitled: Development of nutrition education support material for the South African elderly food based dietary guidelines for isiXhosa and seSotho speaking communities is my original work and it has not been submitted previously in any form to another academic institution. Where use was made of the work of others, it has been duly acknowledged in the text. The research described in this dissertation was carried out in the Department of Food and Nutrition: Consumer Sciences, Faculty of Applied Sciences, Durban University of Technology, South Africa under the supervision of Dr H. Grobbelaar and Prof. C. Napier.

15 February 2024

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19 February 2024

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19 February 2024

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ACKNOWLEDGEMENTS

This research study owes a lot of gratitude to a number of individuals who selflessly contributed their ideas and time to bring this research to its birth and completion. I acknowledge with deep gratitude and appreciation the contribution of the following, without them, this research study could not have been a success.

- I would like to acknowledge and give my warmest thanks to my supervisor, Dr Heleen Grobbelaar who has made this work possible. I honestly do not see a way I could have completed this study if it was not for her guidance, unwavering support, and patience with me. Her expert advices carried me through all phases of writing this dissertation. Thank you so much Dr.
- My co-supervisor, Professor Carin Napier for her valuable input and guidance throughout my dissertation
- To the Delphi panel for their inmense input and advice towards successful development of the nutrition education tools.
- The elderly care facility managers for granting me permission to access their facilities and enteract with the elderly, and also the facility staff members for assisting me in choosing participants that met the inclusion criteria.
- Thank you to the elderly that agreed to participate in this study.
- Graphic designers from Colour Domain for their beautiful work of designing the nutrition education tools, and for their enthusiasm and patience throughout the designing process.
- To my research partner, Zanele Khanyile, we've worked so well together. Thank you for your greatest contribution towards the success of this dissertation, I could not have asked for a better research partner
- My parents (Mzwandile and Nozukile Nteleza), I love you both so much. Thank you for your ever motivational and encouraging words to push forward and never to give up. Thank you for being prayer warriors. I am all that I am today through your powerful prayers.
- My deep sense of gratitude goes to my dear husband, Vuyolwethu Mabena. Thank you for everything. Your support, encouragement, patience and understanding in all aspects through all this journey has been unmatched. You're the greatest indeed, I am greatly honoured to walk this life's journey with you. I love you.

- My siblings (Nthabiseng and Boitumelo Nteleza). I thank God every day for you in my life. You are part of my strongest support system. I know you will be much proud of me for this accomplishment.
- Finally, all glory goes to God. None of all this could have been a success if it was not His will. You are a mighty and marvellous God, I will forever praise your name.

ABSTRACT

South Africa has the highest percentage of older people in the continent at risk of developing Non-Communicable-Diseases (NCDs), contributing to 51% of deaths in SA. As part of efforts to address elderly-specific needs, 13 EFBDGs published in 2017 exist in South Africa but currently there is no known NE support material to communicate and educate the elderly on these EFBDGs.

Literature reveals that the elderly present unique challenges to nutrition educators who try to accommodate diversity in terms of culture, nutrition requirements and changes experienced during ageing. In developing NE support material, it therefore becomes crucial to incorporate elements of acceptability for older persons such as being age-friendly, culturally acceptable, and adaptable to older people's needs whilst considering various health risks and circumstances. The Elderly Food Based Dietary Guidelines (EFBDGs) were translated into the five mostly spoken South African languages for the purpose of Knowledge Mobilisation.

The aim of this study, therefore, was to develop and test nutrition education support material for the EFBDGs for the isiXhosa- and seSotho-speaking communities.

Developing the NE material to support the EFBDGs was done through a three-phase explanatory sequential study, incorporating the quantitative study of a sample of 40 elderly people comprising both isiXhosa and seSotho language speakers to gather information on a preferred and suitable method of knowledge mobilisation for the elderly. The phase one data was collected through a self-administered questionnaire and analysed on SPSS, version 22.0 for descriptive analysis. In the second phase, qualitative methods were used to test for face and content validity through a Delphi panel. Six experts participated in the Delphi technique on the basis of their knowledge of and expertise in the subject and related topics. The Delphi technique was used to obtain consensus among the experts on the design and presentation of the NE material to be developed. A 5-point Likert scale was used to measure the strength of a participant's agreement with a clear statement (1 being strongly agree and 5 being strongly disagree). The results were grouped into three brackets (1 – 2 agree; 3 neutral, and 4 – 5 disagree). Consensus was defined if 60% or more of the responses fell into one of the three brackets. The third phase was testing for acceptability of the developed NE material. This was done through FGDs with two FGDs in each of the two languages made up of 8 participants in

each group. Consensus on FGDs was met in the second round, and consequently the process was terminated.

Data was collected in three phases as were the results. The pre-development survey results indicated that 55% (n=22) of the respondents were in the age bracket of (60 – 69) years, whereas 40% of the (n=16) were in the age bracket of (70 – 79) years. The least number of the respondents (5%; n=2) were from the age bracket of 80+ years. More females 62.5% (n=25) participated in the study compared to males that made up (37.5; n=15) of the study population. A majority of the participants 60% (n=24) had a primary education level, whereas 17.5% (n=7) of the participants had matric as their highest level of education. Similarly, 17.5% (n=7) of the participants had never attended school. The least number of the participants (5%; n=2) had tertiary education. Fifty-two-point-five percent of the participants (52.5%; n=21) had never had any learning opportunities. Twenty-five percent of the participants (25%; n=10) had attended workshops or short courses run by a community organisation, whereas 10% (n=4) of the participants had attended on-campus learning through a college or university, and (7.5%; n=3) of the participants had attended other learning opportunities that were not provided as options in the questionnaire. Only 5% (n=2) of the participants had registered for learning opportunities offered by a clinic or healthcare centre, and none of the participants had ever participated in an online or distance course. Seventy-five percent of the participants (75%; n=30) had never used a computer before, whereas 25% (n=10) of the participants had used a computer before. Of the 25% (n=10) of the participants who had used a computer before, they had used it for the purposes of writing, editing and research (30%: n=3); work 30% (n=3); watching movies and playing games each reflected (10%: n=1) of the participants; and internet browsing reflected 20% (n=2). No participant had ever used a computer for emailing purposes. A majority of the participants 52,5% (n=21) indicated to have a moderate sense of hearing. Sixty-two-point-five percent (62.5%; n=25) of the participants indicated to have a moderate sense of sight. Sixty-seven-point-five percent (67.5%; n=27) of the participants reported to have a good sense of smell. Ninety percent (90%; n=36) of the participants indicated to have an excellent sense of touch. The poster and the booklet were preferred by 57.5% (n=23) and 25% (n=10) of the participants respectively as the preferred tools to communicate the EFBDGs. Fifty-two-point-five percent (52.5%; n=21) of respondents were unaware of the FBDGs. Forty-seven-point-five percent (47.5%; n=19) of respondents knew about the FBDGs but only partially understood what they meant. Only (12,5%; n=5) of the respondents indicated they understood the meaning of the FBDGs. Fifty-seven-point-five percent (57.5%; n=23) of the respondents

did not understand the meaning of the FBDGs, and 30% (n=12) of the respondents only partially understood the meaning of the FBDGs.

The Delphi technique results indicated that 66.6% of the experts reached consensus that the poster and a booklet were the best forms of communication for the elderly. A consensus of 66.6% of the Delphi experts was reached on the aspect that the material held the potential to attract the attention of the elderly. All the experts (100%) agreed that the font type, font size and colours to be used in the NE support material would be suitable for the elderly. No consensus was reached (50%) on the aspect of evaluating the language used in the material. All the experts (100%) agreed that the material was scientifically sound. All three aspects evaluated in round two of the Delphi technique reached consensus, and consequently the process was terminated.

Focus group discussions identified five themes. These themes were that: 1) The font size used in the poster was too small; 2) The visuals were easy to relate to and were attractive and "attention grabbing" insofar as the colours used; 3) The tools held good potential to influence change in elderly eating habits; 4) The tools were an informative, user-friendly source of learning that could be used at any time as a reminder of or a guide to healthy eating; 5) The material would be easily accessible if it were to be placed in the elderly care facilities where some of the elderly lived, local clinics, hospitals and local doctor's rooms.

The elderly population is drastically increasing together with the economic burden for the treatment of NCDs that are more prevalent among the elderly. Even so, the elderly are not prioritised when it comes to nutrition education. The elderly lack nutrition education because nutrition education in South Africa is targeted at all the other vulnerable groups except the elderly. This leads to poor food choices and habits, which subsequently result in the development of NCDs among the elderly. Achieving an optimum level of public awareness about the EFBDGs is crucial in getting elderly people to implement them. Posters are recommended to promote health education in institutions for the elderly and could also be used by health practitioners, and booklets are seen as the best support material for the personal use of the elderly.

ACRONYMS AND ABREVIATIONS

AD	Alzheimer's Disease
ADL	Activities of Daily Living
AI	Adequate Intake
CCDPHP	Centres for Chronic Disease Prevention and Health
CDC	Centres for Disease Control and Prevention
COPD	Chronic Obstructive Pulmonary Disease
DRI	Dietary Recommended Intake
DUT	Durban University of Technology
EAR	Estimated Average Requirement
ECF	Elderly Care Facilities
EFBDGs	Elderly Food Based Dietary Guidelines
FAO	Food and Agricultural Organisation
FBDG	Food Based Dietary Guidelines
FGDs	Focus Group Discussions
FSA	Food Standard Agency
GNR	Global Nutrition Report
KMb	Knowledge Mobilization
LDL	Low Protein Lipoprotein
MetS	Metabolic Syndrome

NCD	Non-Communicable Disease
NE	Nutrition Education
NGO	Non-Governmental Organisation
NIA	National Institute of Ageing
OA	Osteoarthritis
OAU	Organisation of African Union
PAO	Pan African Organisation
PD	Parkinson's Disease
RA	Rheumatoid Arthritis
RDA	Recommended Dietary Allowance
SA	South Africa
SASSA	South African Security Agency
SPSS	Statistical Package for Social Science
SSHRC	Social Sciences and Humanities Research Council
T2D	Type2 Diabetes
UL	Tolerable Upper Intake Level
UNDP	United Nations Development Program
UPS	Ubiquitin-Proteasome System
VUT	Vaal University of Technology
WHO	World Health Organisation

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1.1 Introduction

During ageing, it is vital to persist in choosing healthy foods and enjoying eating as a social activity that an individual can always look forward to (Academy of Nutrition and Dietetics 2021: 2)**.** However, the individual's lifestyle and appetite change as they age and this can influence the types and amounts of food the individual eats (Browne 2021: 6). Loss of appetite in the elderly may be due to a decrease in metabolic rates, changes in senses that cause food to taste differently, medication side effects, problems with dentures, loneliness, or reduced ability to buy and prepare healthy foods (National Institute on Aging (NIH) 2021: 1). Consequently, this can imply that elderly people are at risk of poor nutrition and diet related diseases, as they do not get enough essential vitamins, minerals and fibre, which can aggravate general sickness or worsen some chronic illnesses such as high blood pressure, diabetes and coronary heart diseases (NIH 2021: 1). This, therefore, points out the importance of adequate nutritional intake for elderly people (Browne 2021: 6).

Malnutrition has global effects and progress in overcoming this burden has been unacceptably slow (Global Nutrition Report 2021: 3). The global prevalence of overweight and obesity in persons 60 years and older is at a record high of 41.5% (Centres for Disease Control and prevention 2022: 22). Nutrition greatly affects elderly health, and both under- and over-nutrition are connected to high risks of morbidity and mortality (FAO and WHO 2018:12). To reduce the increased burden of diet-related diseases and promote elderly potential through food and nutrition globally, co-ordination of efforts is urgently needed (National Institute on Minority Health and Health Disparities 2023: 3).

A meta-analysis reported a significant, albeit week positive association between nutrition knowledge and healthy eating (Bouras, Tsilidis, Pounis and Haidich 2021: 9). Even so, a glaring gap exists in South Africa's nutrition education landscape. While programs deligently nourish the minds and bodies of young adults, the elderly, a population facing unique dietary needs and vulnerabilities, are left largely on the sidelines (Browne 2021: 3). This uneven distribution of knowledge contributes to a silent epidemic of malnutrition among older South Africans, jeorpadizing their health, independence, and well-being (Browne 2021: 3). Urgent action is needed to tailor effective nutrition education programs specifically for the elderly, empowering them with information and skills to navigate the complexities of age-related

dietary changes and make informed choices for a healthier, more vibrant later life (Bouras *et al*. 2021: 9).

According to the World Health Organisation (WHO) (2017: 3), some studies classify older adults between 65 and 74 years as the youngest-old, 75 to 84 years as the middle-old, and 85 years and older as the oldest-old. Due to an increase in older patients, the definition of 'old' has changed over time, and the elderly are now identified as the youngest-old (60–69 years old), the old-old (70–79 years old), and the oldest or older old (80 years and older).

The purpose of this study is explained in this introductory chapter and the dissertation overview is provided. The chapter begins by introducing the background and context within which this study was conducted as well as the motivation for the study. This is followed by an explanation of the objectives intended to be achieved by this study. It then proceeds to give an overview of the way in which the study will be conducted by providing the plan of the research activities and finally, an outline of the structure of the dissertation is provided.

1.2 Background to the problem

South Africa is projected to become the fourth country in sub-Saharan Africa to transition into an ageing society during the next 25 years, following Mauritius, Seychelles, and Cape Verde (Jain and Chetty 2020: 5). It is projected that by 2045, the proportion of South Africa's population aged 60 and above, which is the age at which individuals qualify for an older person's grant, will increase double, from 8% to 16%. The population of older adults will experience a significant increase from approximately 4.5 million to 10.6 million (George and Merkus (2021: 23). This growth will occur at an average annual rate of 2.9%, which is significantly higher compared to the total population's growth rate of 0.6% (George and Merkus (2021: 23).

This demographic trend has profound implications for the health, welfare, and long-term care systems, which are now ill-equipped to effectively manage the existing elderly population (United Nations 2019: 1). While the elderly population worldwide is experiencing increased longevity, as indicated by the United Nations (2019: 1), there is limited evidence to suggest that their health is superior to that of their parents' generation, particularly in lower- and middle-income countries where the elderly are more likely to face insufficient healthcare and, as a result, lower levels of well-being. According to Wint (2021: 7), the connection between old age and chronic illnesses suggests a rise in the already high occurrence of chronic diseases. This highlights the issue of a healthcare system that is struggling to handle infectious diseases

like HIV and tuberculosis. Moreover, elevated rates of unemployment and poverty will pose challenges for forthcoming generations of elderly South Africans in terms of accumulating savings for their later years. Consequently, a considerable proportion of this growing older demographic is expected to be impoverished and reliant on public assistance to meet their healthcare and welfare requirements (Wint 2021: 7).

The knowledge gap between the elderly and nutrition knowledge is significant, influenced by factors like education, socio-economic status, cultural background, and access to information (Paul, Kyereh, Sarfo, Ansah, and Attafuah 2022: 12). Common knowledge gaps include lack of awareness about nutritional requirements, limited knowledge about portion sizes, misconceptions about dietary restrictions, lack of knowledge about food safety practices, and limited knowledge of nutritional research (Okunola 2021: 8). As the elderly age, they may not be aware of their specific dietary needs, such as consuming adequate nutrients like calcium, vitamin D, fiber, and protein. They may also struggle with portion control, leading to overeating or inadequate intake (Okunola 2021: 8). Misconceptions about dietary restrictions related to specific health conditions such as diabetes can also impact their overall health (Paul *et al*. 2021: 12). Limited knowledge about food safety practices can increase the risk of foodborne illnesses. Additionally, older adults may not have access to or keep up with the latest nutritional research, leading to outdated beliefs and practices (Paul *et al*. 2021: 12).

This study therefore, is significant to bridge the knowledge gap that exists between the elderly and nutrition knowledge as explained above. It aims to achieve this through developing tailored nutrition education material that would help address the elderly specific needs thereby promoting better health outcomes. Without this study's contribution towards nutrition education, the elderly population may continue to face inadequate nutrition education, resulting in malnutrition, increased risk of chronic diseases, impaired immune function, decreased quality of life, and higher healthcare costs due to higher hospitalisation and medical intervention rates. The importance of this study extends beyond the elderly population and has broader implications for the community, as it can also have intergenerational benefits. By promoting healthy eating habits and knowledge about nutrition, the elderly can serve as role models for younger generations, fostering a culture of good nutrition within families and communities. This can have a ripple effect, positively influencing the dietary choices and health outcomes of younger individuals.

1.2.1 A global perspective

Globally there were 54.1 million individuals aged 65 years and older in 2019 (up from 39.6 million in 2009) (Academy of Nutrition and Dietetics 2021: 2). It is projected that the elderly population will reach 80.8 million by 2040 and 94.7 million by 2060. The total number of the elderly aged 80 years and older is projected to be three times the 2013 population, reaching 392 million by 2050 (Academy of Nutrition and Dietetics 2021: 2). This demographic change is a worldwide challenge that can impact public health. The incidence of non-communicable chronic diseases such as type 2 diabetes (T2D), chronic obstructive pulmonary disease, cognitive decline and cancer, all of which are associated with high costs of diagnosis, treatment and ongoing care, is aggravated with age (WHO 2017: 2). Non-communicable diseases are the cause of 41 million deaths every year, translating to 71 percent of overall deaths worldwide (WHO 2018: 1). Over 15 million people aged between 30 and 69 years succumb to deaths related to NCDs each year, of which 85 percent of these deaths occur in low- and middle-income countries (WHO 2023: 8). Most NCD deaths are attributed to cardiovascular diseases and affect 17.9 million people every year. This is followed by cancer (9.3 million people annually), respiratory diseases (4.1 million people annually), and diabetes (1.5 million people annually) (United Nations Population Fund 2022: 1). Eighty percent (80%) of all premature deaths can be attributed to these four groups of diseases (United Nations Population Fund 2022**:** 1). Malnourished elderly are more prone to deteriorating health diagnoses, prolonged hospital stays and high mortality. Therefore, aside from the apparent personal cost, the economic burden of disease related to malnutrition is inevitable (United Nations Population Fund 2020: 5). Population ageing therefore elicits serious concerns about the fiscal integrity of the healthcare systems globally (United Nations Population Fund 2022: 5).

The most practical and viable means to improve the health and well-being of Americans were identified by the **(**WHO 2020: 4**).** These encompassed improving medical care and knowledge mobilization through nutrition education (WHO 2020: 4). Improvement in these aspects would encourage the elderly to adopt healthier behaviours and obtain regular health screenings that can reduce the risk of many chronic diseases and lower healthcare costs (Agency for Healthcare Research and Quality and the Centre for Disease Control 2019: 9)**.** The intended primary goal for the identified means was to increase the number of Americans who are healthy and productive at every stage of life (Willie 2022: 7). Federal and non-federal programs were implemented to put the United States Prevention Strategy into action in communities across the country (Agency for Healthcare Research and Quality and the Centres for Disease Control

2019: 9). These programs signified favourable practices that could be adopted and adapted by public and private partners to improve the national preventative strategy and generate a lifestyle where the elderly are considered as vibrant, crucial and valuable members of society (Willie 2022: 7). In 2014, however, only about two out of five adults aged 65 years and older were up to date on all of a core set of preventative services (Agency for Healthcare Research and Quality and the Centre for Disease Control 2019: 9). While policies and programs can render healthy options, it is acknowledged by experts that people require knowledge to make healthy choices (Varan 2020: 135).

1.2.2 The African perspective

During old age, the nature of health concerns changes as the focus shifts from communicable diseases to non-communicable diseases, which are typically chronic, degenerative, and mental illnesses (WHO 2018: 12). Furthermore, these changes are accompanied by a heightened prevalence of impairment. Moreover, these situations have significant ramifications for the delivery of healthcare, particularly due to the prevalent shortage of specialised services and personnel to address the healthcare requirements of the growing elderly population in most African nations (WHO 2018: 16).

Only a small number of African countries provide social welfare schemes for the elderly (Piscopo 2019: 1). Regarding formal economic assistance, nations such as Botswana, South Africa, Namibia, Seychelles, Swaziland, Lesotho, and Mauritius offer a non-contributory and means-tested old-age pension system (Varan 2020: 6). Kenya, Uganda, and Zambia are presently conducting trials for universal old-age social pensions. Furthermore, the current focus on the provision of nutrition services does not prioritise older persons. The main focus of nutrition interventions in African countries is on infants, young children, and pregnant and lactating women (WHO 2017: 13). The limited availability of research studies indicates a lack of focus on the aged in policies and programmes (Norman, Hab and Pirlich 2021: 4). The limited data suggests that nutrition issues in the elderly are substantial (Norman, Hab and Pirlich 2021: 4). Given the ongoing rise in the population of elderly individuals in Africa, it is imperative for researchers and policy makers to allocate greater focus to this demographic (Norman, Hab and Pirlich 2021: 4).

The targeting of nutrition interventions in Africa does not prioritise elderly individuals, which explains the lack of reported efficacy of various intervention types in this population (Simkus 2022: 1). The presence of nutritionists specialising in geriatric care in African countries is

scarce, and the number of practitioners engaged in rigorous research in this sector is much lower (Academy of Nutrition and Dietetics 2021: 22). In reality, apart from emergency relief and supplementary feeding programmes, such as luncheon clubs run by volunteers or donor organisations, there have been few further initiatives undertaken (Academy of Nutrition and Dietetics 2021: 22).

On a lighter note, however, Okunola (2021: 9) reported that Help Age International initiated a training and advocacy project targeting nutritionists and non-governmental organisations (NGOs) responsible for elderly care. The plan includes a coordinator stationed at the regional office in Kenya. The Organisation of African Unity (OAU) officially adopted and endorsed a policy framework plan called Action on Action in 2001 (Academy of Nutrition and Dietetics 2021: 22). The purpose of this endeavour was to provide guidance to member states of the OAU in developing, executing, overseeing, and assessing their own suitable national policies for the elderly (WHO 2017: 11). The policy document (WHO 2017: 11) recognised Food and Nutrition as one of the 12 crucial topics. In order to effectively implement policies related to ageing, it is necessary to have collaboration between different sectors such as the ministries of health and welfare, as well as non-governmental organisations and organisations (FAO 2020: 25).

1.2.3 The South African perspective

Statistics South Africa (2020: 22) reported that the proportion of individuals aged 60 and over, categorised as elderly, in South Africa increased from 7.6% in 2002 to 9.1% in 2020, based on population estimates. The exponential increase in the elderly population in South Africa (SA) has resulted in the emergence of novel social, health, and economical requirements (Stefanacci 2022: 5).

Ageing is correlated with a decline in physiological function due to the progressive accumulation of molecular and cellular damage over time (Liou, Joe, Kumar, and Subramanian 2020: 213). A significant number of elderly individuals are susceptible to one or more chronic conditions, including T2D, cancer, metabolic disorders, and hypertension (Liou et al. 2020: 213). Obesity and metabolic illnesses, such as Metabolic Syndrome (MetS), hypertension, and T2D, are major contributors to illness and death in many developed nations. According to Stefanacci (2022: 5), non-communicable diseases were the primary causes of death among individuals aged 60 years and older in 2016, accounting for the top ten leading underlying natural causes of death. Ischaemic heart illnesses, cerebrovascular disorders, and diabetes

mellitus were among the top ten natural causes of mortality for this age group. Ischaemic heart diseases accounted for 4.8% of deaths, cerebrovascular diseases accounted for 9.0% of fatalities, and diabetes mellitus accounted for 8.9% of deaths (Browne 2021: 27). Enhancing the well-being of older individuals has emerged as a significant obstacle on a global scale, including both advanced and emerging nations (Robinson 2018: 4). Older individuals typically rely more heavily on healthcare services, and when malnutrition is widespread, there is a higher likelihood of increased rates of diseases and mortality (Global Nutrition Report (GNR) 2018: 8).

Rea, Walters, and Avgerinou (2019: 4) emphasised the significance of addressing the nutritional well-being of the elderly in South Africa in the year 2000. Nevertheless, there has been a scarcity of practical research concerning nutrition matters, as well as the creation and evaluation of pertinent nutrition treatments (Rea, Walters and Avgerinou 2019: 4). After a span of twenty-three years, there has been little alteration. However, there is now prospect for enhancement as significant advancements are being undertaken to cater to the distinct dietary requirements of the elderly, which differ from those of younger adults (Deshpande 2022: 6). This is achieved by raising knowledge of the nutritional needs of the elderly through the systematic production of material that is explicitly targeted towards elderly nutrition (Browne 2021: 27). Nevertheless, there has been a delay in the development of educational resources to cater to those specific dietary requirements. In 2017, Napier, Oldewage-Theron, and Grobbelaar conducted a study to create and evaluate the South African EFBDGs. The study resulted in the development of 13 EFBDGs, which are currently in use in South Africa. These guidelines were supported and expanded upon by literature from different authors. Regrettably, there is currently a lack of nutrition education resources available to effectively convey these requirements.

Nutrition Education (NE) is a method of instructing individuals or groups about the scientific principles of nutrition, with the goal of facilitating changes in eating habits and behaviour (Piscopo 2019: 1). This particular form of NE does not prioritise the acquisition of factual information and knowledge, but instead emphasises the cultivation of open-ended modifications in conduct (Piscopo 2019: 1). Mastering NE involves breaking down a large amount of information into smaller, manageable bits that are tailored to the specific audience's capacity to understand and apply the information (Food and Agricultural Organisation of the United Nations: 2018: 19). The goal of effective education is to present nutrition information in a way that is easy to understand and use in everyday life (Deshpande 2022: 6). Therefore,

there is a need to develop support materials for nutrition education to assist spread the recently produced EFBDGs.

1.3 Motivation

The Food and Agricultural Organisation (FAO) (2020: 1) defined Food Based Dietary Guidelines (FBDGs) as the recommendations that give basis and guidance specific to the context of healthy eating and a healthy lifestyle. These recommendations were established on solid evidence and are a response to the nutritional priorities and public health of a country, to the patterns of how food is produced and consumed, to sociocultural influences, and to data of food composition and attainability among other factors (FAO 2020: 1).

Developing FBDGs is a comprehensive process requiring several steps which include planning, characterisation of target groups, identifying health and nutritional objectives, preparation of practical guidelines, testing the practicality of the guidelines, preparation of the FBDGs, validation, correction and adjustments and lastly, implementation (Browne 2021: 27).

Following the above-mentioned FBDGs development process, a total of 11 food based dietary guidelines were developed for healthy people aged seven years and older in South Africa (FAO 2020: 1). Due to the vulnerability of older people caused by the prevalence of age-related lifestyle diseases associated with poor quality diets, the FAO/ WHO consultation group recommended the development of a separate set of FBDGs for the elderly to address these needs in South Africa (Napier, Oldewage-Theron and Grobbelaar 2017: 1). The idea for the development of the EFBDGs was supported by the Nutrition Society of South Africa, and subsequently a working group was formed in 2012 to develop the 13 EFBDGs that currently exist in South Africa. The steps for developing FBDGs as mentioned above (Napier, Oldewage-Theron and Grobbelaar 2017: 1) guided the process. These guidelines were further translated into isiZulu, isiXhosa, seSotho and Afrikaans, which are the languages most spoken in South Africa (Esposito: 35). Although there is material to communicate dietary guidelines for people aged seven years and older, there is little literature available on the recently developed EFBDGs and currently there is no known support material available to educate people about or even to communicate the EFBDGs. The intention of this study was therefore to develop support material that will provide NE and information transference to older people in low- and middle-income communities.

As maintained by the FAO (2020: 18), focus ought to be directed at effectively disseminating information about the FBDGs to the public. The dietary guidelines should be simple, short,

clear, culturally appropriate, memorable, and well communicated in diverse media to make them relevant and relatable to the general public. Moreover, they should be multi-sectoral, be inclusive of all relevant community groups and ages, and must be supplementary to existing community programmes (Browne 2021: 13).

Development of NE support material for the EFBDGs will play a big role in Knowledge Mobilization (KMb). Knowledge Mobilization means the transference of existing knowledge (usually in the form formal research) into practical use (Social Sciences and Humanities Research Council (SSHRC) 2019: 2). Knowledge Mobilization in this study will facilitate knowledge sharing between the researcher and the research subjects, which for the purpose of this study are the elderly, but health care professionals and others whose work can benefit from the research findings are not excluded. According to the SSHRC (2019: 2), KMb is not only about information distribution, neither is it just focused on sharing or publishing information, nor is it a one-way flow of information. It rather encompasses consultation, target group participation and careful consideration of its impact. Moreover, evidence does not simply mean research; it involves evidence based on practice from the real world, from the proficiency of experts, and from the evidence of consumers saying what works for them (Browne 2021: 2).

Knowledge expands with usage and deteriorates in value when it is not used (Guarente, Rogers and Simic, 2022: 45). Knowledge Mobilization provides awareness for people to utilize knowledge in a manner that is strategic in dealing with real life problems. Overall, KMb assists people to put what they know into practice and to build up their knowledge. Knowledge Mobilisation also assists in empowering people with knowledge, bringing about change, bringing people together, and putting into practical use what people know (Guarente, Rogers and Simic, 2022: 45). It does not only enhance the manner in which information is shared, but also assists in promoting more fruitful and suitable change (Social Sciences and Humanities Research Council (SSHRC2019: 2) 2019: 2). It can bring about transformation in perspective or behaviour, and can even lead to cultural shifts within an organisation or sector. It can help improve the outcomes of client care. Substantially, KMb helps bring about change (SSHRC2019: 2).

The relevance of KMb in this study is to disseminate information to and empower the elderly about the newly developed EFBDGs and to help them use this information in strategic ways that will improve their lives in terms of nutrition through the use of the nutrition education material to be developed through this study.

1.4 Research Aim and Objectives

The main aim of this study was to develop comprehensive user-friendly nutrition education support material to better communicate the South African EFBDGs to inform the elderly and improve their lives with regards to nutrition and food choices.

The specific objectives of the study therefore were:

1.4.1 Phase one:

1. To determine the preference of the elderly with regard to nutrition education material developed

2. To develop nutrition education support material that will be an optimal nutritionally sound, and efficient method to communicate the EFBDGs in the isiXhosa- and seSotho speaking comprehensive communities.

1.4.2 Phase two:

3. To validate the developed nutrition education resources.

1.4.3 Phase three:

4. To test the efficacy of the developed nutrition education support materials.

Achieving these objectives will assist in bridging the gap that exists between the developed EFBDGs and absence of NE material to disseminate these dietary guidelines. These objectives will help present qualitative information on awareness and understanding of the nutrition education support material developed for the EFBDGs.

1.5 Plan of research activities

The plan of research activities is represented by Figure 1.1.

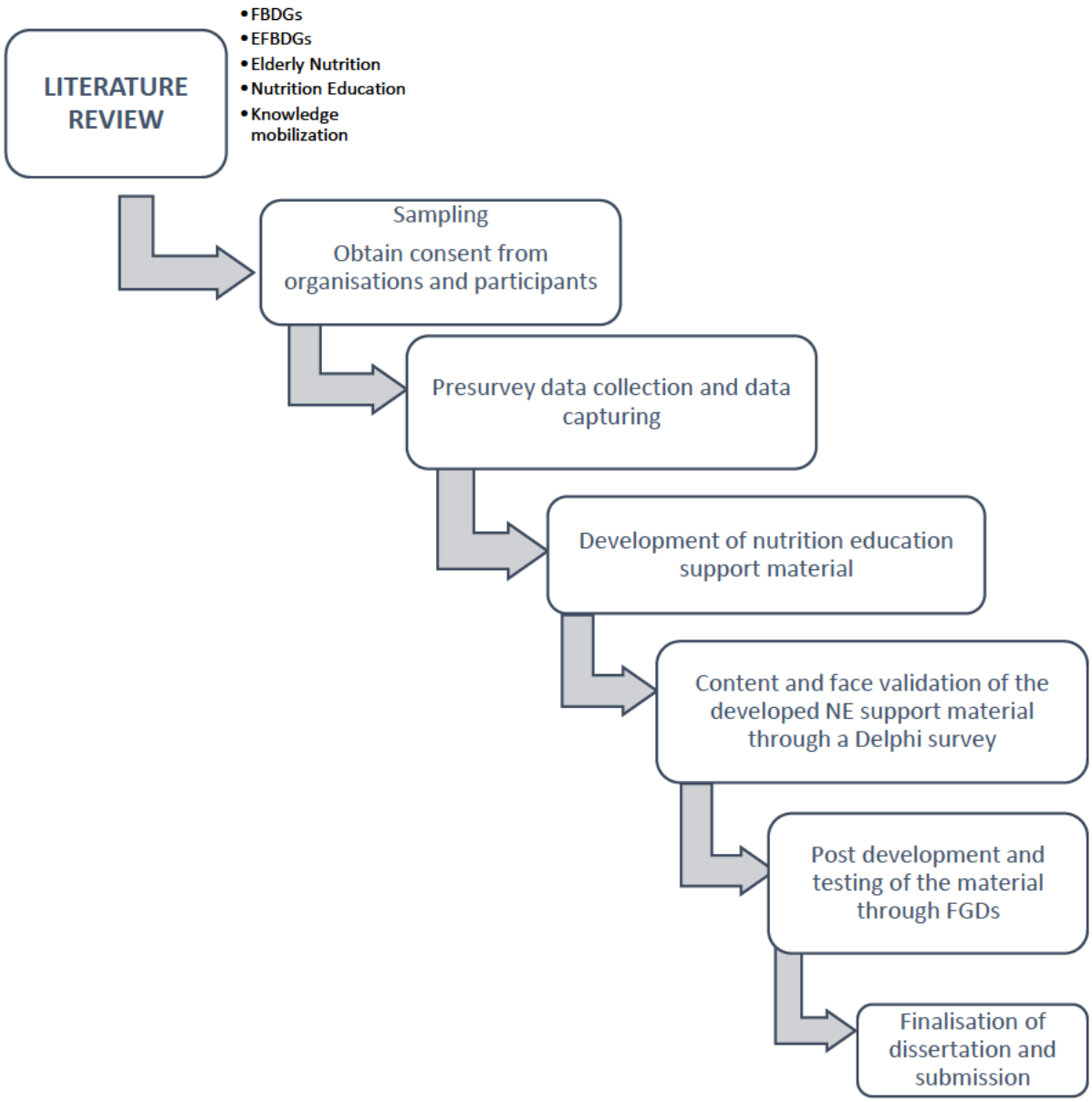

Figure 1.1: Plan of research activities

1.6 Outline of the dissertation

Chapter 1 provides an introduction to the study. Chapter 2 reviews relevant literature, provides a theoretical background to the study, a review of the used sources, and critical assessment of the literature. Chapter 3 describes the research methodology applied in this research and the research process stages. Chapter 4 illustrates in depth the findings of the study while Chapter 5 provides a conclusion by summarising the research as a whole, describing the research limitations and giving recommendations for future research.

1.7 Conclusion

This Chapter has provided a summary of the dissertation by focusing on communicating the importance of KMb and nutrition education strategies to address the health burden of the elderly to government. In so doing, the Chapter has indicated how this dissertation will encourage the development of literature on elderly nutrition education and the support material to disseminate such literature, both in South Africa and internationally. The Chapter also considered the health challenges and implications that come with ageing and indicated how these challenges served as motivation for this research project to be conducted. Chapter 2 provides an in-depth background to the study in terms of the development of the EFBDGs, nutrition requirements of the elderly, factors affecting nutrient intake, malnutrition and its impact on the elderly, as well as nutrition education strategies and approaches.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

This chapter contextualises the study. Good health helps the elderly support, rely, and sustain themselves (Abdi, Spann, Borilovic, de Witte and Hawley 2019: 3). Non-communicable diseases including diabetes, cardiovascular disease, cancer, and hypertension can lower the quality of life of the elderly (WHO 2022: 1). According to Klusener (2019: 1), non-communicable illnesses' societal and economic costs increase significantly with age, which may negatively impact economic growth. The public sector aims to sustain healthy successful agers and prevent or reduce chronic disease morbidity (Centres for Disease Control 2021: 7). Although there have been attempts to determine the nutritional requirements of the elderly, there is still a lack of comprehensive nutrition education initiatives to specifically cater to these needs. (CDC 2021: 7).

2.2 Elderly; the vulnerable to non-communicable diseases

The World Health Organisation (WHO) (2022: 1) stated that the global elderly population is experiencing an unprecedented growth rate. In 2017, the global population of individuals aged 60 years and older was documented at 962 million, which was more than twice the figure of 382 million recorded in 1980 for the elderly population worldwide (WHO 2022: 1). By 2050, the old population is projected to double, reaching approximately 2.1 billion individuals (Varan 2020: 1). The current population of individuals aged 60 and above in Africa stands at 64 million, and it is estimated to increase to 105 million by the year 2030 (Barrett 2020: 1). According to the (WHO) (2018: 34), South Africa has the largest percentage of older persons (8.7%) among all African countries (Statistics South Africa 2020: 1). As a result of decreasing birth rates and increasing longevity, it is expected that this percentage would rise to 17.4% by 2050 (Statistics South Africa 2020: 1).

The elderly population exhibits a remarkable range of variation, spanning from individuals who are quite frail to those who are active, physically robust, and in good health (Stone-Walls 2018: 67). Watson, McGowan, McCrum, Cardwel, McGuinnes, Moore, Woodside, and McKenna (2019: 12) examined the potential for a range of issues related to the well-being of the older population to be exacerbated by the global rise in the number of elderly individuals (WHO 2022: 3). The growing prevalence of chronic non-communicable diseases (NCDs) among the elderly population significantly strains the healthcare system due to an increased need for and availability of healthcare services (WHO 2022: 2). Collective efforts are required to formulate

and implement proposed strategies for the prevention and control of non-communicable diseases (NCDs), particularly among economically disadvantaged populations who are most in need of these interventions. Non-communicable diseases (NCDs) of a long-lasting nature are the primary reason for global mortality (Centres for Disease Control and Prevention, 2021: 4). In 2016, NCDs accounted for over half (54%) of the 57 million deaths worldwide. Among these fatalities, 80% occurred in low- and middle-income regions, such as the African region (WHO 2020: 2). From 2010 to 2020, there has been a 15% increase in global mortality caused by non-communicable diseases (NCDs) (WHO 2020: 2). The African region, characterised by low- and middle-income levels, experienced a substantial increase of over 20% (Wakim and Grewald 2021: 5).

The World Health Organisation (2022: 1) identified that the increased spread of NCDs had caused almost 75% more deaths than communicable, perinatal, maternal and nutritional diseases in 2020, and this percentage is expected to increase as the leading cause of deaths in Africa by 2030. Respiratory diseases, cancer, cardiovascular diseases, diabetes and chronic diseases were reported to be the most prevalent NCDs worldwide (Pan American Health Organisation and WHO 2022: 24). The effects of the high number of deaths caused by NCDs are extensive since they tend to cripple the economies of many countries, and place a burgeoning demand on the delivery of health services that are already experiencing extreme difficulties s in the face of diminishing budgets, and this impacts adversely on the health of the elderly who are often productive members of the labour force (Centres for Disease Control and Prevention (CDC) 2018: 2).

The attention given to diseases such as HIV and AIDS implies that preventative care is often focused on younger people (WHO 2022: 6). The elderly are typically provided with minimal information on healthy ageing and are required to compete for services with all other groups (WHO 2020: 23). The key to ageing healthily is a healthy lifestyle (WHO 2020:6). Eating different kinds of healthy foods, being physically active, and refraining from smoking can promote healthy ageing. Active ageing can improve physical, social and mental well-being all through life (National Institute of Diabetes and Digestive and Kidney Diseases 2020: 10). Given that the population is generally living longer, and considering the recurrent increase of various chronic diseases and the special health needs of the elderly, it is vital to assess the success of the nutrition intervention programming for the population (CDC 2022: 9). Older adults who habitually eat nutritiously and drink sufficient quantities of fluids are not likely to have issues with chronic illnesses and are unlikely to need hospital or nursing home care, or

care at other care facilities (National Institute on Aging (NIA) (2022: 3). Healthy lifestyle behaviours enable the elderly to avoid a deterioration in their health and mobility typically associated with ageing (NIA 2022: 4).

Inadequate nutrition knowledge counts as one of the principal components contributing to an increase in chronic NCDs and malnutrition and needs to be addressed (WHO 2021: 2). One of the elements affecting nutrition status is insufficient nutrition knowledge (Piscopo 2019: 4). Other elements include unsuitable nutrition education (NE), misconceptions and perpetuating unhealthy diet traditions and poor nutritional practices handed down from one generation to the next (Piscopo 2019). The United States Department of Agriculture (UN) (2018: 4) defined NE for the elderly as the supply of knowledge, skills, and/ or support to elderly adults to allow them to eat nutritious foods, thereby promoting the preservation of optimal health (National Library of Medicine 2019: 9). The purpose of providing NE for this sector of the population is therefore explained as being the need to uphold and sustain awareness and knowledge of topics related to nutrition (National Library of Medicine 2019: 9). Thus the purpose of this study was to develop tools that would create awareness and educate the elderly about the EFBDGs developed in South Africa.

In enhancing dietary habits and food choices in order to reverse the tide of under-nutrition, NE is a crucial constituent (CDC 2022: 4). A study on the positive impact of NE on the nutrition status of older adults conducted among the elderly Korean community, as indicated by Rea, Walters and Avgerinou (2019: 1)**,** found that by succeeding to convey the importance of NE and nutrition knowledge, nutrition attitudes and dietary habits were improved enormously. Provision of government support for NE thus needs to be encouraged to establish further healthful ageing policies (Robinson 2018: 12). Such policies would in all probability pay for themselves as they would inevitably shift the focus from hospitals and nursing homes to home care and community-based services (Robinson 2018: 12). It has been proven that the elderly do react favourably to health promotion programmes and NE, and that effective nutrition education and intervention programmes can make it possible for the elderly to improve and prolong their health, enjoy nutritious food and most crucially, retain a high quality of life (Karlsson, Ridback, Brobeck and Pejner 2019: 8).

2.3 Development of Elderly Food Based Dietary Guidelines

The WHO (2021: 7) defines FBDGs as science-based policy suggestions in a system of guidelines for eating healthily; they translate nutrient recommendations that are based on

evidence into food or dietary patterns that should guide the general population towards eating a healthy, more nutritious diet. The purpose of food-based dietary guidelines is to establish the rationale for public food and nutrition programs, healthy agricultural policies, and NE initiatives that promote healthy eating and living. They provide advice on foods, food groups, and dietary patterns so that the general public can receive the essential nutrients to promote overall health and prevent chronic diseases (WHO 2021: 7).

Currently, South Africa has eleven guidelines that make up the South African FBDGs tailored for individuals aged seven (7) years and over and which were revised in 2012 (Browne 2021: 2). Subsequently the Nutrition Society of South Africa encouraged the proposal by the FAO/WHO consultation for the development of the EFBDGs on the basis that different age groups and in particular, different population groups, and specifically older adults, encounter varying challenges, and due to this it is thus necessary to have FBDGs that provide for these needs in SA (Napier, Oldewage-Theron and Grobbelaar 2021: 3). Subsequent to this proposal, and upon a decision being taken to develop these guidelines, a working group, which consisted of an interdisciplinary team of three nutrition and dietetic professionals from Durban University of Technology (DUT) and Vaal University of Technology (VUT), as well as a panel of five experts in the field that were externally based, was established in 2012 to develop the FBDGs specifically for the elderly (Napier, Oldewage-Theron and Grobbelaar 2021: 3). Today a total of 13 EFBDGs exists in SA but there is currently very little literature available about the South African EFBDGs, and no existing NE support material to explain and disseminate these guidelines.

Developing FBDGs is a comprehensive process requiring a number of steps and skills. The flow diagram below indicates the steps taken in the development process of FBDGs.

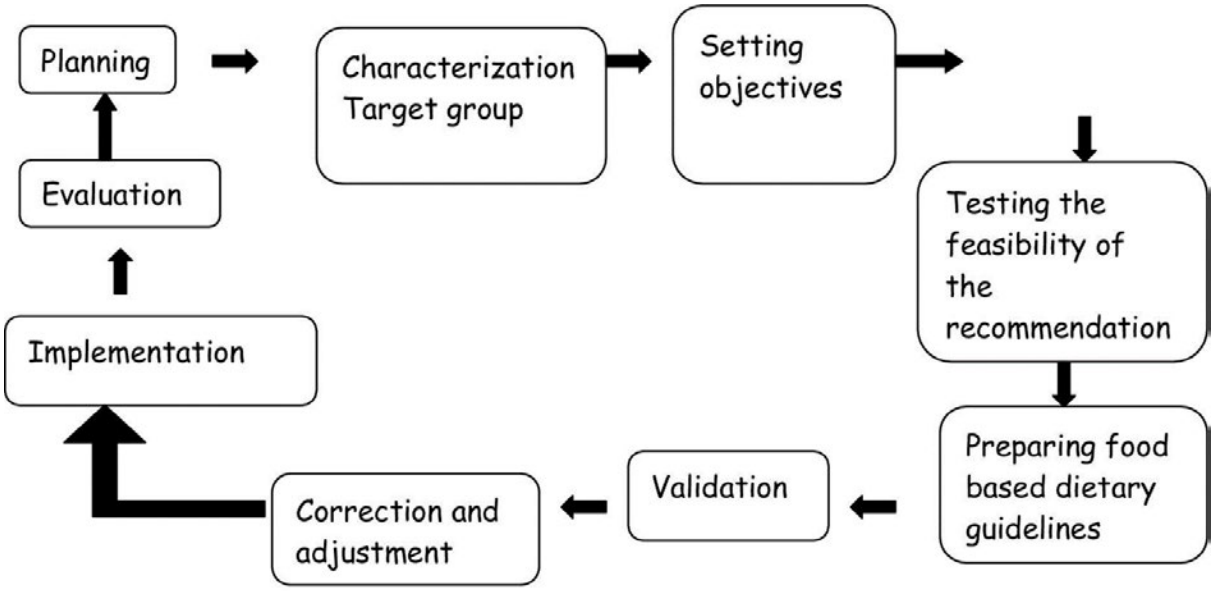

Figure 2.1: Steps for developing FBDGs. Source: (FAO 2007: 39)

2.4 The process of ageing

Ageing is a slow, continual process of change that happens naturally and starts in early adulthood (Stefanacci 2022: 3). Many bodily functions start to slowly deteriorate throughout early middle age (Stefanacci 2022: 3). Ageing is linked to changes in dynamic biological, physiological, psychological, behavioural, and social and environmental processes. Some changes related to ageing are cosmetic, such as greying hair (Guarente, Rogers and Simic 2022: 7). Other changes include a decrease in the functioning of the senses and daily life activities and inclined sensibility to recurrence of diseases, frailty and disability. Actually, ageing is the core determinant for various chronic diseases in humans (Guarente, Rogers and Simic 2022: 7).

People do not get declared old at just any age. Customarily, the age assigned as the initial onset of old age has been age 65 (Stefanacci 2022: 3). The reason for this, however, is not biological but was based on history. In Germany (the first country ever to create a retirement programme) the age of 65 was selected as a retirement age many years ago (WHO 2017: 5). This age has proceeded to be the age of retirement for most people in developed societies, even though this tradition is changing. For the purposes of FBDGs, the pensionable age in South Africa is 60 years of age or older. This age is recognised as the retirement age in SA (Makhetha 2021: 1).

2.4.1 Age-related changes relevant to nutrition

Throughout life, nutritional needs change. For the elderly mainly, nutritional changes may occur in connection with the usual process of ageing, medical conditions or lifestyle (Maricopa Community Colleges 2022: 2). The significance of nutritional status in older adults has growingly been realized in different morbid conditions like dementia, cancer and heart diseases over the past decades. Nutrition is a significant factor determining good health in an elderly patient to avoid or stabilize different chronic and acute diseases and even for healing, assessment of nutritional status is of utmost importance. As people grow older, numerous bodily changes occur, which may, or may not impact the nutrition status of the elderly (Maricopa Community Colleges 2022: 2).

2.4.1.1 Special senses

a) Taste acuity

Loss of sense of taste is a challenge encountered by many among the elderly. Being able to distinguish taste does not cease but the ability to detect salt decreases. How sweet food is perceived does not change and detecting bitterness is exaggerated. The salivary glands get affected, and there is a decline in the amount and quality of saliva produced (Maricopa Community Colleges 2022: 2). All these changes work together to make eating less pleasant. Literature reveals that a physiological decrease in the density of the taste distinguishing papillae leads to a decrease in gustatory function. In actual fact, literature conducted on dysfunction of taste indicates that changes related to ageing in the density of taste distinguishing may impact differently the taste function in different regions of the tongue (Colino 2021: 8). The perception of taste decreases in the course of the common process of ageing. Research conducted on the elderly in a good state of health indicated that over about 70 years of age, the taste threshold starts to rise leading to dysgeusia (altered taste). Sense of taste and reduced production of saliva is also affected by chewing problems commonly resultant from teeth loss and use of dentures (National Institute of Dental and Craniofacial Research 2018: 1).

b) Smell

As individuals age, decline in olfactory function occurs. With usual ageing, hyposmia (decreased capability to smell and sense odours) is also noticed (Kondo, Kikuta, Ueha,

Suzukawa and Yamasoba 2020: 6). With increasing age, the sense of smell decreases, and this impacts the capability to differentiate odours. A greatly altered quality of life can result from a decline in the sense of smell as well as disturbance in taste and compromised pleasure to eat leading to alterations in weight and digestion. The advent of age also decreases functioning of olfactory bulb neurons (Kondo *et al.* 2020: 6).

c) Touch

As humans age, their sense of touch decreases as a result of changes to the skin and decreased circulation of blood to touch receptors in the brain and spinal cord. Small dietary deficiencies such as thiamine deficiency may well be the reason for such changes (Gadhvi and Wasleem 2022: 5). Awareness of vibrations and pain are also classified as senses of touch. The skin, tendons, muscles, internal organs and joints have receptors that sense touch, temperature or pain. A decreased sense of touch alters simple motor skills and leads to a deterioration of balance and strength. It is evident from studies that functioning of muscle spindles and mechanoreceptors decreases with ageing, progressively disturbing balance (Gadhvi and Wasleem 2022: 5).

d) Vision

Ageing encompasses a decrease in presbyopia, colour discrimination, low contrast activity, adaptation of attentional visual fields and glare tolerance. Alterations occur in the eye component and in central processing. Driving, balance and reading are impacted by these numerous changes (Amryas, Singh and Sabharwal 2018: 1).

e) Hearing

Ageing results in a loss of the hearing sense, a process called presbycusis; the loss is basically of high tones resulting in difficulty in distinguishing consonants in speech (National Institute of Aging 2023: 2).

2.4.1.2 Oral health status

Since individuals grow older, oral health encompasses more than just having an attractive set of teeth. It is crucial for overall health and particularly important for the well-being of older adults, since the mouth serves as the entry point to the digestive system (Simkus 2022: 1).

Unhealthy dietary habits such as alcohol intake, smoking and tobacco use during a younger age are some of the contributory factors to bad oral health status. Being healthy orally helps with chewing effectively, and also makes a favourable contribution towards speech, gives confidence socially, and is also linked to better cognitive functioning of the elderly as stipulated by Nunez (2020: 8). Tooth decay in the elderly may be as a result of medication that results in dry mouth and, consequently, tooth decay. Major factors resulting from poor dietary habits are mouth infections; furthermore, the quality of life of the elderly may be diminished by ill-fitting dentures reducing or impeding their ability to chew (Simkus 2022: 1).

Inadequate nutrition levels in the body can arise due to pain and difficulties in consuming food. Social isolation can arise as a consequence of dental frailty, unfavourable oral aesthetics, and halitosis. Oral disease is linked to peptic ulcers, respiratory disorders, and cardiovascular problems. Dental decay is the most expensive diet-related disease in Africa. According to Nunez (2020: 8), this is identified as one of the reasons that disrupts the nutrient consumption of older individuals.

As indicated by the Centres for Disease Control and Prevention (2019: 5), losing teeth is an unavoidable part of the usual process of ageing; dentures have, however, given comfort to challenges related to chewing that a number of older adults may encounter. Tooth wear, oral cancer, periodontal disease, dry mouth and dental caries are oral health challenges older adults are faced with (Centres for Disease Control and Prevention 2019: 5). Oral care is not paid the attention it deserves by the elderly judging from their altered dietary patterns. Additionally, financial constraints may be a contributing factor to the elderly not seeking professional repair of dentures (Lowies, Helliar, Lushington and Whait 2019: 7). Lowies *et al.* (2019: 1**)** further pointed out that oral health, even though seldom deadly, contributes massively to the quality of life, nutrition, medical health problems management, and elderly social interaction. Also, poor quality of life amongst the elderly may result from development of nutritional inadequacy, contributed to by oral health impairment affecting nutrient intake (Lowies *et al.* 2019: 1).

Wealth of literature indicates that soft and processed foods are the most preferred by the elderly as they are much easier to chew and thus resulting in an inclined inadequate nutrient intake. Different researchers have weighed in on the importance of dental status playing a role in diet, thereby illustrating that unfavourable dental status may potentially deter intake of particular foods, which leads to an impaired intake of energy (Watson, McGowan, McCrum, Cardwell, McGuinness, Bernadette, Moore, Woodside and McKenna 2019: 4). A reduced flow of saliva

together with masticatory impairment from poor dental health also results in insufficient mechanical crushing and enzymatic first digestion in the mouth (National Institute of Dental Craniofacial Research 2018: 2). To sum up, poor dentition is linked to compromised consumption of fruits and vegetables owing to difficulty with chewing, and is hugely connected with declined consumption of non-polysaccharides and micronutrients intake. It is thus vital for older adults to maintain their original teeth or invest in effective dentures (National Institute of Dental Craniofacial Research 2018: 2).

2.4.1.3 Gastrointestinal function

Functioning of the gastrointestinal tract decreases greatly during the course of the process of ageing with diverticulosis and ischemic bowel disease being the most common ailments experienced by the elderly, resulting in problems with constipation (Robinson 2021: 4). Robinson (2021: 4) specified that gastroesophageal reflux, or heartburn, is one of the general complaints the elderly often present with. These problems may subject the elderly to further sickness and malnutrition.

According to the American Chemical Society (2018: 12), eating gets less enjoyable and more difficult resulting from a decline in saliva production and taste sensation. Poor chewing and swallowing can result from a weakened tongue or cheek muscles leading to dysphagia (difficulty or discomfort in chewing). Gastric changes impact food consumption ability in old age, leading to the gastric mucosa disabling damage resistance that results in ulcers, cancer and infections (American Chemical Society 2018: 12). Gastritis, also known as inflammation of the stomach, is the primary condition impacting the bioavailability of nutrients. It precipitates inflammation and pain leading to a delay in gastric emptying and discomfort. This consequently results in an increased risk of experiencing chronic diseases such as osteoporosis (a medical condition whereby the bones become weak and frail as a result of tissue loss often caused by changes in hormones or deficiency of calcium or vitamin D) (Wint 2021: 5). Osteoporosis makes it difficult for the elderly to be physically active. Physical activity and exercise are characterised as the basis of preventing and managing chronic diseases owing to their beneficial influence on the clinical perspective in a variety of ailments, encompassing many related with ageing (Wint 2021: 5). Gastrointestinal function in ageing is sustained through the corroborative work of digestion and absorption of nutrients and, be that as it may, the collapsing gastro-intestinal tract gets too weak to absorb vitamin B12, vitamin D and calcium. Delayed transit time due to medication results in chronic complications such as

constipation and uncontrollable soiling (American Chemical Society 2018: 12) and (Wint 2021: 5).

2.4.1.4 Special diets

Food preparation, eating, digestion and absorption become more difficult for the elderly due to the dietary problems encountered by this population group. The elderly are prone to an increased risk of functional, physical, and medical problems due to their lack of ability to ingest sufficient daily diets (National Institute of Aging 2021: 8). Adequate nutrition and healthy eating habits are the basic constituents intended for ageing healthily, but many elderly people are prone to malnutrition due to a variety of factors such as loss of appetite, inability to chew and swallow, chronic diseases, and insufficient access to optimum nutritious food, be it as a result of food insecurity or the inability to prepare and/ or shop for food. Elderly people are most likely to experience numerous changes physiologically that are age related as well as chronic illnesses and may therefore become greatly inactive (National Institute of Aging 2021: 8). These are major contributory factors that interfere with appetite and being hungry, thereby altering diet composition (National Institute of Aging 2021: 8)**.**

Healthy eating, increased energy levels as well as boosting the immune system can help at any age to prevent illnesses such as hypertension, osteoporosis and diabetes (Kubala 2021: 9). The World Health Organisation (2023: 5) indicated that high levels of nutrition and adequate quantities of calories in minimal amounts of food that can be easily digested are provided by an elderly health diet but in progressed phases of illnesses the elderly will need special attention in relation to nutrition. It is further stated by WHO (2023: 5) that therapeutic diets limited in energy, fat, sodium and cholesterol may sometimes be prescribed for some health concerns or multiple risk factors of chronic diseases.

2.4.1.5 Immuno-competence

A healthy body is dependent, to a significant degree, upon an actual balance between the removal of cells that are damaged through apoptosis and a proliferation of the cells that make up the body. Interference with the delicate balance of the latter-mentioned process may result in diseases and hinder successful ageing (Wakim and Grewal 2021: 32). During the process of ageing the body gets exposed to various harmful substances from the environment. Right throughout this process, the immune system plays a critical role in sustaining tissue

homeostasis in response to cellular damage and helps avoid neoplastic diseases. Changes in the immune system related to age include delayed process of wound healing, acute infection, altered response to vaccination and vitro responsiveness (National Library of Medicine 2018: 6).

During the course of ageing, gradual loss in the ability of the immune system to protect the body against infections takes place. This, therefore, increases the chances of being sick, and may lead to ineffective immunity. Moreover, the immune system's capability to recognize and correct defects in cells also drops, which escalates the chances of developing cancers associated with ageing (Esposito 2022: 22). Esposito (2022: 22) further indicated that as an individual gets older, the immune system becomes too weak to manage the body's own cells and additionally, an auto-immune disorder forms when the normal tissue is mistaken for non-self-tissue, and certain tissue organs get attacked by immune cells.

As stated by Wint (2021: 5), in addition to other changes during the normal process of ageing, skin structure, pace, and changes in the previously mentioned senses make the elderly more prone to injuries, which allows bacteria to penetrate the broken skin. Furthermore, the older adult's immune system can further be weakened by illnesses or surgery, thereby making the body more vulnerable and more prone to infection. A compromised immune system can also result from diabetes, which is most common in the elderly (Tenderich 2020: 14). Ageing also influences inflammation and affects the healing of wounds, which results in prolonged healing time of wounds in the elderly. Inflammation is when the immune system reacts by depositing more cells in an area where it 'thinks or suspects' there is a problem. The results of this are pain, redness and swelling (Tenderich 2020: 14). More often, inflammation indicates an infection but it may, however, represent a component of an immune attack. This may also be directly associated with alterations in the immune system or may be an indication of other illness such as diabetes or atherosclerosis that leads to a decline in the flow of blood to certain parts of the body such as the lower legs.

Due to decreased appetite, inability to buy and prepare food and sensory changes among other issues associated with ageing, elderly people are more likely to consume lower than required protein and micronutrients, such as zinc or vitamins C, E and B6, all of which play an important role in regulating the normal immune function (Nall 2020: 1). Consequent to this, an increase in auto-immune disorders, skin cancers, inflammation and infectious diseases, and cutaneous pathological changes takes place. Suppressing the rate of immune-senescence and restoration

of a normal immune-competence in the elderly may involve improving nutrition through consumption of proteins, micronutrients and vitamins, and may also involve dealing with the economic and psychosocial problems of the elderly (Nall 2020: 1).

2.4.2 Factors that influence the ageing process

Even though some changes in elderly people's health are genetic, some are as a result of the individual's physical and social environments, including their homesteads, neighbourhoods and communities, as well as their personal characteristics such as sex, ethnicity, or socio-economic status (Stibich 2020: 6). These components begin to impact the process of ageing very early on in life. The environments that people live in as children or even as developing foetuses, together with their personal characteristics, have long-term effects on how individuals age (Stibich 2020: 6).

2.4.2.1 Frailty syndrome

Frailty is an elderly complex syndrome identified by physiological reserves loss and compromised response to and recuperation from even mild stress. Increased susceptibility to a broad spectrum of unfavourable health effects results from this condition, and is linked to increased morbidity and mortality (de Oliviera, Barbosa, Rodrigues and Fernandes 2020: 7). The National Institute on Aging (2019: 8) identified five aspects to describe frailty as: unintended loss of weight, compromised hand grip, decelerated gait speed, feelings of weariness, and decelerated physical activity. Individuals, especially the elderly, are categorised as frail if they are diagnosed to have three or more out of these five aspects and are more susceptible to accidental falls, have decreased mobility, or inability to carry out the activities of daily living, hospitalization, and death in the following three years. Presence of one or two of these aspects is categorised as intermediate frailty, or the pre-frail condition (Rettersol, Svendsen, Naverud and Holven 2021: 4). In spite of this, frailty conditions may be regressed and patients can return to a state of being non-frail through restoration of certain pathologies, or personalized engagements in physical activities, with or without nutrition supplementation (Rettersol *et al*. 2021: 4).

2.4.2.2 Sarcopenia

Deterioration of the skeletal function, muscle mass and strength is one of the most prevalent occurrences linked with ageing, resulting in a condition called sarcopenia (American Society for Nutrition 2021: 23). Sarcopenia correlates highly to a deterioration in the quality of life of the elderly, and is identified as a major risk factor contributing to adverse health outcomes leading to disability, frailty, loss of independence, morbidity, and mortality (American Society for Nutrition 2021: 23).

The pathophysiology of sarcopenia involves various factors even though its actual cause is still unclear. Recent literature reveals that the beginning and development of sarcopenia relies on a range of symptoms that change the regular skeletal muscle physiology, with some being identified to also be the major constituents of the process of ageing (Food and Agricultural Organisation 2021: 23). Endocrine alterations, loss of regenerative capacity, denervation of muscle fibres and increased deposition of intermuscular and intramuscular fat, mitochondrial dysfunction, oxidative stress, and inflammation are a few factors that affect the pathophysiology of sarcopenia. The last two effects, specifically, form a large part of the ageing process. Ageing is also attributed to the loss of regenerative capacity of satellite cells (Halliday 2020: 2).

Studies on epidemiological and molecular levels have showed that immunosenescence and inflammation greatly contribute to the pathogenesis of sarcopenia according to Rea, Walters, and Avgerinou (2020: 98). Sarcopenia is caused by ageing-related changes in the natural immune system's cells, which result in an increase in systemic inflammation (Stibich 2020: 9).

2.4.2.3 Chronic Obstructive Pulmonary Disease (COPD)

Ageing counts as one of the key risk factors contributing to numerous inflammatory diseases such as dementia, hypertension, diabetes, atherosclerosis, cancer and COPD. These chronic diseases affect the organs and tissue differently, thereby altering their functions and structure (Nall 2020: 6). The loss of lung elastic recoil, pulmonary inflammation, increased gas trapping, decreased function, and growth of the distal air space are all signs of lung ageing. These pathological signs are also the specific characteristics of COPD and they develop gradually. In actual fact, the general increase in COPD is probably linked to the elderly

population, as this disease affects the elderly mostly, and is especially prevalent in those 60 years and older (Nall 2020: 6).

Tenderich (2020: 31) described COPD as an obstructive lung disease denoted by prolonged difficulties in breathing, poor airflow, and impairment of the lung parenchyma (a condition known as emphysema). Chronic obstructive pulmonary disease in industrialised countries is mainly as a result of smoking and is present in underdeveloped countries and attributed to poor nutrition, damp housing conditions and household air pollution. (Tenderich 2020: 31). The decelerated continuous obstruction of the airway, particularly as a result of emphysema, can be an indication of an acceleration in the decrease of the normal function of a lung with age (Esposito 2022: 5).

2.4.2.4 Cancer

The most significant risk factor for cancer generally, and for many specific cancer types, is advancing age. Incidence rates for cancer rise consistently with age, from less than 25 cases per 100,000 in the under 20 age group to roughly 350 per 100,000 in the 45 – 49 age group to more than 1,000 per 100,000 in the 60-plus age group (Esposito 2022: 5). Recurrence of cancer in old age is less likely to be related to a reduction in DNA mutation repair and checkpoint efficiency. Contrarily, accumulating evidence suggests that more permissive settings that allow DNA damage to develop and, more crucially, allow transformed cells to continue to be uncontrollably infectious, and metastasis are what are causing an increase in the number of altering mutations in older patients (Tenderich 2020: 31). Existence of increased levels of pro-inflammatory stimuli that are perhaps linked to decreased immune response to cancer or separate from it is the major character of such non-restrictive conditions. In fact, cast cells can diligently encourage growth of tumours, as these cells are able to foster angiogenesis, invasiveness and cancer cell proliferation (National Library of Medicine: 2018: 6).

2.4.2.5 Cardiovascular Disease (CVD)

Wakim and Grewal (2021: 26) noted that a significant cause of old age incapacity is chronic disease. According to the WHO (2020:12), pathological alterations might result in chronic diseases or other health disorders that require long-term care in addition to pre-existing partial impairments. However, degenerative conditions like cancer, osteoporosis, diabetes,

cardiovascular disease and cerebrovascular disease are all linked to nutrition and are most prevalent among the elderly (Wakim and Grewal 2021: 26). Cardiovascular disease is a nutrition related disease that transpires from food choices that are not healthy, with its contributing factors being a decreased minimum heart rate, decreased arterial wall compliance, decreased responsiveness to b-adrenergic stimuli, increased left ventricle muscle mass, and a slow ventricular relaxation (WHO 2023: 30)**.** Worldwide, cardiovascular disease (including heart disease and strokes) is the primary cause of disabilities and deaths, attributing to 17 million deaths a year (31% of overall deaths globally) (Wakim and Grewal 2021: 26). Cardiovascular diseases account for more deaths than all the cancers combined in South Africa. One in six (17.3%) deaths in South Africa can be attributed to CVD. Heart disease or strokes account for deaths of 215 people every day in South Africa; furthermore, ten people have strokes and five have heart attacks every hour in South Africa, and as a result of these events, ten people will actually die (WHO 2023: 30). Premature deaths as a result of CVD in people of working age (35 – 64 years) are projected to rise by 41% by 2030 (WHO 2023: 30).

Poor nutritional status of the elderly is a widespread concern and diets that are nutritionally inadequate can attribute to, or escalate chronic and acute diseases. Unhealthy diets speed up the progression of degenerative diseases associated with ageing (Kubala 2021: 3). Age is an underlying determinant of chronic diseases globally (Kubala 2021: 3). The National Institute of Aging (2021: 7) acknowledged that the major chronic diseases are influenced by changed behavioural and dietary patterns, with people consuming more processed food and sugar, and leading a sedentary lifestyle.

2.4.2.6 Diabetes Mellitus

Diabetes Mellitus is a disease characterised by impairment of the ability of the body to create or respond to the insulin hormone, leading to non-typical metabolism of carbohydrates and heightened levels in blood glucose (Wint 2021: 33). The second most principal cause of death in South Africa in 2016 and 2017 was diabetes. Moreover, it was discovered to be most prevalent among females. Kaplan (2023: 9) indicated that diabetes prevalence in South Africa has increased dramatically, tripling from 4.5% in 2010 to 12% in 2019. Estimates suggested that out of the 4.58 million people between the ages of 20 to 79 years in 2019 that were said to be diabetic in South Africa, 52% were not diagnosed. In 2022, an estimated 33% of adults aged 65 years or older had diabetes in South Africa. This population group is prone to acquiring complications attributed to diabetes such as hypoglycaemia (low blood sugar), kidney failure

and heart disease compared to younger people living with diabetes (Wint 2021: 33). The WHO (2022: 19) further indicated that the Indigo Wellness Index in 2019 reported that South Africa was declared as one of the unhealthiest countries in the world. The basis of this ranking included blood glucose measures which are a diabetes risk factor, as well as obesity, among others. Consequently, a sugar tax was implemented by the South African government in 2018, whereby sugar-sweetened beverages are taxed according to their sugar content. This was introduced as a means to restrict the heightened consumption of sugar, which is associated with the increasing burden of non-communicable diseases in the South African population (Wint 2021: 33).

The American Chemical Society (2018: 20) stated that diabetes prevalence increases in certain ethnic groups, which therefore indicates that genetic factors also play a role in the development of diabetes in humans. Lifestyle factors also have a significant impact on the development of diabetes. Obese elderly, especially those with the body fat centrally distributed, consuming diets high in saturated fat and low in complex carbohydrates, or not engaging in physical activity, are more prone to developing diabetes (Robinson 2021: 20). There are four types of diabetes namely; type 1 and type 2 diabetes, gestational diabetes, and a condition called prediabetes described as having blood glucose levels higher than normal but not necessarily enough to be certified as type 2 diabetes (Robinson 2021: 20). Type 1 diabetes, previously known as juvenile or insulin dependent diabetes, is defined as when the pancreas does not produce insulin at all, or the insulin is not sufficient to transport sugar out of the blood stream and into cells. Having a close relative with this type of diabetes is the highest risk factor for inheritance (Watson *et al.* 2019: 32). Type 2 diabetes is more common than type 1, and with this type, the pancreas produces insulin, but the body cells cannot utilise the insulin the way they should be utilising it. Lack of physical activity, being overweight, having a family history of type 2 diabetes, being 45 years and over, having a history of smoking and having high blood sugar are the highest risk factors to developing type 2 diabetes (Watson *et al.* 2019: 32). Following a simple lifestyle to maintain healthy body weight, being physically active, following a nutritious balanced diet and avoiding the use of tobacco and alcohol can be beneficial to the elderly in helping reduce the risk of acquiring diabetes or supressing the dangers associated with it for those who have already acquired it (Robinson 2021: 20).

2.4.2.7 Hypertension

Age-related vascular diseases as well as neuro-humoral changes are significant aspects leading to the progression of hypertension in the elderly (Lowies *et al*. 2019: 13). High blood pressure, also called hypertension, is a condition that exists when there is too high force of blood pumping against the artery walls, forcing the heart to work harder to sustain the pressure. Nunez (2020: 12) reported in 2018 that the number of South African people that were suffering from hypertension was estimated to be between 42% and 54%, and this percentage was still projected to increase rapidly. Furthermore, more than one in three adults are diagnosed with high blood pressure in South Africa, to which one in every two strokes and two in every five heart attacks can be attributed. As indicated by Simkus (2022: 23), a study by Wits University scientists indicated the country with the highest prevalence of hypertension in Southern Africa was South Africa. This study further revealed South Africa as the country with the highest number of people with uncontrolled blood pressure even though they were receiving treatment. Poor diet and excessive alcohol, sugar and salt intake, physical inactivity, diabetes, family history of hypertension, stroke, obesity, and high blood pressure in pregnancy are the risk factors for hypertension (Lowies *et al.* 2019: 13)**.** Even so, high blood pressure is often referred to as a silent killer because it rarely has any symptoms or obvious signs to signal it is high. High blood pressure is more associated with advancing age; however, anyone, regardless of their age, gender and fitness level can develop diabetes (Simkus 2022: 22).

Maintaining healthy blood pressure requires regular exercise. Exercising regularly also assists with maintaining a healthy body weight, which is one of the most crucial ways of keeping blood pressure under control. It takes approximately one to three months for regular physical activity to have a positive influence on an individual's blood pressure, and the benefits will continue for as long as an individual continues being physically active. Intake of various nutrients and nutritional status also impact the occurrence and extremeness of hypertension (The National Institute of Aging 2023: 3). High intake of energy and obesity as aforementioned, are primary causes of hypertension. Specialized diets may help treat mild hypertension or prevent it altogether. Most impressive are the DASH diets, which are low in salt and abundant in fruits, vegetables, low-fat dairy products, and other dietary methods to stop hypertension. Long-term adherence to these diets requires dedication and thus remains quite problematic (The National Institute of Aging 2023: 3).

2.4.2.8 Neurodegenerative diseases

Parkinson's disease (PD) and Alzheimer's disease (AD) are the most common neurodegenerative illnesses worldwide (Amryas, Singh and Sabharwal 2018: 3). These illnesses are associated with ageing, and they frequently begin with an initial stage that increases with growing older until later phases are identified by dementia symptoms, which include memory loss, orientation issues, and difficulties completing service-related tasks, among others (Amryas, Singh and Sabharwal 2018: 3). One common pathogenic mechanism in a number of neurodegenerative illnesses is the accumulation of mutated proteins. It was first suggested that protein aggregation contributes to Alzheimer's disease (AD), where beta-amyloid (Abeta) extracellular deposition is the primary neuropathological characteristic. It is now thought that Parkinson's disease (PD), amyotrophic lateral sclerosis, and polyglutamine disorders may all be affected by intracellular accumulation of aggregated proteins. The ubiquitin-proteasome system (UPS) dysfunction appears to be a primary factor in many illnesses (Amryas, Singh and Sabharwal 2018: 3). Additionally, the growth of alpha-synuclein protein in dopaminergic neurons, primarily in the substantia nigra, as well as in other regions of the brain with PD, results in deposits known as Lewy bodies. In both AD and PD, neurodegeneration processes normally co-exist with neuro-inflammation (Gadhvi and Wasleem 2022: 8). Kondo *et al.* (2020: 1) indicated that recent studies suggest that consuming diets that are high in antioxidants and inflammatory components like those found in fruits, vegetables, nuts, and spices and also low energy intake may decrease susceptibility to neurodegenerative diseases.

2.4.2.9 Rheumatoid arthritis (RA), Osteoarthritis (OA), Osteopenia and Muscular Degeneration

Chronic inflammatory (or autoimmune) diseases are known to share an inflammatory component that is strongly influenced by immune system activation, self-epitopes, environmental factors, and genetic makeup. These diseases include RA, psoriasis, ankylosing spondylitis, OA, systemic lupus erythematosus, multiple sclerosis, inflammatory bowel diseases, and pemphigus vulgaris, among others. (Kondo *et al.* 2020: 1). Elderly early RA is one of the osteoarticular disorders that often affects people over the age of 60 years. Activated T/B cells, macrophages, and fibroblasts are the primary players in the development of RA and produce pro-inflammatory cytokines that are important for the development of synovitis and

tissue damage (Colino 2021: 2). Makhetha (2021: 4) reported that much more literature suggesting that diet plays a major role in curbing the risk of diseases such as those that are osteoarticular related was becoming available. Furthermore, several nutrients such as polyunsaturated fatty acids feature anti-inflammatory and anti-oxidant properties, entailing protective properties for the development of RA, whereas some, such as red meat, and salt have adverse effects.

2.4.2.10 Obesity

Obesity affects people of all ages and is a chronic, widespread disease in both industrialized and developing nations. Currently, obesity is more prevalent to the extent that it is replacing other public health concerns including infectious illnesses and undernutrition as one of the most frequent and important contributors to unfavourable health outcomes (Makhetha 2021: 2). According to the WHO (2022: 3), more than 700 million old persons worldwide are obese and there are around 2.3 billion overweight elderly adults. Many older people in South Africa are considered to be overweight or obese, and nutrition is a risk factor for potentially treatable health issues. Whittle and Hanel (2022: 6) revealed that Statistics South Africa reported that approximately seven in ten elderly people in South Africa were declared obese as measured for the body mass index (BMI). Moreover, the majority of women (77%) were found to be obese, as opposed to just 55.4% of men. Due to a sedentary lifestyle and decreased physical mobility, the majority of older people from middle- and high-socioeconomic groups are susceptible to obesity and its comorbidities. One of the main risk factors that contributes to the development and aggravation of non-communicable diseases (NCDs) is obesity (WHO 2022: 3). It is a global health issue that affects aged people in both developed and developing nations. Obesity in the elderly contributes to the early onset of functional limitations and chronic morbidities, both of which increase the risk of early mortality.

An essential factor in determining body fat mass is the relationship between energy intake and expenditure. When energy consumption exceeds energy expenditure, obesity results (Guarente, Rogers and Simic 2022: 6). It is likely that a fall in energy expenditure, especially in the early stages of old age (50–65 years), contributes to the rise in body fat as we age. At age 60 years and older, hormonal changes result in a build-up of fat (Stefanacci 2022: 2). Growth hormone secretion decreases with ageing, as does serum testosterone, leptin resistance, and thyroid hormone responsiveness. According to studies, leptin resistance may result in a decline in the

body's capacity to control appetite. Other genetic, environmental, and social factors also play a role in geriatric obesity. (Stefanacci 2022: 2).

2.5 Nutrition requirements of the elderly

People of any age can benefit from a healthy diet and regular exercise. Age-related changes in bodily demands make some nutrients more crucial for maintaining good health (Browne 2021: 3). With ageing, energy expenditure declines by 150 kcal every ten years, and energy consumption also declines at the same rate (European Commission 2021: 6). There is no proof that older people have decreased nutritional demands, and in some situations their nutritional needs may even increase, aside from a reduction in caloric requirements. Consuming more nutrient-dense foods may be necessary to meet these needs. Meeting the nutritional needs of older persons is frequently made more difficult by chronic illness, appetite loss, and food access issues. (Browne 2021: 3).

A number of changes associated with ageing include muscle loss, thinner skin, and decreased stomach acid. Some of these modifications can increase a person's susceptibility to nutrient deficiencies, while others can impair your senses and lower your quality of life (Karlsson *et al.* 2019: 12). According to studies, 20% of elderly persons suffer from atrophic gastritis, a disorder in which the cells that create stomach acid have been harmed by persistent inflammation. The good news is that there are steps one may take to act against this and other age-related changes. For instance, consuming nutrient-dense foods and taking the right supplements can keep one healthy as one ages (Karlsson *et al*. 2019: 12).

The absorption of minerals such as vitamin B12, calcium, iron and magnesium might be hampered by low stomach acid. As people age they need fewer calories; the reduced need for calories is one of the difficulties of ageing and sadly, this poses a nutritional conundrum (Robinson 2018: 16). While consuming fewer calories, older persons need to obtain the same amount, if not more, of some nutrients. Another problem that people may encounter as they become older is a decline in their body's capacity to detect important signs like hunger and thirst, and one could thus become more susceptible to dehydration and unintended weight loss as a result. Unfortunately, these impacts can become more severe the older you get (Robinson 2018: 16).

The daily energy requirements of a person vary depending on their height, weight, muscle mass, level of activity, and several other factors (Robinson 2018: 16). Due to their tendency to move and exercise less, and their lower muscle mass, older adults may require fewer calories to maintain their weight. A person could easily gain extra fat, especially around their abdomen (visceral adipose fat), if they continued to consume the same number of calories per day as they did when they were younger. This is particularly true for postmenopausal women, as the drop in oestrogen levels during this time may encourage the storage of belly fat (Rea, Walters and Avgeriou 2019: 44). Because of this, it is crucial for the elderly to eat a variety of meals, including fruits, vegetables, seafood, and lean meats. These nutritious basics can assist the elderly in overcoming nutrient deficits without adding to their waistlines. Nutrients that become especially important as individuals age include: protein, vitamin D, calcium, iron, zinc and vitamin B12 (Rea, Walters and Avgeriou 2019: 44).

2.5.1 Dietary Recommended Intake (DRI)

A paradigm shift away from preventing a deficiency state, as determined through scientific manifestation, to fully embracing health and hence enhancing quality of life is represented by the formulation of the DRIs. The risk of developing chronic diseases can be decreased by consuming a nutritious diet adequate in fruits, vegetables, and whole grains while limiting saturated fat, sodium, and calories from added sugars. These foods can also assist with achieving and maintenance of a healthy body weight (Piscopo 2019: 21)

The DRIs are divided into a set of four nutrient-based reference values. Each type of DRI refers to the average daily nutrient intake, so the nutritionally significant reference value is the average mean intake over time. The following is how Piscopo (2019: 21) explains the four DRI categories.

The anticipated daily food intake level that would satisfy the nutrient needs of 50% of all healthy people in a specific stage of life and gender group is known as the estimated average requirement (EAR). The EAR is a figure for dietary consumption that also accounts for an expected bioavailability of the relevant nutrient. The Recommended Dietary Allowance (RDA) is established based on the EAR. No RDA is established if there is insufficient scientific data to support an EAR.

The Recommended Dietary Allowance (RDA) is the amount of food that, on average, should be consumed daily to meet the nutrient needs of almost all healthy people in a gender group at a particular stage of life.

When the scientific data is insufficient to establish an EAR, adequate intake (AI) is used instead. As a result, the AI reference is employed in these situations rather than the RDA. The adequate intake is based on experimentally established intake levels, or rough estimations, of the typical nutrient intakes of a group of healthy people who have normal blood levels of circulating nutrients, normal growth rates, or other functional health markers. An AI is considered as a sign that much more research is required to build an EAR and determine an RDA.

The Tolerable Upper Intake Level (UL) is the highest level of nutrient intake at which practically all members of the general population are unlikely to experience any negative health effects.

2.5.2 Macronutrients

The body uses macronutrients, also known as macros, in relatively substantial amounts and needs them on a regular basis (Piscopo 2019: 24). Proteins, carbohydrates, and fats are the three macronutrients. In lower levels, the body also needs micronutrients like vitamins and minerals. However, macronutrients give the body energy and are the components for cellular growth, immunological response, and general repair. Macronutrient balance is crucial for maximum health and well-being (WHO 2021: 3).

Macronutrients are known to lower the risk of chronic disease. They also serve as the body's primary source of sustenance by supplying it with energy, which forms the basis of the biopsychosocial concept of natural health (National Institute of Aging 2020: 19). According to Abdi *et al.* (2019: 39), socioeconomic circumstances have caused the aged to engage in less physical activity, modify their eating habits, and, in developing nations, have a lower food supply. Abdi *et al.* (2019: 39) added that these factors increase the risk of anaemia and micronutrient deficits that impact erythropoiesis in the elderly. Iron, folate, vitamin B12, and protein energy deficiency are the main dietary factors that contribute to anaemia caused by inadequate macronutrient consumption (WHO 2022: 46).

2.5.3 Energy

Due to their lower basal metabolic rates, the elderly consume less energy than young adults, which causes their levels of activity to decrease (Klusener 2019: 3). Age, gender, body composition, weight, and activity levels are just a few of the variables that affect how much energy is needed. Energy needs often decline as a result of reduction of lean body mass (Centres for Disease Control and Prevention 2021: 5). As a result, compared to young adults, elderly people have decreased resting energy expenditure. There is a possibility that older adults with very low energy needs will not get enough micronutrients from their diet; as a result, diet quality is crucial to prevent deficiencies from arising (Centres for Disease Control and Prevention 2021: 5). It is important to advise the elderly to consume a balanced diet in order to meet their energy needs. For the elderly to maintain their body weight at various levels of physical activity, it is advised that they consume an amount of energy that is 1.41 times their basal metabolic rate (Klusener 2019: 3).

2.5.3.1 Protein

Protein is essential for maintaining healthy muscular mass, replacing lost body fluids, and preventing cellular deterioration. Additionally, it is necessary for the body's metabolic activities in the form of enzymes and hormones (WHO 2022: 1). Age-related protein-energy malnutrition, characterized by a steady loss in body protein, is more common in older people and is reflected in declining fat-free mass (WHO 2022: 2). The loss of skeletal muscle is primarily responsible for the decline in fat-free mass, which is also linked to decreased muscle strength and a higher risk of developing a variety of metabolic diseases. For elderly people, the daily protein requirement is 0.91.1 g/kg. By including milk and milk products, eggs, meat, fish, and poultry in the diet, along with pulses and nuts, one can reach an adequate protein intake (Varan 2020: 2).

2.5.3.2 Carbohydrates

Fibre in carbohydrates aids in digestion and serves as a source of energy. The issue is that many foods today contain sugar, a simple carbohydrate that can be unhealthy and encourage overeating (Varan 2020: 2). The best course of action is to seek out complex carbohydrate sources that are low in simple sugar and high in fibre, vitamins B6, C, and E, magnesium, and

zinc (Kubala 2023: 52). The amount of carbohydrates required varies, depending on an individual's degree of activity but the elderly is advised to always attempt to acquire at least 100g per day for men and women aged 60 and older (WHO 2022: 18).

According to research, the energy requirements of the elderly diminish with age as a result of decreased physical activity and slower metabolism (Stone-Walls 2019: 7). Foods that contain carbohydrates include bread, pasta, rice and cereals. Age-related impairments and the reduction in discretionary home tasks that come with retirement could also have an impact on caloric intake. The maintenance of energy homeostasis, ideal body weight, and body composition is made possible by a delicate balance between food intake and energy expenditure (Stone-Walls 2019: 7).

2.5.3.3 Fat

A concentrated source of energy is fat. It enhances the flavour of food and aids in the absorption of fat-soluble nutrients such as carotenes and vitamins A, D, and E. Concentrated sources of energy include fats and oils (Marevosa, Javanmardi, Barakovic, Husic, Tomsone, Krejcar and Kuca 2019: 6). According to the WHO (2022: 23), there is no need to limit dietary fat consumption to less than 30 percent of total energy for inactive people and 35 percent of total energy for active older people, with the exception of cases of overweight or obesity. However, saturated fat consumption should be limited to no more than eight percent of total calories (Marevosa *et al.* 2019: 18). A diversity of fats should be consumed, with a focus on n-3 fatty acids, which can be found in fish, soy, linseed, canola seed and oil, seaweed, and green leaves. Ghee, butter, and refined oils are examples of fats and oils that should be consumed in moderation. Avoid fried foods, sugary treats, and fatty meats. Like carbohydrates, the amount of fats depends on each person's activity level and body composition (Centres for Disease Control and Prevention: 2018: 9).

2.5.3.4 Fibre

Numerous foods also contain non-digestible carbohydrates in the form of cellulose, gums and pectin in addition to digestible carbohydrates like cereals and sugar. Because they are indigestible, they are referred to as dietary fibre (Nunez 2020: 6). Dietary fibre makes stools bulkier, alleviates constipation, and lowers blood cholesterol levels, especially in the elderly.

The elderly must include fibre-rich foods in their diet, and combined with regular activity and consuming plenty of water, this will assist regular bowel movement. Nunez 2020: 6 further suggests that consuming fibre from whole fruits, vegetables and grains assists in the avoidance of constipation, therefore 5 – 6 servings of fruit and vegetables are recommended per day (Robinson 2021: 8).

2.6 Population nutrient intake goals for preventing diet-related chronic diseases

The average nutritional intake for a population that is thought to be consistent with population health maintenance is represented by population nutrient intake targets. Low rates of diet-related illnesses in the general population are a sign of health in this setting. Rarely is there a single 'optimal' value for such an objective (Wakim and Grewal 2021: 9). Instead, there is frequently a range of population averages that would be consistent with the preservation of health, in line with the idea of a safe range of nutrient intakes for individuals (Robinson 2021: 8). Health issues are likely to materialize if current population averages fall outside of this range or if intake trends indicate that the population averages will do so (Wakim and Grewal 2021: 9). When there is no lower limit, it means that there is no proof that the nutrient should be included in the diet and therefore low intakes should not be a cause for alarm. Concern would arise if a significant portion of values deviated from the specified objectives.

Table 2.1 below lists the population nutrient consumption targets that national and regional organizations should take into account when formulating dietary guidelines for the prevention of diet-related chronic illnesses:

Table 2.1: Population nutrient intake goals (WHO: 2018).

Dietary factor	Goal
Total fat	15 – 30%
Total carbohydrate	55 – 75%
Protein	10 – 15%
Fruits and vegetables	≥400 g per day

These recommendations employ numbers rather than specific nutrient intake increases or decreases because the desired adjustment will rely on current intakes in the target population and may go either way. Table 2.1 focuses on the macronutrients that provide energy. This should not be understood to mean that the other nutrients are not important. Instead, it acknowledges that prior FAO and WHO reports only offered a limited amount of guidance on what constitutes a 'balanced diet', which is defined in terms of the proportions of the different energy sources, and that there appears to be agreement on this aspect of diet in relation to effects on chronic non-deficit diseases. Due consideration is given to the procedure for establishing national dietary guidelines when converting these objectives into recommendations (Kondo *et al.* 2020: 3).

2.7 Factors affecting the nutrient intake and nutritional status of the elderly

Numerous economic repercussions can result from the increasing growth of the 60+ population. This group, which makes up around 18% of the population, is responsible for 30% of all healthcare costs. They visit the doctor on an average of seven to eight times year, use hospitals at a rate that is almost three times higher than that of younger people, and occupy the majority of nursing home beds. Improving the health and well-being of the elderly begins with educating them on the connection between socioeconomic variables and nutrient intake (Kondo *et al.* 2020: 3).

2.7.1 Income status

According to Colino (2021: 3), the Old Age Grant—which is non-contributory and entirely supported by the state is the most significant source of financial social support available to the elderly in South Africa. Men and women who are 60 years of age and older who pass a severe means test evaluating their assets and income are eligible to receive these social handouts for the elderly. Gadhvi and Wasleem (2022: 20) stated that women in black homes, in particular, are responsible for pooling or sharing pension income with other family members. The elderly are left behind to care for the younger generations as a result of job opportunities in cities, according to Gadhvi and Wasleem (2022: 20). The elderly rely on their pension benefits each month to pay for household expenses like food, rent, and utilities as well as their grandchildren's education. Consequently, income that was meant to support people in their later years is instead utilized to support households (Colino 2021: 21).

2.7.2 Elderly food choices

Adequate nutritional intake is an imperative function in the maintenance of health and in increased longevity in the elderly and, therefore, appropriate food choices are an essential factor in maintaining body functioning and health, and influence the velocity of physiology along with the functional decline associated with the ageing process (Amryas, Singh and Sabharwal 2018: 11). Age-related sensory deficits have been demonstrated to lessen the attraction and enjoyment of foods, which helps explain why people eat less as they become older (Amryas, Singh and Sabharwal 2018: 11). Poor dietary choices prevent proper nutritional intake, which is why they increase the risk of malnutrition in older people.

According to Whittle and Hanel (2022: 5), the following variables affect the eating preferences of the elderly: biological, physiological, and psychological factors; cultural origins, religious background, beliefs, tradition, and geopolitical factors; household income, cost of food, meaning and status of food, security, and society; socioeconomic factors; personal factors such as expectations for food, familiarity with food, personality, influence of others, appetite, moods and emotions, and meanings attached to food. Finally, intrinsic factors are made up of the appearance, odour, texture, colour, flavour, quantity, quality, preparation, and presentation of food. Extrinsic factors include the environment, advertising, merchandising, time, and seasonal variation.

2.7.3 Drug and nutrient interaction

In addition, the elderly can anticipate negative effects from medication due to age-related changes that influence the body's utilization of these drugs as well as the quantity of drugs they take (Whittle and Hanel 2022: 5). The majority of medications taken by elderly people are ingested orally and are mainly absorbed in the small intestine. Since specific transporters often function in the small intestine to accomplish this, the drug is transported across the membrane of the small intestine into the blood stream and then dispersed throughout the body (WHO 2021: 15). The medicine is subsequently processed by the liver, which typically renders it inactive and transforms it into forms that can be excreted by the kidney, which is the primary organ responsible for doing so (WHO 2021: 15).

According to Robinson (2018: 17), medicines may alter food intake and the way the body processes nutrients, which may have an impact on nutritional health. Vitamin and mineral deficiencies can be brought on by greater rates of nutrient excretion, poor nutrient absorption as a result of the binding of minerals to the drug, or by improper usage of a vitamin or mineral medication that can change the types or amounts of foods consumed. However, certain medications may cause weight gain while increasing hunger, whilst other medications may cause weight loss while decreasing appetite. According to (Robinson 2018: 17), several medications might change how food tastes, such as imparting a metallic taste. Food consumption in the elderly is impacted by changes in taste or fragrance, dry mouth, oral ulcers, trouble swallowing, nausea, and vomiting, which can also result in an unusual desire for certain foods.

Additionally, prescription side effects, such as dizziness, tiredness, light-headedness, confusion, and instability, as well as discomfort from increased urination, may restrict the elderly's capacity to go food shopping (Rea, Walters and Avgerinou 2019: 32). By binding with nutrients, altering the stomach's acid level, modifying the rate of absorption, lowering bacterial flora, and irritating or harming the lining of the digestive tract, medications can disrupt nutrient usage and alter nutrient absorption in a variety of ways. One nutrient may be specifically affected by the effects of medication, or it may have a broader impact on an entire class of nutrients, such as the fat-soluble vitamins A, D, E, and K (WHO 2022: 6).

2.7.4 Physical activity and mobility

Elderly individuals who engage in physical activity are predicted to live longer than those who do not (Rea, Walters and Avgerinou 2019: 32). Physical activity isn't just one thing; it's a collection of recreational, professional, and self-care activities that, when regularly practised, lead to biochemical and physiological adaptations that enhance the body's capacity, effectiveness, muscle endurance, and range of motion. Compared to elderly people who are sedentary, those who have been active their entire lives retain a greater amount of their physical strength, endurance, and stamina. They also have more bone density, leaner body mass, and a lower body fat percentage (Stefanacci 2022: 3).

The aged person who is physically active has a better quality of life overall and is better equipped to carry out activities of daily living. Physical activity, according to the Centre for

Disease Control (CDC) (2022: 85), can help manage a significant portion of issues that may already exist in elderly people, such as diabetes, high blood pressure, or elevated cholesterol. Physical activity can also help people function better and maintain their independence even in the face of health issues.

2.7.5 Urbanization

According to the National Institute of Ageing (2019: 2), throughout the past four decades, urbanization has had a significant impact on South African cultural and nutritional practices. Environmental improvements, such as better infrastructure and socioeconomic conditions brought on by employment prospects in urban regions, have had a significant impact on urbanization. The consumption of native cuisine by the Indian and black cultures has been hampered by a shift toward Westernized eating practices (FAO 2021: 7).

2.7.6 Food security

Having access to the food necessary for a healthy life is how food security is essentially defined for everyone, all the time. Food security can be achieved in three different ways (FAO 2021: 7). When it comes to individual households, food poverty is associated with disproportionately poor health, high medical costs, high funeral costs, and low labour productivity. In addition, food insecurity frequently has an impact on the family's more vulnerable members, particularly children and women (WHO 2022: 45).

The underlying factor that determines undernutrition in the elderly is household food security, yet one of the main causes of undernutrition in Africa is its impact on dietary consumption (Halliday 2020: 4). Furthermore, many households in South Africa may endure food poverty, as well as increased unemployment and a lack of resources. Therefore, despite receiving a state income, it has been found that households with older residents experience the highest levels of household food poverty, or an inability to supply food to maintain a basic subsistence diet. Additionally, it is doubtful that those who are undernourished will pay attention to educational messages regarding good food consumption habits (Halliday 2020: 4). Prior to promoting specific food consumption patterns in a population group, food security is necessary (WHO 2020: 8).

Elderly people who are food insecure may experience hunger, especially if it occurs frequently. According to some research, this can lead to undernutrition (Nall 2020: 5). However, the majority of South African retirees, whether they reside in urban or rural areas, are members of three-generational homes, with social pensions making up a sizable amount of the household budget (Rettersol, Svendsen, Narverud and Holven 2018: 28). The elderly have stated that their basic requirements are not being met by state pensions (Halliday 2020: 4).

2.7.7 Living arrangements

Sociocultural tastes and socioeconomic considerations heavily influence South Africa's living arrangements, which differ across the ethno-racial groups as described by (Stefanacci 2022: 3). Compared to black, coloured, and Indian older women, white older women are more likely to live independently, either by themselves or with a partner, or to remain in a residential care facility (Rettersol, Svendsen, Narverud and Holven 2018: 28). According to Rettersol, Svendsen, Narverud and Holven (2018: 28), older people in specific ethnic groups in South Africa have indicated a preference for living in multigenerational households with family. In the United States, as of 2020 about 28% (14.7 million) of community-dwelling older adults lived alone, including 21% of older men and 34% of older women. The percentage of people living alone increases with age, that is, among women ≥ 75 years, about 44% live alone. Men are more likely to die before their wives, and widowed or divorced men are more likely to remarry than are widowed or divorced women. About 69% of older men were married compared with 47% of older women and, in 2021, 31% of older women were widows. However, in 2021, about 60% of community-dwelling people age ≥ 65 lived with their spouse or partner (Kaplan 2023: 1).

According to a study by Stefanacci (2022: 3), extended family systems historically supported and cared for the elderly in Sub-Saharan African countries. However, urbanization and the HIV and AIDS epidemic have significantly influenced the altering family structures.

2.7.8 Poverty and economic uncertainty

The elderly population in South Africa is significantly affected by poverty since they have fewer food options due to a lack of resources (National Institute of Ageing 2019: 8). South Africa provides the elderly with a social pension, which differs from those of other developing

nations. One of the factors that influenced this provision for the elderly was the fact that multi-generational living arrangements are no longer willing to care for the elderly (National Institute of Ageing 2019: 8).

Particularly for the elderly, who may only receive State pensions, lack of money is a serious problem that might force them to cut back on essentials like fresh fruits, vegetables and meat due to increasing prices and a fear of wasting food (Rettersol, Svendsen, Narverud and Holven (2018: 28). However, because the recipes for these food items typically call for large quantities, elderly people may avoid cooking or baking foods like meats, stews and casseroles. In conclusion, elderly people may put off getting the necessary medical and dental care to address issues that prevent them from eating healthfully due to budgetary issues (Rettersol, Svendsen, Narverud and Holven (2018: 28).

2.7.9 Effect of HIV and AIDS on the elderly

HIV and AIDS has wreaked such havoc because it has been, and is still robbing families, towns, and entire countries of their most productive and young citizens, leaving the elderly to bear the brunt of the damage (WHO 2020: 28). Southern Africa has been hardest hit by the HIV and AIDS epidemic, which has had an adverse effect on social cohesion, development, life expectancy, and human dignity as well as placing social and economic obligations on communities (Food and Agricultural Organisation 2021: 7). The elderly are impacted because they are forced to take on the role of primary caregiver for the children of unwell adults and are put under more emotional, financial, and physical burden by helpless and orphaned grandchildren. Grandmothers in particular experience this problem and a lack of family support (FAO 2021: 7).

In Zimbabwe, the (WHO 2018: 27) research found that more than 70% of those who care for people with HIV and Aids-related illnesses are older than 60 years of age. Elderly persons are particularly prone to infection and are significantly under-represented in global data on HIV and AIDS, claimed Watson *et al.* (2019: 36). Data on infection rates do not include elderly men and women, even if they continue to have sex well into their old age (Watson *et al.* 2019: 36); however, their understanding of the nature, cause and transmission of HIV can be limited, as they seldom have access to information, and awareness campaigns typically target the young and not the old.

The National Research Institute (2021: 41) revealed that many elderly people in households with HIV experience poor physical and mental health due to increased caregiving responsibilities as well as feelings of guilt, shame, and blame regarding their children's circumstances.

HIV and AIDS and dietary condition are closely related biologically. It is clear that those with good nutritional status may have a lower chance of contracting HIV, with micronutrients, particularly vitamin A, playing a crucial role. A healthy diet may also delay the beginning of the disease and even death in certain people (Food and Agricultural organisation 2021: 5). As stipulated by the (National Research Institute: 2021: 41), research has established that people who are seriously undernourished have a six times higher risk of dying in the first three months than people who have a normal nutritional status. Other investigations showed that HIV-infected patients with poor micronutrient intake or status had a comparatively greater risk of death (Nunez 2020: 6). HIV and nutrition are closely related because HIV and AIDS-related immune system impairment leads to malnutrition, and malnutrition results in a weakened immune system, which exacerbates the effects of HIV and speeds up the progression of AIDS.

2.7.10 Alcoholism

The older population of South Africa (SA), among whom unsafe drinking is a regular practice, is particularly susceptible to alcohol overconsumption and abuse. Previous articles that supported alcohol consumption cited two putative health benefits of alcohol, namely: (1) cardioprotective and hemostatic actions; and (2) supporting a favourable iron status balance. These claims have been refuted by more recent data for all age groups, as alcohol usage has significantly more negative effects than positive ones. Some of these drawbacks can seriously damage the health and physical well-being of elderly people. Because of their advanced age and the way alcohol interacts with medications, elderly populations are susceptible to alcohol misuse regardless of their consumption habits or levels (Theophilus, Napier and Oldenwage-Theron 2021: 3).

As people get older, they tend to limit their alcohol use for physiological reasons, medical issues that make it less desirable or acceptable, lower incomes, and an inability to attend social gatherings where alcohol consumption is permitted. As a result, overall, alcohol consumption in the elderly population tends to decline. However, the elderly in South Africa are increasingly

engaging in risky drinking, which is defined as ‘drinking five or more standard measures on a single occasion’, which frequently exposes them to alcohol-related risks connected to senility. Cases of alcohol-related harm to health and well-being can exacerbate medical issues (such as mental impairment), cause frequent falls, and interfere with medicines. Several studies have linked alcohol intake to a range of health conditions, including dementia (for which old age is the highest risk factor), diabetes, mortality, heart disease, and cancer, in addition to the risk of physical harm and injury from accidents. Furthermore, due to the slowed metabolic rate, increased sensitivity, and relatively small volume of distribution, even moderate alcohol use by the elderly is enough to result in issues. Drinking too much alcohol might also hinder nutrient absorption and digestion. Alcohol abuse can lead to unhealthy eating patterns and nutrition issues.

2.8 Malnutrition

Malnutrition is the condition of having inadequate nutrition (Centres for Disease Control and Prevention 2019: 8). It may be brought on by either an overabundance of nutrients (overnutrition) or a deficiency of one or more nutrients (undernutrition). Malnutrition is a significant issue that has been observed in hospitals, residential care facilities, and the community among the ageing and ill population (Centres for Disease Control and Prevention 2019: 8). Estimated prevalence rates for the general hospital population range from 11% to 44% but they are higher in older populations, where they range from 29% to 61%. (Wakim and Grewal 2021: 65).

Malnutrition is not a necessary side effect of ageing, but numerous age-related changes can increase the risk of malnutrition. For instance, worsening oral health, decreased physical activity, and decreased taste and smell acuity are all regularly linked to ageing and may all have an impact on nutritional intake. Malnutrition can result from any shift in nutritional consumption, with potentially harmful repercussions (Wakim and Grewal 2021: 65). According to numerous studies, the severity of malnutrition is directly correlated with prolonged hospital stays, higher treatment expenses, quicker return to normal life before full recovery after an illness, and higher hospital readmission rates. Consequently, the health care system faces a significant problem in treating and preventing malnutrition, which is especially prevalent in the older age group (WHO 2022: 35).

As stipulated by the National Institute of Dental and Craniofacial Research (2018: 5), the most important issue that keeps recurring with the elderly is the high cost of foods high in micronutrients, which further deters their usage. The fact that elderly people frequently experience lowered immune function, which increases morbidity and death, makes the situation much worse. Cognitive decline and failing vision are two additional significant age-related changes that influence nutritional and healthy lifestyle choices as we age. Throughout life, dietary modifications have an impact on risk factor levels but they have a bigger effect on the elderly (National Institute of Dental and Craniofacial Research 2018: 5).

2.8.1 Impact of malnutrition on the country's health system and economy

Together with poor wound healing and other complications, increased mortality and poor health-related quality of life, malnutrition in the elderly is linked to an increased risk of frailty, sarcopenia, falls, dependency on activities of daily living (ADL), hospital admission, and a longer duration of hospital stay (Rodrigues and Fernandes 2020: 10). In addition to increasing the need for primary care services, malnutrition increased the risk of hospital admission by 20% and death by 60% over a three-year period in older Canadians who lived in the community (WHO 2020: 15). Although investing in solutions can help long-term nutritional outcomes, dealing with malnutrition is expensive. According to studies, spending US$1.2 billion per year on micronutrient supplements, food fortification, and bio-fortification of staple crops for five years would result in benefits of US$15.3 billion annually, a benefit-to-cost ratio of almost 13 to 1, better health, fewer deaths, and higher future earnings (de Oliviera, Barbosa, Rodrigues and Fernandes 2022: 6). A wide range of nutritious foods can be found at more reasonable rates thanks to better agricultural food systems, which are the foundation of healthy diets and good nutrition. Governmental nutrition policies must be coordinated in order to influence many of these changes to the food system but customers can also enhance their own health by making wise eating decisions (de Oliviera *et al.* 2022: 5).

2.8.2 Methods to address malnutrition in South Africa

2.8.2.1 Vegetable gardens

The WHO (2022: 6) recommended that five servings of fruit and vegetables (400g in total) be consumed each day in order to maintain a healthy diet with enough amounts of key

micronutrients. According to the Centres for Chronic Disease Prevention and Health Promotion (CCDPHP) (2022: 9), the United Nations Development Program (UNDP) stated in 1996 that urban agriculture may greatly assist in combating urban hunger and malnutrition by increasing and ensuring access to fresh, nutrient-dense food at prices lower than market rates. Households who farm appear to have greater food security and generally have better nutritional status than non-farming families of the same socioeconomic standing. Then, as scepticism about the effects of food garden production grew, it began to moderate this initially optimistic picture of food gardens. It has been demonstrated that cultivation does not always result in increased consumption, and many growers choose to grow maize, which reduces diversity and does not guarantee vitamin intake, according to CDC (2022: 9). As a result, there was and still is some uncertainty about the ability of food gardens to deliver on nutrition outcomes, especially at the subsistence level. Additionally, vegetable consumption is irregular and low, and there is a lack of knowledge regarding what defines a diet that is nutritionally inadequate. Understanding the limitations and potential benefits of urban food gardens for the poor requires a more analytical and rigorous approach (Robinson 2018: 34).

There is proof that food gardens can serve as a crisis buffer in some cases. Beyond the justifications for food security, they are favoured for their potential to give those who grow them nutritious food (improved nutrition status), to provide access to nutritional diversity where it is challenging to do so (in rural or extremely poor contexts), and to help communities grow and empower their members (European Commission 2021: 4).

2.8.2.2 Food fortification

Fortification is one of the safest, most efficient, and reasonably priced methods to improve the nutritional value of staple foods like wheat, maize (corn), rice, vegetable oil, and sugar, claimed the (Pan American Health Organisation (PAHO) and WHO 2022: 12). This method, which has gained widespread recognition for its advantages to public health, includes adding or substituting important vitamins and minerals that may have been lost during processing (WHO 2020: 12). Fortification of staple foods has become a requirement in many nations; this practice gained popularity in the 1970s and gained momentum in the early 2000s as more nations incorporated it into their nutrition policies (WHO 2020: 12).

One of the first places to adopt it was the Middle East, where Saudi Arabia was one among the first nations to fortify wheat flour in 1978. (United Nations 2020: 7). By 1996, several other

nations in the area, notably Jordan and Iran, had also implemented required national-scale flour fortification (WHO 2020: 12). In an effort to scale up the region's maize flour fortification programme, the Africa Maize Fortification Strategy for 2017–2026 was developed in 2016. Wheat flour and maize flour fortification have also been required in South Africa since 2003 (PAO and WHO 2022: 12).

The impressive uptake of staple food fortification can be ascribed to a number of factors, including its affordability and ease of implementation, which allow governments and food producers to immediately observe benefits that assist to justify the initial investment in equipment (WHO 2020: 12). Fortification of staple foods makes a major difference in the nutritional status and public health of an entire nation, saves millions in annual healthcare costs, and increases the number of people working and contributing to the economy (WHO 2020: 12). This is due to a decreased prevalence of chronic illnesses and cognitive and physical stunting, which also helps to increase productivity and performance at work and school (Stone-Walls 2019: 9).

2.8.2.3 Dietary diversification

Dietary variety plays a key role in enhancing the elderly intake of essential nutrients. According to the National Institute of Diabetes and Digestive and Kidney Diseases (2020: 6), there has been a general shift in dietary trends over the past several decades toward meals with a high calorie density and a high fat content mixed with a low proportion of plant-based ingredients. One of the main elements of a diet that is adequate is consuming a wide variety of foods. The elderly's tapering dietary choices, according to WHO (2020: 5), may lead to inadequate intake of important nutrients, minerals, and phytochemicals—a specific concern that contributes to reduced nutritional status (WHO 2020: 5). The quantity of various foods ingested has been favourably correlated with nutrient intake, hence it is crucial for appropriate metabolic maintenance.

2.8.2.4 Food Based Dietary Guidelines

There is a critical need to inform, educate, and empower consumers to make the proper food and beverage choices that will result in the consumption of healthy diets in order to assure food and nutrition security by making nutritious food accessible and cheap (Watson *et al.* 2019: 4). Any healthy diet will ensure that all nutritional and energy needs are addressed without

resulting in overeating and an increased risk of non-communicable diseases as a result (NCDs). Healthy diets are therefore wise, and protective against the risk of NCDs, as well as adequate in terms of all nutrients (Nunez 2020: 3).

Prudent diets are required to ensure the lowest risk of NCDs and the highest quality of life as people age. Adequate diets are required throughout the life cycle to promote optimal human physical and mental growth and development, health, and well-being (Watson *et al.* 2019: 4). The nutrient profile of healthy diets is based on a substantial body of scientific evidence regarding the various nutrients needed by humans, their presence in foods, absorption, physiology, metabolism, and excretion, genetic influences on these processes, human variability in needs, and the association of specific nutrients with disease, all of which have led to nutrient recommendations made by various scientific bodies around the world (Nunez 2020: 3).

Consumers consume foods, not nutrients, hence nutritionists have replaced dietary advice based on nutrients with consumer-friendly food-based dietary guidelines (FBDGs) (Nunez 2020: 3). Dietary guidelines based on regional cuisines and eating habits are known as country-specific FBDGs. Therefore, FBDGs can be characterized as science-based policy recommendations in the form of suggestions for a healthy diet (Nunez 2020: 3). They are a translation of foods or dietary patterns of evidence-based nutrient recommendations that should direct the general populace towards having a healthy, more ideal diet (Watson *et al.* 2019: 4). In response to the World Declaration and Plan of Action on Nutrition adopted by the 1992 International Conference on Nutrition, the joint (FAO/WHO) consultation held in Nicosia, Cyprus in 1995 conceptualized and designed the key concepts of FBDGs and the scientific evidence-based methodology for their preparation and use (Watson *et al.* 2019: 4). The action plan included eradicating and reducing famine, as well as starvation, specific nutritional deficiencies, and NCDs connected to undernutrition. As a result, FBDGs were incorporated into the FAO/WHO policy to encourage appropriate diets through recommendations for optimal dietary patterns and healthy lifestyles, which urged governments to offer the general public evidence-based guidance in the form of easily understood, reliable and easy-to-apply guidelines (WHO 2020: 3).

The idea of FBDGs is frequently recommended as a technique in nutrition literature to enhance optimum nutrition and health, according to Klusener (2019: 8). Therefore, the ideal FBDG programme should be in line with the demands of effectively "marketing" nutrition knowledge

and inspiring customers to alter their behaviour in order to make the best possible decisions regarding their eating habits while staying within their means. (Klusener 2019: 8). This "ideal" FBDG programme must include at least a set of succinct, qualitative FBDG messages that consumers will understand; a country-specific food guide that explains the food options that, taken together, will lead to a healthy diet; and some technical support information that serves to motivate the FBDG messages and food guide and provide quantitative recommendations on how much and how often to consume certain foods (WHO 2020: 3).

According to the WHO 2020: 18), plans on how to effectively market the FBDG messages, additional creation of specialized educational and promotional materials catered to specialized consumer groups, and plans on how to assess the programme's effectiveness are required for implementation. Unfortunately, there is relatively little information available regarding the short- and long-term effects of implementation on dietary behaviour and health (Browne 2021: 3). This may be because, despite some documentation of the science and supporting methodology for developing FBDGs, many countries still struggle to translate scientific evidence into FBDGs and to develop appropriate education and promotion materials, as well as implementation (intervention) programmes (Browne 2021: 3).

The food-based dietary guidelines for South Africa have been modified to fit the needs of consumer groups of various ethnic backgrounds over the age of seven in both rural and urban settings (Browne 2021: 3). A set of 13 FBDGs specifically for the elderly that were published in 2017 also exist in SA, and they are as listed below (Napier, Oldewage-Theron and Grobbelaar 2021: 3):

1. Enjoy a variety of nutritious foods.

2. Eat plenty of different coloured vegetables and fruit every day.

3. Eat dry beans, split peas, lentils and soya regularly.

4. Include fish, chicken, lean meat or eggs in most meals.

5. Drink or eat milk, maas, cheese or yoghurt every day.

6. Drink clean, safe water and/or other fluids throughout the day even if you do not feel thirsty.

7. Whole grain starchy food, in small portions, could form part of meals.

8. Use fat sparingly; choose vegetable oils rather than hard fats.

9. Use salt, salty seasonings and food high in salt sparingly.

10. Use food and drinks high in sugar sparingly.

11. Be active.

12. If you drink alcohol, drink sensibly.

13. Eat clean and safe food.

2.8.2.5 Supplementation

The addition of nutrients that are missing from food products is known as supplementation (Lowies *et al.* 2019: 2). Supplementing the diet makes up for the nutritional needs caused by ageing, as using supplements can make up for nutrient absorption that is poor, counterbalance bad dietary habits, and assist, avert or hinder the beginning of various chronic diseases linked to ageing (WHO 2022: 8). The World Health Organisation (2022: 8) further elaborated that most older adults show a compromised immune system and are more prone to infections; on that account, improving their diets with supplements enhances the quality and quantity of the elderly nutritional status. At least one brand of staple food is supplemented in SA by means of the nutritional supplementation programme and so provides specifically the vulnerable groups with nutrition-enriched nutrients (Tenderich 2020). The World Health organization (2022: 8) indicated that low income elderly populations get to have access to adequate nutrition through supplemental food programmes.

2.9 Knowledge Mobilisation and Nutrition Education

The American Society for Nutrition (2021: 16) defined NE as a set of learning experiences developed to help individuals choose healthy eating options and other behaviours related to nutrition. Nutrition education is part of the basis vital for the well-being and health of an individual (American Society for Nutrition 2021: 16). The goals of nutrition education include creating positive attitudes regarding good nutrition and physical activity and encourage better nutrition and lifestyle practices suitable to improve and sustain greater achievable levels of

well-being for an individual. Nutrition education is also aimed at providing sufficient knowledge and skills crucial for critical and independent thinking concerning diet and health in order for the individual to be able to apply healthy food choices from a variety of food groups (Halliday 2020: 8).

A suitable NE programme can be of use for school-aged children, teenagers, young adults, and also the elderly as nutrition attitudes, knowledge, and practices vary as people get older. Even so, in order to be successful, constructive, age-appropriate messages that are feasible and attainable should be a focal point (Piscopo 2019: 6). Favourable end results of healthy eating behaviours should be the prime focus of particular topics. Courses for nutrition education are often aimed at young school-aged children for the reason that nutrition educators are of the opinion that educating about healthy food and eating habits earlier in life may be significant to intercept chronic diseases and other health issues later on in life. With that being considered, the elderly is one of the populations that is often disregarded and who for the most part is lacking in their nutrition knowledge. The hesitance in developing the elderly NE programmes is as a result of the perception that they would be reluctant to assent to such lifestyle changes (Stefanacci 2022: 3). Even though older adults may seem rigid in their ways and unwillingness to accept change, nutrition education is crucial as it may turn out to be the determining factor in them being able to retain their independence and dignity.

It is estimated that 10.2% of the population in South Africa by 2030 would be of people aged 60 years and older. Considering this, it is crucial that the elderly is offered nutrition education to thoroughly equip them for the process of ageing (Karlsson *et al*. 2019: 1). The insufficiency of nutrition knowledge among the elderly further impacts eating attitudes, and attention paid to nutrition information and balance of meals (Karlsson *et al.* 2019: 1). Nutrition education can therefore be utilised as a method to enhance the elderly dietary needs that vary from those of younger adults, and eventually enhance their perception on healthy eating.

The National Library of Medicine (2019: 2) indicated that elderly females with multiple chronic diseases who received nutrition education aimed at healthy food habits and dietary guidelines for several weeks, improved their general dietary attitudes and behaviours. A nutrition education and fitness course that was conducted for 10 weeks demonstrated a notable decline in low density lipoprotein (LDL), and a reduction of waist circumference and total cholesterol levels in black elderly participants (Rettersol, Svendsen, Narverud and Holven 2018: 8). A diabetic elderly population that was put on a nutrition education course for 10

weeks indicated that many of the participants improved significantly in their fasting plasma glucose and glycated haemoglobin levels (The National Institute on Aging 2019: 9). The National Institute on Aging (2019: 9) further highlighted that use of NE resources from a basic food programme is encouraged for nutrition service providers. Nutrition education should also educate and put emphasis on physical activity, additional to nutrition. Regular physical activity helps the elderly maintain their capacity for self-sufficiency. It helps release 'feel-good' endorphins and naturally occurring brain chemicals that are similar to those in cannabis, which can enhance an individual's general sense of well-being. This is advantageous for older adults with arthritis as well as those who suffer from anxiety and depression (Kubala 2021: 5). It is effective in suppressing different chronic diseases and may mitigate the risk of cognitive decline in the elderly (Kubala 2021: 5).

The Food and Agricultural Organisation created several informational, educational, and communication products as part of its global mission to support nutrition education initiatives (Halliday 2020: 6). A 'Family Nutrition Guide', one of their numerous publications, helps governments and non-governmental groups mobilize knowledge and encourages people to adopt healthy diets and lifestyles throughout their lives, especially elderly people (Halliday 2020: 6). According to FAO's Nutrition Education and Communication Group's Ellen Muehlhoff, the guide is a fundamental nutrition education tool that can be extremely helpful in promoting healthy eating habits (Food and Agricultural Organisation 2021: 7). The guide was primarily developed for health workers, nutritionists, agricultural extension workers, and other development workers, as these are the professionals that frequently work with low- to high-income communities. The guide also provides numerous recommendations on suitable ways of disseminating and publishing this information when dealing with a set of people from various age groups (CDC 2022: 8). The guide can also be helpful for people or community organizations who want to learn more about nourishing family feeding. With chapters like 'Feeding men and old people', the guide can improve elderly nutrition in various aspects (CDC 2022: 8). The information presented in the guide is applicable to all developing world regions, despite the fact that the photographs and food examples show countries in East and Southern Africa, as it can be used as a model to create similar nutrition education materials for other developing countries (Gadhvi and Wasleem 2022: 6).

2.9.1 Nutrition education strategies and approaches

Robinson (2021: 4) indicated that nutrition education cannot be effective if only the basics of nutrition are taught. It should include nutritional preferences, sensory-affective factors, person-related components including perceptions, beliefs and attitudes, as well as social connotations and expectations. In addition to a behavioural focus to reduce individual risk factors, effective nutrition treatments should also incorporate measures that are developmentally and culturally appropriate. When developing solutions, it's critical to take into account both the factors that influence consumption and the barriers to health preventative practices (Robinson 2021: 4). For example, men may be specifically targeted by attention-grabbing advertising and training initiatives at work. It is also necessary to consider concerns with produce and distribution channel-related variables as well as with food labelling, which can occasionally be misleading and difficult to grasp, with the aid of stakeholders, ministries, and high level legislation (Wakim and Grewal 2021: 26). Nutrition intervention programmes should place an emphasis on physical exercise and a balanced diet to help people lose weight and improve their health. The goals of messages and interventions must be realistic, attainable, inspiring, and original (Colino 2021: 26).

2.9.2 Best NE approach for the elderly

Only 25 studies with quantifiable outcomes or evaluation components were found when Rea, Walters, and Avgerinou (2019: 5) searched the literature on community-based nutrition education and older persons published between 2012 and 2016. The duration of interventions varied greatly, ranging from brief phone counselling to several house visits. More effective strategies have included fewer personalised instructional messages and real-world tasks, and provided opportunities for defining individual goals (Karlsson, Ridback, Brobeck and Pejner 2019: 1).

2.9.3 Knowledge Mobilization (KMb)

Knowledge mobilization is defined as transforming knowledge that is known (often from formal research) into practical use (WHO 2022: 13). Knowledge mobilization helps with sharing knowledge between the research producer and research users, and not putting aside health care professionals and others whose work can benefit from research findings. According to the United Nations (2019: 1), KMb not only focuses on spreading information, nor is it only

about sharing, or circulation, nor is it a unidirectional publication of information; it also focuses on interaction, third party involvement and scrutiny of impact, and proof does not simply imply research, it entails result-oriented proof from reality, from practitioner-expertise of practitioners, and from the confirmation of the end-user stating what works for them (Marevosa *et al*. 2019: 3).

When knowledge is used, its value increases, and when it is not, it decreases (Abdi *et al.* 2019: 3). Knowledge mobilization equips individuals to utilize information tactically in dealing with real life issues. In basic terms, KMb assists individuals to put into action what they are aware of in order to build up their knowledge. Knowledge mobilisation also assists in creating awareness, bringing about transformation, and uniting people, and actively uses what people know. Furthermore, KMb focuses on matters of concern. It does not only enhance how knowledge is exchanged, but also assists in bringing forth greatly effectual and satisfactory transformation (Stone-Walls: 2019: 7). It can result in change on how people view things or how people behave, and can also encourage shifts in organisational or sectoral culture. It can assist in enhancing care and outcomes for clients. Over and above this, KMb helps promote change (Abdi *et al.* 2019: 3).

2.10 Conclusion

This chapter has put into context the connection between ageing and non-communicable diseases, and the impact and burden of such has been outlined. The basis of understanding the literature has therefore created a foundation and support for the primary objective goal of the research, which was to develop NE support material for the SA EFBDGs for isiXhosa- and seSotho-speaking communities.

The challenges of the research objective were to ensure that the tools communicating the EFBDGs are out there and are accessible to the target population, thereby achieving knowledge mobilisation about the EFBDGs. Even so, studies have indicated that elderly malnutrition in SA is provably linked to an amalgam of food insecurity and urbanisation, thereby resulting in inappropriate intake of nutrients.

CHAPTER 3 – METHODOLOGY

3.1 Introduction

The purpose of this chapter is to provide a description of the research design and methodology applied, as well as the data collection approach and analysis applied in this study. A description of the participants and the sampling procedures, and a brief overview of the measures used to collect data are included.

3.1.1 Justification of methodology

This study employed an explanatory sequential design utilizing a self-administered pre-development survey questionnaire, Deliphi survey, and FGDs. The chosen methodology is well suited for the development of elderly nutrition education materal for understanding preferences. The use of a self-administered pre-development survey questionnaire allows efficient data collection on elderly preference regarding format, language, and preferred information in the NE material. This aligns with a study by Fox**,** Rees, Lewis and Heaney (2020: 15) that used a self-administered questionnaire to identify elderly preference for nutrition education delivery methods, highlighting the importance of tailoring materials to their needs. Similarly, De Silva-Sanigorski, Dear and Spence (2015: 6) used self-administered questionnaires to explore older adults' preference for healthy eating information, emphasizing the effectiveness of this method in guiding intervention design.

The method selected for the study ensures validity and relevance. The use of a Delphi survey with experts and representatives from the elderly population strengthens the face and content validity of the NE material. This method offers expert consensus. As demonstrated by (Leme, Hou, Fisberg, Fisberg and Haines 2021: 11), Delphi surveys contribute significantly in ensuring that the content of NE material aligns with experts recommendations and addresses relevant topics. A study by Van der Ploeg, Bergevoet, Van der Oord ansd De Wit (2012: 56) showcased the importance of stakeholder participation in developing culturally appropriate and applicable resources for specific populations.

Conducting FGDs with the elderly enables direct assessment of the NE material's acceptability and comprehension. This is a crucial step in ensuring user-friendliness. A study by Wyllie, Shegog and McNaughton (2020: 25) highlighted the value of FGDs in testing the usability of educational material for older adults. Ahmed et al. (2019) emphasised that involving the target

population through focus groups helps ensure the NE material resonates with their cultural context and addresses their specific needs.

The pre-development questionnaire provides quantifiable data on preferences, informing the Delphi survey and focus group design. Combining methods enables triangulation of findings, leading to a more robust understanding of the elderly's needs and ensuring the developed NE material is effective (Kaur, Rasane, Singh, Kaur, Kumar, Mahato, Dey, Dhawan, and Kumar 2019: 9).

3.2 Planning and administration

The data collection for this study was conducted in a three-phased approach. The first phase included the pre-development survey to determine elderly preferences with regard to NE resources followed by the development of the EFBDGs educational material. The second phase was the Delphi technique for face and content validity of the material which was conducted in two rounds. The last phase was holding FGDs to test acceptability, understanding and comprehensiveness of the NE tools by the target population (refer to table 3.1).

The explanatory sequential mixed-methods design in developing nutrition education material for the elderly is a well-grounded approach that addresses the complex needs of the elderly by combining quantitative and qualitative data. This approach caters to diverse learning styles, allowing for initial quantitative data on visual preferences followed by deeper exploration through FGDs.

The design builds upon existing knowledge and practices by using quantitative data from surveys, which informs the development of materials, which are then refined and assessed for quality and effectiveness through qualitative FGDs. Delphi surveys for face and content validity are well-supported by prior research including a study by Elmadfa, Meyer, Nowak, Nowak and Stehle (2010: 35), entitled "Development of a food pyramid model for older adults in Europe: a Delphi consensus study" and a study by Pereira, Bergmann, Costa and Godoy (2012: 6) that sought to validation a food guide for the elderly by the Delphi technique. In both these studies, the Delphi technique was used to ensure expert consensus on the accuracy and cultural relevance of the content while considering the specific needs and learning styles of the elderly population.

The design ensures user-centered design and acceptance by including the target audience in the development process from the outset, enhancing the likelihood of creating materials that are

not only informative but also engaging and relevant to their specific needs and preferences. Focus group discussions (FGDs) for acceptability and comprehension allow for real-time feedback on the clarity, language, and overall effectiveness of the materials directly from the intended users, leading to further refinement and ensuring the materials are well-received and understood by the elderly.

Similar studies supporting the chosen methodology include the development of a nutritional education program for rural elderly in Egypt , which employed a pre-test/post-test design with FGDs to assess the effectiveness of a nutrition education program (El-Sharkawy, and Abu-Elmagd 2019: 56). Another study is entitled "Characterizing and justifying sample size sufficiency in qualitative health research", and it highlighted the importance of using qualitative methods alongside quantitative data to achieve in-depth understanding and ensure validity in research related to older adults (Britten and Jones (2020: 5)

Table 3.1: The data collection process phases and linked research objectives

Data collection phase	Research objective linked to this phase
Phase one: • **Pre-survey study** • **Development of NE support material for the EFBDGs**	• To determine the visual preference of the Elderly regarding educational material using a self-administered questionnaire. • To develop NE support material that would be comprehensive and easily understandable in communicating the EFBDs through a consultative process with a graphic designer.
Phase two: • **Delphi technique**	• To validate the developed NE support material by using experts in the fields of elderly education and food and nutrition.
Phase three: • **Focus group discussions**	• To test the developed material for acceptability and comprehensiveness using FGDs with the Elderly.

Prior to the implementation of the pre-development survey, a purposive sample of ten participants was randomly selected for a pilot study of the pre-development questionnaire. The participants selected represented the features of the target population (George and Merkus 2021: 23). The purpose for this process was to test the comfortability of the elderly with the questions and the questioning process of the pre-survey questionnaire, as well as to test whether the questions were easy to comprehend (Jain and Chetty 2020: 5). The ten participants were, however excluded from the actual survey (Jain and Chetty 2020: 5).

Table 3.1 illustrates the phases of the data collection process and the objectives aligned with each phase. For the pre-development survey, centre managers of the Empilweni and Santa old-age homes in Mthatha (Eastern Cape) as well as the centre managers of the Tumelo home and hospice in Attridgeville and the Leratong old-age home in Soshanguve (both in the Gauteng province) were approached to be briefed about the objectives of the research proposal. A meeting was scheduled with the senior committee members of the above-mentioned elderly care facilities (ECFs) from whom permission was obtained to pursue the research. Once permission was granted, verbal announcements were made by the centre managers addressing the elderly regarding the project. A day was scheduled for the researcher to return to the ECFs to conduct the pre-development survey.

The pre-development survey results prompted the development of the NE support material for the EFBDGs through a consultative process with the graphic designer and the research supervisors.

Phase two of this study was the Delphi technique. In this phase, a multidisciplinary team of experts from various institutions in the fields of education, communication, and food and nutrition were approached through use of electronic media to be briefed about the research project, and thereafter requested to participate (Simkus 2022: 2). Developed NE support material and a first round Delphi questionnaire (Annexure F) were attached to the email. The approached Delphi experts either signed consent to participate or declined participation through reply e-mails, after which the consenting respondents were asked to email through their input within two weeks from the day of consent. The Delphi technique was conducted in two rounds. After careful review of the first round Delphi responses by the researcher, consensus was not met and a second-round Delphi questionnaire was developed using the first-round responses (Simkus 2022: 2). The second-round questionnaire was fed back to the panel for re-evaluation of the modified first-round responses that did not reach consensus. The panel was again asked

to return their second-round input within two weeks, which met with a level of consensus in this round, and subsequently, the Delphi process terminated (Simkus 2022: 2).

The third phase encompassed administration of FGDs to test the acceptability and comprehensiveness of the developed NE tools by the sample population. Managers of the ECFs that were approached for the pre-development survey were once again approached to be briefed about the progress of the research project and were asked for permission to conduct the FGDs with the elderly residing in these ECFs. Consequently, dates were scheduled for the researcher to return to the centres to conduct the FGDs with the elderly. Figure 3.1 below illustrates the planning and administration process of the research project.

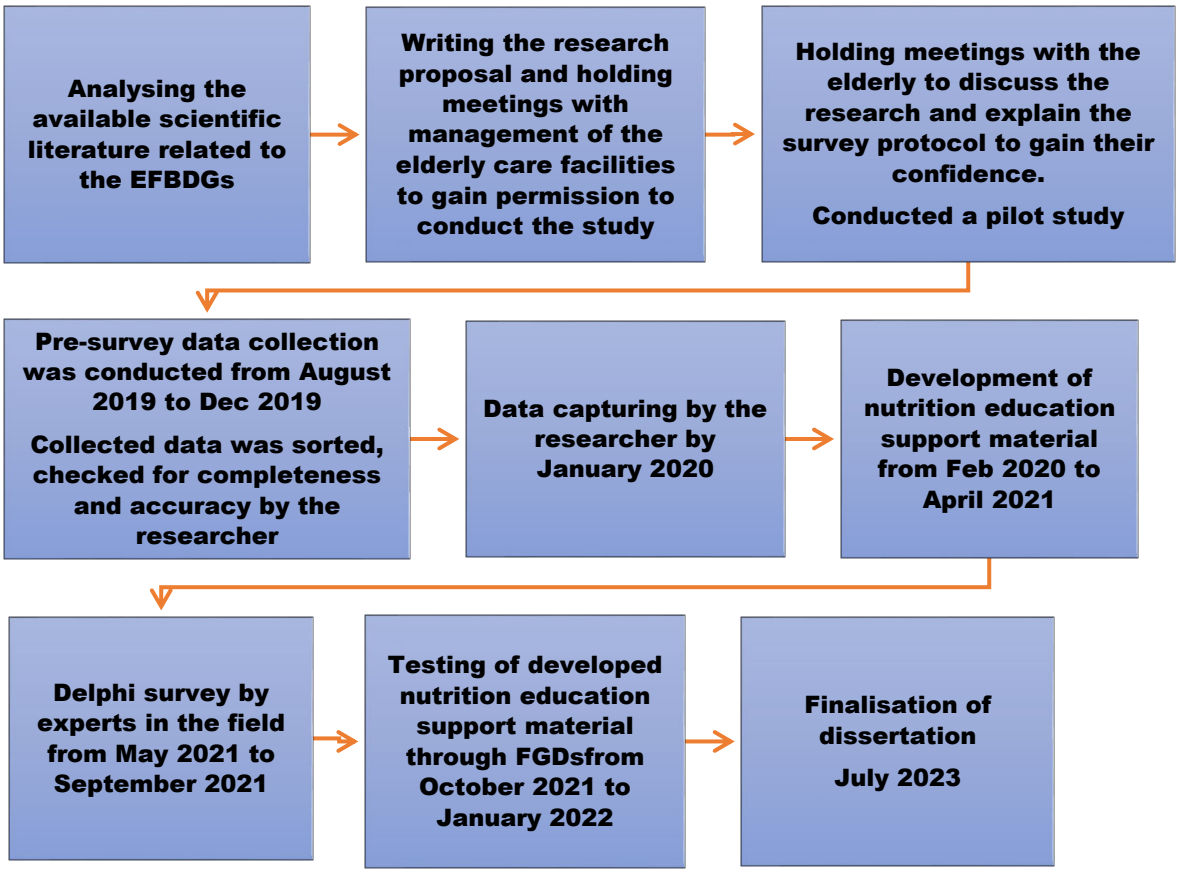

Figure 3.1: Planning and administration process of the research project

3.3. Ethical considerations

Ethical clearance for the study was obtained from the Institutional Research and Ethics Committee at the Durban University of Technology who allocated the clearance number: IRE 024/19.

Gatekeeper permission (Annexure A) was granted by the centre managers of each of the elderly care facilities approached for the study to be conducted. Information letters (Annexure B) providing information about the study that were translated into isiXhosa for the isiXhosa-speaking elderly and into seSotho for the seSotho-speaking elderly were provided to the elderly during meetings for the study briefing. The study briefing meetings included the signing of an informed consent agreement (Annexure C) that was also translated into isiXhosa for the isiXhosa-speaking elderly and into seSotho for the seSotho-speaking elderly. For the Delphi technique, information about the study was explained and sent through electronic media (Annexure D) to the Delphi panellists and informed consent to participate in the study was received through reply emails.

All participants in the study were informed about the confidentiality of all information and the data collection process. Participation in the study was entirely voluntary and codes instead of participants' names would be used in labelling the questionnaires.

3.4 Research design

EFBDGs play a crucial role in promoting healthy eating habits and preventing chronic diseases among the elderly population (Napier, Grobbelaar and Oldenwage –Theron 2021: 3). Many EFBDGs offer clear and concise recommendations on key nutrients, food groups, and dietary patterns relevant to elderly health. The inclusion of specific recommendations for protein, calcium, and vitamin D is commendable (Kaur, Rasane, Singh, Kaur, Kumar, Mahato, Dey, Dhawan, and Kumar 2019: 9). On the contrary, some guidelines fail to address individual needs and preferences, presenting "one-size-fits-all" recommendations (Kaur *et al*. 2019: 9). Additionally, cultural considerations and the impact of socio-economic factors on food access are often underrepresented. Guidelines should integrate personalized approaches, considering factors like health status, cultural background, and food availability (Assan 2023: 5). Addressing social determinants of health and promoting affordable access to recommended foods is crucial (Assan 2023: 5).

Many guidelines attempt to cater to diverse audiences by offering various formats for example, pamphlets, posters, online resources (Spinner, Haynes, Nunez, Baskerville, Bravo and Araojo 2021: 5). The use of simple language and visuals is a positive step towards accessibility (Spinner *et al* 2021: 7). The communication strategies often lack tailoring to specific age groups within the elderly population. Furthermore, cultural sensitivity and adaptation for varying literacy levels are not always adequately addressed (Spinner *et al* 2021: 7). Developing targeted

materials for sub-groups within the elderly population (for example, cognitively impaired versus independent older adults) is crucial. Culturally adapted materials with diverse communication channels and consideration for literacy levels are essential (Assan 2023: 5).

Some studies have explored the effectiveness of EFBDG interventions, documenting improvements in dietary intake and health outcomes (Leme, Hou, Fisberg, Fisberg and Haines 2021: 11). The use of validated assessment tools strengthens the evaluation process (Kaur et al. 2019: 9). Long-term sustainability of behavior change and the impact on specific sub-populations often remain underevaluated. Moreover, ethical considerations related to research design and recruitment of participants are sometimes lacking (Leme et al. 2021: 9).

As previously stated, this study was done in three phases. Phase 1 had two objectives, which were to determining the visual preference of the elderly (objective 1) and to develop NE material (objective 2). Phase 2 was for face and content validity of the developed material, and the last phase was for testing NE material for acceptability and comprehensiveness by the elderly. Different types of questionnaires were used in collecting data for the three phases of this research study.

Employing an explanatory sequential research design, the quantitative domain of the study was used to address objective 1 of phase 1. A quantitative research approach that involves the gathering of imperical data to explain a phenomena, was employed to assess the existing knowledge about NE tools, preferred dissermination material and the demographic information of the Participants (McCombes 2020: 14).

Objective 1 of phase 1 resulted in the development of the NE material for the elderly based on the information obtained through objective 1 of phase 1, being guided by the theory based procedural model for designing NE material as described by (Sirisilla 2023: 1).

Phases 2 and 3 of the study were done in the qualitative domain. Qualitative methods produce in-depth informatiomation regarding a phenomenon and therefore were more appropriate to gather qualitative feedback on the face and content validity (phase 2) and on the clarity, relevance, and usability of the material (phase 3) respectively. In qualitative research, participants freely give their views allowing the researcher to better understand the participants' needs (McCombes 2020: 14)

3.5 Research setting

South Africa has nine official provinces, two of which are the Eastern Cape and Gauteng. The research project took place in a small town called Mthatha (previously known as Umtata as indicated on the map in Figure 3.2) in the Eastern Cape and two townships called Attridgeville and Soshanguve in Pretoria, Gauteng. Mthatha is a town situated on the N2, approximately 250 kilometres north of East London, and approximately 400 kilometres south of Durban. The town currently has a population of 210 783 (Cakata 2022: 59). Pretoria is a city in the northern part of Gauteng province. It is one of the country's three capital cities, serving as the seat of the administrative government and foreign embassies to South Africa.

This study was conducted at the EFCs in Mthatha and Pretoria, where the elderly reside on a full-time basis.

Figure 3.2: Map of South Africa (showing provinces and towns in which the research was conducted) (Google Map 2023)

3.6 Study population and sampling

The study population is the entire group the researcher in interested in learning about, It the big picture encompassing all individuas, objects, or events relevant to the study (Pawar 2020: 9).

The study sample is the group selected by the researcher in which the research data will be collected from (Willie 2022: 2).

3.6.1 Sampling method and sample size

This research employed purposive sampling method in selecting participants through all three data collection phases of this study.

The study focused on a specific subpopulation within the elderly, namely, those residing in elderly care facilities. These facilities were also purposively selected and identified in the communities as elaborated under the research setting section.

According to Schatz, Ralston, Madhavan, Collinson and Gomez-Olive (2017: 18), living arrangements vary widely in South Africa. Living arrangements among the elderly are more important as they enter an age of familial relationships, changing economic conditions and altered physical needs. It is evident through literature that many older individuals reside in large, complex households. The most typical living condition for adults 60 years and above in South Africa is in extended-family households, which include relatives, including grandchildren, nieces, and adult children's spouses.

Inspite the limitation that the selected sample group for the study has limited influence on their nutrition as opposed to independently living elderly, the choice to focus on this specific subpopulation was informed by that, the researcher wanted to delve deeper into their unique needs and challenges related to nutrition education, which may differ to those living independently. Focusing on this specific subpopulation enabled easier access to participants and centralized data collection. It allowed the ability to recruit individuals with potentially similar health conditions or dietary restrictions relevant to the research focus. Controlled environment facilitated gathering consistent data about meals and nutritional support provided by the facilities.

The majority of the sample population were categorised according to the WHO (2020: 7) namely: old (60 – 69 years) that formed 55% of the population; old-older (70 – 79 years) who made up 45% of the sample, and the oldest-old (80 years and older) who made up 5% of the sample.

3.6.1.1 Pre-development survey

The researcher applied the purposive sampling method in selecting participants for the pre-development survey. Purposive sampling, also known as deliberate sampling, is a sampling method whereby a researcher selects a sample based on their knowledge about the study and population (Willie 2022: 5). The participants are selected based on the purpose of the sample and according to the needs of the study; applicants who do not meet the profile are rejected (Willie 2022: 12). One major advantage of this sampling method is that it is easier to make generalisations about your sample compared to, say, random sampling where not all participants have the characteristics you are studying (Willie 2022: 12).

In general, the sample size for a pre-development survey lies between 30 to 50 participants. A sample size of 30 participants is the minimum number adequate for a pre-development survey if the target population size is substantial such as in a community-based study (Memon, Ting, Hwa and Ramayah 2022: 15). For this research study, 50 participants were approached to participate in the pre-development survey, but the response rate turned out to be 40 participants due to dropouts.

3.6.1.2 Delphi technique

In selecting participants for the Delphi survey, key informants' interviews were conducted using a purposeful sample of people who are working and/ or directly linked to the work that involves elderly people and nutrition (Nasa, Jain and Juneja 2021: 24).

Currently, there are no guidelines or recommendations on the appropriate sample size for expert-consensus Delphi studies, or a standardized definition of a small or large sample. For a heterogeneous group of experts, it is recommended to have five to ten participants (Beiderbeck, Frevel, von der Gracht, Sascha, Schmidt and Schweitzer 2021: 15). The actual number of participants recruited would have to be more than the number recommended to account for the attrition of participants between rounds (Beiderbeck *et al.* 2021: 15). In this study, eight experts from heterogeneous fields (as previously mentioned) related to the study were initially consulted for the Delphi technique but since two participants dropped out, the response rate for the Delphi technique ended up yielding six participants.

3.6.1.3 Focus group discussions

According to George (2022: 2), FGDs interviews are a qualitative method in which a small sample of respondents discuss selected topics as a group for approximately one to two hours.

The FGDs facilitator focuses the discussion on relevant subjects in a non-directive manner. The method is a development of the group discussion (George 2022: 2).

A purposeful sample of participants who represented specific demographics and characteristics such as age, health conditions, cultural backgrounds and dietary habits were strategically selected to participate in the FGDs (George 2022: 2).

The most widely recommended size for FGDs discussion is ten to twelve respondents in marketing research (Nyumba, Wilson, Derrick, and Mukherjee 2018: 5). This is too large for most non-commercial topics. The ideal size of FGDs for non-commercial topics is five to eight participants (Nyumba *et al.* 2018: 1). A sample size of two to three focus FGDs will likely capture at least 80% of themes in a topic including those most broadly shared in a study with a relatively homogeneous population using a semi-structured guide. As few as three to six FGDs are likely to identify 90% of the themes. Focus group discussions of eight participants per FGDs were conducted in this study. Data saturation was reached in the second FGDs, therefore, two FGDs of eight participants per group were conducted for each respective ethnic group.

3.6.2 Inclusion criteria

Inclusion criteria for the pre-development survey and FGDs were as follows:

- IsiXhosa and seSotho people of pensionable age (age 60 years and older)
- All races that fell under the isiXhosa and seSotho ethnic groups
- Elderly people residing in the elderly care facilities
- The elderly that belonged to low to middle income communities
- Both sexes (males and females)

3.6.3 Exclusion criteria

Exclusion criteria for the pre-development survey and FGDs were as follows:

- People under the age of 60 years
- People who did not fall under the isiXhosa and seSotho ethnic groups
- Elderly people residing in elderly care facilities or community centres in high income communities

- Visually impaired elderly
- Elderly people suffering from dementia and Alzheimer diseases

3.7 Data collection process and measuring instruments

Data collection is the process of gathering and measuring information on variables of interest in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes (Bhandari 2020: 15). Tools or instruments used to gather data include case studies, checklists, interviews, occasional observations, surveys and questionnaires (Bhandari 2020: 15).

3.7.1 Data collection instruments

Different types of data collection instruments were used in the study to measure a variety of variables. These instruments included a self-administered pre-development survey, a Delphi technique questionnaire, and a FGDs interview schedule. The fieldwork was conducted in open meeting rooms at the elderly care centres.

3.7.1.1 Pre-development survey questionnaire

A self-administered questionnaire (Annexure E) was developed by the researcher in English and sent for face and content validity to experts in the field of food and nutrition prior to piloting it with the target sample group. The experts validated the questionnaire as suitable and comprehensive for the Elderly, after which it was translated into the two respective languages (isiXhosa and seSotho), with the assistance of the respective language experts and editors. The questionnaire was translated into these two languages to cater for the target population of the study. The developed questionnaire was then piloted in a sample of the target population, and subsequently two changes that provide valuable insights, but not major problems were made, which included changing the font size of the questionnaire into a bigger font and two demographic questions, which were to do with living arrangements and employment status were removed as they served no significance to the study, since the target population was the elderly residing in elderly care facilities. This questionnaire focused on determining the demographic variables of the participants and on gathering information about the methods preferred and most suitable for knowledge mobilization in the elderly. The questionnaire included specific coverage of participants' gender, age, level of education, learning opportunities attended, computer literacy, preferred resource tool for elderly activities, status of senses, and awareness about the FBDGs.

3.7.1.2 Delphi technique

The Delphi technique was used to obtain consensus among experts on the design and presentation of the developed NE support material. A panel of eight experts from the food and nutrition and adult education fields were conveniently consulted for the Delphi technique of which the response rate turned out to be six participants due to dropout. This survey consisted of two rounds as explained below:

i. Delphi technique: Round one

A validated first-round Delphi questionnaire (Annexure F) developed by (Tetzlaff, Moher and Chan 2012: 31) and adapted by the researcher with the assistance of the research supervisor in accordance with the objectives of the Delphi technique was used in the study. It gave an introduction to the core purpose of the Delphi technique to kickstart the overall assessment by the panelists. As the aim of the Delphi technique was to determine whether the developed material was suitable for elderly use and comprehension, the first-round Delphi questionnaire was designed to cover the overall in-depth layout of the developed material. The first-round questionnaire consisted of five questions that involved assessment of whether the booklet and poster were the best forms of communicating to the elderly; assessment of the potential of the material to capture elderly attention; assessment of the font size and colour used, and the suitability of the language used; and lastly assessment of the accuracy and scientific soundness of the material. All the questions were constructed to be agreement statements that also allowed experts to provide free-form answers. A 5-point Likert scale was used to measure the strength of a subject's agreement with a clear statement (1 being strongly agree and 5 being strongly disagree). The results were grouped into three brackets (1 – 2 agree; 3 neutral, and 4 – 5 disagree) (Bhandari 2020: 6). Consensus was defined as if 60% or more of the responses fell in one of the three brackets (Bhandari 2020: 6).

ii. Delphi technique: Round two

The second-round questionnaire (Annexure G) was adjusted according to the outcomes of the first round (de Vault 2018: 12). For this round, the researcher carefully reviewed each answer from the first-round Delphi technique for consensus, and also to find common reoccurrences or themes, and to determine new suggested information from all of the answers provided. Also, the most dominant information from these answers, and aspects that did not reach consensus in the first round, was used in the formation of the second-round questionnaire. Aspects that reached consensus in the previous round were not included in the second-round questionnaire

but some were used to formulate new questions to get additional information. This questionnaire with the developed material was then sent back to the panel to re-assess and re-evaluate the importance of the aspects included in the second-round questionnaire (Twin 2022: 32). The second-round questionnaire (Annexure G) consisted of a total of four questions which, as in the first round, were also agreement statements that further allowed for the experts' free-form answers. Questions in the second-round questionnaire involved requesting the panel to evaluate the suitability of the NE material for the South African elderly from low and middle-income groups. They also sought to determine whether the NE material would effectively mobilize knowledge about the EFBDGs, and they also included a request to review the newly-added suggestions from the first-round responses, which included recommendations to add a cover page, an introduction, emergency numbers applicable to the elderly, first aid kit tips relevant to the elderly, the university logo, and use of the university format in the booklet, and also the addition of a copyright declaration, including year of publication and author.

Analysis of the second round was done in the same way as the first: A 5-point Likert scale was used to measure the strength of a subject's agreement with a clear statement (1 being strongly agree and 5 being strongly disagree). The results were grouped into three brackets (1 – 2 agree; 3 neutral, and 4 – 5 disagree) (Twin 2022: 32). Consensus was defined if 60% or more of the responses fell in one of the three brackets (Twin 2022: 32). All (n=6) experts that participated in round one also participated in this round.

General group consensus with regard to the content and potential of the material to improve elderly health was reached after the review of the second-round responses and subsequently, the Delphi process terminated.

After the Delphi process terminated, the researcher conducted a thorough review of the Delphi technique final results and the decisions that the panellists arrived at were incorporated accordingly into the developed material with the assistance of a graphic designer.

3.7.1.3 Interview schedule for focus group discussions

Focus group discussions are a form of qualitative research that offers valuable insights into how target audiences perceive and interact with information (Frisbee 2022: 182).

The interview schedule for FGDs (Annexure H) developed by Krueger (2002: 20) was adapted by the researcher according to the objectives of this study's FGDs and sent for content and face validity to the experts in the field of food and nutrition. The questionnaire included closed and

open-ended questions and was used in discussions to establish common ground on the acceptability of the developed NE support material (booklet and poster) (Bhandari 2021: 43).

The researcher facilitated the progress of the FGDs by ensuring that participants followed the interview schedule and covered the desired topics (Crossman 2020: 38). Participants were allowed to speak out and discuss the topic among themselves, and the researcher tried not to intervene or direct questions at specific members (Hennink, Kaiser and Weber 2019: 8). The discussions were kept as natural as possible, and participants were in charge of how the discussions developed (Halliday 2020: 111).

The interview schedule was initially in English, and the primary discussion topics on the schedule were then translated into isiXhosa and seSotho. During the FGDs, the language utilised was either isiXhosa or seSotho, depending on the relevant ethnic group. Focus group discussions were held separately for each ethnic group.

The very first FGD (Round 1 FGDs), with the objective to test developed elderly NE material for acceptability and comprehensiveness was held with the isiXhosa speaking ethnic group. Procedures and guidelines of the FGDs were explained at the beginning of the FGDs session. Data generated from this FGDs was then analysed by the researcher to identify recurring themes, areas of clariríty and/ or confusion, and participants' feedback. The NE material being assessed was refined based on the analysis focusing on areas requiring more clarity. The second FGDs (Round 2 FGDs) with the isiXhosa speaking ethnic group was conducted, now using the refined NE material and the same interview schedule used in round 1 for re-assessment of the material. No new themes emerged in this round. Saturation was reached as this subsequent group yielded no significant new information, indicating that the diversity of participants' perspective was captured.

The seSotho FGDs were scheduled after the isiXhosa FGDs were concluded. This decision was made because the participants from each ethnic group reside in different provinces. By conducting and completing the FGDs with one group first, the researcher was able to minimise travel expenses before moving on to the next province.

The identical procedural strategy and methodologies utilised in conducting FGDs with the isiXhosa speaking ethnic group were likewise utilised in conducting FGDs for the seSotho speaking ethnic group. Data saturation was similarly achieved in the second round with the seSotho speaking ethnic group due to the absence of any additional substantial information obtained during this round.

The FGDs comprised of mixed genders. The interviews took approximately 1½ hours per FGDs with short breaks, and light refreshments were served at the end of each FGDs session. The researcher facilitated interviews in both languages as she is fluent in both languages. With the permission of the participants, FGDs were recorded using a voice-recording device.

Figure 3.3: Focus group discussion with the IsiXhosa ethnic group

3.8 Data analysis

After each day all the questionnaires were checked thoroughly to ensure they had been completed and everything had been recorded correctly. All collected data was analysed after completing the data collection process.

3.8.1 Pre-development survey

Information about the media most preferred by the target group to communicate health issues was captured and recorded using a pre-survey questionnaire. Data was captured on Microsoft Excel® spreadsheets and further analysed for descriptive statistics using the Statistical Package for Social Sciences (SPSS®) version 25. The analysed data was presented in graphs and tables. The results of the survey were used as a basis to develop the NE support material.

3.8.2 Delphi technique

The Delphi technique statistical data was captured in Microsoft Excel. A 5-point Likert scale was used to measure the strength of a subject's agreement with a clear statement (1 being strongly agree and 5 being strongly disagree). The results were grouped into three brackets (1 – 2 agree; 3 neutral, and 4 – 5 disagree), and then analyzed using thematic analysis, a method

used to analyse qualitative data that entails searching across a dataset to identify, analyse and report repeated patterns (Mcleod 2023: 6). Consensus is defined if 60% or more of the responses fall into one of the three brackets (Mcleod 2023: 6). The analyzed data was used to develop the second-round questionnaire. The second round of the Delphi technique was also captured and analyzed using the same method.

3.8.3 Focus group discussions

Focus group discussions were voice-recorded with a voice-recording device. An interview schedule was used to guide the FGDs. The recorded FGDs were transcribed verbatim by a transcriptionist. Verbatim audio transcription is defined as the word-for-word reproduction of verbal data, where the written words are an exact replication of the recorded (video or audio) words (Chazen 2023: 15). The transcribed FGDs' data was printed and carefully read through by the researcher, and then the transcript was annotated, and separated into sections with descriptive titles to build a separate list of themes. The most important themes with which to dissect the data were then chosen. The FGDs' data was then organised by questions and themes using a highlighter pen. The major themes identified were discussed and the quotes that encapsulated the themes were identified. Finally, the analysed FGDs' findings were then turned into recommendations for alteration of the tested NE support material to perfectly meet the needs of the elderly as preferred by the target population (Chazen 2023: 8).

3.9 Reliability and validity strategies applied in this study

This research study employed a commendable combination of strategies to address both reliability and validity in developing NE material for the elderly.

3.9.1. Reliability

The pre-development questionnaire was piloted to refine its effectiveness and the questioning procedureto to align with the elderly comprehension and understanding. The pre-development survey helped in ensuring that the material aligned with the target population's visual preferences, increasing the likelihood it would be engaged with and understood.

The explanatory sequential research design employed in the study allowed quantitative to qualitative data flow. It allowed for quantitative data from the pre-survey (visual preference) to inform the development of the material. This structured approach helped ensure consistency and reduced potential researcher bias in content creation. Qualitative data from the FGDs then

clarified and refined the material based on actual users' perspectives, further boosting its accuracy and relevance.

3.9.2. Validity

The Delphi method involving experts offered valuable insights into the accuracy, relevance and completeness of the developed material. Its strengths lied in interative feedback process that refined the content gradually. Secondly, expertice of participants ensured that content aligned with scientific knowledge and best practices.

The combination of quantitative (pre-development survey) and qualitative (Delphi survey and FGDs) data strengthened the overall validity of the findings. Triangulation provided multiple perpectives and reduced the risk of bias from any single method. Qualitative data from the Delphi survey and FGDs explained and contextualised the quantitative findings from the pre-development survey. This deeper understanding enhanced the overall trustworthiness of the research.

3.10. Conclusion

This chapter has provided a comprehensive introduction to action research as a methodological technique for developing NE support material for the EFBDGs in the isiXhosa- and seSotho-speaking communities. The study elucidated the concepts, techniques, and epistemological foundations, as well as the development of the practice. The meeting with the management of the elderly care facilities included a discussion of the measuring tools used, as well as an explanation of the roles and ethical considerations in the research study. The next chapter will discuss the interpretation of the results of the study.

CHAPTER 4 – RESULTS AND DISCUSSION

4.1 Introduction

This chapter reports on the results of the data collected with reference to the objectives of the study as tabulated, interpreted and evaluated. The sample technique for the pre-survey resulted in n=50 participants that signed consent to take part in the study from both the seSotho and isiXhosa ethnic groups. Out of the (n=50) elderly that signed consent to participate, (n=10) withdrew from the study after giving consent, resulting in a response rate of 90% (n=40) of participants for the pre-survey. The sample size for the Delphi survey was (n=6) respondents. Lastly, a total of four FGDs consisting of eight participants each were conducted, where two FGDs were made up of the isiXhosa-speaking sample groups and the other two FGDs were made up of the seSotho-speaking sample groups forming part of the sample population.

4.2 Study results – Phase one

4.2.1 Pre-development survey results

Two data sets, one for isiXhosa-speaking respondents and the other for seSotho-speaking respondents were collected and analysed collectively. The pre-survey results presented the study population categorised in percentages and numbers according to age, gender, level of education, living arrangements, learning opportunities taken advantage of, previous use of a computer (and the purpose it was used for), preferred source of information about elderly resources/ activities, preferred resource tool providing information about health and nutrition matters, self-reported status of senses (hearing and sight), as well as knowledge about the FBDGs.

4.2.1.1 Age

Data presented in table 4.1 illustrates that the respondents between the ages (60 – 69) years made up the largest number 55% (n=22) of respondents. Those aged between (70 – 79) years made up a total of 40% (n=16) of respondents, and those aged from 80 years and older made up the least number of respondents, which was 5% (n=2).

Table 4.1: Sample distribution according to age

Age	Number (n = 40)	Percentage (%)
60 - 69 years	22	55
70 - 79 years	16	40

Table 4.1: Sample distribution according to age continue

80+ years	2	5

4.2.1.2 Gender

Table 4.2 indicates that female participation 62.5% (n=25) in the pre-survey was more than the male participation that made up 37.5% (n=15).

Table 4.2: Sample distribution according to gender

Gender	Number (n=40)	Percentage (%)
Male	15	37.5
Female	25	62.5

4.2.1.3 Level of education

Data tabulated in table 4.3 indicates that a large percentage of respondents 60% (n=24) had primary school education as the highest level of education obtained, and 17.5% (n=7) of the respondents had never attended school. This is equal to the number of respondents that had high school/ matric as the highest level of education obtained, which was also 17.5% (n=7). The least number of respondents, 5% (n=2), is of the respondents that had tertiary education as the highest level of education obtained.

Table 4.3: Respondents' highest level of education

Highest level of education	Number (n=40)	Percentage (%)
Never went to school	7	17.5
Primary school	24	60
High school/ Matric	7	17.5
Tertiary	2	5

4.2.1.4 Learning opportunities attended

Data analysed in table 4.5 indicates that 52.5% (n=21) of the respondents had never participated in any learning opportunities in the past. Twenty-five percent (25%; n=10) of the respondents indicated to have attended a workshop course offered by a community organisation. Ten percent (n=4) of the respondents indicated to have attended on-campus learning through a

college or university. Thereafter, 7.5% (n=3) of the respondents indicated to have participated in other learning opportunities that were not listed in the options given on the questionnaire. Five percent (5%; n=2) of the participants stated that they had attended workshops or courses offered by a clinic or health centre. None (n=0) of the participants indicated to have attended online distance courses.

Table 4.4: Learning opportunities attended

Learning opportunities attended	Number (n=40)	Percentage (%)
Workshop/course from a community organization	10	25
Workshop/course from the clinic or health centre	2	5
Online or distance learning course - internet	0	0
On-campus learning through a college or university	4	10
I did not participate in any learning opportunity	21	52.5
Other – Specify	3	7.5

4.2.1.5 Computer literacy

Table 4.6 illustrates whether or not a computer had been used before. The table further indicates the purpose for which the computer was used for respondents who answered 'yes'. Therefore, 75% (n=30) of the respondents indicated to have not used a computer before, whereas 25% (n=10) responded to have used a computer before. The 25% (n=10) of respondents who had used a computer before was comprised of 10% (n=1) of the respondents who had used a computer for playing games; 30% (n=3) of the respondents who had used a computer for the purpose of writing, editing and research; 30% (n=3) of the respondents who had used a computer for work purposes; and 20% (n=2) of the respondents who had used a computer for internet browsing. Lastly, a group comprised of 10% (n=1) of the respondents indicated having used a computer before for the purpose of watching movies. No participants (n=0) responded to previously having used a computer for sending or receiving an email.

Table 4.5: Computer literacy of respondents and the purpose for which the computer was used

Computer literacy	Number (n=40)	Percentage (%)
Yes	10	25
No	30	75

Table 4.5: Computer literacy of respondents and the purpose for which the computer was used continue

Purpose for which computer was used	Number (n=10)	Percentage (%)
Email	0	0
Playing games	1	10
Writing, editing and research	3	30
Work purposes	3	30
Internet browsing	2	20
Watching movies	1	10

4.2.1.6 Preferred source of information about elderly resources or activities

Illustrated in table 4.7 is the source of information about elderly activities or resources preferred by the respondents. The most preferred information source was the family doctor or local clinic with 25% (n=10) of the respondents indicating this. A radio was the second most preferred information source as indicated by 22.5% (n=9) of the respondents. The least preferred information source was the local newspapers as indicated by 12.5% (n=5) of the respondents. Flyers/ pamphlets were preferred by 20% (n=8) of the respondents, as well as television news by (20%; n=8) of the respondents. None of the respondents indicated they preferred community club, magazine, internet and cell phone audio or video messaging as an information source among this sample group.

Table 4.6: Preferred information source about elderly resources or activities

Preferred information source about elderly resources/ activities	Number (n=40)	Percentage (%)
Family Doctor /Local clinic	10	25
Community club	0	0
Magazine	0	0
Local Newspaper	5	12.5
Flyers, Pamphlets	8	20
Television News	8	20
Radio	9	22.5
Internet	0	0
Cell-phone audio or video messaging	0	0

4.2.1.7 Preferred resource tool informing about health and nutrition matters

Table 4.8 indicates that posters were the most preferred resource tool to inform the elderly about health and nutrition-related matters as indicated by 57.5% (n=23) of the respondents. The second most preferred resource tool was pamphlets, preferred by 25% (n=10) of the respondents. The least preferred resource tool was fridge magnets by just 2.5% (n=1) of the respondents. Short videos had 7.5% (n=3) of the respondents preferring them as a resource tool to provide information about adult health and nutrition matters. There were also 7.5% (n=3) of the respondents that preferred audio recordings as a resource tool informing about adult health and nutrition matters. None of the participants preferred bulletin boards and flash cards as a preferred tool informing about health and nutrition matters.

Table 4.7: Preferred resource tool informing about health and nutrition matters

Preferred resource tool informing about health and nutrition matters	Number (n=40)	Percentage (%)
Posters	23	57.5
Pamphlets	10	25
Bulletin boards	0	0
Short videos	3	7.5
Audio recordings	3	7.5
Fridge magnets	1	2.5
Flash cards	0	0

4.2.1.8 Self-reported status of senses

Figure 4.1 indicates the self-reported status of senses of the sample group. The data analysed illustrates that a majority of 52, 5% (n=21) of the respondents indicated their sense of hearing as being moderate. Seven (n=7) of the respondents had an excellent sense of hearing. Respondents that rated positively to their status of hearing numbered (n=9), and only (n=3) of the participants admitted to needing assistance to hear.

The results for the sense of sight show that 62.5% (n=25) of the respondents indicated to have a moderate sense of sight. Twenty-five percent (25%; n=10) of the respondents indicated to have a good sense of sight. The least number of respondents (n=5) were assisted by wearing spectacles to see. No respondent (n=0) indicated to have an excellent sense of sight.

Furthermore, data in figure 4.1 also indicates the status of sense of smell among the sample group, where 67,5% (n=27) of the participants of the sample group indicated they had a good sense of smell. Twenty-five percent (25%; n=10) of the participants indicated to have an excellent sense of smell. Only three of the participants indicated to have a moderate sense of smell and no participant indicated to being assisted to smell.

With regard to the sense of touch, a majority of the participants, which made up 90% (n=36) of the respondents, indicated they had an excellent sense of touch, whereas only four of the respondents indicated they had a good sense of touch. None (n=0) of the participants indicated to have a moderate sense of touch or were assisted to experience a sense of touch.

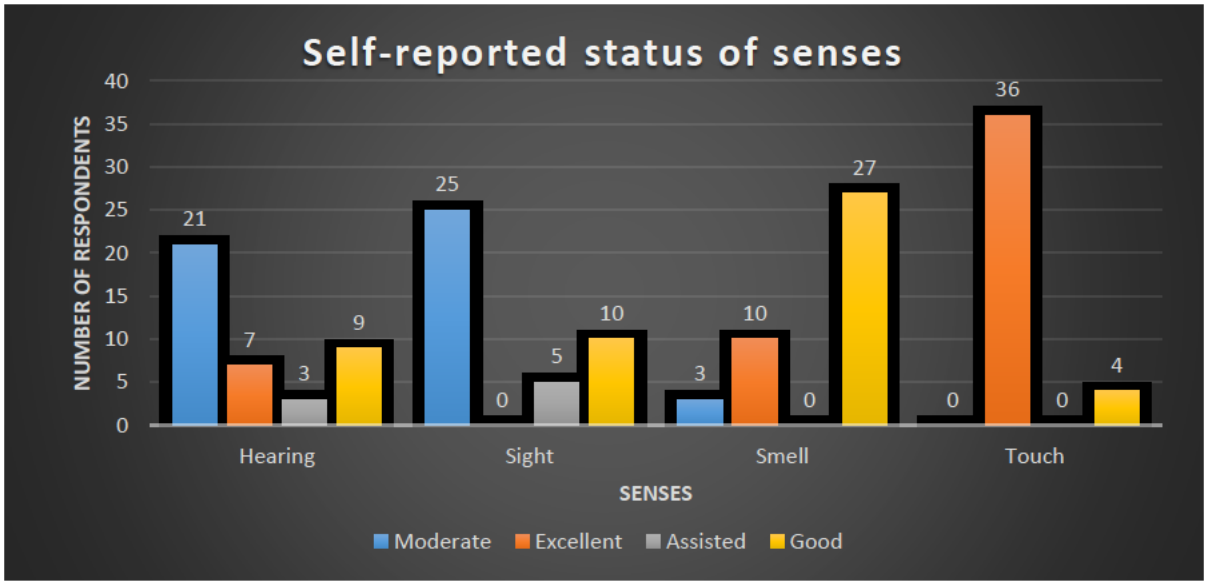

Figure 4.1: Self-reported status of senses

4.2.1.9 Awareness about FBDGs

Table 4.9 indicates whether or not the sample group had heard about the FBDGs, and subsequently, for respondents who indicated to have heard about the FBDGs, the source where they heard about them is indicated.

The results as tabulated therefore indicate that 52.5% (n=21) of the respondents had never heard about the FBDGs, whereas 47.5% (n=19) of the respondents indicated to have heard about the FBDGs. Respondents who indicated to have heard about the FBDGs stated to have heard about them from the following sources: local clinic 31.6% (n=6) of the respondents, family doctor 26.3% (n=5) of the respondents. Four respondents indicated to have heard about the FBDGs

from the elderly care facilities where they stayed. Pamphlets and posters, hospital, "told by my children", and health books had an equal number of only one respondent each as sources from where the FBDGs were heard about.

Table 4.8: Awareness about the FBDGs

Awareness about the FBDGs	Number (n=40)	Percentage (%)
Yes	19	47.5
No	21	52.5
Resource where FBDGs were heard from	**Number (n=19)**	
Pamphlets and posters	1	5.3
Local clinic	6	31.6
Family doctor	5	26.3
Hospital	1	5.3
Read from a health book	1	5.3
Old age home where I stay	4	21.1
I was told by my children	1	5.3

4.2.1.10 Understanding of FBDGs

Table 4.10 indicates whether or not the sample group understood the meaning of the FBDGs, of which 57.5% (n=23) of the respondents indicated not to understand the meaning of the FBDGs. Thirty percent (30%; n=12) of the respondents, however, indicated to partially understand the meaning of the FBDGs, and only 12.5% (n=5) of the respondents indicated to fully understand the meaning of the FBDGs.

Table 4.9: Understanding of the FBDGs

Understanding of the FBDGs	Number (n=40)	Percentage (%)
Yes	5	12.5
No	23	57.5
Partially	12	30

4.2.2 Development of NE support material

The main objective of this study was to develop nutrition education support material that would be most suitable, comprehensive, nutritionally sound, and most effective to communicate the EFBDGs.

As indicated in table 4.11, the tool that was most preferred by the target population to communicate the FBDGs was a poster with 57.5% (n=23) of the respondents indicating this option. The second most preferred tool was pamphlets as indicated by 25% (n=10) of the respondents. Audio recordings and short videos each had an equal number of three respondents who preferred these tools to communicate the FBDGs, and lastly, only one respondent preferred fridge magnets as a tool to communicate FBDGs.

Table 4.10: Preferred resource tools to communicate the EFBDGs

Most preferred resource tool to communicate EFBDGs	Number (n=40)	Percentage (%)
Poster	23	57.5
Pamphlets	10	25
Short videos	3	7.5
Audio recording	3	7.5
Fridge magnets	1	2.5

From the above analysed results it was evident that a poster would have to be developed to communicate the EFBDGs. Development and design of the NE support material commenced with the researcher identifying a professional graphic design company and being introduced to a graphic designer to discuss the research project. The researcher briefed the graphic designer to design a poster that would be age appropriate and suitable to communicate the tested EFBDGs. The poster would have to be visually attractive and a suitable text font size and suitable colours would have to be applied (Mcguire 2023: 61). A background colour which was attractive and acceptable to the elderly would have to be carefully considered when designing the material so that it catered for every elderly, including those that were visually, hearing and physically impaired (Mcguire 2023: 61). Images used in the material would have to be bigger in size and relatable to the target population (Davenport University Libraries 2022: 78). English guidelines were used as a basis to design the material after which the material was translated into isiXhosa and seSotho. The sans serif font was used in the poster as it typically reads better and is more easily viewable from a distance. Eighty-five (85pt) font size for the title and 30pt

font size for sub-headings were the font sizes used in the printed poster. See Annexure I for the first draft of the poster.

The researcher consulted with the research supervisors for a review of the first draft of the poster, which resulted in recommendations that changes be applied to the first draft poster. Changes to be applied included a complete redesign of the first draft poster into a unique poster as the first draft poster was very similar to already existing food guidelines posters. Images used on the poster would have to be free from copyright and relatable to the target population. Further recommendations were that a poster on its own would not communicate the guidelines sufficiently and would not be adequately understood by the target population, and therefore a pamphlet or booklet that would be supplementary to the poster, explicitly explaining the meaning behind each guideline, would need to be designed as a handout specifically for the elderly to use as reference. The booklet would also have to outline the importance of each guideline and its practical applications. A booklet was the tool chosen to work together with the poster on the basis that it was the second most preferred tool by the target population. Specifications and recommendations for the poster design to enable easy comprehension by the elderly as stated above would also have to be applied to the booklet or pamphlet, and more simple language as spoken by the elderly instead of academic or technical language would have to be used (Davenport University Libraries 2022: 78). Information organisation, layout and design of each page would have to be uniform and compatible throughout the booklet or pamphlet (Davenport University Libraries 2022: 78). Recommendations for the booklet also suggested no use of food and nutrition technical language but rather use of vocabulary that would be easy to understand and apply (Mcguire 2023: 61). The above recommendations were applied to the poster and a second draft poster was developed. See Annexure J for the second draft poster.

After careful consideration of the second draft poster and consultation with the research supervisors, recommendations were made to revise it and give more thought to the second draft poster. It was recommended that images under each guideline should match what the guideline stated. Examples were to put a variety of food images next to the guideline that stated ‘Eat a variety of food’ and not to have just eggs and meat, and also to have a variety of different-coloured fruit and vegetables next to the guideline that stated; ‘Eat plenty of different-coloured fruit and vegetables everyday’, and not to have just two vegetables of the same kind and colour. The revised developed material was sent to a panel of experts in the food and nutrition fields related to the study for the Delphi survey. Annexure K represents the adjusted third draft poster.

Annexure L represents the 13-page first draft of the developed nutrition education booklet together with the input of this research study supervisor that was sent to the Delphi panel for review.

4.2.3 Discussion of phase one results

The objective of the pre-survey part of phase one was to determine what the elderly would prefer as a resource tool for nutrition education. This part further sought to discover more about the elderly's thoughts, perceptions and understanding of nutrition knowledge. Collected data from this phase would subsequently be used as a basis to develop and design nutrition education support material for the developed EFBDGs utilising the services of a graphic designer. The pre-development survey data collected supplied the demographic information about the participants, and indicated the poster and the booklet as the nutrition education support material most preferred by the elderly to communicate the Elderly Food Based Dietary Guidelines. These results prompted the development of an A5-sized NE booklet as a personal handout targeted specifically at the elderly living in low- and middle-income communities, and a 1200mm x 800mm sized NE poster with 85pt and 30pt font size as a teaching tool for nutrition educators.

The ageing process is a biological reality that has its own dynamics largely beyond human control; however, it is also dependent on how each society makes sense of old age (WHO 2022: 4). In this study, most elderly were within the range of (60 – 69) years old, which is recognised as the onset of old age for most Western industrialised nations (Deshpande and Livingstone 2021: 1). This is the age when most people retire and become eligible for assistance programmes based on age. According to WHO (2023: 6), adults who reach 60 years have an average life expectancy of an additional 19.3 years. Furthermore, the older population is becoming older, and those 80 years of age and older were expected to increase from 6 million in 2014 to 20 million in 2060 (WHO 2023: 6). A 60-year-old is very different from an 85-year-old in terms of health, mobility, and functioning, and as a result the adult population can be divided into young old (ages 60 – 69), middle old (ages 70 – 79), and oldest old (age 80+), with each group having its own varying needs (WHO 2022: 4).

As indicated by WHO (2023: 6), nutrition educators believe that teaching healthy food and eating habits at a young age may be the key to preventing chronic diseases and other health issues later in life. As a result, nutrition education courses typically target young school-aged

children. In light of this, the elderly are one of the more underrepresented groups that, for the most part, lack nutrition expertise. The belief that older persons will reject such lifestyle modifications is what restricts the development of nutrition education programmes for them (WHO 2022: 4).

The pre-development survey noted a disproportionately large number of participants with low levels of education, with many having only a primary school education. Education is known to enhance a person's ability to understand, preserve and remember information (Robinson and Robinson 2022: 9). In agreement with the results of this study, Anderson and Thayer (2018: 3) found that in South Africa, while educational attainment is quite high among the older white population, the majority of the older black population is still feeling the effects of the discriminatory education imposed by Apartheid laws. In addition, while 96% of white South Africans aged 60 years and older had attained a secondary or a higher level of education as of 2011, only one percent of older white people had never received schooling, whereas the rate among older black adults was nearly 40%. Similarly to these results, Noyoo (2017: 6) re-iterated results found by Statistics SA, which indicated that only one in five black people aged 60 - 70 years and older had completed secondary education or had higher levels of education in South Africa. Few of the higher educated elderly people in the survey indicated that they knew about the FBDGs and fully understood the meaning behind them. They were motivated to learn more about the preparation and consumption of healthy, balanced meals to promote good health. However, nutrition knowledge alone may not be enough to ensure a correct attitude or proper dietary practices because attitudes and behaviours are also essential to overall healthy eating. This study confirmed that nutrition education is necessary, even though it may not be enough to attain optimal behaviour and attitudes among elderly people.

With regard to computer literacy, only 25% (n = 10) of the participants indicated to have used a computer before for research purposes, typing, internet browsing or for playing computer games. According to Johnson (2021: 23), older generations are generally less inclined to use modern technology compared to a majority of younger people who find it easy to use because they have grown up using it. Since the advent of the COVID-19 pandemic when people, especially the elderly, were forced to socially isolate, most people have become much more reliant on technology to communicate with their loved ones. Josh (2023: 5) indicated that older people are now embracing technology more than ever before. In actual fact, according to recent research, 77% of elderly over 60 years used the internet at home in 2020 (Josh 2023: 5). Recent internet use in the 60 – 69 age group has increased from 52% in 2011 to 83% in 2019, which

means older people are closing the generation gap in technology usage (Josh 2023: 5). Older people are not just using their computers either, they are branching out into mobile phones and tablets, too (Josh 2023: 5). Although these reports are promising, there are still many older people who feel intimidated by technology (Wilson-Nash and Tinson 2022: 1). Much more needs to be done to help boost these numbers even further as digital devices can be an effective means for nutrition education in order to enhance the quality of older adults' lives (Wilson-Nash and Tinson 2022: 1). Harris, Blocker and Rogers (2022: 3) found use of digital devices such as computers and cell phones to have a positive effect on older adults in supporting their independence by providing entertainment, leisure activities, and opportunities for learning new repertoires, and promoting cognitive activity improvement. Digital devices were also reported to assist older adults in connecting with their family members and friends, supporting their health and well-being, managing declining mental capacity, and accessing health and social service information (Sixsmith, Horst, Simeonov and Mihailidis 2022: 15). Digital devices can help older adults remember important schedules or health-related information as well as entertain themselves with stimulating fun games (Sixsmith, Horst, Simeonov and Mihailidis 2022: 15).

Rea, Walters and Avgerinou (2019: 4) indicated that some studies on older adults had reported that traditional lectures on nutrition-related education were effective. However, many older adults are independent and self-directed learners with abundant life experience and motivation to learn what they want to know, therefore traditional nutrition education might not be suitable since they all have different learning needs (Rea, Walters and Avgerinou 2019: 4). Results of a study by Villar, Serrat, Celdran and Pinazo (2019: 21) indicated that participants who learned cooperatively and were responsible for their own learning, using systematic activities and support, achieved better learning outcomes. This therefore implies that a multimethod learning approach for older adults needs to be tested in practice.

The self-reported status of senses of the participants in the study indicated a large number of participants to have only moderate senses of sight and hearing. Very few participants reported to have no problems at all with vision and hearing, and just a handful of participants were assisted by spectacles and hearing aids to see or hear. These results correspond with those of Tournier (2022: 3), which indicated that as people age, the way their senses (vision, hearing, taste, smell, touch) provide them with information changes. Furthermore, the senses of an individual become less sharp, and this makes it more difficult for an individual to notice details (Tournier 2022: 3). The WHO (2019: 32) agreed that ageing can affect all of the senses, but

usually hearing and vision are most affected. Reduced vision can lead to an impaired ability to read nutrition information, food labels and recipes as well as food prices (Centres for Disease Control: 2021: 2). It can also affect confidence in cooking skills in the kitchen, and also impair an individual's ability to shop, and to prepare food and snacks (Centres for Disease Control: 2021: 2). Hearing loss, on the other hand, may affect one's readiness to ask questions regarding menu items or food suggestions (Centres for Disease Control: 2021: 2). Similarly, for those participants in this study residing in elderly care facilities, hearing loss may also be a barrier to communicating food preferences, wants and needs effectively as they may not be able to hear options or see what is available to them. However, devices such as spectacles and hearing aids, or lifestyle changes, can significantly improve an individual's ability to hear or see (Centres for Disease Control: 2021: 2). According to Tseng, Liu, Lou and Huang (2018: 43), other sensory impairment can include changes in the ability to taste and smell. Impairment of these two senses can also have a negative impact on a person's perception of the world, diminish a person's mode of communication and lead to social isolation. The results of this study also indicated that a greater number of participants reported to have a good to excellent sense of smell and touch, very few indicated to have a compromised sense of smell, and none reported to have a compromised sense of touch. Sense of smell works together with the sense of taste (Centres for Disease Control: 2021: 2). Smell and taste play an important role in food enjoyment and food safety. These senses allow an individual to detect danger, such as spoiled food, leaking gases and smoke according to the Tseng *et al.* (2018: 43). Contrary to this study, the WHO (2017: 32) reported that in old age, the sense of smell of an individual can diminish, especially after 70 years of age. This may be related to a loss of nerve endings and less mucus production in the nose. A study by the World Health Organisation (2017: 32) and a study by Henry Ford Health Staff (2019: 5) concurred that olfactory acuity (defined as a heightened sense of smell) decreases with age. Moreover, the sense of smell is more impaired by ageing compared to the sense of taste. These changes affect an older individual's food preferences and choices, appetite, dietary intake and nutrition status, all of which can even lead to an individual being uninterested in nutrition education as they may feel that it is not necessary to learn about nutrition if they no longer find any enjoyment in food.

According to the Food and Agricultural Organisation/ World Health Organisation (FAO/ WHO) (2017:12), nutrition education is the process of acquiring knowledge and skills in order to improve an individual's health and that of their community. Nutrition education is considered the most effective, most economical and most rational aspect of health care and

health culture (FAO/ WHO: 2017:12). As indicated by Napier, Grobbelaar, and Oldewage-Theron (2021: 1), when addressing nutritional problems of the elderly, it is crucial to consider their characteristics and potential limitations. Due to a weakening of physical and mental functions, the elderly may not only have less motivation to acquire new knowledge, and lower studying abilities but may also be somewhat rigid in their habits, all of which could make nutrition interventions less effective (Preston and Biddel 2021: 5). Previous studies, however, indicated that NE and/or counselling for the elderly has a positive effect (Rea, Walters and Avgerinou 2019: 33). A study conducted among an elderly Korean community indicated that after nutrition education was delivered, nutrition knowledge, nutrition attitudes and dietary habits increased significantly (Choi, O'Donnell, Choi, Jung and Cowlishaw 2018: 8).

As aforementioned, the results of the pre-development survey indicated the poster and booklet, or pamphlet as the most preferred tools for nutrition education by the participants. According to Hasanica, Remic-Catak, Mujezinovic, Begagic, Galijasevic and Oruc (2020: 35), a poster as a resource tool for NE can increase knowledge and impact positive change in attitudes if the information is presented in a simple and comprehensive manner. The distribution of health education posters is recommended in situations where it is necessary to reach a wide audience for a long period of time, provided the site of the poster is protected (World Health Organisation 2017: 54). The poster should remain in the place where it is set up for some period of time, which allows for long-term retention of knowledge and positive attitudes at approximately the same level as originally experienced after the education (Preston and Biddel 2021: 5)**.**

Barker and Phillips (2021: 22) indicated that in an evaluation study by Samuel and Atinmo (2011), participants identified that posters needed to be accompanied by another source of information to be effective otherwise the only attraction to the poster is the imagery. These results are similar to a study by Rudman and Meiring (2018: 35), which indicated that posters elicit the most effectiveness in knowledge transfer when integrated with other educational modalities. Posters as a single intervention did not elicit changes in knowledge, attitudes or behaviour (Rudman and Meiring 2018: 35). These studies are in agreement with the pre-survey results of this study that indicated the booklet as a tool suitable to work simultaneously with the poster, explaining the poster in depth.

Raz (2021: 1) is also of the view that poster presentations achieve success in increasing knowledge, changing attitudes and behaviour when integrated with a suite of educational interventions. Although superficial, the graphic design and physical appearance of the poster

can determine its success in promoting knowledge transfer (Raz 2021: 1). There has not been a study that directly compares the effectiveness of poster presentations to other educational interventions in achieving knowledge transfer (Barker and Phillips 2021: 2). Given their common use within the academic and public health fields, there is a need for comparative studies to assess the effectiveness of posters in knowledge transfer as the first step in establishing evidence based on this topic (Barker and Phillips 2021: 2). According to Pain (2022: 8), poster presentations are a common form of presenting health information at conferences and in the community. According to Kim and Bae (2020: 23), Ilic and Rowe (2013: 56) indicated that anecdotal evidence within the discipline indicates that health information framed in a poster presentation may be an effective method of knowledge transfer.

Contrary to the findings of this study that the elderly preferred posters and pamplets as the most effective tools to communicate NE, Kim and Bae (2020: 12) are of the view that, with advancing age, a person's memory is more receptive to information that is heard than it is to information that is seen. Therefore, an older person is more likely to remember information he or she hears than information that he or she reads (Kim and Bae: 12) .

The development of the NE tools part of Phase one aimed at deciding what would be a more appropriate and effective design and layout in a printed poster and pamphlet. In designing the NE material, the first consideration is to catch the attention of the audience; people must want to listen to or to look at the message if it is to affect them (Luesse, Koch and Contento 2019:4). This aspect is of particular importance in designing materials that are to convey messages through visual means (Luesse, Koch and Contento 2019:4). Posters, for example, rely on their "stopping power" to attract attention, especially if they are displayed without presentation through face-to-face communication (University of Leeds 2023: 15). Guidelines for consideration in designing the NE material for the EFBDGs were that the size of graphics and text font should be large enough to accommodate difficulties with vision and should focus on establishing good contrast between the text and background colour for elderly people to easily see the content (Luesse, Koch and Contento 2019:4). Images that are familiar, simple, clear and culturally tailored to facilitate easy understanding and relatability should be used. Information organisation, design and layout of each page should be standardised and consistent throughout the booklet or pamphlet (University of Leeds 2023: 15). Applicable alternatives can be highlighted to ensure that elderly people can readily see the information as it makes for easy interpretation of the guidelines (University of Leeds 2023: 15).

4.3 Phase two: Delphi technique

A Delphi survey of two rounds was used to validate the developed nutrition education support material for the EFBDGs. In this phase, consensus results of the two Delphi survey rounds, along with the experts' qualitative comments are presented. Please see a copy of the first round of the Delphi survey questionnaire in (Annexure F), and the second round of the Delphi survey questionnaire in (Annexure G). The aim of this Delphi survey was to collate the experts' opinions on the developed NE support material for the EFBDGs. These expert opinions were used to validate the face and content of the developed material. The panel of experts included experts from different institutions with expertise in various fields as follows: food and nutrition, media and communication, elderly nutrition, and NPO for the elderly. A total of eight (n=8) experts were invited to participate as experts in their respective fields (as listed above), and six (n=6) accepted the invitation. The (n=6) experts all participated in both rounds.

4.3.1 Delphi technique: Round one

As the aim of the Delphi survey was to determine whether the developed material was suitable for elderly use and comprehension, the first round of the Delphi survey was implemented to cover the overall in-depth layout of the developed material. The first round of the Delphi survey consisted of five questions, all of which were agreement statements that also invited the experts to provide free-form answers. The structure of the results of the round one Delphi survey followed the evaluation aspects included in the first round Delphi questionnaire. A 5-point Likert scale was used to measure the strength of a subject's agreement with a clear statement (1 being strongly agree, and 5 being strongly disagree). The results were grouped into three brackets (1 – 2 agree; 3 neutral; and 4 – 5 disagree). Consensus was defined if 60% or more of the responses fell in one of the three brackets.

4.3.1.1 Round one statistical and qualitative analysis and interpretation

Presented in table 4.11 is the data analyses of the Round one experts' responses. The structure of the analyses and interpretation follows the evaluation aspects as per the first round Delphi questionnaire (Annexure F). The statistical data in table 4.12 is interpreted as follows:

a) Booklet and poster: best forms of communication for the elderly

A majority of 66.6% (n=4) of the Delphi panel agreed that the poster was a good tool to disseminate information and educate the elderly about the EFBDGs, as stated by one of the panellists:

'Availability of a poster is a great way to engage the elderly who are illiterate and to summarise the information that is presented in the longer booklet.'

Four (66.6%; n=4) of the experts also agreed that the booklet was a good supplementary tool to work with the poster in educating the elderly, as one of the panellists stated:

'A booklet is more practical for individual use at home. The interactive health booklet shows how you included the elderly during the development stages, tailor-making it to be simple and engaging. I am impressed that you have included information on lifestyle modification.'

Two (33.3%; n=2) experts disagreed that the poster was the best form of communication for the elderly, as one of the panellists was quoted as saying:

'I think the suitable material for the target market is media like television or radio.'

b) Presentation of the material: potential of the material to capture the attention of the elderly

A majority of 66.6% of the Delphi panel agreed that the presentation of the material had the potential to capture the attention of the elderly, as one panellist was quoted as saying:

'Huge potential for the elderly to be captured by the material. It's catchy and good on the eye. Great presentation.'

On the contrary, 33.3% of the Delphi panel disagreed that the presentation of the material would capture the attention of the elderly, as one expert stated:

'I suggest a review of how the guidelines are presented in the poster to capture the essence of the messages, for example, put the food that needs to be restricted in the last row and make them a bit smaller than others, and also do not put alcohol next to milk; I would suggest milk before water for instance.'

c) Recommendations on font, size and colour

- **Font and size**

All the experts (100%; n=6) agreed that the text font and size should be legible and elderly-friendly, and that the elderly should not face difficulties reading both the poster and the booklet, as one expert was quoted as saying:

'The font size is ideal for reading distance, legible, and greater reading efficiency, not over bold to make them feel like a toddler, and no need to move the book further away.'

- **Colour**

All the experts (100%; n=6) also agreed with the colours used in the material being attractive, eye-catching and attention grabbing. One expert was quoted as saying:

'No contrasting background, the images impart a pleasant mood, makes you salivate a bit, keeps the cognitive function alive; someone said the green used encourages physical activity, and I thought…soothing.'

d) Language used in the material: Is it suitable for comprehension by the elderly? Please make recommendations on suitable language use.

Fifty percent (50%; n=3) of the Delphi panel agreed that the language used in the material would be suitable for elderly comprehension. The experts expressed the view that the language was simple and easy to understand, although some of the pictures needed to be changed to more reflect the South African context, for example, use of an ordinary tap for washing vegetables was recommended.

Another half (50%; n=3) of the Delphi panel, however, disagreed that the language used was suitable for elderly comprehension, especially some specific words and terms. For example, one expert, commenting on the use of the terms "serving" and "portion control", expressed the view that, from their experience, language use is open to misinterpretation, and the term becomes ambiguous as it is left up to each person to translate it in their own way. The experts further suggested use of clear guidelines and measuring scales that everyone is familiar with.

e) Content of the material: Is it accurate and scientifically sound?

All of the experts (100%; n=6) agreed that the content of the material was accurate and scientifically sound. The experts indicated that it reflected the dietary requirements of the elderly. The experts also highlighted that the guidelines were in line with the South African Food Based Dietary Guidelines, emphasizing the need for a variety of food, with restrictions within the food groups. The experts further indicated that the content was up to date, not overwhelming, and easy to follow and understand, and that the poster was an excellent reminder that certain foods should comprise a healthy lifestyle. The experts also expressed that the practical application on the booklet was well stated.

Consensus was reached on four aspects out of the five evaluated. The one aspect where consensus was not reached was in the development of the second round Delphi survey questionnaire.

Table 4.11: Round one Delphi feedback

Round 1 feedback			
Aspect / Statement	**Agree** **1 - 2**	**Neutral** **3**	**Disagree** **4 - 5**
	Responses in percentage (%) – (n=6)		
Booklet and poster: Best forms of communication for elderly	66.6	0	33.3
Presentation of the material: Potential of the material to capture elderly attention	66.6	0	33.3
Recommendations on: • **Font and size** • **Colour**	 100 100	 0 0	 0 0
Language use in the material: Is it suitable for comprehension by the elderly? Please recommend suitable language use.	50	0	50
Content of the material: Is it accurate and scientifically sound?	100	0	0

4.3.1.2 Round one Delphi additional comments and recommendations

Illustrated in table 4.13 is the summary of the Delphi experts' additional comments and recommendations. The newly added comments, along with statistical results where consensus was not reached, were used in developing the second-round questionnaire (Annexure G).

Table 4.12 Experts' additional comments and recommendations – Round 1

Summary of Round 1 Delphi additional comments and recommendations
• Consider including the details of the clinic where they can get help (Contact/ support). It can also be a social welfare centre number or a space can be provided for such details.
• Consider including a few notes on the importance of healthy eating before presenting the guidelines.
• Consider stating exactly who the booklet is aimed at as it not clear if it is intended for the community or the healthcare workers.
• Consider rephrasing, and /or removal of some words and phrases such as trans fats, boosting mood, strawberries, coconut milk, soy milk and almond milk if the booklet is targeted at the elderly community, as they are not suitable for the South African elderly communities.
• Consider removing water melon juice from the guideline 'Drink clean, safe water.' Juice is not a good substitute for water.
• Consider removing the image of an apple from the guideline: 'Use foods and drinks containing sugar sparingly.' – it may be confusing. If the idea is to illustrate blended juice, perhaps put an image of a blender, with fruit being added in.
• Revise the need to include vegetable oil and juice on page 4 'Eat plenty of fruit and vegetables.'
• Consider including eggs in the 10th guideline as one of the affordable and often overlooked protein sources.
• Consider making it clear to your target group what 'safe' food is as stated by the 'Eat clean and safe food' guideline. You can add that 'the expiry date is to be checked on all foods, including perishables'.
• Consider including: 'Separate meat and their juices from other food when shopping' under the 'Eat clean and safe food' guideline.
• Consider including the amount of beer recommended in the 'Drink alcohol sensibly' guideline 10.
• Include 'stroke' as one of the consequences of high salt intake.
• Correct the spelling for Aromat

Table 4.12 Experts' additional comments and recommendations – Round 1 continue

• Revise the milk recommendations: 1-2 servings recommended in the 'Enjoy a variety of food' guideline while 3 servings are recommended in the milk guideline.
• Page 8: avoid mentioning products by name to avoid opening yourself up for litigation. Also rethink the use of the Coca Cola image. Poster: remove the brand names like you have done with the beer and just write 'fizzy drink'.
• Either consider basing the recommended portion sizes on a 2000kcal diet or remove the portion sizes altogether from the booklet since energy requirements are individualised according to level.
• 'A nutritious meal should include protein in the form of meat or fish or beans, starch, vegetables, fruit and dairy products'. This statement can be interpreted as if starch is also a form of protein. Consider changing the order in which items are listed as follows: "A nutritious meal includes starch, vegetables, fruit, dairy products and protein in the form of beans, eggs, fish or meat."
• 'Eating a variety of nutritious food' unnecessarily repeated 3x. Rather just list the reasons with bullets: - helps you to ... / - gives your body ... / - is a way to…
• '…like white meat, chicken or fish' – by implication it means that chicken or fish is not white meat.

4.3.2 Delphi technique: Round two

For this round, collated Delphi technique comments along with the statistical results from the first round were used to formulate the second-round questionnaire, and the latter was fed back to the Delphi experts as a summary. Statements that reached consensus in the previous round were not included in the second round of the Delphi, but some were used to formulate new questions to get additional information. The second-round questionnaire (Annexure G) consisted of a total of four questions, which, as in the first round, were also agreement statements that further sought the experts' free-form answers. Analysis of the second round Delphi was done the same way as the first. All (n=6) the experts that participated in round one also participated in this round.

4.3.2.1 Round two: statistical and qualitative analysis and interpretation

Table 4.13 indicates the analysed data of the second round Delphi responses. The structure of the analyses and the interpretation of the round two Delphi survey follow the evaluation aspects as per the second round Delphi questionnaire (Annexure G). Data illustrated in table 4.13 was interpreted as follows:

a) Please evaluate the suitability of the NE material for the South African elderly from low- and middle-income groups.

A majority of 83.3% (n=5) of the experts agreed that the NE material was suitable for the South African elderly from low- and middle-income groups. The panellists further indicated that it would be interesting to see the material in other languages such as isiZulu and isiXhosa.

'This would be effective, similar to the 'Baby road to health' booklet', commented one of the panellists.

Emphasizing the suitability of the material for the target group, one expert stated:

'The booklet is addressing the low-income groups. The low-income population associates high energy dense food with low cost; this will help them easily learn more on food they can consume to keep healthy and sustain themselves.'

One (16.6 %; n=1) of the Delphi panellists disagreed that the developed NE material was suitable for the South African elderly people in low- and middle-income groups as their view was that the materials they considered to be suitable for the target population was media-based like television and radio.

b) From your evaluation of this NE material, will the EFBDGs knowledge be effectively mobilised?

All 100% (n=6) of the Delphi panellists agreed the developed NE material would effectively mobilise knowledge about the EFBDGs among the target population.

c) Please review and comment on the importance of the new information suggested by other panellists. Do you agree or disagree with the newly added recommendations?

All experts 100% (n=6) agreed that all the new comments and recommendations were important and relevant enough to be applied to the material as they would improve the material in a way that would make it even better suited to and more comprehensive for the elderly.

4.3.2.2 Round two Delphi additional comments and recommendations

The experts were also requested to add and/ or highlight any information they wished to input to improve the material, for which the additional comments in this round (as provided in table 4.13) corresponded with the additional comments from round one. No additional information was included in this round.

Table 4.13: Round 2 Delphi Feedback

Round 2 feedback			
Aspect / Statement	Agree 1 - 2	Neutral 3	Disagree 4 - 5
	Responses in percentage (%) – (n = 6)		
Please evaluate the suitability of the NE material for the South African elderly from low- and middle-income groups	83.3	0	16.6

Table 4.13: Round 2 Delphi Feedback continue

From your evaluation of this NE material, will the EFBDGs knowledge be effectively mobilised?	100	0	0
Please review and comment on the importance of the new information suggested by other panellists. Do you agree or disagree that the newly added recommendations are relevant enough to be applied to the material?	100	0	0
What would you recommend be added or removed to improve the NE material? **(Experts' additional comments and recommendations)**	**• Addition of local healthcare centres' contact numbers, and SASSA contact numbers in the booklet.** **• Add examples of diseases prevalent in the elderly and their symptoms, first aid tips for strokes, falls, burns and other age-related ailments.** **• Replace the image of white rice with brown rice to be consistent with the written recommendations.** **• Incorporate images of food relatable to the low-income population in South Africa.** **• Please consider non-English-speaking elderly.**		

A level of satisfaction and consensus with regard to the suitability of the material was achieved in this round, and subsequently the Delphi process terminated. After the Delphi process was terminated, a thorough review of the survey responses was conducted by the researcher, and the agreed decisions and additional recommendations that the experts made were accordingly incorporated into the developed material with the services and assistance of a graphic designer. The final developed tools are illustrated in Annexure M and Annexure N.

4.3.3 Discussion of Phase two results: Delphi technique

The developed NE tools were evaluated by experts in the field of food and nutrition, education for the elderly, and media and communication in two Delphi survey rounds. The Round one Delphi survey involved asking experts to complete a self-administered Delphi questionnaire to evaluate the developed NE tools with respect to content, graphics and design. Questions and/ or aspects on which consensus was not reached in the first Delphi survey round were used in development of the second round Delphi survey and were fed back to the panel for re-evaluation until consensus was reached.

The results of this study indicated that the experts approved the content and the design of both the poster and the booklet as being suitable for the South African elderly from both low- and middle-income groups, and also that the tools held good potential to effectively disseminate the EFBDGs information. Recommendations for the booklet included the addition of contact numbers of services related to the elderly. Examples of these services were the South African Social Security Agency (SASSA), Department of Social Development, and Diabetes South Africa. The addition of a page with a few notes before presenting the guidelines, and the use of images and language relatable to the target population were also recommended.

In agreement with the results of this study, Hani, Nur, Samia and Devinder (2020: 45) indicated that a study entitled 'Development and analysis of acceptance of a nutrition education package among a rural elderly population: An action research study' that was conducted in Malaysia in 2012 revealed that the nutrition education tools developed were well accepted by both the elderly and the expert panel, although alterations with regard to medical terminology, and the addition of more illustrations to further improve the comprehension and acceptability of the tools were recommended. Furthermore, the experts in the Malaysian study added that the tools had the potential to maximise the nutrition and health knowledge of older adults and encourage them to adopt healthy eating behaviour and a healthy lifestyle. More literature relating to nutrition education interventions to promote health among the elderly is gradually being developed but literature focusing on the development and evaluation of nutrition education tools is still scarce.

4.4 Translation to isiXhosa and seSotho

The final draft of the material developed in English was translated to isiXhosa and seSotho with the aid of language experts specialised in each respective language. The intention behind this was to enhance the relevance and appeal of the content to the specific audience by

employing colloquial language (Piscopo 2019: 56). According to Postan (2020: 67), translation is the act of transferring the meaning or concept from one language to another. However, it is challenging to discover an exact equivalent for each word in two different languages. Consequently, it is incumbent upon the translator to maintain the identical meaning of the target language as that of the source language. The term for this phenomenon is 'equivalence', which is defined as the conveyance of the same meaning through a different phrase (Postan 2020). Hence, it is imperative that the translated EFBDGs are culturally assimilated and that nutrition messages are accurately received and comprehended by the intended recipients, while preserving the original significance.

Liou *et al.* (2020: 4) assert that numerous factors might influence an individual's comprehension of nutrition and adoption of good eating habits. Thus, the manner in which nutrition information is conveyed holds great significance. Utilising NE resources that are suitable for particular cultural groups is a crucial component of providing comprehensive and culturally sensitive nutrition information (Liou *et al.* 2020: 4). Customised education resources are essential in South Africa due to the diverse diet, food customs, and meal patterns among various ethnic groups (Piscopo 2019: 56). This is considered a vital aspect of best practice, as stated by Pawar (2020: 9). According to Liou *et al.* (2020: 4), the use of generic resources that represent the conventional 'South African' diet may lead to a fallacy that the South African diet is inherently healthy, while actually undermining the healthiness of indigenous diets. The food and nutrition education materials developed in this study have been tailored to the target population's language and literacy level, as well as their cultural and religious background and dietary preferences (Postan 2020: 67). Additionally, the NE material was designed in collaboration with members of the specific local community being targeted. Use of graphics suitable and easily understandable by the target group was employed (Postan 2020: 67).

These aspects were considered in the process of translating the material developed in English to isiXhosa and seSotho, ensuring that the culture, tradition and financial status of the elderly in the respective ethnic groups were reflected and that the images used in the isiXhosa and seSotho NE support material were culturally relevant to the isiXhosa- and seSotho-elderly ethnic groups while maintaining the South African context. Culture and tradition deeply influence isiXhosa and seSotho communitites, shaping communication styles, knowledge systems, and worldviews. Ignoring these aspects would render would render the material irrelevant and ineffective (Piscopo 2019: 56). Educational materials that acknowledge and

affirm cultural values empower the elderly, fostering a sense of belonging and respect (Postan 2020: 67). Recognising traditional knowledge enhances self-worth and validates their experinces. Education is not solely about acquiring knowledge; it is about improving lives. By incorporating these aspects the NE material can cater to their specific needs, values and realities, ultimately improving the lives of the elderly in these communities.

Many of the food items pictured in the English version are rarely eaten by the isiXhosa and seSotho population so they needed to be replaced. Cultural adaptations included replacing food items with familiar and commonly consumed items such as *imifino, umphokoqo, amasi, umqa,* and samp and beans in the isiXhosa-translated booklet, and *likhobe* and *motoho* (fermented sorghum porridge) in the seSotho-translated NE booklet. The beverage illustration was changed to beer for both ethnic groups and also *umqombothi* (a Xhosa traditional beer) in the Xhosa-translated NE booklet, which is the preferred drink in the isiXhosa and seSotho communities as opposed to wine which is more common amongst English speakers. Annexure O and Annexure P illustrate the isiXhosa-translated NE poster and booklet, and illustrated in Annexure Q and Annexure R are the seSotho-translated NE poster and booklet.

4.5 Phase three: Focus group discussions

Focus group discussions were conducted to test the developed NE support material among the isiXhosa and seSotho speaking elderly. A total of 32 elderly people (21 men and 11 women) participated in the FGDs from the two respective ethnic sample groups. For both ethnic groups, data saturation for was reached on the second round of the FGDs and consequently the FGD was terminated. All four FGD panels consisted of eight participants each. Focus group discussions were held in isiXhosa and seSotho in the respective elderly care facilities where the participants resided.

Qualitative analysis revealed five overarching themes across the FGDs with related subthemes. Findings across all groups were mainly positive about the material, although there were some constructive critical comments as well but on a lighter note, the participants were generally excited by the possibility of the production of support material that would cater specifically for the health- and nutrition-related needs of the elderly.

4.5.1 Themes identified:

a) The font size used in the poster was too small

Focus group discusssions participants were asked to speak about their ability to read the writing on the material. Most participants described the font size used in the poster as too small and therefore not easy to read. As noted by a man that participated in one seSotho group:

'The words on the poster are small, the only word I can see that is written boldly is 'exercise', the rest of the words I can't see.'

Some participants expressed that the poster font size was so small that one had to be really close to the poster to be able to read it, otherwise it was impossible to read it from a distance. A participant from the seSotho group stated:

'Now that I came closer to the poster I can see well. I cannot see at all from where I am sitting, the words are too small.'

Other participants claimed that some colours underneath some guidelines in the poster affected how clearly the words appeared with one participant reporting that:

'It seems like the colours used beneath some writings are too bright, therefore making the words above them seem faint and unclear. Other than that, I personally see the font size used as ok, it is just the colours beneath the words that I have a problem with. If only that could be changed.'

A few of the participants indicated that they could only read with the assistance of spectacles and so they felt that the poster font size would have been acceptable if they had good eyesight, but since they had poor eyesight they could only see clearly and read the poster when wearing spectacles. One participant was quoted as saying:

'Me, my child I can only see and read the poster since I am now wearing my glasses, when I take my glasses off, I only see faint words that I cannot read.'

There were, however, a few participants who were able to see clearly, were satisfied and could read the font size used in the poster. One elderly woman from one isiXhosa FGDs said:

'I am able to read what is written on the poster, even as far as am from the poster but I can clearly see everything written there.'

Similarly, a respondent from the same FGDs agreed with the statement made by the previous participant saying:

'No, the writing on the poster is very clear, I can see everything from where I am seated.'

When asked to speak about their ability to read the booklet, nearly all participants of the FGDs expressed satisfaction with the font size of the booklet; one participant expressed that:

'*The size used in writing the words is perfect, I am able to see and read it without challenges, for example, let me read for you now…" Introduction…A healthy diet often includes nutrient-rich foods from all major food groups".'*

A similar view was shared by another participant who stated that:

'I can read the booklet without encountering any obstacles of not being able to see the words. I can see everything.'

It was only participants who wore spectacles that made remarks about not being able to read the booklets clearly on the basis that the words looked feint when trying to read the booklet without wearing the reading glasses, but they could see and read clearly when wearing glasses. As noted by one participant from the SeSotho focus group:

'I, my child, cannot read without wearing my reading glasses, because then the words become small and feint, but once I put on my reading glasses everything becomes clear.'

b) The visuals are easy to relate to and are attractive and attention-grabbing with the colours used

Discussions about the visuals and the colours used in the material were all positive in the sense that all participants indicated that the visuals and colours used were interesting and attention-grabbing, with one participant stating that:

'We love nice food, so one would even be attracted by these visuals of nice food displayed here and be interested to look through and read what is being said about food in the poster.'

Some participants indicated that the visuals and the colour co-ordination might actually be what is inviting the audience to have a look at the material and then end up actually reading it. As one participant was quoted saying:

'The poster is beautifully designed, the visuals and colours used are blended well and are bright in an attractive way…you would actually stop to have a look at the poster even if you were just passing by.'

Participants from all the FGDs expressed the view that they were familiar with the visuals used and were happy to learn that eating healthily does not mean that you have to eat fancy-looking and complicated-looking food, with one participant saying:

'I am seeing images of food I know and am familiar with, and that makes me happy because it is teaching me now that eating healthy is actually not difficult and may be not as expensive as we are made to think and believe.'

None of the participants from any of the FGDs expressed the view that the visuals and colours used in the poster were not familiar and attractive.

c) The tools hold great potential to influence change in elderly eating habits

In discussions about the potential of the material to change eating habits, all the participants held a similar strong view that the material would assist them greatly in learning about and understanding how they should eat as the elderly, subsequently assisting them in managing and controlling their elderly illnesses such as high blood pressure, diabetes and heart diseases. One participant excitedly made a comment as follows:

'This is a good material, especially the booklet. It would be very helpful in guiding me on what and how I should eat as I am diabetic and supposed to watch what I eat.'

Some participants referred to the material as the "bible", saying it was an eating manual as the bible is a life's manual. A man from one of the FGDs was quoted as saying:

'You see, my child…I can compare these things (the material) you brought us today to the bible. They are food and eating manuals just as the bible is a life's manual. You can always refer to them for guidance on how to eat right, especially with us that are attacked by elderly illnesses like high blood pressure and diabetes.'

Some participants praised the tools, saying they were a great learning tool as they contained much useful information that most of them were not aware of and that would turn their eating habits around. One participant said:

'I have learnt new things already from this material…for an example, I was not aware that it is a health risk to pour salt on the table and consume it raw if you can't taste it after food has been dished up. They often cook us food without or with very less salt here and I always add it myself to my plate when I eat. Now that I learned that I am actually putting my own self at health risk, I will just try and adjust to eating food as is and not add extra salt when I eat.'

d) The tools are an informative user-friendly source of learning that can be used any time as a reminder or guide to healthy eating.

In discussions about what the participants thought about the content and user-friendliness of the material, almost all the participants felt that the material was very informative as it teaches them about good and healthy eating habits, especially with many of them having diet-related illnesses. They also appreciated that the material was easy to read and understand. One participant noted that:

'The material is written in a language that is easy to read and understand. The booklet is explained thoroughly in a simple and logical sequence that is easy to follow.'

Some participants appreciated that the booklet was a handy and portable guide that could be used anywhere, at any time and everywhere, with one participant saying:

'I love the size of the booklet, because it is something you can even put in your bag and travel with wherever you go. You won't have to pause eating healthy because you have forgotten some good eating habits and therefore don't have something to refer to because you could not carry the booklet with since its size does not allow to be carried around.'

Some participants commended the material for being educational since the booklet especially contained much useful information they were not aware of in relation to food. This view was supported by one man who was quoted as saying:

'Hey, there's a lot I'm learning already from this book. For example, I did not know that you have to actually trim fat off the meat before you can cook it. I always though it made the same difference if you trim it off before or after you cook the meat. The material would really be a bright light put up in the mountain for us elderly to be out of darkness and live healthily.'

Supporting this, one woman also highlighted new information she learnt from the booklet, saying:

'Don't you mention that!... I also was not aware that exercise can be anything involving bodily movement…common house chores such as the washing of dishes and sweeping of the floors. I always had this belief that you have to have gone to an actual gym to be considered as having done real exercise.'

e) The material would be easily accessible if it were to be placed in the elderly care facilities where some of the elderly live, local clinics, hospitals and local doctor's rooms.

Most respondents indicated that since they were staying at the elderly care facilities, the poster would be easily accessible to them if it could be put up in the dining hall where they all gather to have their meals and also on the notice boards around their centres. One participant had the following to say:

'*Since we stay here [at the elderly care facilities], it would be nice to have the poster pasted in our dining hall where almost all of us gather to eat during meal times, so we can always see it and be reminded when we are there to eat.'*

Participants also indicated that the material would be accessible if it were to be put up in doctor's rooms, local clinics and hospitals as they would see it when they go for their medical reviews and check-ups. A participant from one FGDs said:

'If the poster can be pasted in the doctor's rooms, hospitals and our local clinics, we would have access to them as we visit these places almost monthly for our medical reviews and check-ups.'

The participants indicated that the booklets would be more accessible if they could have them delivered to their elderly care facilities and each one of them be handed their own copy, and also have some kept in the office. One participant noted:

'We can have access to the booklet through having them delivered here, where we stay, and each one of us can be handed a copy to keep for ourselves and also have some kept in the office for people visiting us to also see and have access to them.'

Participants also expressed that the booklets could also be easily accessed from the healthcare facilities with a participant from one FGDs saying:

'The booklets may also be made available as handouts in the healthcare facilities where we have our medical reviews and check-ups. This way, everyone and not only us can have access to them.'

4.5.2 Discussion of phase three results: Focus group discussions

According to Moitra, Madan and Verma (2021: 6), FGDs are an effective method in testing NE material and they were used in this study to test the developed NE support material for the EFBDGs. Piekut (2020: 70) highlighted that testing is an import stage in the development of NE material, as pictures may cause offence or be misinterpreted, and technical words such as, for example "vitamin A" and "nutrients", may not be familiar to the target group. The testing

of messages focused on five characteristics, which included: attention (Does the message have 'stopping power'?); comprehension (Is it clearly understood?); relevance (Is the message of concern to the audience?); and acceptability (Is the message free from offensive references?) (Piekut 2020: 70). These characteristics were considered in adapting an interview schedule for the FGDs.

The FGD feedback for this research study indicated that the font size used in the poster was too small. This feedback correlated with the findings by (Luesse, Koch and Contento 2019: 2) which indicated that, based on a 2012 study on the design of an interactive digital nutritional education package for elderly people, some participants indicated the font size used in the designed digital nutritional education package was too small. The findings by Luesse, Koch and Contento (2019: 2) also suggested that design guidelines were an important consideration in a 2012 study, which resulted in increasing the font size used in the NE package to a minimum of 14pt to accommodate vision difficulties. The study further recommended that there should be a focus on good contrast between the text and background colour. Moreover, the size of the graphics should be designed and displayed as sufficiently large to permit elderly people to easily read the content, increase usability and encourage interaction (Siregar, Ashar, Hasibuan, Nasution, Hayati and Susanti 2021: 45). This concurred with the results of this research study that showed that the participants had indicated that the visuals were easy to relate to, and were attractive and attention-grabbing as a result of the colours used.

The FGDs results also illustrated that the participants felt strongly that the tools had considerable potential to encourage change in elderly eating habits, and that they were an informative user-friendly source of learning that could be used at any time as a guide to healthy eating. These results are similar to the findings of Chin, Wicks, Feyasa and Koen (2022: 21) in their review of literature on nutrition education for the elderly, which revealed that participants in one study indicated that the dietary recommendations set out in the NE tool were easy to understand as they were written using short simple sentences. These findings are also similar to the study by Ruzita and Rasyedah (2007), which demonstrated that drawings, diagrams and illustrations play an important role in nutrition education materials and can facilitate understanding and keep the readers' attention (Chin *et al.* 2022: 21).

Additionally, in correlation with the findings of this study, Charlton, Walton and Rosario 2019: 23) made some recommendations in their study entitled "Improving Nutrition in Older Adults" saying that, as far as information on nutrition education materials is concerned, there are many

factors that need to be taken into consideration. For example, font size needs to be adjusted due to possible vision problems in the target population. Moreover, educational information should be kept simple and to the point to avoid confusion for the participants. The message needs to be simple yet convey the meaning effectively. Besides the text and sentence structure, incorporating meaningful pictures would also be beneficial. These pictures would reinforce the concepts and importance of the nutrition education.

4.6 Conclusion

In this chapter the results of the study were presented in line with the objectives in order to determine the visual preferences of the elderly with regard to nutrition education, and to subsequently develop NE support material that would communicate the EFBDGs. Thereafter the developed material was validated through use of a Delphi survey. Lastly, the developed NE material was tested for acceptability through the use of FGDs. The majority of respondents had never heard about the FBDGs before and the few respondents who had heard about the FBDGs indicated that they did not really understand what the FBDGs meant. This can therefore be seen as convincing evidence that elderly NE is needed, especially in terms of the elderly residing in low- to middle-income communities.

The most preferred resource tool by the respondents was a poster, which was mostly preferred for reasons relating to the visual and hearing impairment of most of the respondents as indicated by the results of the study. Volter, Thomas, Maetzler, Guthoff, Grunwalt and Hummel (2021: 20) noted that with advancing age, there is a corresponding normal decline in sensory function, including vision, hearing, and touch and that two-thirds of the frail elderly are said to have have vision and hearing deficiencies. In addition, there is a normal decline in physical dexterity and endurance (Volter *et al.* 2021: 20). Eighty percent of people over 60 years of age have some form of chronic disease. The effects of chronic diseases, together with the normal changes that occur with ageing, may impede learning. Respondents in this study believed that a poster together with the booklet were a good choice of tools as they would be more comprehensive and easier to use because of the use of visuals and would be readily available whenever needed.

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, phases of the research study are highlighted, and conclusions in line with the research objectives are drawn and some limitations acknowledged. Specific contributions are highlighted and recommendations for future research made. The research study set out to develop nutrition education support material for the Elderly Food Based Dietary Guidelines that were developed and published in 2017 by Napier, Grobbelaar and Oldenwage-Theron (2021: 3) with the specific purpose of promoting nutrition education knowledge of the elderly and consequently addressing their nutrition needs, and so contributing towards better food choices.

5.2 Phases of the research study

The study objectives and the main findings in each aspect of the study were summarised in different phases as specified in Chapter 1. The study objectives were addressed in three phases, with the aim of the study being to develop nutrition education support material for the Elderly Food Based Dietary Guidelines for isiXhosa- and seSotho-speaking communities.

Phase one of the study was implemented in order to achieve two objectives which were: 1) to determine elderly preferences with regard to nutrition education tools using a pre-development survey and 2) to develop elderly nutrition education tools through using the data gathered from the pre-development survey using the services of a graphic designer. Phase two of this study aimed at face and content validation of the developed tools by experts in their fields using a Delphi survey. Phase three of the study consisted of testing the developed nutrition education tools in the target population using FGDs.

5.3 Main findings

The reliability of the data in the study was validated by means of the expert evaluation and a pilot study was conducted before the pre-development survey. The pre-development survey was used to determine the tool most preferred by the elderly to communicate the developed Elderly Food Based Dietary Guidelines. The participants in the pre-development survey consisted of elderly people from the isiXhosa- and seSotho-speaking elderly. The developed material was tested for face and content validity by a panel of six experts in the fields of food and nutrition, elderly nutrition education, and media and communication. Testing of the acceptability of the developed material was through use of FGDs in the respective two ethnic

groups involved in the study. In the next section, the main findings of the literature review, the pre-development survey, the development of the nutrition education tools, the Delphi survey, and the FGDs are discussed.

5.3.1 Literature review

The literature reviewed revealed that South Africa rates highest in respect of the percentage of older people in Africa. Due to a decline in fertility rates and an incline in longevity, this percentage will presumably increase. An increase in the burden of chronic NCDs impacting the elderly places a massive burden on the healthcare system consequent to an incline in demand and access to healthcare services. Chronic NCDs are the fundamental cause of death worldwide. More than half of the 57 million deaths globally in 2016 were as a consequence of NCDs, where 80% of all these fatalities occurred in low- and middle-income regions such as the African region. It is estimated that the leading cause of death in Africa by 2030 will be NCDs. Respiratory diseases, cancer, cardiovascular diseases, diabetes and chronic diseases are reported to be the most prevalent NCDs worldwide

The wealth of available literature illustrates that nutrition education is often aimed at young school-aged children. The elderly are one of the population groups that are often disregarded and who for the most part are lacking in their nutrition knowledge. The significance of nutrition education tools especially tailored to the elderly to create health awareness and promote healthy eating habits that will help curb the prevalence of non-communicable diseases and other nutrition related diseases associated with old age has been identified through literature. Currently, in South Africa there are no known available tools communicating the developed EFBDs. The hesitance in developing the elderly NE programmes has been as a result of the perception that the elderly would be reluctant to agree to such lifestyle changes. Even though older adults may seem rigid in their ways and unwilling to accept change, nutrition education is crucial as it may turn out to be the determining factor in them being able to retain their independence and dignity.

5.3.2 Pre-development survey

The pre-development survey (phase 1) provided the demographic information of the participants, and identified the nutrition education support material most preferred by the elderly to communicate the Elderly Food Based Dietary Guidelines. The preferred tools were identified as a poster to assist elderly nutrition educators in communicating nutrition education. The second preferred tool was a detailed nutrition education booklet specifically for the elderly

to act as a personal guide and reference supplementary to the poster. The pre-development survey further identified the exclusive content to be used in the nutrition education booklet, including the type of images and language to be used apart from just the EFBDGs.

The majority of the elderly that participated in the study were within the range 60 – 69 years. All the participants in the pre-development survey resided in elderly care facilities in Mthatha in the Eastern Cape and Attridgeville and Soshanguve in Gauteng. The pre-development survey noted a disproportionately large number of participants with low levels of education. Determining the education levels of the study participants was important in ensuring that the tools would be tailored to cater to the degree of comprehension of the target population with regard to education level. Regarding knowledge and understanding of the FBDGs, very few participants identified as knowing about the FBDGs and most did not understand the meaning behind them. This indicated the existence of the need for nutrition education among the elderly population. A disproportionately large percentage of participants identified as having never used a computer before. These results were an indication that the elderly from low- and middle-income communities were not familiar with the use of computers and therefore the tool to be developed would have to be appropriate and easy to use, and would need to be accessible to the target population.

With regard to the self-reported status of senses, a large number of participants revealed that they had only moderate senses of sight, and hearing. Very few participants reported to have no problems at all with vision and hearing, and a few participants were assisted by spectacles and hearing aids to see and hear. These results indicated that most of the elderly had vision and hearing problems, which was an indication that the tools to be developed would need to accommodate these sensory issues of the elderly. These results were analysed and subsequently a nutrition education poster and a booklet were developed as the tools most preferred to communicate the EFBDGs.

5.3.3 Development of nutrition education tools

The development process was an ongoing consultative process between the researcher, graphic designer and the research supervisor. The tools were developed according to the requirements and guidelines as provided by the researcher. The second draft poster was redesigned by including the recommendations made about the first draft poster. In addition to the recommendations made by the research supervisors on the first draft poster, it was also recommended that the poster on its own would not be adequate to communicate the guidelines

effectively given the level of understanding of the target population. Therefore, a booklet that would supplement the poster, explicitly explaining the meaning behind each guideline, would need to be designed as a handout for the elderly to use as a reference. The booklet was designed, and together with the second draft poster, was sent for face and content validity by the Delphi panel.

5.3.4 Delphi survey

The Delphi survey was conducted to test the appropriateness of the developed tools through evaluating the content, design and suitability for use by the elderly. The Delphi survey took place over two rounds. In the first round, the content of the tools was evaluated in terms of being accurate and scientifically sound. Text font and size and use of colour were also evaluated in terms of being suitable for the elderly. There was no consensus on the suitability of the language used in the booklet regarding the ability of the elderly to comprehend. It was said to be too technical to be understood by the target population and needed to be revised. There was also no consensus in terms of the evaluation of the booklet and poster as being the most suitable forms of communication for the elderly and in terms of the potential of the presentation of the material to capture the attention of the elderly. These two aspects where consensus was not reached were rephrased and included in the second round of the Delphi survey

Round two of the Delphi survey intended to evaluate the suitability of the NE tools for the South African elderly from low- and middle-income groups. This round further intended to determine whether the tools would be able to effectively mobilize knowledge about the EFBDGs. All the aspects evaluated in the second round Delphi survey met consensus with a few new recommendations being made to be applied to the booklet, which included the addition of a page for important contact numbers relating to the elderly, the addition of an introductory title page, and the inclusion of first aid tips relevant to the elderly. The inclusion of a cover page as well as a page on which the elderly could write personal details was also agreed on. The Delphi process was terminated in this round as consensus on all aspects evaluated was gained. Third round draft tools were developed from the results of the second round Delphi survey with all the experts' recommendations and suggestions incorporated.

5.3.5 Translation to isiXhosa and seSotho

The third draft of the material developed in the English language was translated into isiXhosa and seSotho with the assistance of the respective language experts. This was done for the purpose of making the material more relatable and engaging to the target population through

use of colloquial language. The translated EFBDGs needed be culturally familiar and the nutrition messages needed to be interpreted correctly and understood by the target audience without losing the original meaning. It was also ensured that images used in the isiXhosa and seSotho NE support material were culturally appropriate and relevant to the isiXhosa- and seSotho-speaking elderly in the South African context. Cultural adaptations included replacing food items with familiar and commonly consumed items such as *imifino, umphokoqo, amasi, umqa*, and samp and beans in the isiXhosa-translated booklet, and *likhobe* and *motoho* (fermented sorghum porridge) in the seSotho-translated NE booklet. Thereafter, the tools were then tested with the isiXhosa and seSotho speakers.

5.3.6 Focus group discussions

Focus group discussions were held for the testing of the developed tools in terms of acceptance by the target population. Major themes identified indicated that the font size used in the poster was too small, which implied that it needed to be enlarged to accommodate and be in line with the limited vision capabilities of the target population. Visuals used in the material were evaluated in terms of being easy to relate to and whether the colours used were attractive and 'attention-grabbing'. Focus group discussions also revealed that the tools were an informative, user-friendly source of learning that could be used at any time as a reminder or a guide to healthy eating. The results of the discussions on the FGDs further indicated that the material would be more easily accessible if it could be placed in the elderly care facilities where some of the elderly lived, and in local clinics, hospitals and doctor's rooms. In conclusion, the results highlighted that the tools had great potential to influence change in elderly eating habits.

5.4 Conclusion

The available literature reviewed revealed that the elderly population is gradually increasing, and so is the economic burden attached to the treatment of NCDs that are most prevalent in the elderly. Despite this, the elderly are not being prioritized with regard to nutrition education. Available NE programmes target other vulnerable groups but not the elderly. This has led to a void existing between the elderly and NE knowledge, which subsequently often leads to poor food and lifestyle choices that increase the risk of the development of NCDs among the elderly. A need for nutrition education programmes and interventions targeted at the elderly is seen as crucial to narrow the gap between nutrition knowledge and the elderly. Currently, there are no known tools suitable to communicate the EFBDs. This study was thus important insofar as it

has identified and produced tools in the form of support materials to mobilise knowledge on the EFBDGs.

This study identified the preferred educational tools to communicate the EFBDGs and confirmed the appropriateness of the developed tools after being tested with the elderly through FGDs. The nutrition education tools developed in this research were the result of a combined effort to educate the elderly about the EFBDGs, thereby empowering them with knowledge on food and lifestyle behaviours to improve their food choices, dietary intake and lifestyle behaviours. The tools were found to be suitable, acceptable and comprehensive as confirmed by the Delphi experts and the FGDs participants. Elderly Food Based Dietary Guidelines nutrition education tools are a promising development aimed at bridging the gap between nutrition knowledge and the elderly.

5.5 Limitations of the study

- The selection of a specific subpopulation (Only participants from elderly care facilities) made generalization to the entire elderly population limited.

- Authorities at some elderly care facilities were hesitant to grant permission for a researcher to conduct a study on nutrition education tools for the elderly, fearing the researcher might be a government department or organization visiting to investigate their living conditions. The researcher had to provide proof that she was a Masters student at Durban University of Technology, not an investigating representative from any organization.

- The elderly at the centers believed the researcher was an organization or government official, attempting to address their dissatisfaction and queries about their living conditions. The process of explaining the visit's purpose was time-consuming, and some participants withdrew from the study after the researcher explained its true purpose.

- The COVID-19 pandemic delayed data collection due to restricted access to facilities for the elderly, a vulnerable group. Visits to centers were restricted until the government lifted the lockdown and declared it safe for people to congregate, limiting exposure and risk of virus transmission.

- The researcher had to be sensitive to the vulnerability of the study's participants, as some meetings with the elderly at centers had to be postponed due to extreme cold weather conditions.

5.6 Contribution of the study

The study contributed to the first-ever production of nutrition education tools targeted specifically at the elderly in South Africa. The developed tools will contribute to the dissemination of information on the developed EFBDGs. They will enhance the nutrition knowledge of the elderly as well as elderly nutrition educators and further empower them to provide nutrition education to the elderly. Furthermore, the tools will help promote healthy eating and an active lifestyle among the elderly. The developed nutrition education booklet, as well as the poster, will be beneficial in further related studies, consequent to their potential success in improving the nutrition knowledge of the elderly as well as that of nutrition educators to the advantage of the elderly in the community. Finally, the future applications of this study may include informing elderly care facility policies of adapting existing educational programs.

5.7 Recommendations

The tools developed in this study will be one of the strategies Government can use to disseminate nutrition education targeted specifically at the elderly, thereby improving their nutrition status and health. All tiers of government that are major decision-makers and are responsible for the caring of elderly citizens at various levels could be appraised of further activities aimed at the effective distribution of the tools for easy access by the elderly and elderly nutrition educators.

NGOs, as partners in the communities, are instrumental in supporting results-oriented actions on information accessibility, which could lead to improved nutritional knowledge and healthy food choices on the part of the elderly.

5.7.1 Local government

Local government, as a major role-player, has the most access to vulnerable populations in the community, including the elderly. This tier of government has the potential to provide adequate long-term support to make nutrition education tools available and accessible in the interest of knowledge mobilisation in the various communities in order to address the nutritional needs of the elderly.

5.7.2 National government

Consideration should be given to providing the general public and government workers with NE knowledge required in their various departments. For example, the agriculture and health sectors in particular could contribute significantly in the dissemination of the elderly NE tools, as they are solely responsible for implementing agricultural, food security and nutrition programmes in the community settings. This includes the responsibility to empower nutrition educators on nutrition knowledge for the elderly.

Knowledge about the EFBDGs need not be limited to nutrition educators and the elderly, but should also be accessible to everybody, especially those with whom the elderly reside, such as (extended) families or others. Therefore, implementing social media marketing of the EFBDGs using the mass media and government channels, and involving elements of the food industry such as restaurants, food service providers, and consumers should also be considered. EFBDGs could be communicated nationally through all media channels to all South Africans, especially elderly caregivers, to enable them to familiarise themselves with elderly healthy eating practices and general well-being.

Launching advocacy projects to educate policy- and decision-makers on the importance of the NE tools as support materials for the EFBDGs in advocating good nutrition and improving the elderly health status to decrease the national economic burden of having to deal with non-communicable diseases exacerbated by poor dietary choices would also be beneficial. Long-term investment in NE knowledge mobilisation would subsequently improve elderly lifestyle and food consumption behaviour that could lead to higher productivity and economic growth.

5.8 Recommendations for future research

The results of the research study indicated that further research is needed as follows:

- Evaluating the impact of the developed nutrition education tools for the Elderly Food Based Dietary Guidelines should be prioritised.
- Follow-up studies with elderly individuals living independently need to be conducted to validate and adapt the material developed in this study for broarder applicability.
- More research needs to be conducted into the differences in diet and nutritional status of the elderly living in elderly care residences and free-living elderly.

- Elderly nutrition knowledge and its impact on food choices needs to be further researched in order to identify the extent of the problem, and to ensure nutrition programmes aimed at the elderly are appropriate and address relevant nutrition challenges.

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Annexure A: Gate keeper permission letter

Gatekeeper permission

Research title: Development of nutrition education support material for the South African Elderly Food Based Dietary Guidelines for Sotho and IsiXhosa speaking communities.

Dear ECF Manager

My name is Matsidiso Nteleza, a Masters student at the Durban University of Technology. The research I wish to conduct for my Masters dissertation involves development of nutrition education support material for the South African Elderly Food Based Dietary Guidelines for Sotho and IsiXhosa speaking communities.

I am hereby seeking your consent to conduct a research study at your organization. The aim of the study is to produce nutrition education support material in the IsiXhosa and Sotho Languages, and to test their capabilities in informing, educating and influencing the elderly towards better nutrition choices as per the elderly food based dietary guidelines. This study is important because it seeks to produce an elderly friendly solution centred approach to nutrition education for the elderly. The research study requires at least 50 elderly people from the age of 60 and above to participate in a pre-development survey and in focus group discussions of between 6-8 participants in order for the study to be valid.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Participation to the study will be voluntary, and participants will have the right to withdraw their participation anytime. All data and conclusions made from the survey, discussions and questionnaires are kept strictly confidential and anonymity will be maintained. The data gathered from these research methods will be reported in a research paper available to all participants on completion.

Please tick (√) to confirm your understanding of the study and that you are happy for your organization to take part.

1. I confirm that I have read and understood the information provided for the above study

□□

2. I understand that participation of our organization and residents in the research is voluntary and that they are free to withdraw anytime

□□

3. I understand that any personal information collected during the study will be anonymous and remain confidential

□□

4. I agree for our organization residents and elderly visitors relevant to the study to take part in the study

□□

_____	_____	_____	_____
Full Name of Gatekeeper	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____

(name of researcher) herewith confirm that the above gatekeeper has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**

_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**

Persons to contact in the Event of Any Problems or Queries Please contact the researcher, Matsidiso Nteleza on 0614808467; my supervisor, Dr H.H. Grobbelaar on 031 373 2328 or Heleeng@dut.ac.za, or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

Annexure B: Participants information letter

PARTICIPANTS LETTER OF INFORMATION

Title of the Research Study:
Developments of nutrition education support material for the South African Elderly Food Based Dietary Guidelines

Principal Investigator/s/researcher: (Matsidiso L. Nteleza, Masters student, Consumer Science: Food and Nutrition)

IREC 024/19

Supervisor: (Dr Heleen Grobbelaar: PhD Food and Nutrition)

Brief Introduction and Purpose of the Study: The aim of this study is to develop nutrition education tools that will be in the IsiXhosa and SeSotho languages, it also aims at testing whether these tools will be suitable enough to teach and influence the South African elderly people towards making better food and lifestyle choices as recommended by the Elderly Food Based Dietary guidelines**.** This study needs at least 50 elderly people from the age of 60 and above to participate in a pre-development survey and in focus group discussions of between 6-8 participants in order for the study to be valid.

Outline of the Procedures:

- You as the participant will be asked to sign a letter of consent, indicating that you are willing to participate in the research study and that the researcher has clearly explained the study and all the steps involved to you.
- Data will be collected through one-on-one interviews using a pre-development survey, and also through focus group discussions using open-ended questions.
- Focus group discussions will be recorded and they will take approximately 1½ hours with short breaks in between.

Risks or Discomforts to the Participant: No risks or discomforts are associated with the study, but should you as a participant feel uncomfortable in any way, you will be free to withdraw from the study, and there will be no consequences to that.

Benefits: The study hopes that the results will help develop a suitable and relevant nutrition education tool that will be used to communicate the elderly food based dietary guidelines.

Reason/s why You May Be Withdrawn from the Study: You will be withdrawn from the study if you happen to not comply to the rules of the study or you become ill. There will be no bad consequences to you should you voluntarily choose to withdraw.

Remuneration: No pay or any form of remuneration will be given to you as the participant.

Costs of the Study: There is no cost to you as the participant if you agree to participate in the study.

Confidentiality: Your information as a participant that will be obtained from this study will be treated with strict confidentiality, no names, but codes will be used to identify participants. Confidential information from this study will be kept in a locked cupboard in the Food and Nutrition Department, and will be shredded using a shredding machine after a period of five years.

Research-related Injury: No injuries are anticipated in this study

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher, Matsidiso Nteleza on 0614808467; my supervisor, Dr Heleen Grobbelaar on 031 373 2328 or Heleeng@dut.ac.za, or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support, Prof C E Napier on 031 373 2577 or carinn@dut.ac.za.

Annexure B: IsiXhosa translated participants information letter

Incwadi yenkcazelo ngophando

Isihloko sophando: Ukuqulunqwa kwezixhobo zokufundisa ngezempilo ngokujolisele ekutyeni okusekelezwlwe kwimigaqo yendlela yokutya kwabantu abadala eMzantsi Afrika, kuluntu olukumaphondo iMpuma-Koloni kunye neRhawuti.

Umphandi oyintloko: Matsidiso L. Nteleza, nongumfundi kwibakala leeMasters kwizifundo ze-Consumer Science: Food and Nutrition

IREC 024/19

Intsumpa kuphando: Dr Heleen Grobbelaar (PhD Food and Nutrition)

Amagqabantshintshi nenjongo yoluphando: Imigaqo yeendlela zokutya kwabadala zivelisiwe, koko akukabikho zixhobo zokufundisa ngale migaqo kweliqela ijoliswe kulo. Injongo yesisifundo ngako oko kukuqulunqa izixhobo ezizakuthi zincedisane nabezempilo ukufundisa abadala ngezempilo kujoliswe kwimigaqo yeendlela zokutya kwabadala ngeenjongo zokuphucula indlela yokutya kwabadala ezakuthi iphucule iimpilo zabo. Esi sifundo sikwajolise ekuvavanyeni nasekuhlalutyeni igalelo nokusebenza ngokwenene kwezixhobo zizakuthi zakhiwe njengeziphumo zoluphando sifundo kwiqela elo labantu abadala ekujoliswe kubo.

Uzakucelwa ngako oko ukuba uthathe inxaxheba kwingqoxo yeqela ezakuthatha ixesha elimalunga ne yure enesiqingatha kunye nabanye abazakube bekhethiwe baze bavuma ukuba bathathe inxaxheba kwesi sifundo. Imibuzo ezakuthi ibuzwe kwesi sifundo izakube ijoliswe kwizimvo zakho ngokutya gabalala nemiyalezo eyohlukeneyo yezempilo, kwakunye nezixhobo eziphathekayo zokugcina nokunwenwisa ulwazi ongathanda ukuba zisetyenziswe ukukwazisa ngemiba ephathelele ngezempilo.

Incukacha ngokuzakwenzeka:

- Wena njengomthathi nxaxheba uzakucelwa ukuba wenze isityikityo sokuba uyavuma ukuthatha inxaxheba ngokuzikhethela koluphando oluzakube luchazwe ngokucacileyo

kuwe.

- Ingxoxo zamaqela zizokwenziwa liqela labadala abasithandathu ukuya kwabasibhozo.
- Ulwazi luzakuqokelelwa ngodliwano-ndlebe lobuso ngobuso kwakunye neengxoxo zamaqela kusetyenziswa amaphepha emibuzo.
- Iingxoxo zamaqela zizakushicilelwa yaye zizakuthatha malunga ne yure enesiqingatha neekhefu ezinfutshane phakathi kwee ngxoxo.

Imingcipheko nokungaziva kakuhle komthathi nxaxheba: Akukho mingcipheko nakungaziva kakuhle kuwe njengomthathi nxaxheba okuzakukhokhelelwa loluphando, kodwa kuselungelweni lakho ukuba urhoxe ekuthabatheni inxaxheba koluphando, yaye akuzobakho miphumela ngenxa yalonto.

Iziphumo eziyinzuzo: Oluphando lujolise ekubeni luqulunqe izixhobo ezizakuncedisana nokufundisa abantu abadala ngemigaqo yokutya kwabadala eMzantsi Afrika, yaye iziphumo zoluphando zipapashwe.

Izizathu ezinokukhokhelela ekubeni umthathi nxaxheba akhutshwe kuphando: uyakuthi ukhutshwe koluphando kwakube kufunyaniswe ukuba awulandeli miqaqo yoluphando okanye xa uthe waqubuliseka kukugula. Akuzubakho sohlwayo xa uthe wakhetha ukuphuma kuphando.

Inzuzo ngokwezemali: Awuzukubhatalwa nangayiphi na indlela ngokuthatha inxaxheba koluphando

Iindleko zoluphando: Akuzubakho zindleko kuwe ngokuthatha inxaxheba koluphando

Ukhuseleko lwenkcukacha: Incukacha zakho njengomthathi nxaxheba ezizakufumaneka koluphando zizakugcinwa ziyimfihlo, Akukho magama abathathi nxaxheba azakukhankaywa, koko kuzakusetyenziswa iicodes ukubhekisa kuwe njengomthathi nxaxheba. Iincukacha eziyimfihlo koluphando zizakugcinwa kwikhabhathi etshixwayo yesebe le Food and Nutrition, ukuze ikrazulwe kusetyenziswa umatshini wokukrazula amaphepha emva kweminyaka emihlanu.

Ukulimala okunxulumene noluphando: Akukho kulimala okuqondakala ukuba kungenzeka ngexesha loluphando

Abantu onokunxulumana nabo xa kukho ingxaki okanye imibuzo

Nceda nxulumana nomphandi u-Matsidiso Nteleza ku 0614808467; intsumpa eyongamele uphando, Dr Heleen Grobbelaar ku 031 373 2328 or Heleeng@dut.ac.za, okanye i-Institutional Research Ethics Administrator ku 031 373 2375. Izikhalazo zingathumyelwa kwi-Director: Research and Postgraduate Support, Prof C E Napier ku 031 373 2577 okanye carinn@dut.ac.za.

Annexure B: SeSotho translated participants' information letter

Lengolo le hlalosang ka thuto

Sehloho sa thuto: Ho lokiswa le ho hlahlotjwa ha dintho tsa ho rutisa kamaphelo ka ditjo ka melwana ya ditjo tsa batho ba baholo.

Mosuoe-hlooho: Matsidiso L. Nteleza, athutang diMasters, Consumer Science: Food and Nutrition

IREC 024/19

Mookameli wa thuto: Dr Heleen Grobbelaar (PhD Food and Nutrition)

Matseno le morero o khutsoanyane wa thuto: Melwana ya ditsela ya ditjo tsa batho ba baholo tsentsha de lokesetswe, me ha ho sobe ditholose tsa rutisa ka melwana ho sehlopha se. Sepheko sa thuto ke ho aha le ho lokisa dintho tsa thuto.

Ka mora ho ba ke fumana tokelo ho ba etapele ba mahaeng abatho ba baholo. Batho ba baholo batla bokelana nqa elengwe ba batswase ke kopano bahlaosetswe ka thuto ena. Tsatseng leo bahlalosetswa batse ka thuto ena, bao ba dometseng hore batlanka karolo thutong ena bafumana le ngolo mo batekena teng ho re banka kasolo.

Kemiso ya mekgwa ya tshebeletso:

- 0 tla etsa letsoao jwalo ka monki waloro la ho re wadumela ho nka loro thutong
- Ho tla ba le dihlopha tsa puisano tsetla tswarang ke ra diphuphutso ya selilong.
- Dipuisano ditla nka 1 ½ hours ho be le khefu tse gotswani ka mo hare.

Kotsi kapa boemong bo sa thabiseng ba monki ya loro: Ha ho na kotsi kappa boemong bo sa thabiseng thutong ena, empa ha uena jwalo ka monki ya loro o he kotlwa a le boemong bo sa thabiseng o kana wa hula thotong ena ho nka sebe na liphello.

Rue molemo lijong: Thuto ena e tshepa ho re diphetho ditla thusa ho a ha di tools tse loketseng batho ba baholo ho re ba e thute ka melwana ya ditjo ya batho ba baholo.

Le baka le ka hetsa monki kamloro a tswiswe thuto: Otla tswa thutong ha e le hore ho ile wakola kapa ha aua latela melwana ya thuto.

Mputso: Ha ho na tshelete kapa mputso otla ifiwang jwalo ka monki ka loro

Theko ya thuto: Ha ona dijeho tse teng ha motho kapa anhang kasolo thotong ena

Lekunutu: Lesedi ya monki ka loro e tla tswariwa ka lekunutu le holo, ha ho na mabitso atla sebeditswa kapa di code. Lesedi le le kunutu le tla fihliwa kabeteng ya honotlewlwa. Ko

Departmenteng ya Food and Nutrition. Lesedi le kununutu le tla timetswa moraho dilimo tse thlanu ka mothsini wa hotimetsa

Ntsa kotsi tsa thuto: Ha hona ntsa kotsi thutong ena

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher, Matsidiso Nteleza on 0614808467; my supervisor, Dr Heleen Grobbelaar on 031 373 2328 or Heleeng@dut.ac.za, or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support, Prof C E Napier on 031 373 2577 or carinn@dut.ac.za.

Annexure C: Consent form

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Annexure C: IsiXhosa translated consent form

Isivumelwano

Ingxelo sivumelwano sokuthatha inxaxheba kuphando

- Ndiyangqina ukuba ndazisiwe ngumphandi…… (igama lomphandi) ngendlela olume ngayo uphando, ukuziphatha, imingcipheko namaqithiqithi ophando-inombolo ye Ethics Clearance……
- Ndikwafumene, ndafunda, ndaqonda okubhalwe ngasentla apha (kwincwadi yenkcazelo ngophando) ngokubhekiselele kwisifundo.
- Ndiyaqonda ukuba iziphumo zophando, kuquka iincukacha zam ngokubhekiselele kwisimi, iminyaka, umhla wokuzalwa nezigulo endinazo zizakufakwa kwiziphumo zophando ngokufihlakeleyo.
- Ngokwezidingo zophando, ndiyavuma ukuba idata ezakuqokelelwa ngexesha loluphando izakuhlalutywa kwikompuyutha ngumphandi.
- Ndinako ukulahla ekuthatheni inxaxheba koluphando nakwesiphi na isigaba ndifuna ngaphandle kwesohlwayo.
- Ndibe nethuba elaneleyo lokubuza imibuzo (endiyithandayo) yaye ndikulungele ukuthatha inxaxheba koluphando.
- Ndiyakuqonda ukuba iincukacha ezintsha ezifumanekileyo ngexesha yoluphando nezinento yokwenza ekuthatheni kwam inxaxheba, ndizakukwazi ukufikelela kuzo.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Annexure C: SeSotho translated consent form

Tumello

Tlaleho ea tumellano ho nka loro thutong

- Ke-mogolo netefatsa ho re ke ile ka behwa ke mofuputsi wathuto……(le bitso la mopufutsi) ka molemo, boitsoaro le likotsi tsa thuto-Nomoro ya Ethics Clearance……
- Ke boetse ke ile a fumana, ka bala, ka utloisisa se sengotsweng ka molimo (le ngolo le hlalosang ka thuto) mabapi a thuto.
- Kea hlohomelo hore liphello la thuto, ho kopanyelletsa le tsa linthla tsa motho ka mong mabapi le tekano, dilimo, le tsatsi la tsoalo, di initials, le hlahlojo ya pelo ditla yetsiwa hore di sa tsejoe sebetsanoe ho kena tlahelong ea yhuto.
- Ka libaka la dithloko tsa thuto kea dumela hore data ye nkiweng ka nakho ya thuto e itla sebetsoea tsamaisong ea k'hompiuetha ke mopufutsi.
- Nka, ho sa tsotelletso boemo leha e le bofe, ntle le khethollo, ke tlohele ho nka kaloso thutong ena.
- Ke ile kaba na le monyetla o lekaneng ua ho botsa dibotso ibile (ea mot boikhethelo) ke itukisetse ho nka kaloso thutong ena.
- Ke utloisisa hore liphetheho tse ncha tsa bohlokoa ka nako ya thutong ena e ka'nang ea amana le hore ke nkile kaloso e tla neloa sebaka mo honna.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Annexure D: Delphi panellist information letter

Delphi panellist information letter

Dear Ms/Mr/Dr/Prof,

You have been nominated as an expert in the field of Nutrition and we are hereby requesting for your participation in a panel of experts that are evaluating the nutrition education tools developed with the aim of creating awareness of the newly developed elderly food based dietary guidelines.

The aim of this study is to produce nutritional educational support material in the English, isiZulu, isiXhosa, Sotho and Afrikaans languages, and to test their ability in informing, educating, and influencing the elderly towards better nutrition choices.

Your expert opinion would be appreciated in order to assess and validate the nutrition education support material that has been developed for suitability for the elderly communities in South Africa.

Master students (Qualification: Master of Applied Science in Food and Nutrition) at the Durban University of Technology, Zanele Khanyile and Matsidiso Nteleza are the main researchers under the supervision of Dr Heleen Grobbelaar and Prof Carin Napier (cc'd in this email).

What does the study involve?

- Ethical clearance has been obtained from the DUT ethics committee.
- Permission from the experts will be obtained.
- As an expert participant, your response to this email will be considered as consent, indicating that you are willing to participate in the research study
- The study will be conducted through a survey consisting of open-ended questions and a short questionnaire. The developed Education Material consisting of a poster and an accompanying booklet, have been attached to this email and should you decide to participate, the questions are attached for completion.

Please note the following:

- Participation is voluntary and participants can withdraw at any time with no penalty.
- No pay will be given to any of the participants.
- There is no cost to the participants if you agree to partake in the study.

The results of the study will be made available to you. The study hopes that at completion of the study it will help develop elderly appropriate nutrition education support material to be used to communicate the elderly food based dietary guidelines.

Research related injury:

No injuries are anticipated in this study.

Attached in this e mail are the following:

• The developed tools:

1. Poster- that will be: 1200mm X 800mm in size

2. A5 Booklet

• The Questionnaire for completion

For any questions or concerns please feel free to contact my supervisor or the Ethics committee. Your participation will be greatly appreciated and thank you for affording us the opportunity to explain the study to you.

Regards

Researchers: Zanele Khanyile and Matstidiso Nteleza, +27734159422, zanelekhanyile@gmail.com, +27614808467, nmatsidiso@gmail.com

Supervisor: Dr Heleen Grobbelaar +27313732326, heleeng@dut.ac.za.

The Institutional Research Ethics administrator: +27313732375.

Complaints can be reported to the DVC: Research, Innovation and Engagement, Prof S Moyo Moyos@dut.ac.za or 031 373 2576.

Annexure E: Pre-development questionnaire

Pre-development survey questionnaire

Good day, I am a Food and Nutrition Master's student. I am doing a study to develop and test Nutrition education support material for the elderly, the support material is to communicate and educate the elderly on the Food Based Dietary Guidelines.

Your participation will help ensure development of clear and accurate nutrition education support material that meet the needs and considers limitations of the elderly population aged 60+.

Your responses will be used to develop comprehensive and user friendly Nutrition Education Tool/s communicating Food Based Dietary Guidelines, with the intention to inform and improve the lives of the Elderly.

Please tick the appropriate box.

1.1. What is your current age?

60- 70 years	
71- 80 years	
81-90 years	

1.2. What is your Gender?

Female	
Male	

1.3. What is your level of education?

Never went to school	
Primary school	
High school/ Matric	
Tertiary	

1.4. What best describes your current living arrangement?

Please Tick all that apply.

Live alone	
Live with spouse or partner	
Live with other relatives	
Live with non family	
Live with my children	
Live at a home for the elderly	
Other specify	

1.5. What learning opportunities did you attend in the past year?

Please Tick all that apply.

Workshop/course from a community organization	
Workshop/course from the clinic or health center	
Online or distance learning course- Internet	
On-campus learning through a college or university	
I did not participate in any learning opportunity	
Other –Specify	

1.5. Have you used a computer before?

Yes	
No	

1.6. If “Yes”, what did you use it for?

Please Tick all that apply.

E mail	
Playing games	
Writing, editing and Research	
Work purposes	
Internet browsing	
Watching movies	

I have never used a computer	

1.7. Where would you prefer to get information about resources/activities for the elderly?

Please tick all that apply.

Family Doctor /Local clinic	
Community club	
Magazine	
Local Newspaper	
Flyers, Pamphlets	
Television News	
Radio	
Internet	
Cellphone audio or video messaging	

1.8. What would you prefer as a resource tool, informing you on health and nutrition matters?

Posters	
Pamphlets	
Bulletin Boards	
Short Video's	
Audio Recordings	
Fridge Magnets	
Flash cards	

1.9. How would you describe the current status of your senses?

Sense	**Excellent**	**Good**	**Moderate**	**Assisted**
Hearing				
Sight				
Smell				
Touch				

1.10. Have you ever heard anything about elderly food based dietary guidelines?

Yes	
No	

1.11 If yes, where have you heard about the EFBDGs?

1.12 Do you understand the meaning of the EFBDGs?

Yes	
No	
Partially	

Thank you for your participation

!!

Contacts in the Event of Any Problems or Queries:

Supervisor: Dr Heleen Grobbelaar: +27313732326, heleeng@dut.ac.za.
Researcher: Matsidiso Nteleza: +27 614808467, nmatsidiso@gmail.com.
The Institutional Research Ethics administrator: +27313732900.
Complaints can be reported to the DVC: TIP, Prof S Moyo Moyos@dut.ac.za **or 031 373 2576.**

Annexure E: IsiXhosa translated pre-development questionnaire

Imibuzo eyintshayelelo phambi kophando ngqo

Ndenza izifundo zeemasters kwicandelo lezokutya. Ndiqhuba uphando ngeenjongo zokuqulunqa ndivavanye izixhobo zokufundisa abadala ngendlela elungileyo yokutya, ezi zixhhobo zizakuthi zifundise abantu abadala ngemgaqo yokutya.

Ukuthatha kwakho inxaxheba kuzakuqinisekisa ukuqulunqwa kwezixhobo ezizizo nezicace gca, ezizakuthi zohlangabezane nezidingo kwakunye nemiceli mngeni yabadala abakwiminyaka engama-60 ukuya phezulu.

Iimpendulo zakho zizakusetyenziswa ukwakha izixhobo zokufundisa ngendlela yokutya ekulula ukuziqonda nezingenabungozi, ngeenjongo zokwazisa nokuphucula iimpilo nobomi babadala.

Nceda khetha ibhokisi efanelekileyo.

1.7. Mingaphi iminyaka yakho?

60- 70 yeminyaka	
71- 80 yeminyaka	
81-90 yeminyaka	

1.8. Sesini isini sakho?

Ungumama	
Ungutata	

1.9. Leliphi inqanaba lakho lemfundo?

Zange ndaya esikolweni	
Amabanga aphantsi	
Amabanga aphezulu/ Ibanga leshumi	
Imfundo ephakamileyo	

1.10. Khetha indlela echanekileyo echaza indlela yokuhlala kwakho?

Nceda khetha konke okufanelekileyo

Uhlala wedwa	
Uhlala nomlingani	
Uhlala nezihlobo	
Uhlala nabantu abangezozihlobo	
Uhlala nabantwana	
Uhlala kwikhaya labantu abadala	
Okunye - Chaza	

1.5. Ngawaphi amathuba okufunda oke wawafumana kwiminyaka edlulileyo?

Nceda khetha konke okufanelekileyo

Ikhosi ethile kwingingqi ohlala kuyo	
Ikhosi ethile kwikilinikhi okanye kwicandelo lezempilo	
Kwi-internethi okanye izifundo ezimgama	
Izifundo zase-university ekhampasini	
Andizange ndathatha mathuba okufunda ebomini bam	
Okunye –Chaza	

1.6. Uke wayisebenzisa ikhompuyutha ngaphambili?

Ewe	
Hayi	

1.7. Ukuba impendulo ngu ‘’ewe” wawuyisebenzisela ukwenzani?

Nceda khetha konke okufanelekileyo

E-mail	
Udlala imidlao	

Utayipha okanye usenza phando luthile	
Ngeenjongo zomsebenzi	
Uphenya I internethi	
Ubukele imifanekiso bhanya-bhanya	
Zange ndayisebenzisa ikhompuyutha	

1.7. Ungathanda ukuva phi ngezinto ezinxulumene nabadala?

Nceda khetha konke okufanelekileyo

Kugqirha wasekhaya /Kwikilinikhi yasekuhlaleni	
Kwiclub yasekuhlaleni	
Magazini	
Kwiphepha ndaba lasekuhlaleni	
Flyers, Pamphlets	
Kwiindaba zikamabona kude	
Kunomathotholo	
Internet	
Kumyalezo oshicilelweyo womnxeba	

1.8. Ungakhetha ukuva phi ngeendaba/ iimeko ezinxulumene nezempilo zabantu abadala?

Iiposter	
Pamphlets	
Iibhodi zezikhumbuzo	
Iivideo ezimfuntshane	
Imiyalezo eshicilelweyo	
Izitikha ezincanyathiselwa kwizikhenkcezisi	

1.9. Ungayichaza kanjani indlela yakho yokuva?

Isense	**Kkuhle kakhulu**	**Kakuhle**	**Kancinci**	**Uyancediswa**

Ukuva				
Ukubona				
Ukunukisa				
Ukubamba				

1.10. Uke weva ngemiqaqo yeendlela zokutya ngaphambili?

Ewe	
Hayi	

1.11. Ukuba impendulo ngu ‘’ewe’’ uke weva phi ngayo?

1.12 Uyayiqondisisa imigaqo yeendlela zokutya?

Ewe	
Hayi	
Kancinci	

Enkosi ngokuthatha inxaxheba

!!

Contacts in the Event of Any Problems or Queries:

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Annexure E: SeSotho translated pre-development questionnaire

Pre-development survey

Dumelang. Tse moithute ya etsang thuto fapeng la dijo tse fepang mmele, mm eke yetsa le di masters fapeng leo. Ke etsa dithuto tsa ho ntlafatsa le ho hlahloba dijo tse fang mmele le ho etsa dithuto tsa ho thusa batho babaholo. Tsheletso ena ke hopuisana le ho ruta batho babaholo ho dijo tsetlameng ho latelwa ntleng ena.

Ho nka kasolo mona etla thusa hore bonete le ntlafatso le ho etsa ntho ehlakeleng thutong ena le dintho tsa tsheletso. Hona ke ho bantsha hantle le ditloko le meedi ya batho babaholo ya dilemong tse mashome a tsheletseng ho ya ho dimo.

Boikabelo ba ha obo tla sebeletswa ho ntlafatsa le ho hlakisetsa le hore ntlesese hantle dintho tse seng kotse, boikarabelo bahao botla sebeletswa thuto ya hao dijong tse a hang mmele, ke hore puisanong ka dijong tse hlalosetsweng mona, sepeho ka ho ruta le ho ntlafatsa maphelo a batho babaholo.

Ka kopa tswaya le pokise le nepahetseng.

1 Ho dilemo tse kae?

60- 70 ya dilemo	
71- 80 ya dilemo	
81-90 ya dilemo	

2. Keng bong ba hao?

Mosadi	
Monna	

3. Ho pasetseng sehlopha sabokae?

Ha ke a ruteha	
Dihlopha tse hlase ha holo	
Dihlopha tse phahameng/ Matric	
Dithuto tse hodimo tsa university	

4. Ke eng ehlalosang hantle bodulo bahao?
Kakopo tswaya kaofela tse nepahetseng.

O dula olemong	
O dula le motswalle	
O dula le famili	
O dula le bao eseng babloko	
O dula le banna ba hao	
O dula lehaeng la batho babaholo	
Le babang - hlalosa	

1.5. Ke difing thuto oileng wa di etsa nakong efeteleng?

Kakopo tswaya kaofela tse nepahetseng.

Khoso mo o dulang teng	
Thuto ko klinikeng kappa fapeng la tsa bophelo	
Internete kapa thuto tsa othule o le hole	
Thuto tsa ko univesithi, campaseng	
Ha ke eka ka etsa thuto efe kappa efe bophelong baka	
Tse ding - Hlalosa	

6. Okele waetsa computer ha esale elewena?

eh	
che	

7. Haeba uitse e, oile waetsetsang?
Kakopo tswaya kaofela tse nepahetseng.

E-mail	
O papala dipapadi	

Otaipa kappa oetsa di batlesetso	
Sepheho sa mosebetse	
Internet browsing	
O ne oshebeleha di tshwantso	
Ha esale ake soka ke sebeletsa computer	

1.7. O ka khetha oifumana kae tsebiso ya butho babaholo?

Kakopo tswaya kaofela tse nepahetseng.

Nyaka ya lelapeng kapa sehlophemg sa sechaba	
Dikoranteng tsa sechaba	
Dipampriri tse fumanehang setrateng	
Dikoranteng	
Ka tabeng tsa television	
Dialemoeng	
Internet	

1.8. O ka khetha ntho ife uruta batho kantho eka othosang, ho thusa sechaba?

Diposter	
Dipampere	
Dibodo tse namathelang dintho	
Divideo tse khutshwane	
Recordo ya otlwa	
Dimagnete tse namathelang di fridgine	

1.9. Okabohlalosa jwang moemo bahao bahlao?

Tsatlaho	**Hntle haholo**	**Hantle**	**Emahaseng**	**Thuso**
Ohotlwa				
Pono				

Onkhesa				
Tswara				

1.10. Oke le waotlwa ka dijo le melwana elatelang mapabe le didaele sepisang tsela?

Eh	
Che	

1.11. Haeba ke eh, oke le waotlwa kae?

1.12. Na oya hotlwisa sehlaloswane mahape dijo?

Eh	
Che	
Hanyane	

Key a leboha ka honka kasolo

!!

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Annexure F: First round Delphi technique questionnaire

Delphi survey questionnaire – Round 1

The aim of this Delphi survey is to validate the developed nutrition education material by panel of experts in the following categories: nutrition information accuracy, nutrition education, adult education, elderly health, media and communication.

Name of Researcher ……. Date ……..

Name of expert participant

……

Introduction: This is the Nutrition education support material– a poster (1200mm x 800mm) and a A5 booklet - that has been developed for the purpose of communicating elderly food based dietary guidelines. Please examine the education material and evaluate as per below table while making recommendations.

Round 1 Delphi questionnaire			
Aspect / Statement	**Agree**	**Neutral**	**Disagree**
Booklet and poster: Best forms of communication for elderly			
Presentation of the material: Potential of the material to capture elderly attention			
Recommendations on: • Font and size			

• Colour			
Language use in the material: Is it suitable for comprehension by the elderly? Please recommend suitable language use.			
Content of the material: Is it accurate and scientifically sound?			

Responses to be e mailed to researcher.

Thank you very much for your time.

Contacts in the Event of Any Problems or Queries:

Supervisor: Dr Heleen Grobbelaar +27313732326, heleeng@dut.ac.za.
Researcher: Matsidiso Nteleza +27 614808467, nmatsidiso@gmail.com.
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Annexure G: Second round Deliphi technique questionnaire

Delphi survey questionnaire – Round 2

The aim of this Delphi survey is to validate the developed nutrition education material by panel of experts in the following categories: nutrition information accuracy, nutrition education, adult education, elderly health, media and communication.

Name of Researcher ……. Date ……..

Name of expert participant

……

Introduction: This is the Nutrition education support material– a poster (1200mm x 800mm) and a A5 booklet - that has been developed for the purpose of communicating elderly food based dietary guidelines. Please examine the education material and evaluate as per below table while making recommendations.

Round 2 delphi questionnaire			
Aspect / Statement	Agree	Neutral	Disagree
Please evaluate the suitability of the NE material for the South African elderly from low- and middle-income groups			
From your evaluation of this NE material, will the EFBDGs knowledge be effectively mobilised?			
Please review and comment on the importance of the new information suggested by other panellists. Do you agree or			

disagree that the newly added recommendations are relevant enough to be applied to the material?			
What would you recommend be added or removed to improve the NE material? (Experts' additional comments and recommendations)			

Responses to be e mailed to researcher.

Thank you very much for your time.

Contacts in the Event of Any Problems or Queries:

Supervisor: Dr Heleen Grobbelaar +27313732326, heleeng@dut.ac.za.
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Annexure H: Focus groups interview schedule

FOCUS GROUPS INTERVIEW SCHEDULE (Main discussion questions translated to IsiXhosa and SeSotho)

Good morning/ Good day.

I am a Food and Nutrition Master's student. I am doing a study to test Nutrition education support material for the elderly, the material communicates and educate the elderly on the Food Based Dietary Guidelines.

Your participation will help ensure dissemination of clear and accurate nutrition education tool/s that meet the needs and considers limitations of the elderly community population age 60+. The intention is to inform and improve the lives of the Elderly.

Participant ID:……

Name of centre:……

TIME: Start: .....
End .....
Total time taken for interview: hours ..... minutes……

Age:.....

Nationality (Ethnic group):

Black	
White	
Indian	

Highest Education level:

None	
Sub A/Grade 1 – Std 4/ Grade 6	
Std 5/ Grade 7 – Incomplete matric	
Matric/ Grade 12	
Tertiary education	

Does your religion influence the way you eat?

☐ Yes

In what way?

☐ No

Observer/recorder - to do name tags

Phase 1: OPENING - 5 minutes

By focus group facilitator

- introduces herself
- thanks participants for coming
- focus group facilitator explains the *general* purpose of the group discussion:

This day I would like to speak to you about the Elderly Food Based Dietary Guidelines and the tools developed to inform you about health issues affecting the elderly . I am going to be asking a few questions and I am interested in your ideas and opinions about these questions. These questions will be about the tools developed to communicate the elderly food based dietary guidelines.

Focus group moderator explains the "ground rules":

- **There are no right or wrong answers**
- **Answers/opinions, whether negative or positive, will in no way affect the moderator, and are therefore welcome**
- **All answers/opinions will be treated with confidentiality**
- **Participants are to speak one at a time**
- **Participants can disagree with one another, but should let others finish what they are saying - no interrupting**

Focus group moderator explains procedure:

I am going to be asking general, broad questions that I'd like you to discuss. As we have a lot to get through, I may change the subject or move ahead, but please feel free to stop me at any time if you want to add something. I would like to tape record the discussion as this makes it easier for me to remember what everyone has said. Would this be acceptable to everyone here? Please remember that these tapes will be treated with confidentiality and will be erased when we have finished with them. Please do not feel intimidated by the tape recorder. Please speak one at a time so that the tape recorder can pick up everything clearly. Our discussion will take about 2 hours. After an hour or so, we will have a break for some refreshments, and then continue.

Phase 2: ICE-BREAKER- 5 minutes

Everyone to introduce themselves (facilitator to start)

STARTER QUESTION - 5-10 minutes

I would like to start today's discussion by asking you about yourself:

What learning opportunities have you attended in the past?

Phase 3: MAIN DISCUSSION 5 minutes per question = 15x2= 30 minutes

I am now going to ask you some specific questions about the two developed nutrition education tools:

3.1. **Poster, Booklet…** [put up poster and booklet]

— Are you able to read the writing on the tool?
(Xhosa): Uyakwazi ukufunda okubhalwe kwesi sixhobo?
(Sotho): Wa hona ho balla se se ngoetsweng thulusing ena?

— Are the colours appealing to you?
(Xhosa): Ingaba uyakholiseka yimibala ekwesi sixhobo?

(Sotho): E nkabe mi bala emona thulusing ena yah o gatlisa?

- Would this tool influence change on any of your eating habits? Why do you say this?
(Xhosa): Ingxaba esi sixhobo singayichaphazela indlela otya ngayo? Kutheni usitsho njalo nje?
(Sotho): Tsela ojang ka yona nou ika tsheyntsha ka lebaka la thulusi ena? Ho baning o sho joalo?

- What are the messages you get from this tool? What does it tell you?
(Xhosa): Yeyiphi imiyalezo oyifumanayo kwesi sixhobo?
(Sotho): Mi yaletsa efeng o etholang thulusing ela?

- Do you find it easy or difficult to use this tool as a reminder and /guide on how you should eat as an adult? Why do you say this?
(Xhosa): Ngaba ufumanisa kulula okanye ukusebenzisa esi sixhobo njengesikhumbuzo okanye umkhomba ndlela wohlobo ofanele ukutya ngalo? Kutheni usitsho njalo?
(Sotho): Na u fumana ho le bonolo kapa ho le thata ho sebelisa sesebelisoa sena e le khopotso le / tataiso ea hore na u lokela ho ja joang ha u le motho e mholo? Hobaneng o bua tjena?

- Where would you prefer we put this tool for easy accessibility to you?
(Xhosa): Yeyiphi indawo esinokubekwa kuyo esi sixhobo apho unokusibona khona ungasokolanga?
(Sotho): O nka rata ho re ebeyiwe kae thulusi ena?

- Are you going to read through the poster and booklet for all the nutritional messages being conveyed by these tools to have yourself informed and improve your eating habits?
(Xhosa): Uzakuyifunda le poster/ ncwadana ukuzixhobisa ngemiyalezo yesondlo equlethwe kuzo ukuze ube nolwazi yaye uphucule indlela otya ngayo?
(Sotho): A na u tla bala poso le bukana bakeng sa melaetsa eohle ea phepo e nepahetseng e fetisoang ke lisebelisoa tsena hore u be le tsebo le ho ntlafatsa mekhoa ea hau ea ho ja.

!!!!!!!!!!!!!!!!!REFRESHMENTS!!!!!!!!!!!!!!!!!!!!

Phase 4: SUMMARY - 10 minutes

(allow participants to alter, clarify, add on to their previous opinions)

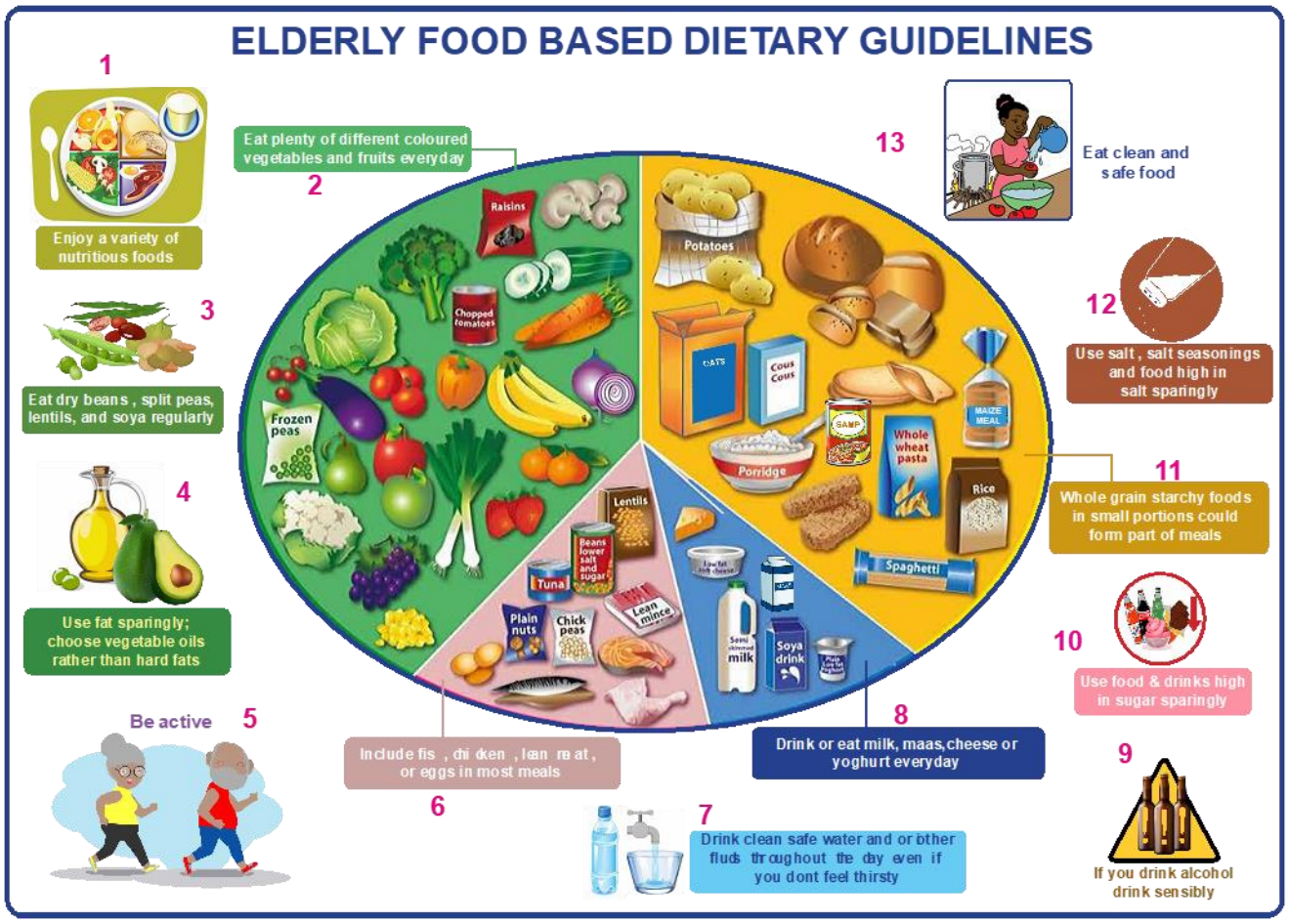
THANK-YOU – 5 minutes

Meeting dispersed

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher, Matsidiso Nteleza on 0614808467; my supervisor, Dr Heleen Grobbelaar on 031 373 2328 or Heleeng@dut.ac.za, or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za

Annexure I: First draft poster



Annexure J: Second draft poster

Annexure K: Adjusted third draft poster

Annexure L: Thirteen-page first draft of the developed nutrition education booklet

1. ENJOY A VARIETY OF NUTRITIOUS FOOD

What is nutritious food?

- Nutritious food is different kinds of foods that give your body the nutrients it needs for good health, make you feel good and give you energy.
- A nutritious meal should include protein in the form of meat or fish or beans, starch, vegetables, fruit and dairy products.

Why should you eat a variety of nutritious food?

- Eating a variety of nutritious food is a way to help your body stay strong and healthy.
- Eating a variety of nutritious food also gives your body the energy it needs to carry out daily chores.
- Eating a variety of nutritious food helps you get better more quickly from sickness and disease.

How can you manage to eat a variety of nutritious food?

- Have different-coloured foods in your meal, like white meat; chicken or fish, dark green spinach, red beetroot, orange pumpkin and brown rice.
- Eat a variety of foods throughout the day from each food group
  - > 5-6 servings of vegetables or fruit
  - > 2 servings of starch
  - > 2 servings of meat, chicken, fish or beans
  - > 1-2 servings of dairy products such as milk, cheese or maas

2. EXERCISE

What is exercise?

Exercise is any activity that involves movement of the body and makes you sweat or makes your heart beat faster, such as household chores, walking briskly, playing sports like bowling or golf and other recreational activities.

Why should you exercise?

- > To keep a healthy body weight
- > When you exercise your body is more able to fight off illness and disease.
- > Exercise relieves stress and keeps you in a good mood..
- > Exercising reduces the risk of injuries that could cause bone fractures.

How can you exercise more?

- > Go for a daily walk in the neighbourhood.
- > Do some gardening.
- > Do household chores such as washing clothes, sweeping, mopping and general cleaning.
- > Participate in your favourite sport such as bowling, netball, golf or football.
- > If you still can, join a gym or keep fit class and do some aerobic exercise.

3. STARCHY FOODS HIGH IN FIBRE, IN SMALL PORTIONS, SHOULD FORM PART OF MEALS

What are starchy foods high in fibre?
These are starchy foods that contain fibre, such as brown bread, whole wheat flour steamed bread, whole wheat dumplings, mealie meal, whole wheat pasta, brown rice, couscous, potatoes, all bran , oats and other grains such as rye and barley.

Why should starchy foods high in fibre form part of your meals?

> Starchy food is needed by your body for energy and to keep you fuller for longer.
> Starchy food high in fibre gives your body the fibre it needs to keep you regular.

How can you include portions of starch in your meals?

- Eat jungle oats, maltabela porridge or all bran flakes cereal for breakfast.
- Have a small portion of starch such as brown bread, brown rice, potatoes or phutu with lunch and dinner.
- Choose starch that is high in fibre such as brown rice and brown or whole-wheat bread.
- Eat potatoes with their skin on.
- Do direct substitution - use brown rice instead of white rice, brown bread instead of white bread, whole wheat pasta instead of white pasta, and use wholewheat flour for steamed bread and dumplings.

4. EAT PLENTY OF DIFFERENT COLOURED FRUITS AND VEGETABLES EVERY DAY

What is meant by plenty of fruits and vegetables?

> Eat 5-6 portions of different fruits and vegetables per day

Why should you eat plenty of fruits and vegetables?

> Fruits and vegetables give your body the vitamins it needs for growth and repair; for example, eating yellow and orange vegetables can help to improve your eyesight.
> Eating fruits and vegetables helps the body to fight diseases; for example, eating citrus fruit such as oranges, naartjies and grapefruit gives you vitamin C that fights against colds and 'flu.
> Fruits and vegetables eaten with the skin on (apples, pears, potatoes, sweet potatoes) provide the body with fibre to keep your digestive system regular.

How can you include plenty of fruits and vegetables daily?

- Plan your meals to include a variety of different coloured vegetables.
- Steam vegetables to make them softer and easier to chew; this method also preserves the vitamins.
- Eat sliced fruits or vegetables such as melon, cucumber, celery or tomato as snacks between meals.
- Add slices or pieces of fruit such as banana, pineapple or strawberries to breakfast porridge or cereals.
- Cut your fruits and vegetables into bite-sized pieces to make them easier to eat.
- Make soup with different vegetables as they are filling and easy to eat.
- Include frozen mixed vegetables when cooking meat and fish dishes like curries and stews

5. EAT DRY BEANS, SPLIT PEAS, LENTILS AND SOY REGULARLY

What does eating dry beans, split peas, lentils and soy regularly mean?
Eat 3-4 cups of bean varieties - sugar beans, jugo beans, red speckled beans, split peas and soybeans per week.

Why should you eat dry beans, split peas and soy regularly?

> Dry beans, split peas,lentils and soybeans are a nutritious and cheap replacement for meat.
> Different varieties of beans help build the body without the fat that is found in meat.
> Beans, lentils and soy have fibre that makes you feel fuller for longer and keeps you regular, preventing constipation which can often affect the elderly.
> Replacing meat with beans helps you maintain a healthy weight and a healthy cholesterol level.

How can you regularly include beans, split peas, lentils and soybeans in your meals?

- Soak beans before cooking them to reduce cooking time, do not use the water it was soaked in.
- Cook larger quantities of beans at a time as they can be safely stored in the refrigerator for about 5 days or buy canned beans.
- Soya beans and different soya products are a good protein replacement.
- Eat beans, split peas and lentils as salads and in soups, stews and curries.
- Canned beans and peas have already been cooked and are ready to use to save time
- Variety in your meal can be achieved by replacing one kind of bean with another in the same recipe; for example, instead of red kidney beans with samp use butter beans.

6. DRINK OR EAT MILK, MAAS, CHEESE OR YOGHURT EVERY DAY

What does drinking and eating milk, cheese, yoghurt and maas daily mean?
Eat or drink 3milk products daily, for example, milk with your porridge or cereal, cheese in your sandwich, yoghurt as a snack. The 25ml milk in your tea or coffee is not sufficient.

Why is it important to drink or eat milk and milk products every day?

> Milk and milk products contain calcium needed by the body to build and keep bones and teeth strong, prevent fractures and assist with the healing of bones..

How can you include milk and milk products in our meals?

- Add milk instead of water when preparing breakfast porridge.
- Have slices of cheese in your sandwich or just eat it as a snack.
- Drink a glass of milk every day.
- Eat maas and phutu as a meal.
- Add milk to sauces such as macaroni cheese sauce.
- Have yoghurt or milk with your breakfast cereal.
- If milk gives you a runny tummy use other plant alternatives such as coconut milk, almond milk, soymilk or lactose-free milk.

7. DRINK CLEAN, SAFE WATER AND/OR OTHER FLUIDS THROUGHOUT THE DAY EVEN IF YOU DO NOT FEEL THIRSTY

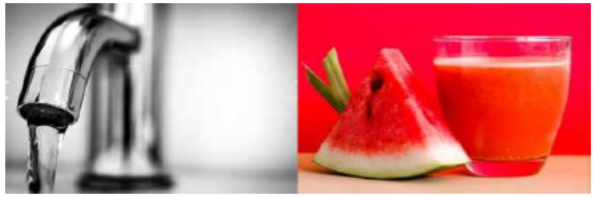
What does it mean to drink water even if you are not thirsty?
Drink 8 glasses of water daily.
Safe water is water that is safe for human consumption (potable water); if you are not sure that the water is safe to drink, first boil it and then cool the water down before drinking it or add a teaspoon of bleach for every litre of water..

Why should you drink lots of water?

> Your body needs water to function properly and produce saliva in the mouth, urine and moisture in the eyes.
> If your body does not get enough water you may lack energy for daily activities.
> If your body does not get enough water you may get sick more often and more easily, for example, you may suffer from headaches.

Practical applications:

- Drink water before and after taking medication.
- Carry water in a bottle or container for easy access.
- Drink water instead of sugar-sweetened cordials, oros or fizzy coldrinks at home as well as when eating out.
- Add a slice of lemon or other fruit like watermelon or orange to water to improve the taste and to make it more fun to drink.
- Boil and cool water to ensure it is safe to drink.
- South African Tap water is safe to drink.



8. USE FOODS AND DRINKS HIGH IN SUGAR SPARINGLY

Which foods and drinks are high in sugar?
These are foods and drinks that have had sugar added to them such as fizzy cold drinks, sugar sweetened cordials like OROS, fruit juices sports drinks, flavoured milk, flavoured coffee, store bought iced tea, pre-made soup and soup packets, canned fruit, canned fruit in fruit juices and smoothies. Using it sparingly means using only a little of these foods and drinks that are high in sugar.

Why should you use these foods and drinks sparingly?
High sugar intake exposes you to the risk of obesity and illnesses like hypertension and diabetes. High sugar intake can lead to dental problems such as rotting of teeth.

Practical applications:

- Replace sugar-sweetened cordials like oros, fizzy drinks and sports drinks with water, you can add sliced fruit to your water for better taste.
- Replace fruit juice with water.
- Replace sugar in coffee and tea with honey or sweeteners.
- Replace sweetened breakfast cereals such as cornflakes, rice crispies, cocoa pops with All-bran, weet bix, oats, Maltabella, and maize porridge.
- Avoid adding sugar to vegetables such as carrots and pumpkin.
- Limit your intake of pastries, biscuits, sweets, ice cream, chocolates and dessert for special occasions.
- Limit or avoid jam by replacing it with fish paste, cheese spread or peanut butter

9. USE FAT SPARINGLY; CHOOSE VEGETABLE OILS RATHER THAN HARD FATS

Hard Fats
This is processed fat and its harder at room temperature. It is found in processed foods such as margarine and salad dressing , crisps , cookies pie crusts. Avoid as hard fats can raise your cholesterol, so eat as little as possible.

What are vegetable fats and why should fats be used sparingly?
Vegetable fat should be used rather than animal fat. Vegetable fat is any fat or oil that comes from plants examples are peanut butter, olive oil, coconut oil, sunflower oil and grapeseed oil.
Fats and oils used should be no more than 5 teaspoons per day because too much fat increases the risk for weight gain, high cholesterol and the onset of chronic diseases.

Practical applications:

- Replace full-fat dairy products with low-fat substitutes.
- Replace full fat margarine with lite margarine
- Replace full fat salad dressing and mayonnaise with lite varieties
- Eat chicken without the skin, and trim beef, pork and chicken of all visible fat and cook with no fat.
  Use cooking methods such as oven roasting, steaming, and boiling instead of frying.
- Limit eating fast foods and processed foods to once a week if at all.
- Replace red meat and chicken with fatty fish such as mackerel, salmon, herring or sardines for a few meals per week.

Replace fats that are solid at room temperature (hard fats) such as butter, beef fat, chicken fat, ghee, lard and margarine with vegetable oils such as sunflower oil and canola oil

10. INCLUDE FISH, CHICKEN, LEAN MEAT IN MOST MEALS

These are meats with a low fat content.

Why should you include these meats in most meals?

- The low fat content of these meats helps to keep cholesterol levels in the body low.
- The low fat content reduces the risk of heart disease and other chronic illnesses.
- The low fat content also helps you to maintain a healthy body weight.

Practical applications:

- Before cooking remove fatty rind from pork chops, choose lean rump steak and remove skin from chicken.
- Poach or steam fish instead of frying.
- Grill, steam or oven bake your meat rather than frying it and do not add extra oil.
- Use herbs and spices to give your meat and chicken flavor.
- When roasting meat or poultry, place it on a metal rack above the roasting pan so that the fat drips off.

11. USE SALT, SALT SEASONINGS AND FOOD HIGH IN SALT SPARINGLY

Why should salt and seasonings be used sparingly?
Packet soup, gravy powder and processed meats such as polony, ham and sausages all contain added salt. Salt should be used sparingly because a high salt intake may increase the risk of high blood pressure.

Practical application:

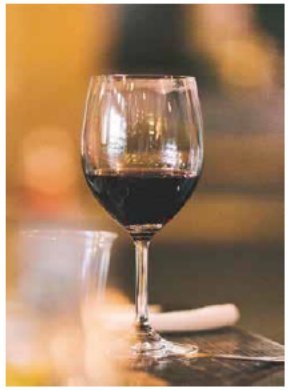
- Reduce the amount of salt added during cooking.
- Remove additional salt from the table.
- Reduce the intake of foods that contain added salt, such as bread, pies, sausages and cold meats, breakfast cereals, crisps, soups and margarine.
- Use herbs to flavor food instead of salt, aroma and stock cubes.

12. IF YOU DRINK ALCOHOL DRINK SENSIBLY

Why should you drink alcohol sensibly?
Alcohol contributes to weight gain and is often linked to serious health problems and diseases including bowel cancer, high blood pressure, stroke and liver disease.
Alcohol may also impair your judgement, which can increase the risk of falls.
Drinking alcohol while on medication can cause drowsiness and also affect how effectively the medication works in your body.

Practical application:

- Restrict alcohol intake to special occasions only. And limit your intake to 1 tot of hard liquor or 1 glass of wine.
- Avoid alcohol while on medication.



13. EAT CLEAN AND SAFE FOOD

What is clean and safe food?
Clean and safe food is food that is safe to eat without getting sick for example, food that has not spoilt and is not stale. It is important to check the 'sell by' and 'use by' dates on food packaging. Food safety means handling, preparing and storing food or drink in such a way that the risk of people getting sick from food-borne diseases such as food poisoning is reduced.

Why is it important to eat clean and safe food?

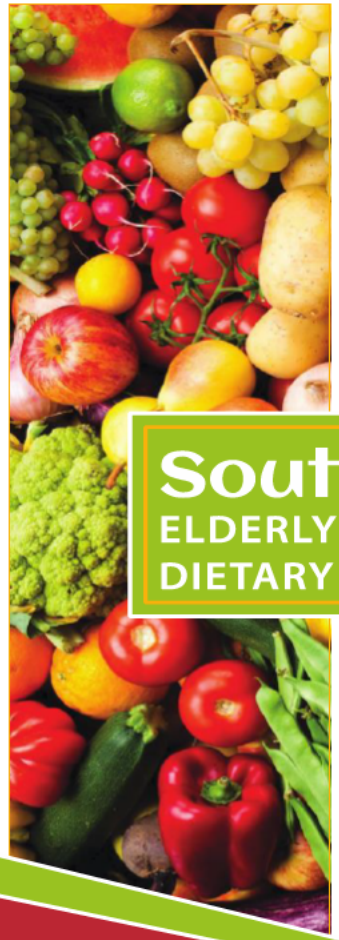
- Eating food that is not clean can cause diseases such food poisoning and tapeworms

Practical application:

- Wash your hands thoroughly with soap and water before handling food.
- Store raw and cooked foods separately.
- Cook foods such as pork thoroughly so that any unseen germs can be killed by the heat.
- Check and monitor expiry dates on all non-perishables.
- Wash all fruits and vegetables before use to wash away pesticides.
- Keep foods that need to be kept cold in the fridge.
- Keep insects and pests away from food preparation areas.
- Store food such as flour, rice and mealie -meal in sealed containers not on the floor

Annexure M: Final draft nutrition education poster

Annexure N: Final draft nutrition education booklet



South African
ELDERLY FOOD BASED DIETARY GUIDELINES

THIS BOOK BELONGS TO:

Name: _____

Contact: _____

Address _____

_____

NOTES:

INTRODUCTION

A healthy diet often includes nutrient-rich foods from all major food groups, consisting of lean protein such as chicken, eggs and fish, whole grains such as whole-grain brown rice, maize-meal, whole-wheat cereals and steamed bread, healthful fats such as, olive oil, peanuts, avocado and canola oil, and also fruits and vegetables of many colours such as oranges, apples, pears, cabbage, spinach and carrot.

Eating healthily also means replacing foods that have trans fats, added salts and sugars with more nutritious options. Please note, examples of foods containing trans fats, added salt and added sugars along with their healthy substitutes are provided in the content of this booklet.

Healthy eating has many benefits which include building strong bones, helping with weight reduction, protecting the heart from diseases such as coronary heart diseases, preventing diseases such as diabetes, stroke, hypertension, reduction of cancer risk, boosting mood, improving memory and getting a good nights' sleep.

This booklet looks at the 13 Elderly Food Based Dietary Guidelines, explains what each guideline means, why is it important to implement them and provides ways in which the guidelines can be conveniently, cost effectively and practically implemented in everyday lives.

1. ENJOY A VARIETY OF NUTRITIOUS FOOD

What is nutritious food?

- Nutritious food is different kinds of foods that give your body the nutrients it needs for good health, make you feel good and give you energy.
- A nutritious meal should include starch, vegetables, fruit, dairy products and proteins in the form of beans, eggs, fish, or meat.

Why should you eat a variety of nutritious food?

- Eating a variety of nutritious food is a way to help your body stay strong and healthy.
- Gives your body the energy it needs to carry out daily chores.
- Helps you get better more quickly from sickness and disease.

How can you manage to eat a variety of nutritious food?

- Have different-coloured foods in your meal, like white meat such as chicken or fish, dark green spinach, red beetroot, orange pumpkin and brown rice.
- Eat a variety of foods throughout the day from each food group
  - > 5-6 servings of vegetables or fruit
  - > 2 servings of starch
  - > 2 servings of meat, chicken, fish or beans
  - > 1-2 servings of dairy products such as milk, cheese or maas

2. EXERCISE

What is exercise?

Exercise is any activity that involves movement of the body and makes you sweat or makes your heart beat faster, such as household chores, walking briskly, playing sports like bowling or golf and other recreational activities.

Why should you exercise?

- > To keep a healthy body weight
- > When you exercise your body is more able to fight off illness and disease.
- > Exercise relieves stress and keeps you in a good mood.
- > Exercising reduces the risk of injuries that could cause bone fractures.

How can you exercise more?

- > Go for a daily walk in the neighbourhood.
- > Do some gardening.
- > Do household chores such as washing clothes, sweeping, mopping and general cleaning.
- > Participate in your favourite sport such as bowling, netball, golf or football.
- > If you still can, join a gym or keep fit class and do some aerobic exercise.

3. STARCHY FOODS HIGH IN FIBRE, IN SMALL PORTIONS, SHOULD FORM PART OF MEALS

What are starchy foods high in fibre?
These are starchy foods that contain fibre, such as brown bread, whole wheat flour steamed bread, whole wheat dumplings, mealie meal, whole wheat pasta, brown rice, couscous, potatoes, all bran , oats and other grains such as rye and barley.

Why should starchy foods high in fibre form part of your meals?
> Starchy food is needed by your body for energy and to keep you fuller for longer.
> Starchy food high in fibre gives your body the fibre it needs to keep you regular.

How can you include portions of starch in your meals?
- Eat jungle oats, maltabela porridge or all bran flakes cereal for breakfast.
- Have a small portion of starch such as brown bread, brown rice, potatoes or phutu with lunch and dinner.
- Choose starch that is high in fibre such as brown rice and brown or whole-wheat bread.
- Eat potatoes with their skin on.
- Do direct substitution - use brown rice instead of white rice, brown bread instead of white bread, whole wheat pasta instead of white pasta, and use wholewheat flour for steamed bread and dumplings.

4. EAT PLENTY OF DIFFERENT COLOURED FRUITS AND VEGETABLES EVERY DAY

What is meant by plenty of fruits and vegetables?
> Eat 5-6 portions of different fruits and vegetables per day

Why should you eat plenty of fruits and vegetables?
> Fruits and vegetables give your body the vitamins it needs for growth and repair; for example, eating yellow and orange vegetables can help to improve your eyesight.
> Eating fruits and vegetables helps the body to fight diseases; for example, eating citrus fruit such as oranges, naartjies and grapefruit gives you vitamin C that fights against colds and 'flu.
> Fruits and vegetables eaten with the skin on (apples, pears, potatoes, sweet potatoes) provide the body with fibre to keep your digestive system regular.

How can you include plenty of fruits and vegetables daily?
- Plan your meals to include a variety of different coloured vegetables.
- Steam vegetables to make them softer and easier to chew; this method also preserves the vitamins.
- Eat sliced fruits or vegetables such as melon, cucumber, celery or tomato as snacks between meals.
- Add slices or pieces of fruit such as banana, pineapple or strawberries to breakfast porridge or cereals.
- Cut your fruits and vegetables into bite-sized pieces to make them easier to eat.
- Make soup with different vegetables as they are filling and easy to eat.
- Include frozen mixed vegetables when cooking meat and fish dishes like curries and stews
- Have a vegetable garden to grow your own vegetables such as, spinach, cabbage, carrot, beetroot, peas, carrot lettuce, pumpkin and potatoes. Growing your own vegetables not only ensures that you get to eat your vegetables fresh, but it is also cost effective and helps you to exercise and be physically active.

5. EAT DRY BEANS, SPLIT PEAS, LENTILS AND SOY REGULARLY

What does eating dry beans, split peas, lentils and soy regularly mean?
Eat 3-4 cups of bean varieties - sugar beans, jugo beans, red speckled beans, split peas and soybeans per week.

Why should you eat dry beans, split peas and soy regularly?

> Dry beans, split peas,lentils and soybeans are a nutritious and cheap replacement for meat.
> Different varieties of beans help build the body without the fat that is found in meat.
> Beans, lentils and soy have fibre that makes you feel fuller for longer and keeps you regular, preventing constipation which can often affect the elderly.
> Replacing meat with beans helps you maintain a healthy weight and a healthy cholesterol level.

How can you regularly include beans, split peas, lentils and soybeans in your meals?

- Soak beans before cooking them to reduce cooking time, do not use the water it was soaked in.
- Cook larger quantities of beans at a time as they can be safely stored in the refrigerator for about 5 days or buy canned beans.
- Soya beans and different soya products are a good protein replacement.
- Eat beans, split peas and lentils as salads and in soups, stews and curries.
- Canned beans and peas have already been cooked and are ready to use to save time
- Variety in your meal can be achieved by replacing one kind of bean with another in the same recipe; for example, instead of red kidney beans with samp use butter beans.

6. DRINK OR EAT MILK, MAAS, CHEESE OR YOGHURT EVERY DAY

What does drinking and eating milk, cheese, yoghurt and maas daily mean?
Eat or drink 3milk products daily, for example, milk with your porridge or cereal, cheese in your sandwich, yoghurt as a snack. The 25ml milk in your tea or coffee is not sufficient.

Why is it important to drink or eat milk and milk products every day?

> Milk and milk products contain calcium needed by the body to build and keep bones and teeth strong, prevent fractures and assist with the healing of bones..

How can you include milk and milk products in our meals?

- Add milk instead of water when preparing breakfast porridge.
- Have slices of cheese in your sandwich or just eat it as a snack.
- Drink a glass of milk every day.
- Eat maas and phutu as a meal.
- Add milk to sauces such as macaroni cheese sauce.
- Have yoghurt or milk with your breakfast cereal.
- If milk gives you a runny tummy use other plant alternatives such as coconut milk, almond milk, soymilk or lactose-free milk.

7. DRINK CLEAN, SAFE WATER AND/OR OTHER FLUIDS THROUGHOUT THE DAY EVEN IF YOU DO NOT FEEL THIRSTY

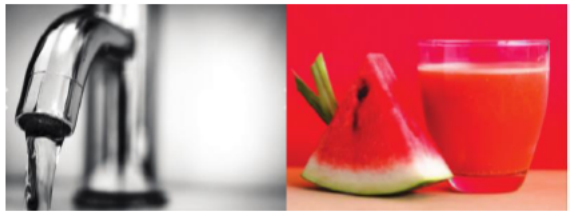
What does it mean to drink water even if you are not thirsty?
Drink 8 glasses of water daily.
Safe water is water that is safe for human consumption (potable water); if you are not sure that the water is safe to drink, first boil it and then cool the water down before drinking it or add a teaspoon of bleach for every litre of water..

Why should you drink lots of water?

> Your body needs water to function properly and produce saliva in the mouth, urine and moisture in the eyes.
> If your body does not get enough water you may lack energy for daily activities.
> If your body does not get enough water you may get sick more often and more easily, for example, you may suffer from headaches.

Practical applications:

- Drink water before and after taking medication.
- Carry water in a bottle or container for easy access.
- Drink water instead of sugar-sweetened cordials, oros or fizzy coldrinks at home as well as when eating out.
- Add a slice of lemon or other fruit like watermelon or orange to water to improve the taste and to make it more fun to drink.
- Boil and cool water to ensure it is safe to drink.
- South African Tap water is safe to drink.



8. USE FOODS AND DRINKS HIGH IN SUGAR SPARINGLY

Which foods and drinks are high in sugar? IN SUGAR SPARINGLY
These are foods and drinks that have had sugar added to them such as fizzy cold drinks, sugar sweetened cordials like OROS, fruit juices sports drinks, flavoured milk, flavoured coffee, store bought iced tea, pre-made soup and soup packets, canned fruit, canned fruit in fruit juices and smoothies. Using it sparingly means using only a little of these foods and drinks that are high in sugar.

Why should you use these foods and drinks sparingly?
High sugar intake exposes you to the risk of obesity and illnesses like hypertension and diabetes. High sugar intake can lead to dental problems such as rotting of teeth.

Practical applications:

- Replace sugar-sweetened cordials like oros, fizzy drinks and sports drinks with water, you can add sliced fruit to your water for better taste.
- Replace fruit juice with water.
- Replace sugar in coffee and tea with honey or sweeteners.
- Replace sweetened breakfast cereals such as cornflakes, rice crispies, cocoa pops with All-bran, weet bix, oats, Maltabella, and maize porridge.
- Avoid adding sugar to vegetables such as carrots and pumpkin.
- Limit your intake of pastries, biscuits, sweets, ice cream, chocolates and dessert for special occasions.
- Limit or avoid jam by replacing it with fish paste, cheese spread or peanut butter

9. USE FAT SPARINGLY; CHOOSE VEGETABLE OILS RATHER THAN HARD FATS

Hard Fats
This is processed fat and its harder at room temperature. It is found in processed foods such as margarine and salad dressing , crisps , cookies pie crusts. Avoid as hard fats can raise your cholesterol, so eat as little as possible.

What are vegetable fats and why should fats be used sparingly?
Vegetable fat should be used rather than animal fat. Vegetable fat is any fat or oil that comes from plants examples are peanut butter, olive oil, coconut oil, sunflower oil and grapeseed oil.
Fats and oils used should be no more than 5 teaspoons per day because too much fat increases the risk for weight gain, high cholesterol and the onset of chronic diseases.

Practical applications:

- Replace full-fat dairy products with low-fat substitutes.
- Replace full fat margarine with lite margarine
- Replace full fat salad dressing and mayonnaise with lite varieties
- Eat chicken without the skin, and trim beef, pork and chicken of all visible fat and cook with no fat.
  Use cooking methods such as oven roasting, steaming, and boiling instead of frying.
- Limit eating fast foods and processed foods to once a week if at all.
- Replace red meat and chicken with fatty fish such as mackerel, salmon, herring or sardines for a few meals per week.

Replace fats that are solid at room temperature (hard fats) such as butter, beef fat, chicken fat, ghee, lard and margarine with vegetable oils such as sunflower oil and canola oil

10. INCLUDE FISH, CHICKEN, LEAN MEAT IN MOST MEALS

These are meats with a low fat content.

Why should you include these meats in most meals?

- The low fat content of these meats helps to keep cholesterol levels in the body low.
- The low fat content reduces the risk of heart disease and other chronic illnesses.
- The low fat content also helps you to maintain a healthy body weight.

Practical applications:

- Before cooking remove fatty rind from pork chops, choose lean rump steak and remove skin from chicken.
- Poach or steam fish instead of frying.
- Grill, steam or oven bake your meat rather than frying it and do not add extra oil.
- Use herbs and spices to give your meat and chicken flavor.
- When roasting meat or poultry, place it on a metal rack above the roasting pan so that the fat drips off.
- Eggs are affordable and high in protein. Boil or poach eggs and use as meat substitute.

11. USE SALT, SALT SEASONINGS AND FOOD HIGH IN SALT SPARINGLY

Why should salt and seasonings be used sparingly?
Packet soup, gravy powder and processed meats such as polony, ham and sausages all contain added salt. Salt should be used sparingly because a high salt intake may increase the risk of high blood pressure and stroke.

Practical application:

- Reduce the amount of salt added during cooking.
- Remove additional salt from the table.
- Reduce the intake of foods that contain added salt, such as bread, pies, sausages and cold meats, breakfast cereals, crisps, soups and margarine.
- Use herbs to flavour food instead of salt, aromat and stock cubes.

12. IF YOU DRINK ALCOHOL DRINK SENSIBLY

Why should you drink alcohol sensibly?
Alcohol contributes to weight gain and is often linked to serious health problems and diseases including bowel cancer, high blood pressure, stroke and liver disease.
Alcohol may also impair your judgement, which can increase the risk of falls.
Drinking alcohol while on medication can cause drowsiness and also affect how effectively the medication works in your body.

Practical application:

- Restrict alcohol intake to special occasions only. And limit your intake to a maximum of 1 tot of hard liquor or 1 glass of wine or 1 beer (355ml) a day for elderly women, and a maximum of 2 drinks a day for men.
- Avoid alcohol while on medication.

13. EAT CLEAN AND SAFE FOOD

What is clean and safe food?
Clean and safe food is food that is safe to eat without getting sick for example, food that has not spoilt and is not stale. It is important to check the 'sell by' and 'use by' dates on food packaging. Food safety means handling, preparing and storing food or drink in such a way that the risk of people getting sick from food-borne diseases such as food poisoning is reduced.

Why is it important to eat clean and safe food?

- Eating food that is not clean can cause diseases such food poisoning and tapeworms

Practical application:

- Wash your hands thoroughly with soap and water before handling food.
- Store raw and cooked foods separately.
- Cook foods such as pork thoroughly so that any unseen germs can be killed by the heat.
- Check and monitor expiry dates on all foods including perishables
- Wash all fruits and vegetables before use to wash away pesticides.
- Keep foods that need to be kept cold in the fridge.
- Keep insects and pests away from food preparation areas.
- Store food such as flour, rice and mealie -meal in sealed containers not on the floor.
- Separate meat and their juices from other food when shopping.

FIRST AID TIPS RELEVANT TO ELDERLY

The elderly can suffer serious injuries from falls, bleeds and burns that would be slight in a younger person. Response to medical emergency may not be as usual and can deteriorate very fast.

Following are the first aid tips that can be applied relevant to the elderly:

- Identify common hazards and take precautions to prevent possible injuries
- Understand how ageing affects the body and the effects of common prescription medication and illnesses on the response to trauma.
- Calmly approach any injury of medical emergency
- Assess the severity of the situation
- Quickly prioritise and identify whether there are any life-threatening injuries
- Reassure the casualty and treat the most urgent issues
- Seek medical advice or call an ambulance if necessary

USEFUL CONTACT NUMBERS

National Department of Health (Switchboard) / www.health.gov.za:	012 395 8000
Ambulance:	10177
Alcoholics Anonymous:	086 143 5722
National Counselling Lines:	086 132 2322
Gender Based Violence:	080 001 2322/ 080 015 0150
South African Depression and Anxiety Group:	080 056 7567
AIDS Helpline:	080 001 2322
Diabetes South Africa:	086 111 3913
Department of Social Development:	086 037 4537
SASSA:	012 400 2000/ 080 060 1011

South African
ELDERLY FOOD BASED DIETARY GUIDELINES

Annexure O: isiXhosa translated nutrition education poster

Annexure P: isiXhosa translated nutrition education booklet

UMNIKAZI WALE NCWADI NGU:

Igama: _____

Inombolo yomnxeba: _____

Idilesi: _____

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NOTES:

INTSHAYELELO

Ukutya okusempilweni kuhlala kubandakanya ukutya okunezakha-mzimba kuwo onke amaqela aphambili okutya, aquka i-lean protein ezifana nenkuku, amaqanda kunye nentlanzi, iinkozo ezifana nerayisi emdaka, i-maizemeal, ingqolowa kunye nesonka esiphekwe ngamanzi, amafutha asempilweni afana neoyile ye-olive, amantongomane, iavokhado kunye ne-canola oyile, kwakunye neziqhamo kunye nemifuno enemibala emininzi enje ngeeorenji, iiapile, amapere, ikhaphetshu, ispinach neminqatha.

Ukutya ngendlela esempilweni kukwathetha ukukhetha izidlo ezinesondlo endaweni yokutya ukutya okunamafutha atshintshisiweyo (trans-fats), kwakunye neetyuwa neeswekile ezongezeleliweyo.

Nceda uqaphele, imizekelo yokutya okuqulethe i-trans fats, kunye netyuwa neswekile ezongeziweyo kunye nezidlo ezisempilweni ezinokuzibambela ziqulathiwe kumxholo wale ncwadana.

Ukutya okusempilweni kunembuyekezo ezininzi ebandakanya ukwakha amathambo omeleleyo, ukunceda ukunciphisa ubunzima bomzimba, ukukhusela kwizifo ezinje ngezifo zentliziyo,

ukukhusela izifo ezifana neswekile, uxinzelelo lwegazi, ukunciphisa umngcipheko womhlaza, ukonyusa imood, ukuphucula inkumbulo kunye nokulala ubusuku obuhle.

Le ncwadana ijonge ekufundiseni ngemigaqo eli-13 yokutya yabantu abadala. Ichaza ngokuthe vetshe ukuba umqaqo ngamnye uthetha ukuthini, kutheni kubalulekile ukuzalisekisa okuyalelwa ngumgaqo ngamnye. Le ncwadana ikwanikezela ngeendlela apho le migaqo ingazalisekiswa ngakhona, ezonga imali, ezilula nezifikelelelayo kwakunye nezibonakalayo kubomi bemihla ngemihla.

1. YONWABELA IINTLOBO ZOKUTYA OKUNESONDLO

Yintoni ukutya okunesondlo?
Ukutya okunesondlo ziindidi ezahlukeneyo zokutya okunika umzimba wakho izondlo ozifunayo ukuze ube nempilo entle, kukwenza uzive wonwabile kwaye kukunike amandla.
Ukutya okunezondlo kufuneka kuquke istatshi, imifuno, iziqhamo, iimveliso zobisi kunye neeprotheni ngo hlobo leembotyi, amaqanda, intlanzi, okanye inyama.

Kutheni kufuneka utye iintlobo ngeentlobo zokutya okunesondlo?

- Ukutya iintlobo ngeentlobo zokutya okunesondlo yindlela yokunceda umzimba wakho uhlale womelele kwaye usempilweni.
- Kunika umzimba wakho amandla owadingayo ukwenza imisebenzi yemihla ngemihla
- Kunceda ukuba ube ngcono ngokukhawuleza ekuguleni nakwizifo.

Unokumelana njani nokutya iintlobo ngeentlobo zokutya okunesondlo?

- Yiba nokutya okunemibala eyahlukeneyo kwisidlo sakho, njengenyama emhlophe efana nenkukhu okanye intlanzi, isipinatshi esiluhlaza, i-beetroot ebomvu, ithanga eli-orenji kunye nerayisi emdaka.
- Yitya iintlobo ngeentlobo zokutya imini yonke kwiqela ngalinye lokutya
  - > I-5-6 servings yemifuno okanye iziqhamo
  - > liservings ezi-2 zesitashi
  - > liservings ezimbini zenyama, inkukhu, intlanzi okanye iimbotyi
  - > liservings ezimbini zemveliso zobisi ezifana nobisi, icheese okanye amasi.



2. ZILOLONGE

Yintoni ukuzilolonga?
Ukuzivocavoca umzimba nguwo nawuphi na umsebenzi obandakanya intshukumo yomzimba kwaye ukwenza ubile ukwakwenza nentliziyo ibethe ngokukhawuleza, njengokwenza imisebenzi yasekhaya, ukuhamba ngokukhawuleza, ukudlala imidlalo efana ne-bowling okanye igalufa kunye nezinye izinto zokuzonwabisa.

Kutheni kufuneka wenze uzilolonga

- > Ukugcina ubunzima bomzimba obuphilileyo.
- > Xa usenza uzilolonga umzimba wakho uyakwazi ukulwa izigulo kunye nezifo.
- > Ukuzilolonga kukhulula uxinzelelo lwengqondo kwaye kukugcina wonwabile.
- > Ukuzivocavoca umzimba kunciphisa umngcipheko wokonzakala nokunokubangela ukwaphuka kwamathambo.

Ungazilolonga njani ngakumbi?

- > Hamba uhambo lwemihla ngemihla ebumelwaneni
- > Sebenza igadi
- > Yenza imisebenzi yasekhaya enjengokuhlamba iimpahla, ukutshayela, ukukorobha nokucoca ngokubanzi.
- > Thatha inxaxheba kwezemidlalo ozithandayo ezifana ne-bowling, ibhola yomnyazi, igalufa okanye ibhola ekhatywayo.
- > Ukuba usenakho, joyina umthambo okanye iklasi yokuzigcina usemandleni kwaye wenze imithambo ye-aerobic.

3. UKUTYA OKUNESITATSHI OKUPHEZULU KWIFIBRE, NGOKOMLINGANISELO OFANELEKILEYO, KUFANELE KWENZE INXALENYE YEZIDLO

Kokuphi ukutya okunesitatshi okuphezulu kwifayibha?
Oku kukutya okunesitatshi okuqulethe ifayibha, okufana nesonka esimdaka ngebala, isonka somgubo wengqolowa esiphekiweyo, amadombolo engqolowa, umgubo wombona, ipasta yengqolowa, irayisi emdaka, icouscous, iitapile, all-bran, oats kunye nezinye iinkozo ezifana ne-rye kunye ne rhasi (barley)

Kutheni le nto ukutya okunesitatshi okuphezulu kwifayibha kufuneka kube yinxalenye yokutya kwakho?

- Ukutya okunesitatshi kuyadingwa ngumzimba wakho ukuze ube namandla kwaye kukugcine uhluthi ixesha elide.
- Ukutya okunesitatshi okuphezulu kwifiber kunika umzimba wakho ifayibha oyidingayo ukuze uhlale usempilweni.

Ungazifaka njani iinxalenye zestatshi ekutyeni kwakho?

- Yitya i-jungle oats, isidudu samabele okanye ii all-bran flakes kwisidlo sakusasa
- Yiba nentwana yesitatshi esifana nesonka esimdaka ngebala, irayisi emdaka, iitapile okanye iphutu ngexesha lesidlo sasemini kunye nedinala.
- Khetha istatshi esinefayibha eninzi esifana nerayisi emdaka kunye nesonka esimdaka okanye sengqolowa.
- Yitya iitapile nesikhumba sazo
- Yenza utshintsho ngqo – sebenzisa irayisi emdaka endaweni yerayisi emhlophe, isonka esimdaka endaweni yesonka esimhlophe, ipasta yengqolowa endaweni yepasta emhlophe, kwaye usebenzise umgubo wengqolowa ukupheka isonka esibilisiweyo kunye namadombolo.

4. YITYA IZIQHAMO NEMIFUNO ENEMIBALA EYAHLUKENEYO IMIHLA NGEMIHLA

Ithetha ukuthini intaba lala yeziqhamo nemifuno?

- Yitya i-5-6 yezahlulo zeziqhamo ezahlukeneyo kunye nemifuno ngosuku

Kutheni kufuneka utye iziqhamo kunye nemifuno eninzi?

- Iziqhamo kunye nemifuno zinika umzimba wakho izakha mzimba ezifunekayo ekukhuleni nasekulungiseni; umzekelo, ukutya imifuno emthubi neorenji kunokunceda ekuphuculeni amehlo akho.
- Ukutya iziqhamo kunye nemifuno kunceda umzimba ukulwa nezifo; umzekelo, ukutya iziqhamo zesitrasi ezifana neorenji, i-naartjies kunye ne-grapefruit zikunika i-vitamin C olwa ingqele kunye nomkhuhlane.
- Iziqhamo kunye nemifuno etyiwa namaxolo (ama-apile, amapere, iitapile, ibhatata) zinika umzimba ifayibha ukugcina inkqubo yakho yokwetyisa isebenza kakuhle.

Ungazitya njani iziqhamo nemifuno emininzi yonke imihla?
Cwangcisa izidlo zakho ziquke iintlobo ngeentlobo zemifuno enemibala eyahlukeneyo

- Pheka imifuno ngomphunga (steam) ukuze ithambe kwaye kube lula ukuyihlafuna; le ndlela ikwanceda nasekugcineni izakha mzimba
- Yitya iziqhamo ezisikiweyo okanye imifuno efana nemelon, cucumber, celery okanye itumata njengesnacks phakathi kwezidlo.
- Yongeza izilayi okanye amaqhekeza eziqhamo ezifana nebhanana, ipayinapile okanye amaqunube kwisidlo sakusasa okanye iicereals.
- Sika iziqhamo kunye nemifuno yakho ibe ngamaqhekeza alingana nokuluma ukwenza kube lula ukutyiwa.
- Yenza isuphu ngemifuno eyahlukeneyo njengoko igcwalisa kwaye kulula ukuyidla.
- Bandakanya imifuno exutyiweyo egcinwa emkhenkceni xa upheka inyama kunye nezitya zentlanzi ezifana nekheri kunye nesityu
- Yiba nesitiya semifuno ukuze uzikhulisele imifuno enjenge, ispinatshi, ikhaphetshu, umnqathe, ubeetroot, iiertyisi, umnqathe, iletisi, ithanga kunye neetapile. Ukukhulisa imifuno yakho akuqinisekisi nje ukuba ufumana ukutya imifuno yakho imitsha, kodwa kukwa kongela imali yaye kuncedisa ukukulolonga.

YITYA IIMBOTYI EZOMILEYO, I-ERTYISI, IILENTILE KUNYE NESOYA RHOQO

Kuthetha ukuthini ukutya iimbotyi ezomileyo, ii-ertyisi, iilentile kunye nesoya rhoqo?
Yitya iikomityi ezi-3 ukuya kwezi-4 zeentlobo zeembotyi – iimbotyi zeswekile, iimbotyi zejugo, iimbotyi ezibomvu ezinamachokoza, ii-ertyisi kunye neembotyi zesoya ngeveki.

Kutheni kufuneka utye iimbotyi ezomileyo, uhlukanise ii-ertyisi kunye nesoya rhoqo?
Iimbotyi ezomileyo, ii-ertyisi ezicandiweyo, iilentile kunye neembotyi zesoya zinesondlo kwaye zinexabiso eliphantsi endaweni yenyama.

> Iindidi ezahlukeneyo zeembotyi zinceda ukwakha umzimba ngaphandle kwamafutha afumaneka enyameni.
> Iimbotyi, iilentile kunye nesoya zinefayibha ezikwenza uzive uhluthi ixesha elide kwaye zikugcina udlamkile, zithintela ukuqhinwa okuhlala kuchaphazela abantu abadala.
> Ukutshintsha inyama ngeembotyi kukunceda ugcine ubunzima obunempilo kunye nenqanaba le-cholesterol enempilo

Ungazifaka njani rhoqo iimbotyi, iiertyisi, iilentile kunye neembotyi zesoya kwizidlo zakho?
Zicwilise iimbotyi phambi kokuba uzipheke ukunciphisa ixesha lokupheka, ungawasebenzisi amanzi ebezifakwe kuwo.

> Pheka izixa ezikhulu zeembotyi ngexesha njengoko zinokugcinwa ngokukhuselekileyo efrijini malunga neentsuku ezi-5 okanye uthenge iimbotyi ezinkonkxiweyo.
> Iimbotyi zesoya kunye neemveliso zesoya ezahlukeneyo ziyayithatha indawo yeprotheyini.
> Yitya iimbotyi, ii-ertyisi kunye nelentile njengeesaladi nakwisuphu, isityu kunye nekheri.
> Iimbotyi ezinkonkxiweyo kunye nee-ertyisi sele ziphekiwe kwaye zilungele ukusetyenziswa ukonga ixesha
> Ukwahluka kwisidlo sakho kunokufezekiswa ngokutshintshela olunye uhlobo lwembotyi nolunye ngokufanayo iresiphi; umzekelo, endaweni yeembotyi zezintso ezibomvu emngqushweni sebenzisa imbotyi yebhotolo

6. SELA OKANYE UTYE UBISI, AMASI, IITSHIZI OKANYE IYOGUTHI YONKE IMIHLA

Kuthetha ukuthini ukusela nokutya ubisi, itshizi, iyogathi kunye neemasa yonke imihla?
Yitya okanye usele iimveliso zobisi ezi-3 yonke imihla, umzekelo, ubisi kunye nesidudu sakho okanye i-cereal, itshizi kwisandwich yakho, iyogathi njengesnack. I-25ml yobisi kwiti okanye ikofu yakho ayonelanga.

Kutheni kubalulekile ukusela okanye ukutya ubisi kunye neemveliso zobisi yonke imihla?
Ubisi kunye neemveliso zobisi zinekhalsiyam edingwa ngumzimba ukwakha nokugcina amathambo namazinyo omelele, zithintele ukophuka kwaye zincede ekuphileni kwamathambo.

Ungalufaka njani ubisi kunye neemveliso zobisi ekutyeni kwakho?

- Yongeza ubisi endaweni yamanzi xa usenza isidudu sakusasa
- Yiba nezilayi zetshizi kwisandwich yakho okanye uyitye nje njenge-snack.
- Sela iglasi yobisi yonke imihla
- Yitya imaas kunye nephutu njengesidlo.
- Yongeza ubisi kwiisosi ezifana ne-macaroni cheese sauce
- Yiba neyogathi okanye ubisi kunye nesidlo sakho sakusasa.
- Ukuba ubisi lukunika isisu esibalekayo sebenzisa ezinye iindlela zezityalo ezifana nobisi lwekhokhonathi, ubisi lwe-almond, ubisi lwesoya okanye ubisi olungenayo lactose.

7. SELA AMANZI ACOCEKILEYO, AKHUSELEKILEYO KUNYE/OKANYE NEZINYE IZIGUNGU IMINI YONKE NOXA ANGAZIVA UNXINWE

Kuthetha ukuthini ukusela amanzi nokuba awunxanwanga?

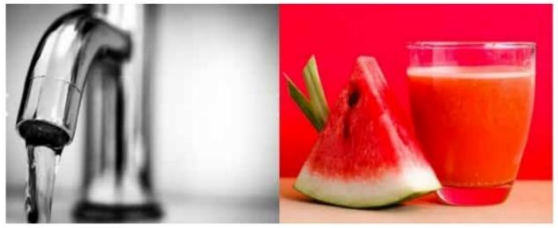
- Sela iiglasi zamanzi ezisi-8 yonke imihla.
- Amanzi akhuselekileyo ngamanzi akhuselekileyo ukuze asetyenziswe ngabantu (amanzi okusela); ukuba awuqinisekanga ukuba amanzi akhuselekile ukuba angaselwa, qala uwabilise wandule ukuwapholisa amanzi phambi kokuba uwasele okanye wongeze itispuni yeblitshi kwilitha nganye yamanzi .

Kutheni kufuneka usele amanzi amaninzi?

> Umzimba wakho udinga amanzi ukuze usebenze kakuhle kwaye uvelise amathe emlonyeni, umchamo kunye nokufuma emehlweni.
> Ukuba umzimba wakho awufumani manzi aneleyo unokuswela amandla okwenza imisebenzi yemihla ngemihla.
> Ukuba umzimba wakho awufumani manzi aneleyo unokugula rhoqo kwaye kulula ngakumbi, umzekelo, unokuqaqanjelwa yintloko.

Iindlela onokwenza ngazo ukuze usele amanzi awoneleyo mihla yonke

> Sela amanzi ngaphambi nasemva kokuthatha iyeza.
> Phatha amanzi ngebhotile okanye kwisikhongozeli ukuze afikeleleke lula.
> Sela amanzi endaweni yemixube ezineswekile, i-oros okanye iziselo ezihlwahlwazayo ekhaya ngoku njalo xa usitya ngaphandle.
> Yongeza isilayi selamuni okanye esinye isiqhamo esifana nevatala okanye iorenji emanzini ukuphucula incasa nokwenza kube mnandi ukusela.
> Wabilise, wandule ukuwapholisa amanzi ukuqinisekisa ukuba kukhuselekile ukuwasela .
> Amanzi etephu aseMzantsi Afrika kukhuselekile ukuwasela.



8. SEBENZISA UKUTYA NEZISELELO EZINESWEKILE ENINZI NGONONOPHELO

Kokuphi ukutya neziselo ezineswekile eninzi?

- Oku kukutya kunye neziselo ezifakwe iswekile kuzo ezifana neziselo ezihlwahlwazayo ezibandayo, imixube eziswiti ezifana ne-OROS, iijusi zeziqhamo, iziselo zezemidlalo, ubisi olunencasa, ikofu enencasa, iti epholisiweyo ethengiweyo, isuphu esenziwe kwangaphambili kunye neesuphu ezithengwayo, iziqhamo ezinkonkxiweyo, iziqhamo ezinkonkxiweyo kwiijusi zeziqhamo kunye nesmoothies.
- Ukuyisebenzisa ngononophelo kuthetha ukusebenzisa intwanana kwezi zidlo neziselo zineswekile eninzi.

Kutheni le nto kufuneka usebenzise oku kutya neziselo ngononophelo ?

Ukutya okuphezulu kwiswekile kukubeka emngciphekweni wokutyeba kakhulu kunye nezigulo ezifana noxinzelelo lwegazi kunye nesifo seswekile
Ukutya iswekile eninzi kunokukhokelela kwiingxaki zamazinyo njengokubola kwamazinyo.
Iindlela onokwenza ngazo ukuze utye ukutya neziselo ezineswekile ngononophelo

- Sela amanzi endaweni yemixube eneswekile njenge-oros, iziselo ezihlwahlwazayo kunye neziselo zemidlalo, unokongeza iziqhamo ezisikiweyo emanzini akho ukuze ufumane incasa engcono.
- Sela amanzi endaweni yejusi yeziqhamo.
- Sebenzisa ubusi okanye izincasanisi endaweni yeswekile kwi kofu ne-ti yakho.
- Yitya ii-weet-bix zengqolowa, amabele kwakunye nesidudu sombona kwizidlo zakusasa endaweni yee siriyeli ezithengwa sele zineswekile ezifana nee cornflakes, rice crispies, cocoa pop.
- Kuphephe ukufaka iswekile kwimifuno efana neekherothi kunye nethanga
- Nciphisa indlela otya ngayo iipastries, iibhiskithi, iilekese, i-ayisikrimu, iitshokolethi kunye nezimuncumuncu ngezihlandlo ezikhethekileyo.
- Tyeshela ukusebenzisa i-jam ngokufaka endaweni yayo intlama yentlanzi, itshizi okanye ibhotolo yamandongomane.

9. SEBENZISA AMAFUTHA NGOKUNGQINGQIWEYO; KHETHA IIOYILE ZEMIFUNO KUNAMAFUTHA AQINILEYO

Amafutha aqinileyo
La ngamafutha agayiweyo athi aqine kwiqondo lobushushu begumbi. Afumaneka ekutyeni okugayiweyo okufana ne-bhotolo, salad dressing, amakram-kram (crisps), iibhiskitsi kunye nakwisikhokho se pie. Kuphephe oku njengoko amafutha aqinileyo anokunyusa i-cholesterol yakho, ngako oko watye kancinci kangangoko unako.

Yintoni amafutha emifuno kwaye kutheni amafutha kufuneka asetyenziswe ngononophelo?
Amafutha emifuno kufuneka asetyenziswe endaweni yamafutha ezilwanyana. Amafutha emifuno ngawo nawaphi na amanqatha okanye i-oyile evela kwizityalo imizekelo yibhotolo yamandongomane, i-oyile ye-olive, i-oyile yekhokhonathi, i-oyile kajongilanga kunye ne-oyile yeediliya. Amanqathe kunye namafutha asetyenzisiweyo kufuneka angabi ngaphezu kweetipuni ezi-5 ngosuku kuba amanqatha amaninzi anyusa umngcipheko wokwanda kobunzima bomzimba, i-cholesterol ephezulu kunye nokuqala kwezifo ezingapheliyo.

Iindlela ongasebenzisa ngazo amafutha ngomnonophelo

- Endaweni yeemveliso zobisi ezityebileyo kumafutha sebenzisa iimveliso zobisi ezinamafutha aphantsi
- Sebenzisa ibhotolo enamafutha aphantsi endaweni yebhotolo enamafutha aphezulu.
- Sebenzisa i-salad dressing nemayoneyzi ezinamafutha aphantsi endaweni yesalad dressing nemayoneyzi ezinamafutha aphezulu.
- Yitya inkukhu ngaphandle kwesikhumba, kwaye unqumle amanqatha abonakalayo kwinyama yenkomo, ihagu kunye nenkukhu phambi kokuba uzipheke.
- Sebenzisa iindlela zokupheka ezinje ngoku rosta kwi-oveni, ukufuthisa, nokubilisa endaweni yokuqhotsa emafutheni.
- Nciphisa ukutya okukhawulezayo kunye nokutya okucoliweyo kube kanye ngeveki okanye ungakutyi konke-konke.
- Sebenzisa intlanzi ezinamafutha ezifana ne-mackerel, i-salmon, i-herring okanye i-sardines kwizidlo ezimbalwa ngevekini endaweni yenyama ebomvu okanye inyama yenkukhu.
- Faka endaweni yamafutha aqinileyo kubushushu begumbi (amafutha aqinileyo) njengebhotolo, amanqatha enyama yenkomo, amanqatha enkukhu, i-ghee, amafutha enyama kunye nebhotolo i-oli yemifuno efana ne-oli ye-sunflower kunye ne-oli ye canola.

10. QUKA INTLANZI, INKUKHU, INYAMA ENGATYEBANGA KWIZIDLO EZININZI

Ezi ziinyama ezinamafutha aphantsi.

Kutheni le nto kufuneka udibanise ezi nyama kwizidlo ezininzi?

- Amafutha aphantsi kwezi nyama anceda ukugcina amanqanaba e-cholesterol emzimbeni ephantsi
- Amafutha aphantsi anciphisa umngcipheko wesifo senhliziyo kunye nezinye izifo ezinganyangekiyo
- Amafutha aphantsi akwakunceda ukuba ugcine ubunzima bomzimba obunempilo.

Iindlela esempilweni onokuquka ngayo ezi nyama kwizidlo zakho

- Ngaphambi kokupheka, susa cwecwa amanqathekwinyama ye-hagu, khetha inyama yenkomo ebhityileyo kwaye uxobule isikhumba kwinkukhu.
- Yibilise okanye uyifuthise intlanzi endaweni yokuyiqhotsa emafutheni
- Grilla, futhisa okanye uyibhake kwi-oveni inyama yakho endaweni yokuyiqhotsa, yaye ungongezi amafutha.
- Sebenzisa ii-herbs kunye neziqholo ukunika inyama yakho kunye nenkukhu incasa.
- Xa ugcada inyama okanye inkukhu, yibeke kwi-rakhi yentsimbi engentla kwepani yokugcada ukuze amanqatha athontsize.
- Amaqanda ayafikeleleka kwaye aneprotheyini eninzi. Bilisa okanye untywizise emanzini abilayo amaqanda kwaye uwasebenzise endaweni yenyama.

11. SEBENZA ITYUWA, IZINONGO ZETYUWA, KUNYE NOKUTYA OKUPHEZULU KWITYUWA NGONONOPHELO

Kutheni le nto ityuwa nezinongo kufuneka zisetyenziswe ngononophelo?
Ipakethe yesuphu, umgubo wegravy kunye nenyama egayiweyo efana nepolony, ham kunye neesoseji zonke ziqulathe ityuwa eyongezelelweyo. Ityuwa kufuneka isetyenziswe ngononophelo kuba ityuwa eninzi inokunyusa ingozi yoxinzelelo lwegazi kunye ne-stroke.

Iindlela onokusebenzisa ngazo ityuwa, izinongo kunye nokutya okuphezulu kwityiwa ngononophelo

- Nciphisa izinga letyuwa oyigalelayo ngexesha upheka
- Ityuwa mayingabikho etafileni ngexesha lokutya
- Nciphisa ukutya okunetyuwa eyongeziweyo, okufana nesonka, iipayi, iisoseji kunye nenyama ebandayo, iicereals zakusasa, amakramkram, isuphu kunye nebhotolo.
- Sebenzisa ii-herbs ukuncasanisa ukutya endaweni yetyuwa, i-aromat kunye ne-stock cubes

12. UKUBA UYABUSELA UTYWALA, BUSELE NGENGQIQO

Kutheni kufuneka usele utywala ngengqiqo?

- Utywala bunegalelo ekongezeleleni ubunzima bomzimba kwaye buhlala bunxulunyaniswa neengxaki ezinzulu zempilo kunye nezifo ezibandakanya umhlaza wamathumbu, uxinzelelo lwegazi oluphezulu, i-stroke kunye nesifo sesibindi.
- Utywala bunokuphazamisa indlela obona ngayo, nto leyo enokonyusa umngcipheko wokuwa.
- Ukusela utywala ngelixa usebenzisa amayeza kunokubangela ukozela kwaye kuchaphazela indlela asebenza ngayo amayeza emzimbeni wakho.

Indlela onokusela ngazo utywala ngengqiqo

- Nciphisa utywala ngezihlandlo ezikhethekileyo kuphela kwaye unciphise ukusela kwakho ukuya kuthi ga kwi-tot enye yotywala obuqinileyo okanye iglasi e-1 yewayini okanye ibhiya e-1 (355ml) ngosuku kwabasetyhini abasele bekhulile, kunye nobuninzi beziselo ezi-2 ngosuku kumadoda.
- Kuphephe ukusela utywala xa usebenzisa amayeza.

13.YITYA UKUTYA OKUCOCEKILEYO OKUKUKHUSELEKILEYO

Yintoni ukutya okucocekileyo ngokukhuselekileyo?
Ukutya okucocekileyo nokukhuselekileyo kukutya okukhuselekileyo ukuba kungatyiwa kungakugulisi, umzekelo, ukutya okungonakalanga nokungekho kudala. Kubalulekile ukujonga isingxobo sokutya ukukhangela usuku ekufanele ukuba kube kuthengiswe okanye kutyiwe ngako oko kutya.

- Ukhuseleko lokutya luthetha ukuphatha, ukulungisa nokugcina ukutya okanye iziselo ngendlela yokuba unciphise umngcipheko wokuba abantu bagule ngenxa yezifo ezibangelwa kukutya ezifana netyhefu ekutyeni.

Kutheni kubalulekile ukutya ukutya okucocekileyo ngokukhuselekileyo?
Ukutya ukutya okungacocekanga kunokubangela izifo ezifana netyhefu ekutyeni kunye nee ntshulube.

Iindlela onokuthi utye ngazo ukutya okucocekileyo nokukhuselekileyo

- Hlamba izandla zakho kakuhle ngesepha namanzi phambi kokuba uphathe ukutya
- Gcina ukutya okukrwada nokuphekiweyo ngokwahlukeneyo.
- Pheka ukutya okufana nenyama yehagu ngokucokisekileyo ukuze naziphi na iintsholongwane ezingabonakaliyo zibulawe bubushushu.
- Jonga kwaye ubeke iliso kwimihla yokuphelelwa kuko konke ukutya kubandakanywa nokutya okonakala msinya.
- Hlamba zonke iziqhamo kunye nemifuno phambi kokuba uyisebenzise ukuhlamba amayeza okubulala izitshabalalisi
- Gcina ukutya okufuneka kugcinwe kubanda kwisikhenkcezisi
- Gcina izinambuzane kunye kude neendawo zokulungiselela ukutya
- Gcina ukutya okufana nomgubo wombona irayisi kunye nomgubo wokuxova kwizikhongozeli ezivalwayo zingagcinwa zihleli phantsi.
- Yahlula inyama kunye nejusi yazo kokunye ukutya xa uthenga.

IINGCEBISO ZONCEDO LOKUQALA OLUFANELEKILEYO KUBANTU ABADALA

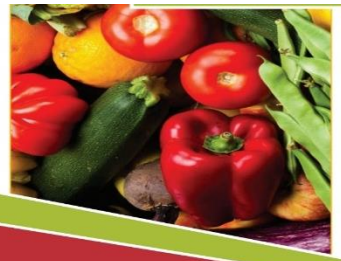
Abantu abadala banokwenzakala kakhulu ngenxa yokuwa, ukopha kunye nokutshisa okunokungabi na msebenzi kubantu abancinci. Unyango olungxamisekileyo lusenokungasebenzi ngokukhawuleza nje ngesiqhelo yaye isimo sononzakala sisenokuya siba sibi ngokukhawuleza kunendlela eqhelekileyo.

Oku kulandelayo ngamacebiso oncedo lokuqala anokusetyenziswa ngokufanelekileyo kubantu abadala:

- Qaphelisisa izinto okanye iimeko eziqhelekileyo ezinokubangela ukonzakala kwaye uthathe amanyathelo okuthintela ukwenzakala okunokwenzeka
- Qonda indlela ukuguga okuwuchaphazela ngayo umzimba kunye nemiphumela yamayeza aqhelekileyo achazwe ngugqirha kunye nezifo kwimpendulo yokwenza Kala nezigulo ezinokubangelwa kukugula
- Hlangabezana nako ngokuzola nakuphi na ukulimala ukudinga unyango olukhawulezileyo
- Vavanya ubuzaza bemeko
- Khawuleza ubeke phambili kwaye uchonge ukuba kukho nakuphi na ukulimala okusongela ubomi
- Qinisekisa ixhoba kwaye uphathe eyona miba ingxamisekileyo
- Funa iingcebiso zonyango okanye ufowunele inqwelo yezigulana ukuba kuyi mfuneko

IINOMBOLO ZOQHAGAMSHELWANO EZILUNCEDO

National Department of Health (Switchboard) / www.health.gov.za:	012 395 8000
Ambulance:	10177
Alcoholics Anonymous:	086 143 5722
National Counselling Lines:	086 132 2322
Gender Based Violence:	080 001 2322/ 080 015 0150
South African Depression and Anxiety Group:	080 056 7567
AIDS Helpline:	080 001 2322
Diabetes South Africa:	086 111 3913
Department of Social Development:	086 037 4537
SASSA:	012 400 2000/ 080 060 1011



IZIKHOKELO ZOKUTYA KWABADALA EMZANTSI AFRIKA

Annexure Q: seSotho translated nutrition education poster

Annexure R: seSotho translated nutrition education booklet

DITATAISO TSA DIJO TSA MAQHEKU TSA AFRIKA BORWA

BUKANA ENA E IKARABELLA HO:

Lebitso: _____

Nomoro ya mohala: _____

Aterese: _____

_____

NOTES:

SELELEKELA

Dijo tse phetseng hantle hangata di kenyelletsa dijo tse nang le dimatlafatsi tse tshwanang le protheine e omeletseng jwalo ka dikgoho, mahe, le tlhapi, dijo-thollo tse felletseng jwalo ka raese e sootho, dijo-thollo tsa koro e felletseng le bohobe bo fufutsweng, mafura a phedisang hantle jwalo ka oli ya mohlware, matokomane, avocado le oli ya canola, le ditholwana le meroho ya mebala e mengata jwalo ka dilamunu, diapole, dipere, khabeche, sepinichi le dihwete ka di kgetho tse matlafatsang haholonyane.

Ho ja dijo tse matalafatsang ho nka sebaka sa dijo tsenang le mafura, tswekere e ekeditsweng, le tse ding. Kakopo hlokomela, mehlala ya dijo tsenang le mafura, letswai le kentsweng le tswekere e ekeditsweng hammoho le tse ding tse phetseng hantle di fanwe ka hara bukana ena.

Dijo tse phetseng hantle dina le melemo e mengata jwalo ka ho aha masapo a matlafetseng, phokotso ya mmele, ho serelletsa pelo kgahlanong le mafu a pelo a amang methapo ya pelo, ho thibela mafu a kang lefu la tswekere, stroke, kgatello ya maikutlo, phokotso ya kotsi ya mofetshe, ho eketsa maikutlo, ho ntlafatsa mohopolo le ho robala hantle bosiu.

Bukana ena e shebana le tataiso ya dijo ya batho ba hodileng ya 13 e hlalosang dijo, e hlalosa hore na tataiso e ngwe le e ngwe e bolelang, hobaneng ho le bohlokwa ho e sebedisa le ho fana ka mekgwa eo ka yona ditataiso di ka sebediswang ha molemo, ka theko e tlase le ka mokgwa o sebetsang bophelong ba letsatsi le letsatsi.

1. NATEFELWA KE MEFUTA E FAPANENG YA DIJO TSE MATLAFATSANG

Dijo tse matlafatsang ke eng?

- Dijo tse matlafatsang ke mefuta e fapaneng ya dijo tse fang mmele wa hao dimatlafatsi tseo o di hlokang bakeng sa bophelo bo botle, di o etsa hore o ikutlwe motlotlo mme ona le matla.
- Dijo tse matlafatsang di lokela ho kenyelletsa setache, meroho, ditholwana, dihlahiswa tsa lebese le diprotheine ka mokgwa wa dinawa, mahe, tlhapi kapa nama.

Hobaneng o lokela ho ja mefuta e fapaneng ya dijo tse matlafatsang?

- Ho ja mefuta e fapaneng ya dijo tse matlafatsang ke tsela ya ho thusa mmele wa hao hore o dule o le matla o bile o phetse hantle.
- Di fa mmele matla ao e a hlokang ho ntshetsa mesebetsi ya letsatsi pele.
- Di thusa hore o fole ka pele ho kuleng le mahlokong.

O ka kgona jwang ho ja mefuta e fapaneng ya dijo tse matlafatsang?

- Eba le dijo tse mmala o fapaneng dijong tsa hao, jwalo ka nama e tshweu jwalo ka kgoho, kapa tlhapi, sepinichi se botala ba lefifi, beetroot e kgubedu, mokopu wa mmala wa lamunu le raese e sootho.
- E ja dijo tsa mefuta futa ka letsatsi, ho tswa sehlopheng ka seng sa dijo.
  - > Eleng meroho kapa ditholwana tse hlano ho isa ho tse tshelela.
  - > Setache tse pedi.
  - > Dijo tse pedi tsa nama, kgoho, tlhapi kapa dinawa.
  - > Dijo tsa lebese tse pedi jwalo ka lebese kapa chisi.

2. BOIKWETLISO

Bo ikwetlisa ke eng?

Bo ikwetliso ke ntho efe kapa efe ekenyang motsamao wa mmele mme e etsa hore o fufulelwe kapa utlwe pelo ya hao e otla kapele, jwalo ka ha o etsa mesebetsi ya lapeng, ho tsamaya ka potlako, ho bapala dipapadi tse kang bowling kapa kolofo le mesebetsi emeng ya boithabiso.

Hobaneng o lokela ho ikwetlisa?

- > Ho boloka boima bo phetseng hantle ba mmele.
- > Ha o ikwetlisa mmele wa hao o kgona ho lwantsha mahloko o hle.
- > Ho ikwetlisa ho imolla kgatello ya maikutlo ebile ho o boloka o thabile.
- > Ho ikwetlisa ho fokotsa dikotsi tse ka bakang ho robeha ha masapo.

O ka ikwetlisa ha holonyana jwang?

- > Tsamaya letsatsi le letsastsi sebakeng seo o ahileng hosona.
- > Etsa mosebetsi wa serapa.
- > Etsa mesebetsi ya lapeng e kang ho hlatswa diaparo, ho fiela, ho koropa le ho hlwekisa ka kakaretso.
- > Kenela dipapadi tseo o diratang tse kang bowling, kolofo, bolo ya matsoho, kapa bolo ya maoto.
- > Ha eba o ntse o kgona, kenela tlelase ya boikwetliso kapa o ipoloke ole hantle mme o ikwetlise mme o etse le di aerobics.

3. DIJO TSA SETACHE TSE NANG LE DITLHEFERETSI TSE NGATA, KA DIKAROLO TSE NYANE, DI LOKELA HO BA KAROLO YA DIJO

Dijo tsenang le setache le ditlheferetsi tse ngata ke eng?
Dijo tse nang le setache tse nang le ditlheferetsi tse ngata ke tsena tse kang bohobe bo sootho, bohobe bo felletseng ba koro, mafura a koro, koro, raese e sootho, ditapole, matlapi ohle le habore.

Ke hobaneng ha dijo tse nang le setache se nang le ditlheferetsi di le karolo ya dijo tsa Hao?

> Dijo tse nang le setache di hlokwa ke mmele wa hao hore di ofe matla le ho o boloka o kgotse nako e teletsana.
> Dijo tse nang le setache se nang le ditlheferetsi di fa mmele wa hao ditlheferetsi tseo o di hlokang ho o boloka ka tlwaelo.

O ka kenyelletsa di karolo tsa setache dijong tsa hao jwang?

> E ja di oats, motoho wa mabele kapa dijo thollo tsohle tsa Makala bakeng sa dijo tsa hoseng.
> E ba le karolwana ya setache e kang, bohobe bo sootho, raese e sootho, ditapole kapa phuthu ka dijo tsa motsheare le mantsibuwa.
> Kgetha dijo tse nang le ditlheferetsi tse ngata tse kang raese e sootho, bohobe bakoro e felletseng.
> E ja ditapole le letlalo.
> E tsa phaposo ka kotlololoho- sebedisa raese e sootho ho fapana le raese e tshweu, bohobe bo sootho ho fapana le bohobe bo bosweu, pasta e felletseng ya koro ho fapana le pasta e tshweu, mme o sebedise phofo ya koro efelletseng bakeng sa bohobe bo fufutsweng.

4. E JA DITHOLWANA LE MEROHO E MENGATA YA MEBALA E FAPANENG KA LETSATSI LE LETSATSI

Ho bolelwa eng ka ditholwana le meroho e mengata?

> E ja dikarolo tse hlano ho isa ho tse tshelela tsa ditholwana le meroho e fapaneng ka letsatsi.

Hobaneng o lokela ho ja ditholwana le meroho haholo?

> Ditholwana le meroho difa mmele wa hao lero la divithamini tseo di di hlokang bakeng sa kgo lo le tokiso, mohlala: ho ja meroho e mesehla le ya mmala wa lamunu ho ka thusa ho ntlafatsa mahlo a hao.
> Ho ja ditholwana le meroho ho thusa mmele ho lwantsha mafu, mohlala: ho ja ditholwana tse kang dilamunu, naartjies le grapefruit di fana ka vithamini C e lwantshang ntaramane le sefuba.
> Ditholwana le meroho tse jewang le letlalo jwalo ka diapole, dipere, patata le ditapole di fa mmele dithleferetsi ho thusa mmele wa hao ho silang dijo kgafetsa.

O ka kenyelletsa ditholwana le meroho e mengata jwang letsatsi le letsatsi?

- Rera dijo tsa hao ho kenyelletsa meroho e fapaneng ka mebala.
- Meroho e fufutsweng ho etsa hore e be bonolo ho hlafuna, mokgwa ona o boetse o boloka vithamini.
- E ja ditholwana tse dikotwana kapa meroho e kang mahapu, dikomkomere, celery kapa tama ti ele dijo tse pakeng tsa dijo.
- E ketsa dilae kapa dikotwana tsa ditholwana tse kang panana, phaenapole kapa setorobei pho rorong ya dijo tsa hoseng kapa dithollo.
- Kgaola ditholwana le meroho ya hao dikotwana tse lekaneng ho loma ho e tsetsa hore ho be bonolo ho dija.
- E tsa sopho ka meroho e fapaneng kaha e ntse e tlala ebile e le bonolo ho jewa.
- Kenyelletsa meroho e hadikilweng ha o pheha nama le dijana tsa tlhapi jwalo ka kheri le se chu.
- Ho lema meroho ya hao ha ho netefatse feela hore o ja meroho ya hao e hlwekileng, empa hape ho theko e tlase ebile ho o thusa ho ikwetlisa.

5. JA DINAWA TSE OMMENG, DIEREKISI TSE PETSOHILENG, LENTISI LE MO-HLABA KGAFETSA

Ho ja dinawa tse ommeng, dierekisi tse petsohileng, lentisi le mohlaba kgafetsa ho bolelenag?
Ja dikopi tse tharo ho isa ho tse nne tsa mefuta ya dinawa e leng dinawa tsa tswekere, dinawa tsa jugo, dinawa tse kgubedu tse nang le makgasi a matala, dierekisi tse petsohileng le dinawa tse sootho ka beke.

Hobaneng o lokela ho ja dinawa tse ommeng, dierekisi tse petsohileng le mohlaba kgafetsa?

> Dinawa tse ommeng, dierekisi tse petsohileng, lentisi le mohlaba ke dimatlafatsi e bile di the ko e tlase bakeng sa nama.
> Mefuta e fapaneng ya dinawa e thusa ho ntlafatsa mmele ntle le mafura a fumanwang na meng.
> Dinawa, lentisi le mohlaba di na le ditlheferetsi tse etsang hore o phele hantle nako e teletsa na mme di o boloka kgahlanong le ho soka ho ka amang batho ba baholo hangata.
> Ho kenya nama bakeng sa dinawa ho o thusa hore o be le boima ba mmele bo phetseng han tle le mafura a phetseng hantle a mmele.

O ka kenyelletsa dinawa tse ommeng, dierekisi tse petsohileng, lentisi le mohlaba kgafetsa jwang dijong tsa hao?

- Inela dinawa metsing pele o di pheha ho fokotsa nako ya ho pheha, o se ke wa sebedisa metsi a neng a inetse dinawa ha o di pheha.
- Pheha dinawa tse ngata nako ele ngwe kaha di ka bolokwa di bolokehile ka sehatsetsing mat satsi a ka bang mahlano, kapa o ka reka dinawa tse ka makotokoting
- Dinawa tse fapaneng tsa mohlaba ke phethoho entle ya protheini.
- Ja dinawa, dierekisi tse petsohileng, lentisi e le salate le sophong, sechu le dikheri.
- Dinawa le dierekisi tse kentsweng ka makotikoting di se di ntse di pehilwe mme di se di loke se ho sebediswa ho boloka nako
- Dijo tsa hao tse fapaneng di ka fihlellwa ka ho tlosa dinawa tsa mofuta o mong o sa fapaneng ka risepe le o mong, mohlala sebakeng sa dinawa tse kgubedu tsa diphio tse nang le setampo o ka sebedisa dinawa tsa botoro.

6. E NWA KAPA O JE LEBESE, CHISI KAPA YOKATE LETSATSI LE LETSATSE

Ho nwa le ho ja lebese, chisi, yokate letsatsi le letsatsi ho bolelang?
Ho ja kapa ho nwa dihlahiswa tsa lebese tse tharo ka letsatsi, mohlala, lebese le motoho kapa dijo thollo tsa hao, chisi ka samentjhisi, yokate e le seneke. Lebese la 25ml ka tee kapa kofi ya hao ha le a lekana.

Hobaneng ha ho le bohlokwa ho nwa kapa ho ja lebese le dihlahiswa tsa lebese letsatsi le leng le le leng?

> Dihlahiswa tsa lebese le lebese dina le calcium e hlokwang ke mmele ho aha le ho boloka masapo le meno a le matla, ho thibela ho robeha le ho thusa ka phodiso ya masapo

O ka kenyelletsa lebese le dihlahiswa tsa lebese dijong tsa rona jwang?

- Kenya lebese sebakeng sa metsi ha o pheha motoho wa hoseng.
- E ba le dilae tsa chisi ka hara sementjhisi sa hao kapa o se je e le seneke feela.
- Nwa kgalase ya lebese letsatsi le leng le le leng.
- Ja maas le phutu jwalo ka dijo.
- Kenya lebese ho disoso tse kang sopho ya macaroni le chisi.
- E nwa yokate kapa lebese le dijo thollo tsa hao tsa hoseng.
- Haeba lebese le ofa mala a hlephileng, sebedisa mefuta e meng ya dimela jwalo ka lebese la coconut, lebese la almond, lebese le se nang protheine ya lactose.

7. NWA METSI A HLWEKILENG, A BOLOKEHILENG KAPA DINO TSE DING KA LETSATSI LE HA O IKUTLWA O SENA LENYORA.

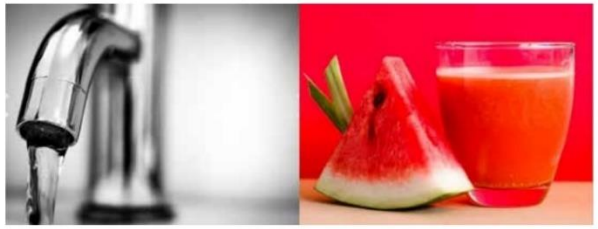
Ho bolelang ka ho nwa metsi le ha o sa nyorwa?
Nwa di kgalase tse robedi tsa metsi ka letsatsi.
Metsi a bolokehileng ke metsi a ka sebediswang ke batho (metsi a nowang), haeba o sena bo nnete hore metsi a bolokehile ho ka nowa, qala ka ho a bedisa ebe o a phodisa pele o a nwa kapa o kenye tenepele e le nngwe ya bleach ka hare ho litara engwe le engwe ya metsi.

Hobaneng o lokela ho nwa metsi a mangata?

> Mmele wa hao o hloka metsi hore o sebetse hantle le ho hlahisa mathe ka hanong, moroto le mongobo mahlong.
> Haeba mmele wa hao o sa fumane metsi a lekaneng o ka nna wa hloka matla bakeng sa mese betsi ya letsatsi le letsatsi.
> Haeba mmele wa hao o sa fumane metsi a lekaneng o ka kula hangata le ha bonolo, ho etsa mohlala, o ka ba le hlooho e opang.

Mekgwa e metle ya ho sebedisa metsi:

- Nwa metsi pele le ka morao hore o nwe meriana
- Tsamaya ka botlolo ya metsi kapa setshelo ho netefatsa hore o a fihlella ha bonolo.
- Nwa metsi ho fapana le di cordials tse tswekere, kapa di oroso kapa dino-maphodi tse futhu metseng lapeng le ha o ja.
- Kenya selae sa sirilamunu, kapa tholwana e nngwe jwalo ka lehapu kapa lamunu metsing ho ntlafatsa tatso le ho etsa hore ho natefise
- Pheha o phodise metsi ho netefatsa hore a bolokehile hore a ka nowa.
- Metsi a pompo a Afrika Borwa a bolokehile hore a ka nowa.



8. SEBEDISA DIJO LE DINO TSE NANG LE TSWEKERE E NGATA KA HLOHO

Ke dijo le dino tse fe tse nang le tswekere engata?
Tsena ke dijo le dino tse ekeditsweng tswekere ho tsona tse kang dino-maphodi, tswekere e kang ya oroso, dino-maphodi tsa dipapadi, lebese le nang le tatso, kofi enang le tatso, tee ya leqhwa e tswang lebenkeleng, sopho ya dipakete, ditholwana tsa makotikoti tse nang le lero la smoothies.
Ho e sebedisa ka hloko ho bolela ho sebedisa hanyane feela dino le dijo tse nang le tswekere e ngata.

Hobaneng o lokela ho sebedisa dijo le dino tse ka hloko?
Ho ja tswekere e ngata ho o beha kotsing ya ho nona haholo, le mafu a kang khatello ya madi le lefu la tswekere.
Hoja tswekere e ngata ho ka lebisa mathateng a meno a jwalo ka ho bola ha meno.

Mekgwa e metle ya ho sebedisa tswekere:

- Bakeng sa tswekere e jwalo ka di oroso, dino-maphodi le dino tsa dipapadi o ka sebedisa met si, o ka eketsa dilae tsa ditholwana metsing a hao bakeng sa tatso e ntle.
- Sebedisa metsi bakeng sa lero la tholwana.
- Sebedisa mahe a dinotshi kapa dihlahiswa tse tswekere ho natifisa kofi kapa tee ya hao.
- Bakeng sa dijo thollo tse tswekere jwalo ka di cornflakes, raese crispies, di cocoa pops jwalo ka dijo tsa hoseng sebedisa all bran, weet bix, oats, maltabella le motoho wa poone.
- Qoba ho eketsa tswekere ho meroho e kang dihwete le mokopu.
- Fokotsa ho ja dipesteri, dibiskiti, dipompong, ice cream, chokolete le dijo tse tswekere ha hona le diketsahalo tse kgethehileng.
- Fokotsa kapa o qobe jeme, mme o sebedise peista ya tlhapi, chisi e phatlaladitsweng kapa botoro ya matokomane

9. SEBEDISA MAFURA KA HLOKO, KGETHA MAFURA A LERO LA MEROHO HONA LE MAFURA A THATA

Mafura a thata
A na ke mafura a sebeditsweng ka mechine, mme a thatafatswa mochesong wa phaposi. A fumanwa dijong tse sebeditsweng tse kang rama le dinoko tse ding tsa di salate, crisps, di-cooking pie crusts. Qoba mafura a thata a ka phahamisang mafura a mmele wa hao (cholesterol), kahoo e ja hanyane kamoo ho ka kgonehang.

Mafura a lero la meroho ke eng, mme ho baneng a lokela ho sebediswa ka hloko?
Mafura a lero la meroho a lokela ho sebediswa bakeng sa mafura a diphoofolo. Mafura a lero la meroho ke mafura kapa oli e tswang mefuteng ya dimela jwalo ka botoro ya matokomane, mafura a lero la mohlware, mafura a lero la kokonate, mafura a lero la soneblomo, le mafura a tholwana ya morara. Mafura le di oli tse sebediswang ha di a lokela ho ba ditenepele tse fetang tse hlano ka letsatsi hobane mafura amangata a eketsa menyetla ya ho nona, mafura a mmele a phahameng le ho qala ha mahloko a sa foleng.

Mekgwa e metle ya ho sebedisa mafura:

- Tlosa dihlahiswa tsa lebese tsenang le mafura a mangata ka tse nang le mafura a tlase.
- Sebedisa rama e nang le mafura a tlase bakeng sa e nang le mafura a hodimo.
- Se tlotsitsweng ka mafura ka botlalo le mayonnaise ka mefuta e fapaneng ya lite.
- Ja nama ya kgoho ntle le letlalo; mme o pome nama ya kgomo, nama ya kolobe le kgoho mafura ohle a bonahalang mme o phehe o se na mafura.
- Sebedisa mekgwa ya ho pheha jwalo ka ho besetsa ka ontong, ho pheha le ho bedisa bakeng sa ho hadika.
- Fokotsa ho ja dijo tse potlakileng le tse sebeditsweng hang ka beke ha ebe ke teng.
- Sebedisa tlhapi e mafura jwalo ka mackerel, salmon, herring kapa sardine bakeng sa nama e kgubedu le kgoho dijong tse mmalwa ka beke.

Tlosa mafura a tiileng motjhesong wa phaposi (mafura a thata) jwalo ka botoro, mafura a nama ya kgomo, mafura a kgoho, ghee, mafura le rama o kenye oli ya meroho e kang oli ya soneblomo le oli ya canola.

10. KENEYELLETSA TLHAPI, KGOHO LE NAMA E SESANE DIJONG KA KAKARETSO

Tsena ke dinama tse nang le mafura A fokolang

Hobaneng ha o lokela ho kenyelletsa dinama tsee dijong ka kakaretso?

- Mafura a dinama tsena a thusa ho boloka mafura a mmele a le tlase.
- Mafura a tlase a fokotsa menyetla ya lefu la pelo le mafu a mang a sa foleng.
- Mafura a tlase a boetse a o thusa ho boloka boima ba mmele bo phetseng hantle.

Mekgwa e metle ya ho kenyelletsa nama dijong ka kakaretso:

- Pele o pheha nama tlosa mafura nameng mme o tlose le letlalo la kgoho.
- Tshwaya kapa o chese ditlhapi ho fapana le ho e hadika.
- Grill, fufutsa kapa o phehe ka ontong nama ya hao ho fapana le ho e hadika mme o se ke wa eketsa mafura kapa oli.
- Sebedisa ditlamatlama le dinoko ho fa nama le kgoho tatso.
- Ha o besitse nama kapa kgoho, e behe hodima sekwahelo sa tshepe ka hodima pane e beset sang e le hore mafura a rothe.
- Mahe a theko e tlase e bile ana le diprotheine tse ngata. Bedisa kapa o chese mahe mme o a sebedise sebakeng sa nama.

11. SEBEDISA LETSWAI, DINOKO TSA LETSWAI LE DIJO TSENANG LE LETSWAI LE LENGATA KA

Hobaneng letswai le dinoko di lokela ho sebediswa ka hloko?

Sopho ya pakete, phofo ya gravy le nama e sebeditsweng e kang polony, ham le soseje kaofela di na le letswai le ekeditsweng. Letswai le lokela ho sebediswa ka hloko hobane ho ja letswai le phahameng ho ka eketsa menyetla ya ho ba le kgatello e phahameng ya madi le stroke.

Mekgwa e metle ya ho sebedisa letswai:

- Fokotsa letswai le ekeditsweng ha o pheha.
- Tlosa letswai le leng tafoleng.
- Fokotsa ho ja dijo tse nang le letswai le ekeditsweng, jwalo ka bohobe, le di pie, disoseje le nama e batang, dijo thollo tsa hoseng di crispis, sopho le rama kapa majarine.
- Sebedisa ditlamatlama ho natefisa dijo ho fapana le letswai, aromete le di cubes tsa stock.

12. HAEBA O NWA JWALA O NWE KA TSELA E UTLWAHALANG

Hobaneng o lokela ho nwa jwala ka tsela e UTLWAHALANG?

Jwala bo tlatselletsa ho nona ha mmele mme hangata bo amahangwa le mathata a tebileng a bophelo bo bottle le mafu a kenyelletsang mofetshe wa mala, kgatello e phahameng ya madi, stroke le lefu la sebete.

Jwala bo ka boela ba ama kahlolo ya hao, bo ka eketsa menyetla ya kotsi ya ho wa.

Ho nwa jwala ha o ntse o le merianeng ho ka baka ho otsela hape ho ka ama ha mpe katleho ya meriana e sebetsang mmeleng wa hao.

Mekgwa e metle ya ho sebedisa jwala:

- E nwa jwala diketsahalong tse kgethehileng feela. Fokotsa ho nwa ha hao jwala o seke wa feti sa toto e le ngwe ya majwala a thata a sekgowa kapa kgalase e le ngwe ya veine kapa biri e le ngwe (355ml) ka letsatsi bakeng sa basadi ba hodileng, mme o nwe dino tse sa feteng tse pedi ka letsatsi bakeng sa banna,
- Qoba jwala ha o ntse o sebedisa meriana.

13. E JA DIJO TSE HLWEKILENG LE TSE BOLOKEHILENG

Dijo tse hlwekileng le tse bolokehileng ke eng?
Dijo tse hlwekileng le tse bolokehileng ke dijo tse loketse ho jewa ntle le ho baka ho kula, mohlala dijo tse sa senyehang ebile di sa tsofala. Ho bohlokwa ho lekola matsatsi ao dijo di lokelang ho sebediswa ka ona le ao dipakilweng ka ona. Polokeho ya dijo e bolela ho sebetsana, ho pheha le ho boloka dijo kapa dino ka tsela ya hore kotsi ya batho bakulang ka mafu a bakwang ke dijo jwalo ka chefo ya dijo e fokotsehe.

Hobaneng ho le bohlokwa ho ja dijo tsehlwekileng le tse bolokehileng?
- Ho ja dijo tse sa hlwekang ho ka baka mafu a kang chefo ya dijo le manyowa.

Mekgwa e metle ya ho hlwekisa le ho boloka dijo:
- Hlatswa matsoho a hao hantle ka sesepa le metsi pele o tshwara dijo.
- Boloka dijo tse tala le tse phehilweng di a rohane.
- Pheha dijo tse kang nama ya kolobe ka botlalo e le hore dikokwana hloko tse sa bonahaleng di bolawe ke motjheso.
- Lekola le ho beha leihlo matsatsi a ho fellwa ke nako dijong tsohle ho kenyeletsa le tse senye hang.
- Hlatswa ditholwana le meroho kaofela pele o di sebedisa ho hlatswa chefo e bolayang dikokonyana
- Boloka dijo tse hlokang ho bolokwa di bata ka sehatsetsing.
- Qoba dikokonyana tse senyang dijalo dibakeng tse lokisetsang dijo.
- Boloka dijo tse kang folouru, raese le phoofo ka hara dijana tse kwalehang, e seng fatshe.
- Arola nama le mero ya yona, le dijong tse ding ha o reka.

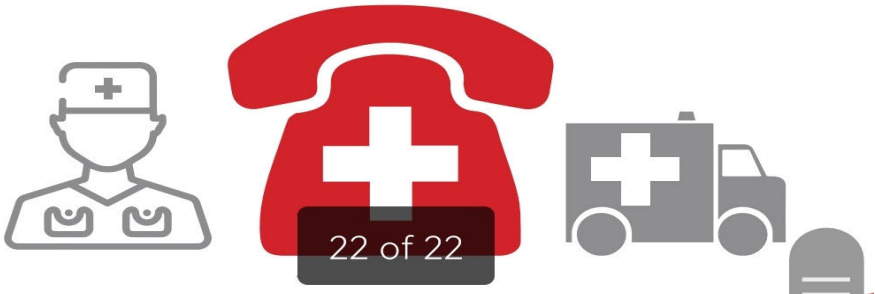
DITLHAHISO TSA THUSO YA PELE TSE AMANG BATHO BA HODILENG

Batho ba hodileng ba tswa dikotsi tse mpe ka lebaka la ho wa, ho tswa madi le maqeba a hotjha a ka bang manyane ho motho e monyane.
Karabelo maemong a tshohanyetso a bongaka e ka nna ya se be jwalo ka tlwaelo mme ho ka mpefala kapele haholo.

Tse latelang ke ditlhahiso tsa thuso ya pele tse ka sebediswang tse amanang le batho ba hodileng:
- Ho kgetholla dikotsi tse tlwaelehileng le ho itshirelletsa ho thibela dikotsi tse ka bang teng.
- Utlwisisa hore na botsofadi bo ama mmele jwang le ditlamorao tsa meriana e fanwang ke dinga ka le mahloko a mang ha o thusa ka tsieleho.
- Atamela ka kgutso kotsi efe kapa efe ya tshohanyetso ya bongaka.
- Hlahloba ho teba ha maemo.
- Ka pele beha dintho ka lenaneo mme o netefatse hore na ho na le dikotsi tse ka behang bophelo ba hao tsietsing.
- Kgodisa motho ya lemetseng mme o phekole feela mathata a potlakileng ka ho fetisisa.
- Batla boeletsi ba bongaka kapa o letsetse ambulense ha ho hlokahala.

DINOMORO TSA BOHLOKWA TSA DIKGOKAHANYO

National Department of Health (Switchboard) / www.health.gov.za:	012 395 8000
Ambulanse:	: 10177
Alcoholics Anonymous:	086 143 5722
National Counselling Lines:	086 132 2322
Tlhekefetso ya Bong:	080 001 2322/ 080 015 0150
South African Depression and Anxiety Group:	080 056 7567
AIDS Helpline:	080 001 2322
Diabetes South Africa:	086 111 3913
Department of Social Development:	086 037 4537
SASSA:	012 400 2000/ 080 060 1011



DITATAISO TSA DIJO TSA MAQHEKU TSA AFRIKA BORWA