

Robert Kanyingi Ndugire

**TREATMENT AND PREVENTION OF MALNUTRITION IN THE
ELDERLY**

**Thesis
CENTRIA UNIVERSITY OF APPLIED SCIENCES
Degree Programme in Nursing
September 2019**

ABSTRACT

Centria University of Applied Sciences	Date September 2019	Author Robert Kanyingi Ndugire
Degree programme Degree Programme in Nursing		
Names of thesis TREATMENT AND PREVENTION OF MALNUTRITION IN THE ELDERLY		
Instructor Marjo-Tilus Sandelin		Pages 31 + 1
Supervisor Anita Hollanti		
<p>The purpose of this study was to find out how early nursing interventions can help prevent malnutrition. The goal of this study was to provide accurate and adequate information to nurses on how to prevent and manage malnutrition. Likewise, it was to promote better health and quality life for the elderly by reducing malnutrition cases in the aged population. The researcher chose this topic due to his experience working in an elderly care setting and dealing with malnourished patients who were suffering from weight loss. It became the researcher's goal to find out different ways of preventing and treating malnutrition.</p> <p>The method of research used in this thesis was literature review. The data for the study was gathered by using different computerized databases such as CINAHL, Ovid, SAGE Premier and Science Direct to find scientific journals. The collected data was then analyzed using summary method of data analysis.</p> <p>The results show that screening, anthropometric assessments, physical examinations, diet assessments and patient's history were important preventive measures of malnutrition. Likewise, management of medical conditions, medication review, dietary restrictions review, oral health and pain management were vital treatment measures. Furthermore was, management of social and functional issues, nutritional support and monitoring as well as reinforcement.</p>		
Keywords Malnutrition, elderly, treatment and prevention, risk factors and screening tools.		

Contents

1 INTRODUCTION	1
2 MALNUTRITION IN THE ELDERLY	3
2.1 Risk factors for malnutrition	3
2.1.1 Social factors	3
2.1.2 Medical factors	4
2.1.3 Psychological factors	5
2.2 Consequences of malnutrition	6
2.2.1 Muscle and bone	6
2.2.2 Gastrointestinal issues	6
2.2.3 Immunity and tissue repair	6
2.2.4 Psychological issues	7
2.2.5 Refeeding syndrome	7
2.3 Screening	7
3 PURPOSE AND RESEARCH QUESTIONS	9
4 METHODOLOGY	10
4.1 Data collection	10
4.2 Data analysis	11
4.3 Ethics and reliability	12
5 FINDINGS	13
5.1 Prevention measures	13
5.1.1 Early Screening	13
5.1.2 Elderly Anthropometric Assessment	16
5.1.3 Laboratory Assessment	16
5.1.4 Physical Examinations	17
5.1.5 Diet Assessment	17
5.1.6 History	17
5.2 Treatment measures	18
5.2.1 Management of medical conditions	18
5.2.2 Medication review	20
5.2.3 Dietary restrictions review	20

5.2.4 Oral health	21
5.2.5 Pain	21
5.2.6 Managing social and functional issues	22
5.2.7 Encouraging exercising	23
5.2.8 Nutritional support and advice	24
5.2.9 Monitoring and reinforcement	26
6 DISCUSSIONS AND CONCLUSION	28
REFERENCES	31
APPENDICES	35
TABLES	
TABLE 1. Inclusion and exclusion criteria.....	11
TABLE 2. Validated Malnutrition Screening and Assessment Tools.....	14

1 INTRODUCTION

Malnutrition is a condition resulting from consumption of a diet that has either excess or not enough nutrients causing health problems to an individual's body. Malnutrition may manifest mainly in two ways which are under nutrition or over nutrition.

Under nutrition, as the name suggests, results from the body not having enough nutrients, while over nutrition is a consumption of too much nutrients. Human bodies need nutrients such as fats, proteins, carbohydrates, vitamins and minerals for its normal function. These nutrients are important since human bodies need them for the energy and fuel they provide which help in regulating metabolic processes and building or repairing tissues. However, too much intake or under consumption is hazardous to the body. As a result, eating the right proportions is necessary to maintain normal tissue function on a regular basis.

Ageing is an irreversible process which occurs to every human over time. It brings about changes which are physical, psychological or even social. With these changes brought out by ageing, the body deteriorates physiologically which means that they cannot perform in the same way as before. Due to this, malnutrition of the elderly should be taken seriously since it can lead to physical, cognitive and social impairments which act as a hindrance to carry out daily living activities.

The prevalence of malnutrition in the elderly population is high and varies due to a variety of factors which include geography, distribution, living situation and age. Studies reveal that the prevalence of malnutrition in the aged population is 29%-61% in acute settings. This percentage also rises in patients who are over 60 years compared to those less than 60 years. In addition, 60% of older adults in hospitals who are 65 years and above suffer from malnutrition. Likewise in long term care, 35% to 85% of aged patients suffer from malnutrition. Elderly people who are 65 years and above account for 7.7 percent of the world population. This figure is estimated to rise to 10.2 percent by 2023 and 27.7 percent by 2075. This simply means that the population of elderly people will rise in future causing global issues if malnutrition is not addressed. (Casey, O'Donoghue, Siddique & Walsh 2017.)

The researcher developed an interest for this topic in the course of working as a nurse in an elderly care setting. During the working period, the researcher noticed different cases of suffering malnourished elderly patients with the core sign being low body weight. Other signs included loss of interest in eating, depression, general fatigue and loose clothing. Henceforth, it became an initiative of the author to determine causes and consequences of malnutrition and its preventive and treatment measures.

The main purpose of this research was to raise the level of awareness the health care practitioners or care takers have in regards to this subject. This study was also aimed at finding out risk factors and adverse effects of malnutrition on elderly people's lives. The purpose of this study was to find out how nursing interventions can help prevent malnutrition. The goal of this study was to provide accurate and adequate information to nurses on how to prevent and manage malnutrition. Likewise, was to promote better health and quality of life for the elderly. Literature review was the method used to conduct this research and it combined data collection and data analysis to get the final results. The gathered articles were analyzed and summarized to give a brief view of the topic at hand. Ethics and reliability were also crucial in the process and had to be adhered to by the author in performing the research.

2 MALNUTRITION IN THE ELDERLY

Malnutrition is used to define under nutrition where the body lacks enough calories, proteins and micronutrients leading to major health problems. The human body requires energy for regular metabolism and normal function. Macronutrients are energy providing nutrients and are needed in large amounts in the body. They include carbohydrates, fats, proteins and water. Micronutrients are nutrients which include vitamins and minerals and are needed in small amounts in the body. These vitamins are such as vitamin A and vitamin K. Likewise, examples of minerals are calcium, potassium and iron. Malnutrition, if not detected early, can also lead to micronutrient deficiencies. These deficiencies include lack of vitamin A which causes dry eyes and increases risk of infection. Lack of zinc which leads to loss of appetite, delayed healing of wounds and hair loss. Malnutrition has been a serious problem to public health and despite its high prevalence across settings the awareness among clinicians and health care practitioners are still low. Statistics show that 462 million adults across the world are underweight. Thus malnutrition poses a great problem in future if not addressed and dealt with. (World Health Organization 2018.)

2.1 Risk factors for malnutrition

Malnutrition has a variety of risk factors, the major risk factors of malnutrition are social factors, medical factors and psychological factors. These risk factors are discussed briefly below.

2.1.1 Social factors

There are different factors that cause or contribute to malnutrition in the elderly. Human beings are social beings who need interaction with each other on a daily basis. Lack of human interaction might cause feelings of isolation and segregation and this is witnessed more in the elderly population in comparison to the youth population. In most cases, isolated aged people lose the desire to eat since they end up eating alone most of the times. In addition, the desire to cook proper meals which equates to proper balanced diet is rarely there leading to malnourishment. (Casey, O'Donoghue, Siddique & Walsh 2017, 32.)

In elderly long term care settings, especially in third world countries, there is food rationing from time to time due to a variety of factors and these factors include shortage of supplies and overcrowded settings. As a result, there is scarcity of food or it lacks the proper nutrients to fight malnourishment. Food rationing in rare cases might also be due to the results of wars, famine and sometimes government related in order to save funds. (Casey et al. 2017, 32.)

Lack of money is another social factor that contributes to malnourishment. Due to different wages and social economic status, people live different lives based on their earnings. This usually has an impact on how we eat and the lifestyles we live. Most aged persons by this time do not work anymore and mostly depend on their pension money. This might create financial constraints and lead to a situation where eating a balanced diet is not considered a priority or is mostly overlooked. Most deal with this situation by eating what they can get and do not necessarily try to practice a healthy eating lifestyle. (Casey et al. 2017, 32.)

2.1.2 Medical factors

Due to age associated chronic diseases such as cardiovascular diseases, Alzheimer's and other conditions, it is common for the aged to be under medication. Usually, these medications prove helpful and are recommended to improve quality of living and improve their conditions. However, under certain circumstances these medications have side effects which are loss of appetite or they affect taste of food. Example of such medicine is sertraline which belongs to the group of antidepressant drugs. Likewise, these medication can affect nutritional status since they lead to dry mouths and in extreme cases nausea or vomiting. (Clinical Guidance 2014.)

Dysphagia which is difficulty in swallowing is a common problem when it comes to senior adults. This is especially common in adults with neurodegenerative disorders such as stroke. Due to this, they cannot swallow and thus do not get the needed nutrients in the body needed for metabolism and normal body function. Poor oral health is also a factor that plays a role in malnutrition of older adults due to missing teeth and dentures that do not fit which can cause difficulties in eating. (Ballesteros-Pomar, Galindo, Luque, Martines & Sanchez 2018.)

According to study by Agarwal, Isenring, Miller & Yaxley (2013), neurological disorders which are diseases of the brain such as Parkinson's diseases have a direct negative impact on an individual's health. This is because the diseases lead to cognitive impairment which means that the person has problems with communication, remembering or even making simple decisions. Due to these memory problems, many of elderly adults forget to eat and skip meals most of the time causing malnutrition.

Physical disabilities, such as arthritis, which are characterized by joint pain and stiffness are common in senior adults. These conditions lead to immobility which means they cannot perform certain activities such as shopping or cooking meal for themselves and most of the time they need a care taker to help them in daily activities. Due to lack of mobility, most of them miss meals during the day especially if there is no caretaker or relatives around. (Agarwal et al. 2013, 298.)

Previous studies carried out by Higgs, Howard & Satherley (2015), suggest that another medical factor which is not as common in elderly people is malabsorption which is a gastrointestinal disorder. This disorder happens when the small intestine cannot absorb enough of nutrients and fluids needed in the body.

2.1.3 Psychological factors

Confusion is common in senior adults of age 65 years and above. Confusion is mainly associated with delirium and dementia and comes with a decline with cognitive ability. Due to this change in mental state of an individual, they often lose appetite and generally lose interest in eating. Depression which might be caused by changes in the environment, being isolated or lack of relatives for regular visits might lead to loss of weight due to loss of appetite. This leads to an increased risk of being malnourished. Anxiety disorders such as generalized anxiety disorder can worsen their health and decrease their abilities to do daily activities limiting their functionality. This might lead to poor nutrition intake (Bischoff-Ferrari, Chocano-Bedoya, Egli, Freystätter, Staiger, Wiegand & Zieger 2019, 178-180.)

2.2 Consequences of malnutrition

Malnutrition has a variety of consequences if not addressed by health professionals. Discussed below are the major consequences of malnutrition.

2.2.1 Muscle and bone

Malnutrition has a number of consequences that affects every vital organ of the human body. Malnutrition causes weight loss to an individual's body which has a negative impact on muscle and bone tissues. The bone mass normally declines due to weight loss and lack of intake of important vitamins such as magnesium, vitamin D or calcium. Likewise it leads to sarcopaenia which is a loss of skeletal muscle mass and strength. This means that in case of an injury the bones take long to recover and also the risk of fractures and injuries is high. (Bear, Camprubi-Robles, Cederholm, Cruz-Jentoft, Landi, Malafarina & Welch 2018, 3.)

2.2.2 Gastrointestinal issues

According to Higgs, Howard & Satherley (2015), proper and adequate nutrition is vital to preserve the functioning of vital organs such as gastrointestinal function. Henceforth, the aged who suffer from chronic malnutrition are at a risk of facing changes in pancreatic exocrine function and intestinal blood flow. The pancreas is an important organ since it contains exocrine glands which produce enzymes that are important to digestion. Moreover, it leads to loss of digestive enzymes due to dietary energy restriction and this leads to secondary lactose intolerance and diarrhea.

2.2.3 Immunity and tissue repair

In malnourished patients, the risk of infection increases due to reduced cytokine and phagocyte function which suppresses the immune system. Both cytokine and phagocytes play an important role in the immune

system. Cytokine helps in regulating immunity and phagocytes destroy harmful bacteria and foreign particles by ingestion. As a result, these patients are prone to succumb to infections such as respiratory infections and bacterial infections which progress fast in the body. Furthermore, these patients suffer from delayed wound healing due to poor nutrition and also it might take longer for a wound to heal in case of a surgery. (Agarwal, Isenring, Miller & Yaxley 2013, 299.)

2.2.4 Psychological issues

Previous studies carried out by Casey, Donoghue, Siddique & Walsh (2017), reveal that lack of proper vitamins and nutrients in the body might also affect a vital organ in our body which is the brain. The brain, which helps us to think, emotional control and has an impact on other major vital organs, might cause problems if not nourished. This might bring depression, unpleasant feelings of anxiety and self neglect.

2.2.5 Refeeding syndrome

Refeeding syndrome is a syndrome that causes metabolic disturbances which occur due to provision of nutrients to a starved or an individual who is severely malnourished. This condition is fatal and an individual can die if the needed precautions are not taken due to a shift in balance between electrolytes and fluids. It is therefore important to detect the signs early and contact a doctor as soon as possible. (Barnova, Caro, Fragkos, Keane, Mehta, Pantoja, Patel, Samaan & Rahman 2019.)

2.3 Screening

Research by Gamaletsou, Karageorgou, Panagiotakos, Poulia, Yannakoulia & Zampelas (2012), revealed that early screening is one of the preventive measures used to prevent or identify patients who are at a risk of malnutrition. It is not possible to identify malnourished elderly patients only by their physical appearance, weight or body mass index. Screening is therefore recommended to all elderly patients within 72 hours once institutionalized. This helps the nurses and dieticians involved to be alerted in case of a

high risk elderly patients. Screening tools help health practitioners by providing them with an easy and reliable way to identify clinical characteristics of undernutrition.

3 PURPOSE AND RESEARCH QUESTIONS

The purpose of this thesis study was to find out how nursing interventions can help prevent malnutrition cases of the elderly. In addition, was finding out the risk factors of malnutrition when dealing with the elderly and its consequences if not dealt with. The goal of this study was to provide accurate and adequate information to nurses and health care practioners on how to prevent and manage malnutrition. Likewise, was promoting better health and quality of life for the elderly. The research questions of this study were as follows

1. How to prevent malnutrition of the elderly?
2. How to treat and manage malnutrition of the elderly?

4 METHODOLOGY

Literature review was the chosen method used to conduct this research. Literature review as a method involves summary and investigation of a previous topic in depth. Literature review is also made of research questions which are used as guides for the research. These questions are answered throughout survey of scientific articles, books and other sources related to the topic. In addition, literature review compiles and evaluates all materials available on a particular topic which are then used to answer the final research questions. (Aveyard, 2010.)

4.1 Data collection

Data collection is a significant part of conducting research on a particular subject. Data collection is achieved through research of previous existent articles related to the topic. The researcher mainly focused on recent articles while conducting this research to provide updated and new information related to the topic. One article from 2007 was used due to its accurate information and deals with the Finnish population which is the author's residing place. In addition, this article was relevant for comparison of the findings and analysis. The rest of the articles were limited to a time frame of 2012 and 2019. This is due to the fact that new and updated information had to be used since information changes over time. As a result, thirty articles were found which were singled down to 20. This is because some articles were old and the author could not rely on them. In addition, some were vaguely related to the subject even though the key words were present while searching. Moreover, some articles broadly spoke on the subject of malnutrition and were not specific to the aged population. This information was assembled by using different scientific data bases available to the researcher such as Sage premier, Science direct, Cinahl and Ovid to find the scientific journals.

In addition, publications from web sites such as World Health Organization were used to add information to the research. Likewise, articles were gathered from other scientific journals which also provided accurate and trustworthy information due to limitation of research materials in the schools databases. Research involves a variety of steps and one of those steps is establishing key words to conduct the research. Henceforth, the researches key words in the research topic were malnutrition, elderly, treatment,

prevention and screening tools. Twenty articles gathered were of English language while one had both Finnish and English language.

TABLE 1. Inclusion and exclusion criteria

INCLUSION CRITERIA	EXCLUSION CRITERIA
Articles used were of English language.	Articles which were not in English, creating language barriers.
Articles with full text and can be accessed.	Short articles and articles that have to purchased.
Limited time frame of 2012 to 2019 for relevancy.	Articles published before 2011.
Articles related to the topic.	Articles not related to the topic.
Scientific articles and evidence based studies.	Non-scientific articles and articles that were not evidence based.

4.2 Data analysis

A summary as an analyzing method is usually conducted with an aim of providing information based on existing resources. Summary consists of the reassessment of previous research articles generally from reliable data bases. The main aim of a summary as a method of data analysis is to provide an overview about the particular field in question. (Green & Thorogood, 2010.)

Summary ensures a clear apprehension towards the field of research, as the author diversifies through the reliable sources. Examining the main keywords, studying and skimming are the elements of a good summary. The data analysis method was used in this study is a summary. A summary provides a concise description of the main points in a document.

After thorough skimming and scanning through the key words, 20 articles were used to write a summary that answered the two research questions. All the ideas and concepts were weighed in a theoretical framework to ensure that the findings were supported by the literature.

4.3 Ethics and reliability

Throughout the research process, it was important for the author to maintain high standards of ethics as required. This was ensured by conducting and maintaining the study to as high level of professionalism as possible to maintain high ethics. High ethic standards and professionalism were made possible by carefully referencing all authors based on their works as a show of respect. In addition, it was to make sure the readers can identify and, if needed, use the different authors articles and publications for themselves for future research and creating hypothetical questions.

The aim of the research was to find out different methods to prevent and manage or treat malnutrition of the elderly. It was of great importance for the author to read and follow the thesis guidelines of Centria University of Applied Sciences to maintain high ethical standards. Reliability is also an integral part of research and it holds the author accountable to his work. Therefore, it was the responsibility of the author to only obtain articles from reliable electronic sources mainly provided by the school library database and to ensure that the results finally obtained are valid.

5 FINDINGS

Results reveal a detailed research for material and literature related to prevention and treatment of elderly malnutrition. The materials were carefully analyzed and after analysis the preventive and treatment measures compiled are discussed later in this chapter. It is important to know that early intervention and prevention are vital to curb the adverse effects of malnutrition and weight loss.

5.1 Prevention measures

Due to high morbidity and mortality rates in the elderly population across the world as a result of malnutrition, effective preventive measures have to be implemented. These preventive measures are aimed at reducing and eradicating negative consequences related to malnutrition. Prevention of malnutrition is crucial and can help save unnecessary burden to both the patient and the economy in general. These preventive measures include early screening, anthropometric measurements, lab assessment, history and diet assessment which will be discussed below. (Russell 2019.)

5.1.1 Early Screening

Early screening is one of the main preventive factors used to fight malnutrition and should be encouraged across all settings. The most common malnutrition screening tools used are Mini Nutritional Assessment short form, Nutritional Risk Screening, Malnutrition Universal Screening Tools, Malnutrition Screening Tool and Geriatric Nutrition Risk index. These screening tools are used in different settings and are used to diagnose the risk of malnutrition or show what is the stage of the malnutrition. They come in a set of questions usually asked from the patient at risk and once completed they can give a clear picture if the patient is at risk of malnourishment or not. Below is a malnutrition screening and assessment tools table with a brief description of the screening tools and how they work. (Banks 2017.)

TABLE 2. Validated Malnutrition Screening and Assessment Tools (adapted from Banks 2017)

Screening Tool	Patient Population	Nutrition Screening parameters	Criteria for risk of malnutrition	When/by whom
Malnutrition Screening Tools (MST)	Acute adults: inpatients & outpatients including elderly Residential aged care facilities	Recent weight loss. Recent poor intake.	Score 0-1 for recent intake Score 0-4 for recent weight loss. Total score: >2 = at risk of malnutrition	Within 24 hours of admission and weekly during admission Medical, nursing, dietetic, admin staff; family, friends, patients themselves
Mini Nutritional Assessment -Short Form (MNA-SF)	Elderly May be best used in community, sub-acute or residential aged care settings, rather than acute care.	Recent intake Recent weight loss Mobility Recent acute disease or psychological stress Neuropsychological problems BMI	Score 0-3 for each parameter Total score: < 11 = at risk, continue with MNA	On admission and regularly.

(continues).

TABLE 2. (continues).

Malnutrition Universal Screening Tool (MUST)	Adults – acute and community.	BMI Weight loss(%) Acute disease effect score	Score 0 – 3 for each parameter. Total score: >2 = high risk 1 = medium risk 0 = low risk	Initial assessment and repeat regularly All staff able to use
Nutrition Risk Screening (NRS-2002)	Acute adult.	Recent weight loss (%) Recent poor intake (%) BMI Severity of disease Elderly	Score 0-3 for each parameter. Total score: > 3 = start nutritional support	At admission and regularly during admission Medical and nursing staff
Mini-Nutritional Assessment (MNA)	<u>Setting:</u> Acute Community Rehab Long term care <u>Patient group:</u> Geriatric	Screening and Assessment component Includes diet history, anthropometry (weight, history, height), medical and functional status. Assessed based on numerical score as: - no nutritional risk - at risk malnutrition <u>or</u> – malnourished		

According to Cascio & Logomarsino (2017), it is important that the screening should be conducted accurately since the results achieved from screening play a major role in the treatment or management of the patient. Inaccurate screening results may lead to negative outcomes in both the care setting and patient involved. Screening tools provide major help in obtaining and interpreting data related to patients nutrition history which is helpful in the final treatment.

5.1.2 Elderly Anthropometric Assessment

Certain assessments performed on elderly patients to determine whether they are malnourished or frail and these assessments are called anthropometric assessments. They include weight, height, body circumferences, knee height length, body mass index and waist to hip ratio. In case of any variations in weight, the elderly person involved is at a risk of frailty and malnutrition. Therefore, these anthropometric assessments can be used as tools which help in identification of individuals at risk and elderly people with compromised nutritional status. It is also important to know that height is one of the anthropometric assessments conducted, however, some elderly patients are bed ridden or cannot stand. Consequently, height measurements can be achieved through measuring their knee height which is not affected by ageing. (Saunders, Smith & Stroud 2018, 157.)

5.1.3 Laboratory Assessment

Studies conducted by Marinos (2017), reveal that laboratory data can also help in identification of elderly who are at a risk of malnutrition. These tests can reveal whether the nutritional status of elderly people has been compromised or not. These tests which include albumin, prealbumin, hemoglobin, total cholesterol and total protein are all useful indicators of malnutrition. These tests are used normally to diagnose for malnutrition in clinical settings. However, nurses should not use these tests as sole measures for diagnosis. These tests should be used alongside with other interventions such as physical examinations and dietary records.

5.1.4 Physical Examinations

In a study by Saunders, Smith & Stroud (2018), physical examinations are important to prevent malnutrition in the elderly. While conducting assessments, an assessment focused on nutrition of the patient at risk is pivotal to avoid further consequences. These examinations can help in evaluating factors that affect the dietary intake and nutritional status which has been compromised. Signs of malnutrition may be exhibited by signs such as dry hair and skin, hollow cheeks and sunken eyes and weight loss. Moreover, such examinations include removal of dentures to inspect for tooth decay or poor dental cavity which hinders proper food consumption. In addition, elderly patients with iron or zinc deficiencies may show signs of inflamed tongue which inhibits patient from eating certain food or vegetables.

5.1.5 Diet Assessment

Another important method to prevent malnutrition is proper assessment of the dietary intake. It is important to note that identifying simple signs such as loss of appetite are vital to prevent costly measures which can be prevented. Methods of diet assessment include food dairies properly documented by the patient and questions regarding the food he /she has consumed during the day. These questions reveal types and amounts of foods consumed by the individual and avoided foods. In case of a patient with poor memory, a family member or care giver can be consulted for the information. It is important while accessing the dietary intake to take into account that older adults who are more than 71 years require more nutrients like calcium, vitamin D and vitamin B12. This is due to changes that occur in elderly and their physiologic needs. (Suominen 2007.)

5.1.6 History

According to a study done by Saunders, Smith & Stroud (2018), a patient's medical history is effective in preventing malnutrition. The patient history should reveal information on the patient's past and current

status. These files have their medical reports, diagnoses done and also their nutrition history. Furthermore, it shows their abilities to perform day -to -day living activities and through this information condition of the patient can be accessed. Most of the times, their social support system is also present and the social care giver might have left some notes giving more details on the patient. This information might help in identification of a person at risk for malnutrition and to determine possible interventions to be made. The contributing factors to poor diet intake may also be assessed by looking at a patient's medical history.

5.2 Treatment measures

Treatment measures are vital in the fight against malnutrition in the aged population. These include management of underlying conditions, medication review, diet assessment review, exercising, managing pain and other factors which will be discussed below. Treatment of this condition requires a holistic approach which is treatment of the person as a whole. Moreover, for successful management of malnutrition there should be consideration of a multidisciplinary approach which involves nurses, doctors, physiotherapists, dentist, caregivers and dieticians. Treatment measures are also encouraged due to the cost and burden if not treated early. (Wallace 2018).

5.2.1 Management of medical conditions

Certain medical conditions, diseases, symptoms or their treatment contributes directly to malnutrition. Some of these include depression and dementia. Moreover, dysphagia and gastrointestinal diseases that, cause malabsorption. Depression is one of the main known contributors to malnutrition in the elderly. Depression and malnourishment are both associated. The two are strongly related since depression leads to changes in someone's appetite and lack of food resulting to weight loss. Consequently poor nutrition leads to psychological upsets such as depression and agitation. This confirms that both depression and malnourishment are associated. In addition, loss of weight and loss of appetite among the elderly is one of the major hints used in diagnosis of depression. Therefore treatment of depression an underlying cause should be considered to avoid the adverse outcomes of malnutrition. (Kim, Kwon & Nho 2014.)

Research done by Lopez & Molony (2017), reveal that management of dementia by nurses is critical to fight against malnutrition. Dementia can be defined as loss of cognitive functioning which includes remembering and reasoning and also it affect general behavior and this interrupts and interferes with a persons day -to -day activities. These- day-to - day activities include eating which is vital for provision of energy to our bodies to maintain normal metabolism and organ functions in the body. Dementia is a common condition of the elderly and is also associated to malnutrition. This can be observed in senior adults affected by dementia who often skip or forget their meals. Most of the times it takes the effort of relatives, nurses and caregivers to assist them to remember to eat their meals. Moreover, dementia can cause other disorders such as depression and anxiety both of which lead to malnutrition. Therefore consideration of managing dementia symptoms is important to deal with malnutrition.

Dysphagia can be defined as a difficulty in swallowing and this means it takes a lot of effort and time for food to go from the mouth to the stomach during digestion. Dysphagia is very common among elderly people and it is associated with other diseases such as dementia and stroke. Due to the difficulties in swallowing and eating we create deficits in nutritional status and suffer a risk of losing weight. Dysphagia might also come with pain and vomiting so it is an uncomfortable situation for the patient. Management of dysphagia is therefore important in the fight of malnutrition. This can be done through provision of soft foods that do not require much chewing to the patient and thickened liquids for easier swallowing. In addition, enteral feeding which is feeding through the gastrointestinal tract is a method recommended to patients who suffer from dysphagia. (Lauretani, Maggio, Meschi, Pela & Tagliaferri 2018.)

In a study conducted by Johnston, Nolan & Walters (2015), gastrointestinal disorders should be managed in an effort to treat malnutrition. Gastrointestinal disorders can be used to define disorders which involve the gastrointestinal tract. This includes rectum, large intestine, stomach, and small intestine. In addition are organs involved in digestion such as liver, gall bladder and pancreas. Malabsorption and maldigestion are examples of these conditions. Maldigestion can be simply defined as a lack of complete breakdown of nutrients mainly in the gastrointestinal tract and is usually due to lack of digestive enzymes. Malabsorption happens when there is an impairment of transportation of nutrients from the intestine to the blood. This impairment of the digestive system and absorption of nutrients both have a negative effect of the body and both lead to malnutrition. This is because the body is being depleted of important nutrients and in turn causes malnutrition or symptoms which are associated with the deficiencies in specific

nutrients. Therefore prioritization of management of these conditions is important and beneficial in the overall treatment of malnutrition.

5.2.2 Medication review

As discussed earlier, ageing is associated with some diseases such as dementia which require medical treatment including medications. Some of these diseases and medications for conditions have adverse side effects that affect the appetite and therefore general nutrition. These side effects include nausea, vomiting and constipation. The side effects caused by these medications hinder or disrupt general way of living and thus might affect his or her general outlook on nutrition. It is therefore important for nurses to review and consult with doctors about the medications which cause such types of side effects and consider trying different alternatives of medication. In addition, nurses should pay more attention to the elderly who seem to be affected by certain types of medications but cannot express themselves or try to hide it. New medications might elevate moods and since there are no adverse side effects they are helpful in treating malnutrition. (Esquivel 2017, 108-109.)

5.2.3 Dietary restrictions review

Human bodies go through different physical changes and psychological changes as ageing occurs, and in the same way the nutritional requirements change. Some foods are more important than others because they have the needed minerals and vitamins required by the body to maintain a healthy immune system. The elderly are a vulnerable group that require special attention and dietary needs since ageing doubles the threat of developing diseases. It is common that the elderly have dietary restrictions which they abide to in their day- to- day- living. These dietary restrictions may be due to personal preference or even religious restrictions. Some people are vegan while on the other hand some prefer a meal with meat. Religious restrictions also might affect the diet of specific religion by banning specific types of food from consumption. However, as ageing occurs our needs change and some foods prove more nutritional than others. It is therefore important to review these diet restrictions accordingly and consider adding some alternatives or near similar foods which might be more appealing to the patient while at the same time

nutritious. In addition is referral of the patient to a dietician for more support and educational advice. (Saunders, Smith & Stroud 2018, 157.)

5.2.4 Oral health

Oral health is generally important since mouths are vital organs when it comes to digestion. The mouth has salivary glands that are vital in the breaking down of food for easier digestion. Due to different changes and other factors sometimes it is difficult for the elderly to maintain proper health and dental hygiene. Common oral health problems experienced include dentures that do not fit, dry mouth, dental caries and even oral cancer. Poor oral health acts as a disruption to eating and therefore causes or leads to malnutrition. In addition it creates discomfort, pain and in general affects quality of life. It is easy for the elderly not to maintain proper oral health due to certain conditions, physical and cognitive impairments. It is the work of nurses to check for loose dentures and loose teeth. Likewise, inspect the mouth without dentures and encourage regular brushing of teeth. A doctor should also be consulted and a dentist for further inspection and general advice to the patient. (Beeckman, Goossens, Hecke, Lancker, Vanderwee & Verhaeghe 2012.)

5.2.5 Pain

Research conducted by Gallucci, Schirr, Silva & Trindade (2013), reveal that pain is one of the major contributors to malnutrition. Pain can be defined as an unpleasant physical sensation which is caused by illness or injury. Pain is a common issue especially among the elderly. As people grow older, it is common to get age-related chronic diseases as the body grows more frail. This means that pain is likely to increase. In most cases pain in the elderly is often undertreated or even not treated at all due to various factors. Some of these factors include the lack of training, lack of proper pain assessment and reluctance to prescribe the patient opioids. In addition, there are patients who are reluctant to say they are in pain since they think it is normal and physical disabilities such as being mute or not being able to speak which limit communication. Most elderly people either living in the community or nursing homes suffer from pain. There can be vast consequences of undertreated or untreated pain and these consequences have

adverse outcomes on the elderly. These consequences usually have a negative impact on the general health and quality of living for the person affected. One of these consequences is poor appetite leading to lack of eating and in the end this leads to malnutrition. It is therefore the duty of the nurse to carefully assess patients who suffer from pain and not to ignore the ones who say they do. Pain management can be crucial and effective in the overall treatment of malnutrition.

5.2.6 Managing social and functional issues

In the aged population, social and functional issues are major contributors to malnutrition. Factors such as low social economic status, limitations to normal functioning and isolation are some of the major contributors to malnutrition in the elderly. In addition, lack of money limits access to food rich in proper nutrients thus consumption of nutrition deficient food. Moreover, leaving alone means that the person is isolated and most of the times is alone at dinner time which is depressing. In most cases isolated elderly people end up not eating or cooking easy meals just to get their stomach full and not for the nutritional benefit. This increases their risk for malnutrition. Management of these issues should be approached in an individualistic type of approach since everyone has different social and functional issues. (Diego-Diez, Lorenzo-Lopez, Lopez-Lopez, Maseda, Millan-Calenti & Regueiro-Folgueira 2018.)

A study conducted by Esquivel (2018), reveals that one of the major ways to manage these issues is encouraging community care services to the patient. These community care services include services such as meals delivered to home, domestic assistance and senior day care facilities. These services prove beneficial to the elderly since they break the day -to-day routine and provide them with a platform where they have options. Meals delivered to their home and domestic assistance is helpful since they do not have to think of cooking meals which might be strenuous and a stressful physical activity for them. This is important to consider since some of them are bed ridden and lack physical capability. Senior day care facilities are facilities which are non-residential and support health, nutritional and social daily living needs of adults in a professional setting. This is beneficial in a major way since they can enjoy healthy nutritious meals in the company of other adults.

Another major strategy to combat social and functional issues is to encourage home visits. These home visits might vary from friends and family, nurse and service providers. It is important as a nurse to

communicate with the patient's family and friends constantly and ensure they have proper education on nutrition. In addition, it is important to encourage them to visit their loved one as much as possible and during these visits check if they have eaten or not. During these visits they can bring food, home cooked meals and family presence alone is of great importance since they do not feel alone. Home visits from nurses is also important. During these home visits, nurses should check on their daily meals if they have a diary, confirm if they have been eating and check whether the food is nutritious or not. The importance of these visits is to fight isolation and also ensure that food consumed is of nutritional value and benefit. (Diego-Diez, Lorenzo-Lopez, Lopez-Lopez, Maseda, Millan-Calenti & Regueiro-Folgueira 2018.)

Dietary and social supports are also helpful to overcome social and functional issues. Depending on the patients social economic status it might be helpful to recommend this patient to a dietician who has more knowledge in human nutrition and diet regulation. In addition, some adults do not know how to prepare proper meals due to different reasons. It is therefore essential to plan with the family or relatives on ways of offering cooking lessons to the patient. Likewise, some adults suffer from financial constraints and community meal programmes arranged in the community might be of help. An additional approach is Men's Shed which is a nonprofit organization in different countries meant to advice and help in the overall health of all men across the world. These Men's Shed mainly work on a local level and aim to promote better quality of life by emphasizing social interactions. Such organizations can be recommended since they promote both social and healthy living to the patient and overall change to his or her life with positive outcomes. (Diego-Diez et al. 2018.)

5.2.7 Encouraging exercising

Research conducted by Cominetti, Gomez-Cabrera, Ingles, Nascimento & Vina (2019), reveal that exercising and proper nutrition are effective in curbing malnutrition. Exercising or physical activity is beneficial since it helps by improving the general health and reduces the risk of developing diseases. Exercise is not a direct intervention to fight malnutrition; however, its benefits are still crucial when used with proper nutrition to build muscle and reverse symptoms of malnutrition.

Older adults suffer from sarcopenia which is gradual loss of muscle mass that happens over time and results in frailty and is linked to malnutrition. This is due to the fact that sarcopenia progresses with

malnutrition and vice versa. When someone becomes malnourished or frail this means that they have not been practicing good eating and exercising habits. It is therefore important to note that by maintaining healthy habits prevention of these conditions associated with malnutrition is possible. Proper exercise and a healthy well rounded diet are one the best methods to prevent malnutrition. Eating sufficient proteins throughout the day is beneficial while training since proteins are foods known to be rich in energy and help in the buildup of muscle. In addition, resistance training has been proved necessary in maximizing muscle mass and strength in the elderly. (Cominetti et al. 2019.)

Physical activities for adults can also be seen as a way to interact with other people and as a link to other social activities. This can be seen especially in senior resident homes where there are daily exercise routines arranged for everyone who has physical ability to participate in them. Exercise and proper nutrition are both equally important to fight malnutrition and improve general well being of the patient. Without proper nutrition it is hard to maintain or build muscle when exercising since the body lacks fuel to power through the workout. (Cominetti et al. 2019.)

5.2.8 Nutritional support and advice

According to study conducted by Esquivel (2018), nutritional therapy is one of the major components used in treatment of malnutrition in elderly patients. It is considered to be one of the most effective ways to treat malnutrition when used alongside other interventions such as social and medical interventions. Nutritional support and advice for the elderly can be offered in a variety of ways. One of the ways is the encouragement of flavor enhancers. Flavor enhancers are additives that are used to improve the flavor of food. It is well known that ageing might cause loss of some senses such as taste and smell. Loss of these senses result in lack of enjoyment of food which then results to the lack of consumption or decrease in consumption of food. This affects their nutritional status especially the elderly who are frail. Studies conducted; however, prove that adding flavor enhancers to food had major positive results in increasing appetite and overall weight in elderly across nursing resident homes.

An additional way of offering nutritional advice and support is through the recommendation of frequent small meals and snacks. These small snacks and meals can be in the form of sandwiches with high protein filings such as cheese, tuna or ham. Likewise they can have milk based puddings and drinks, fortified

soup, baked beans, scramble or boiled eggs and cheese snacks. It is important to recommend nutritious snacks which contain fruits, vegetables, whole grains, low fat dairy, nuts or seeds. This is because these snacks and small meals will most likely help the patient achieve their nutrient needs for the day. In addition the blood sugar remains steady thus the person has steady energy levels. (Esquivel et al. 2018.)

It is also important to ensure that the food offered suits the patient's needs in terms of chewing and swallowing ability. This is because problems with swallowing and chewing has adverse outcomes such as food getting stuck in the upper airway or entering the lungs which causes aspiration. In the long run they lead to malnutrition and can cause other problems such as dehydration and decreased desire to eat or drink. To ensure maximum consumption of the meal, nurses and the entire health team should offer assistance and advice the person in choosing the right food for his or herself which is both nutritious and simple when it comes to swallowing. (Esquivel et al. 2018.)

Due to different changes related with ageing the dietary requirements of senior adults differ from that of younger adults. It is noted that the protein requirements for senior adults is more and increases the more you age. The recommended protein intake for seniors is 1g protein per kg body weight or higher for elderly adults. The importance of proteins to the elderly should be emphasized and therefore nurses should suggest ways to increase protein and general energy intake in foods. This advice can be in the form of incorporation of milk, butter or cheese into foods such as soups, sandwiches or mashed potatoes. Moreover, includes the addition of milk based sauces such as custard and cheese sauce to fruits and vegetables. In addition to proteins it is important to add calcium rich foods per day, 3 to 5 servings of vegetables, 2 to 4 servings of fruit and 6 to 12 servings of bread, grain or cereals. (Esquivel et al. 2018.)

Due to various issues, sometimes the elderly have low appetites or bad moods causing poor eating. During such days, high energy protein supplements can be considered. Such supplements can be in the form of nutritional drinks such as protein shakes which are convenient and can meet the nutritional protein requirements for the day. In addition they can be in powder form and we can add them to foods such as soup, cereals and mashed potato. These supplements are crucial since they help someone to remain energetic during the day. Furthermore, lack of enough protein is associated to loss of muscle strength and functionality. Proper protein intake in elderly adults has been related to positive outcomes such as lean muscle mass and better physical performance. (Dyo, Goebel, Gorman, Harding & Levine 2016.)

The body requires a variety of different vitamins and minerals which prove useful in the development of the body and prevention of disease. These minerals and vitamins are known as micronutrients and since they cannot be produced by the body the only way of acquiring them is from food. Lack of these minerals and vitamins in the body are high indicators of malnutrition and they are many tests done in the lab to test which minerals or vitamins a person lacks in the body. Based on the lab results, once the nutrient deficiency has been identified it is crucial to replace it with a supplement or food alternatives rich in the lacking nutrients to curb malnutrition. However, sometimes trying to fulfill the nutritional needs through diet alone is impossible since these individuals might have increased requirements or inadequate intake due to diet restrictions or tolerances. Recommendations of micronutrient supplements such as vitamin D and vitamin B12 are therefore important in the treatment of malnutrition. (Page 2012.)

Research done by Mechanick & Via (2013), reveals that water is one of the major components of nutrition. Water is also an important nutrient that is required in the body to maintain its normal functions. Water is essential in the body since it is responsible in processes such as eliminations of wastes from the body, transportation, absorption, dissolving nutrients and many more. In addition, water makes up for 50 to 80 percent of our body weights depending on lean body mass. Therefore, water associated problems such as dehydration lead to loss of body weight. Lack of water is detrimental to our bodies and affects nearly all major organs. It is also associated with malnutrition therefore importance of water cannot be overemphasized.

5.2.9 Monitoring and reinforcement

It can be difficult for the elderly to change old habits and adopt new ones. This is due to variety of factors which range from cognitive impairments to poor eating habits. Due to this, it is important to employ an approach that also involves family, friends and even care takers to help reinforce and monitor the patient when the nurse is not around. Follow up and day-to-day monitoring is needed if necessary to help emphasize these nutritional interventions. Methods may include written advice such as sticky notes placed on the fridge which serve as a day to day reminder of the dietary advice. Moreover, keeping close contact to the relatives who might visit or call their loved ones is important. During regular phone calls they might check in to see if they have eaten or eaten or taken their supplements for the day. Furthermore, as a nurse

it is important to employ a multidisciplinary team management review which includes both registered nurses and assistant nurse. Additionally, it is important to monitor the patient's weight to see if weight gain is achieved and also record any changes on food intake. (Beck, Belqaid, Pohju & Rasmussen 2018.)

6 DISCUSSIONS AND CONCLUSION

Summary method was used to analyze and summarize both new and previous knowledge of the topic and give a broader view of how to prevent and treat malnutrition in the elderly. It also helped create awareness since a lot of malnutrition cases go untreated or undetected. The results of the study encompass a multidiscipline approach to the treatment and prevention measures. The findings of this study can be used to conduct further research on the subject. In addition it can be used by other nurses in health care settings. Ethics and reliability was also ensured throughout this thesis by carefully referencing each author for their work and carefully following Centria guidelines to ensure professionalism.

Studies showed that majority of older adults were more vulnerable to nutritional deficiencies since ageing is associated with different diseases and certain impairments. These may involve depressive symptoms, poor oral health, cognitive and physical decline and socio-economic changes. These factors are known to have an effect on the person and eventually cause changes to his or her nutrition. The studies also revealed that malnutrition can also appear regardless of good food consumption due to factors such as poor absorption of nutrients.

The prevalence of malnutrition is high in all health care settings and statistical data shows that the number of elderly people is suspected to rise in the near future. This means that the number of elderly adults in the future with a risk of being malnourished will rise. Malnutrition is associated with negative consequences such as increases in mortality, high costs of hospitalization, immune dysfunction, and decline in functional status among other problems. Moreover, studies showed that nutrition problems in adults often remain unaddressed in different settings.

The findings of the research revealed that both preventive and treatment measures were needed to curb malnutrition. Prevention was mainly emphasized since malnutrition is associated with adverse outcomes which create a financial burden to both the person and the economy. Screening was one of the methods revealed in the studies and studies showed that proper nutrition screening with nutrition intervention was associated with improved nutritional status of adults at risk for malnutrition.

Studies also revealed that common biochemical tests can be useful when there seems to be suspicions about malnutrition. These tests can include serum proteins such as albumin reactive proteins which are used to measure malnutrition. However, the author discovered that these tests cannot be fully relied on and it is advised that health professionals should only use them as indicators of malnutrition. Lab tests should be used with other additional data such as medical records, watching for physical signs, anthropometric measurements and evaluation of meal consumption. In addition, they must use their own assessment skills and critical thinking in the diagnosis for malnutrition.

Treatment measures were found to be effective but costly to both the hospital and affected adults. The findings of the research showed that management of underlying factors such as depression and conditions such as dysphagia was adequate in treating malnutrition. Furthermore, a nurse's role was seen to encourage the elderly to participate in more social activities to fight depression which was one of the risk factors for malnutrition. In addition, the role of the family was mentioned in the studies as more social contact with their loved ones. Social contact along with regular phone calls was one of the major methods used to encourage and remind the elderly on the importance of their daily nutritional needs.

A number of studies revealed the importance of nutritional support and advice to treat malnutrition. Some elderly adults may be misinformed or lack the proper nutritional education to cater for their daily needs. Henceforth, provision of nutrition articles and magazines and education on a balanced diet is important. In addition, assistance to the elderly who cannot eat by themselves and need assistance is important. Management of pain through medication and other interventions was also seen as important to boost moods and improve appetite.

Oral health was also emphasized in the studies and this included dentist visits, drinking water and changing dentures to ones that fit. Proper medication review and changing to better alternatives that suit the patient's needs was seen as beneficial. This was because some medications had side effects such as nausea and vomiting which in turn affected the patient's nutrition. The studies also showed the nurses role in monitoring the patient to see if he/she is following the nutritional plan and having regular exercises to build muscles and maintain a healthy body. In addition, food flavors to enhance the taste of foods and eating nutritional snacks were also effective in promoting eating among the elderly. Furthermore, proper review of dietary restrictions was recommended as a major effort to introduce new foods unfamiliar to the person that might have nutritional properties fit to meet the required needs. These prevention and

treatment measures are crucial to nurses and the whole health department in helping combat malnutrition which poses great threat in the future if not addressed.

It is important for nurses to remember that the older adults are more exposed to the risk of poor nutritional status due to the changes that come with ageing. Other factors that contribute are cognitive, psychological and social factors. Malnutrition leads to poor quality of life, is related with increased costs of health and the risk for mortality is increased. In addition, they should be aware of the important role they play in preventing malnutrition in all health care settings.

This study was meant to help all nurses working in the geriatric field on preventive and treatment measures of malnutrition related to the elderly. In addition, it was to create awareness on the untreated and undetected cases of the elderly who are suffering or are at a risk of malnutrition. In the future, hope is this might prevent unnecessary hospital health care costs and long hospitalization to patients which might have been avoided with the right interventions. The study was also aimed to promote proper training of nurses to encourage effective and precise health care plans and critical accessing tools. The author had a great learning experience while conducting research and also broadened his knowledge on the topic of malnutrition.

The results of this study have positive implications on proper methods to fight and eradicate malnutrition in the future. The aim is also to encourage further research on the subject since little research has been conducted on the topic. Future research should be directed towards the effectiveness of multidiscipline approach and team coordination to curb malnutrition .In addition is education of healthcare professionals on malnutrition and nutrition as a whole.

REFERENCES

- Agarwal, E., Isenring, E., Miller, M., Yaxley, A. 2013. Malnutrition in the elderly: A narrative review. *Maturitas* 76 296–302. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0378512213002491> Accessed on 2 April 2019.
- Aveyard, H. 2010. *Doing A Literature Review in Health And Social Care: A Practical Guide*. Chapter 1. Available: <https://centria.finna.fi/PrimoRecord/pci.vlebooksAH3721125> Accessed on 12 October 2019.
- Banks, M. 2017. Validated Malnutrition Screening and Assessment Tools: Comparison Guide. Dietitian/Nutritionists from the Nutrition Education Materials Online. Available at: https://www.health.qld.gov.au/_data/assets/.../hphe_scrn_tools.pdf Accessed on 20 April 2019.
- Barnova, I., Caro, S.D., Fragkos, K.C., Keane, N., Mehta, S.J., Pantoja, F., Patel, P.S., Samaan, M.A., Rahman, F. 2019. Refeeding syndrome in adults receiving total parenteral nutrition: An audit of practice at a tertiary UK centre. *Clinical Nutrition* Volume 38, Issue 3, Pages 1457-1463. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0261561418311865> Accessed on 14 May 2019.
- Bear D.E., Camprubi-Robles, M., Cederholm, T., Cruz-Jentoft, A.J., Landi, F., Malafarina, V., Welch, A.A. 2018. Muscle loss: The new malnutrition challenge in clinical practice. *Clinical Nutrition* 1-8. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0261561418325548> Accessed on 6 April 2019.
- Beck, A.M., Belqaid, K., Pohju, A., Rasmussen, H.H. 2018. Changes in nutritional routines at discharge in Scandinavia during a 10-year period: A follow-up survey. *Clinical Nutrition ESPEN* 28 148-152. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S2405457718302560> Accessed on 21 April 2019.
- Beeckman, D., Goossens, J., Hecke, A.V., Lancker, A.V., Vanderwee, K., Verhaeghe, S. 2012. The association between malnutrition and oral health status in elderly in long-term care facilities: A systematic review. *International Journal of Nursing Studies* 49 1568–1581. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0020748912001216> Accessed on 10 April 2019.
- Bischoff-Ferrari, H.A., Chocano-Bedoya, P.O., Egli, A., Freystätter, G., Staiger, R.D., Wiegand, A., Zieger, A. 2019. Association of depression with malnutrition, grip strength and impaired cognitive function among senior trauma patients. *Journal of Affective Disorders* 247 175–182. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0165032718316112> Accessed on 4 April 2019.
- Ballesteros-Pomar, M.D., Galindo, D.E.B., Luque, A.A., Martines, P.F., Sanchez, R. 2018. Clinical repercussions of dysphagia and malnutrition in the stroke patient. *Endocrinología, Diabetes y Nutrición* Volume 65, Issue 10, Pages 625-626. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S2530018018301549> Accessed on 11 May 2019.

Casey, M.C., O'Donoghue, M., Siddique, N., Walsh, J.B. 2017. Malnutrition in the elderly and its effects on bone health – A review. *Clinical Nutrition ESPEN* 21 31-39. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S2405457717300372> Accessed on 1 April 2019.

Cascio, B.L., Logomarsino, J.V. 2017. Evaluating the effectiveness of five screening tools used to identify malnutrition risk in hospitalized elderly: A systematic review. *Geriatric Nursing* 39 (2018) 95–102. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0197457217301957> Accessed on 7 May 2019.

Clinical Guidance. 2014. MEDICAL MANAGEMENT OF MALNUTRITION (UNDERNUTRITION). Available at: <https://www.bop.gov/resources/pdfs/malnutrition.pdf> Accessed on 10 May 2019.

Cominetti, M.R., Gomez-Cabrera, M.C., Ingles, M., Nascimento, C.M., Vina, J. 2019. Sarcopenia, frailty and their prevention by exercise. *Free Radical Biology and Medicine* 132 42–49. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0891584918314990> Accessed on 12 April 2019.

Diego-Diez, C., Lorenzo-Lopez, L., Lopez-Lopez, R., Maseda, A., Millan-Calenti, J.C., Regueiro-Folgueira, L. 2018. Quality of life, functional impairment and social factors as determinants of nutritional status in older adults: The VERISAÚDE study. *Clinical Nutrition* 37 993-999. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0261561417301486> Accessed on 11 April 2019.

Dyo, M., Goebel, J.R., Gorman, N., Harding, K.M., Levine, J. 2016. Early malnutrition screening and low cost protein supplementation in elderly patients admitted to a skilled nursing facility. *Applied Nursing Research* 31 29–33. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0897189715002359> Accessed on 13 April 2019.

Esquivel, M. 2017. Nutritional Assessment and Intervention to Prevent and Treat Malnutrition for Fall Risk Reduction in Elderly Populations. *American Journal of Lifestyle Medicine* volume 12 no 2, 107-112. Available at: <https://journals.sagepub.com/doi/abs/10.1177/1559827617742847> Accessed on 2 April 2019.

Gallucci, M.C., Schirr, R.A., Silva, P.B., Trindade, L.C.T. 2013. Prevalence of malnutrition and pain in patients admitted by the screening service of an oncologic hospital. Available at: http://www.scielo.br/scielo.php?pid=S1806-00132013000400006&script=sci_arttext&tlng=en Accessed on 11 April 2019.

Gamaletsou, M., Karageorgou, D., Panagiotakos, D.B., Poulia, K.A., Sipsas, N.V., Yannakoulia, M., Zampelas, A. 2012. Evaluation of the efficacy of six nutritional screening tools to predict malnutrition in the elderly. *Clinical Nutrition* 31 378-385. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0261561411002299> Accessed on 6 April 2019.

Green, J., Thorogood, N. 2010. Qualitative method for health research: Third edition. Available: https://books.google.fi/books?id=CnNEAgAAQBAJ&printsec=frontcover&hl=fi&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false Accessed on 9 October 2019.

Higgs, S., Howard, R., Satherley, R. 2015. Disordered eating practices in gastrointestinal disorders. *Appetite* Volume 84, Pages 240-250. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0195666314004851> Accessed on 14 May 2019.

Johnston, I.M., Nolan, J.D., Walters, J.R.F. 2015. Physiology of malabsorption. *Basic science* 193-199. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0263931915000411> Accessed on 10 April 2019.

Kim, S.R, Kwon, Y.S., Nho, J.H. 2014. Depression and appetite: predictors of malnutrition in gynecologic cancer. *Support Care Cancer* 22:3081–3088. Available at: <http://web.a.ebscohost.com.ezproxy.centria.fi/ehost/pdfviewer/pdfviewer?vid=7&sid=ba5588f0-1a20-4a97-b749-cdb772f64916%40sdc-v-sessmgr03> Accessed on 7 April 2019.

Lauretani, F., Maggio, M., Meschi, T., Pela, G., Tagliaferri, S. 2018. The risk of dysphagia is associated with malnutrition and poor functional outcomes in a large population of outpatient older individuals. *Clinical Nutrition* 1-6. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S026156141832555X> Accessed on 10 April 2019.

Lopez, R.P., Molony, S.L. 2017. Dementia: Weight Loss and Mealtime Challenges. *The Journal for Nurse Practitioners* 153-159. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S1555415517307869> Accessed on 8 April 2019.

Marinos, E. 2017. Defining, Recognizing, and Reporting Malnutrition. *Special Issue Review: Nutritional Supplementation in Chronic Wounds*. Available at: <https://journals-sagepub-com.ezproxy.centria.fi/doi/full/10.1177/1534734617733902> Accessed on 6 April 2019.

Mechanick, J.I., Via, M.A. 2013. Malnutrition, Dehydration, and Ancillary Feeding Options in Dysphagia Patients. *Otolaryngologic Clinics of North America* Volume 46, Issue 6, Pages 1059-1071. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S0030666513001059> Accessed on 21 April 2019.

Page, F. 2012. Oral Nutritional Supplements to Tackle Malnutrition. *Medical Nutrition International Industry* 2-273. Available at: <https://medicalnutritionindustry.com/files/user.../Dossier2012FINAL2012-09-04.pdf> Accessed on 20 April 2019.

Russell, M. 2019. Priority: Prevent, Identify, Treat Malnutrition. *Academy of Nutrition and Dietetics* 11. Available at: [https://jandonline.org/article/S2212-2672\(18\)32208-1/fulltext](https://jandonline.org/article/S2212-2672(18)32208-1/fulltext) Accessed on 7 May 2019.

Saunders, J., Smith, T., Stroud, M. 2018. Malnutrition and undernutrition. *Undernutrition* 152-158. Available at: <https://www-sciencedirect-com.ezproxy.centria.fi/science/article/pii/S1357303918303177> Accessed on 4 April 2019.

Suominen, M. 2007. Nutrition and Nutritional Care of Elderly People in Finnish Nursing Homes and Hospitals. Department of Applied Chemistry and Microbiology (Nutrition) University of Helsinki, Finland. Available at: <https://helda.helsinki.fi/bitstream/handle/10138/20785/nutritio.pdf?sequence=1> Accessed on 7 April 2019.

Wallace, M. 2018. The cost of malnutrition - predictions for the next 25 years. *Undernutrition 1-3*. Available at: <https://www.sciencedirect-com.ezproxy.centria.fi/science/article/pii/S1357303918303189> Accessed on 7 April 2019.

World Health Organization. 2018. Malnutrition. Available at: <https://www.who.int/news-room/fact-sheets/detail/malnutrition> Accessed on 3 April 2019.

APPENDICES

Title of the research	Authors	Source	Research methods	Key results
Evaluating the effectiveness of five screening tools used to identify malnutrition risk in hospitalized elderly:A systematic review	Cascio, B.L., Logomarsino, J.V. 2017.	Geriatric Nursing (2018) 95–102	Literature review	The study show four screening tools demonstrate more effectiveness in identifying malnutrition risk.
Malnutrition and undernutrition	Saunders, J., Smith, T., Stroud, M. 2018	Undernutrition 152-158.	Literature review	The study show that management of malnutrition is crucial in eradicating malnutrition.
Defining, Recognizing, and Reporting Malnutrition	Marinos, E. 2017	Special Issue Review: Nutritional Supplementation in Chronic Wounds	Literature review	Studies show that early diagnosis of malnutrition is key to managing malnutrition.
Nutrition and Nutritional Care of Elderly People in Finnish Nursing Homes	Suominen, M. 2007.	Department of Applied Chemistry and Microbiology (Nutrition) University	Literature review	Studies reveal the importance of nutrition and nutritional care of elderly people in day to day basis to

and Hospitals.		of Helsinki, Finland.		prevent malnutrition.
The cost of malnutrition - predictions for the next 25 years.	Wallace, M. 2018.	Undernutrition 1-3.	Literature review	This Study emphasize prevention and early treatment of malnutrition is important due to its cost and burden .
Depression and appetite: predictors of malnutrition in gynecologic cancer	Kim, S.R, Kwon, Y.S., Nho, J.H. 2014.	Support Care Cancer 3081–3088.	Descriptive cross-sectional design	The results revealed that depression and malnutrition are associated and depression should be managed in an effort to manage malnutrition.
Dementia: Weight Loss and Mealtime Challenges	Lopez, R.P., Molony, S.L. 2017	The Journal for Nurse Practitioners 153-159.	Evidence based	Study shows that association between dementia and malnutrition and importance of managing dementia .
The risk of dysphagia is associated with malnutrition and poor functional outcomes in a large population of outpatient older	Lauretani, F., Maggio, M., Meschi, T., Pela, G., Tagliaferri, S. 2018	Clinical Nutrition 1-6.	Statistical analysis	The results of the study show patients with dysphagia had malnutrition due to eating difficulties.

individuals.				
Physiology of malabsorption.	Johnston, I.M., Nolan, J.D., Walters, J.R.F. 2015.	Basic science 193-199.	Literature review	Study reveals that malabsorption can be underlying condition of malnutrition and should be managed.
Nutritional Assessment and Intervention to Prevent and Treat Malnutrition for Fall Risk Reduction in Elderly Populations.	Esquivel, M. 2017	American Journal of Lifestyle Medicine 107-112.	Review	Study reveals general importance of treating and managing malnutrition.
The association between malnutrition and oral health status in elderly in long-term care facilities: A systematic review.	Beeckman, D., Goossens, J., Hecke, A.V., Lancker, A.V., Vanderwee, K., Verhaeghe, S. 2012.	International Journal of Nursing Studies 1568–1581	Systematic review	Results revealed association between oral health and malnutrition in the elderly population.
Prevalence of malnutrition and pain in patients admitted by	Gallucci, M.C., Schirr, R.A., Silva, P.B., Trindade, L.C.T. 2013.		Prospective study	Results showed weight loss in elderly patients who suffered from severe to moderate

the screening service of an oncologic hospital.				pain.
Quality of life, functional impairment and social factors as determinants of nutritional status in older adults	Diego-Diez, C., Lorenzo-Lopez, L., Lopez-Lopez, R., Maseda, A., Millan-Calenti, J.C., Regueiro-Folgueira, L. 2018.	The VERISAÚDE study. Clinical Nutrition 993-999.	Cross sectional study	Studies showed that impaired social resources were strong determinants of malnutrition or risk of malnutrition.
Sarcopenia, frailty and their prevention by exercise.	Cominetti, M.R., Gomez-Cabrera, M.C., Ingles, M., Nascimento, C.M., Vina, J. 2019.	Free Radical Biology and Medicine 42–49.	Review	Study shows the importance of exercise in the fight of sarcopenia and frailty which are associated with malnutrition.
Early malnutrition screening and low cost protein supplementation in elderly patients admitted to a skilled nursing facility.	Dyo, M., Goebel, J.R., Gorman, N., Harding, K.M., Levine, J. 2016.	Applied Nursing Research 29–33.	Retrospective design	Results revealed that a protein supplement programme was one of the key methods used to treat malnutrition patients.
Oral Nutritional Supplements to Tackle Malnutrition	Page, F. 2012.	Medical Nutrition International Industry 2-273.	Summary booklet	Study reveals importance of oral supplements in treating

				malnourished patients
Malnutrition, Dehydration, and Ancillary Feeding Options in Dysphagia Patients.	Mechanick, J.I., Via, M.A. 2013	Otolaryngologic Clinics of North America 1059-1071.	Review	Studies reveal importance of water, dehydration and its relation to malnutrition.
Changes in nutritional routines at discharge in Scandinavia during a 10-year period: A follow-up survey.	Beck, A.M., Belqaid, K., Pohju, A., Rasmussen, H.H. 2018.	Clinical Nutrition ESPEN 148-152.	Survey	Results revealed positive development in countries who were effective in nutritional discharge routines.
Comparison Guide. Dietitian/ Nutritionists from the Nutrition Education Materials Online.	Banks, M. 2017.	Health		Results were used for comparison studies and as a support to related studies.
Priority: Prevent, Identify, Treat	Russell, M. 2019.	Academy of Nutrition		Studies were used as a guide to answer the questions how to prevent and

Malnutrition.		and Dietetics 11.		manage malnutrition.
Doing A Literature Review in Health And Social Care: A Practical Guide	Aveyard, H. 2010.	Electronic books		Studies were used as a guide to writing literature review.
Qualitative method for health research: Third edition	Green, J., Thorogood, N. 2010.	Electronic books.		Studied were used as a guide to writing summary.