

DEPRESSION AND MALNUTRITION AMONG ELDERLY IN LONG-TERM CARE - A Literature Review

Umesh Poudyal

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JYVÄSKYLÄN AMMATTIKORKEAKOULU
JAMK UNIVERSITY OF APPLIED SCIENCES



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Title DEPRESSION AND MALNUTRITION AMONG ELDERLY IN LONG-TERM CARE – A Literature Review		
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Abstract <p>Purpose of this study was to review elderly people with malnutrition in long-term care and to clarify whether there is relation between depression symptoms and malnutrition in elderly in long term care. The aim of this study was to gather information on the co-relation between depression and malnutrition in long-term care in elderly so that the quality of life status of the elderly can be improved.</p> <p>The study was conducted as a literature review and the data for the study was collected on April 2012. In the search strategy the data collection was based on the main issues of malnutrition and depression in elderly in long-term care. The data was searched from electronic databases. Ten scientific articles were eventually chosen for the review. The data was analyzed using a content analysis method.</p> <p>The study revealed that there was a strong association and co-relation between depression and malnutrition in elderly in long-term care. The result showed a bidirectional relation between depression and malnutrition. The affect was both individual and indirect.</p>		
Keywords depression, malnutrition, elderly, long-term care, literature review		

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1 INTRODUCTION

Physical dependency and institutionalization are common in older age. The risk of need of long term care increases with the age. (Atchley 1997, 8-9.) There has been an increase in mental disorders associated with old age. The increase is due to the fact that people are living longer and consequently are more likely to develop symptoms of mental disorder produced by ageing brain. (Matteson, McConnel and Linton 1997, 629-636; Aiken 1995, 155.)

There are many complications of malnutrition among institutionalized elderly. Among those complications depression is one. (Vellas, Garry & Guigoz, 1999, 133.) Depression in old age is not a normal reaction of ageing but rather it is a pathological process. Depression is the most common mental health problem among elderly. (Aiken 1995, 157; Matteson et al 1997, 629-636.) The risk of malnutrition and protein energy malnutrition is higher in older people who are living in hospitals and institutionalizations (Vellas, Garry and Guigoz, 199, 133). Depression can be the cause of generalized malnutrition. (Barker 1996, 132-133; Callen & Wells 2005, 141.)

In this thesis the term elderly is used to represent aged, elder and older people. The long -term care represents medical and non-medical care includes: all the health care services for elderly that need continuous follow-up care and treatment and cannot be alone at home.

Purpose of this study was to review elderly people with malnutrition in long-term care and to clarify whether there is relation between depression symptoms and malnutrition in elderly in long term care. The aim of this study is to gather information on the co-relation between depression and malnutrition in long-term care in elderly so that the quality of life status of the elderly can be improved.

2 ELDERLY AND LONG-TERM CARE

2.1 Aging and old age

Aging is referred to a process or group of processes takes place in living organisms which leads to a loss of adaptability, functional impairment, and eventually death. The process of aging refers to clinical symptoms and includes the effects of environment and disease. Aging process increase one's vulnerability to disease and environmental disease. Aging is the logical extension of growth and development, beginning with birth and ending with death. Spirduso (1995) has described the individuals older or old as sexagenarians aged 60-69, septuagenarians aged 70-79, octogenarians aged 80-89, nonagenarians 90-99 and centenarians aged more than 100 (Spirduso 1995, 6-8).

There are four interrelated aspects of aging which are physical aging, psychological aging, social psychological aging and social aging. Human aging is described as physical changes over adult life, psychological changes in the minds and social psychological changes in what the individuals think and believe, and social changes in how individuals are viewed, what individual can expect and what is expected from the individuals. (Atchley 1997, 3.)

Different countries have different variations of age to define "An older person". Thus, the definition of "an older person" varies country wise. Throughout the European Union the standard age of eligibility to pension is 65 years for both men and women. Hence, an individual who is eligible to pension is define as "An older person" in European Union member countries. (Hankey & Leslie 2011,286.)

The old age is characterized by physical weakness, disabling chronic disease, prevalence of organic brain disease and mental retardation. The onset of old age occurs in the individuals in the 70 years of age. However, many individuals indicate

few characteristics of old age when they are at 80 or 90 years of age. Atchley (1997) used the terms aged, elderly, elder and older people for individuals age 65 and over. During the old age, activity of the individuals is greatly restricted and the social networks destroyed by the deaths of friends and relatives and by the individual's own disabilities. Physical dependency and institutionalization are common in older age. (Atchley 1997,8-9.)

2.2 Long term care

Long term care is a comprehensive service which provides health and functional needs to individuals over an extended period of time. The risk of need of long term care increases with the age. Thus, the older people age 65 or over account for needing long term care because of the effects of chronic conditions. Hence, the individuals requiring long term care are circumscribed by disability, chronic illness, or trauma. Long term care includes medical and non-medical care; provides assistance with the functional activities such as basic activities of daily living (ADLs) and instrumental activities of daily living (IADLA) which are necessary for life and independence. Long-term care services are provided in home, community, residential and institutional living. (Kouch 2009, 2-3.)

According to European Union, institutional care includes both short term care and long term care in old people nursing homes and in nursing homes. Long-term care lasts more than three months. Long-term institutional care is organized by many different sectors such as municipalities, private service providers, foundations and associations. Long-term care is facilitated by nursing homes, service centers, health centers and a variety of inpatient care in nursing homes or psychiatric hospitals. Long-term care provides medical and social services to the individuals who need help with basic activities of daily living, caused by chronic conditions of physical or mental disability (Health-EU 2012). Long-term care is meant for elderly and the sick that need continuous follow-up care and treatment and do not effort to be alone at home (Suomi.fi 2011).

3 ELDERLY AND DEPRESSION

3.1 Depression

Depression is a term that includes major depressive disorder, minor depressive disorder and dysthymic disorder. Major Depressive Disorder (MDD) is also known as major depression. American Psychiatric Association Diagnostic and Statistical Manual of Mental disorders (DSM-IV) , has been characterized MDD as having depressed mood for at least two weeks and loss of interest along with four additional symptoms of distress causing functional impairment. Depressive Disorder (MDD) includes symptoms like a depressed mood or loss of interest nearly every day for the same two week period. The symptoms such as: Tiredness or lack of energy, sad mood most of the day, insomnia or hypersomnia , lack of concentration, changes in appetite, weight loss, inactive, suicidal tendency, feeling worthlessness, psychomotor retardation. (Kouch 2009, 6-8.)

DSM-IV describes minor depressive disorder as identical to Major Depressive Episodes but involve fewer symptoms and less functional impairment. Whereas, Dysthymic disorder is more chronic than major depression. Usually, people having dysthymia are chronically depressed for at least 2 years. The person having dysthymia feels does not feel good and is unable to function at full steam. Sometimes, people with dysthymia also experience episodes of major depression. This combination of the two types of depression is referred to as double-depression. (Kouch 2009,6-8; Kring, Davision, Neale & Johnson 2007, 231.)

Dysthymia is characterized by blue mood or depressed mood, and other symptoms are present at least for half of the time for at least 2 years. During that time at least two of the following symptoms must be seen in the person having dysthymia such as: over eating or poor appetite, sleeping too much or too little, low energy , poor self stem, hopelessness, trouble in making decision or concentrating. These symptoms do not get clear at least for 2 months. Genetic, psychological and

environment factors are involved in developing the symptoms of depression. Family history of bipolar disorder is more likely to associate with depression symptoms. Furthermore, a significant loss, change in life pattern, acute illness, frequent arguments, difficulties in relationship, divorce, unemployment and financial problem may develop depression symptoms. Beside, inadequate skills to cope with the stress may result to depression symptoms. The level of the neurotransmitters such as dopamine, serotonin and nor epinephrine is some way related to depression. (Kring et al 2007, 230-253.)

3.1 Depression in elderly

Depression is a clinical syndrome having specific diagnosis criteria. The disorder is characterized by sadness, low mood, pessimism about the future, self-criticism and self-blames retardation or agitation, slow thinking, difficulty concentrating and appetite and sleep disturbances. In general the term depression is used in elderly people to mean depressive symptoms because they may not meet the diagnosis criteria. The depressed mood describe in the diagnostic criteria of clinical depression may differ from the depressed mood in elderly that includes several affective responses such as anxiety, irritability etc. (Zauszniewski, Morris, Preechawong & Chang 2005, 60; Aiken 1995, 155; Matteson McConnel and Linton 1997, 629-636; Fulbright 2010, 386; Waugh 2006, 27.) In older people, it can be difficult to diagnose depression because it appears along other mental and physical illnesses (Waugh 2006, 29). Thus, depression has been usually viewed as under diagnosed in older people (Gaboda, Lucas, Siegel, Kalay & Crystal 2011, 673).

Elderly are more responsive to treatment of illness. The most prevalent psychiatrist disorders in later life are depressive syndromes and dementias. In later life depression is the most common mental disorder with a prevalence range from 10 to 25 percent. The multiple of internal and external causes leads to depression in late life. The depression in late life is related biological factors, physical factors, psychological processes and social cultural influences. Hence, it is regarded as a

cause of physical disability in elderly. (Aiken 1995, 155; Matteson et al. 1997, 629-636; Fulbright 2010, 386; Waugh 2006, 27.)

Depression in old age is not a normal reaction of ageing but rather it is a pathological process. Depression is the most common mental health problem among elderly. Problems of health and disability are a common cause of depression among older adult, but bereavement, retirement, and relocation are apparently not as important in precipitating depression as one might think. The intensity of depressive states varies from relatively mild reactions to specific situational factors like physical problem and institutionalization. (Aiken 1995, 157; Matteson et al 1997, 629-636.)

There has been an increase in mental disorders associated with old age. The increase is due to the fact that people are living longer and consequently are more likely to develop symptoms of mental disorder produced by ageing brain. (Matteson et al. 1997, 629-636; Aiken 1995, 155.) In United States and in Finland depression is the most common mental disorder among elderly people (Zauszniewski, et al. 2005. 59; Virtanen 2007).

Depression in elderly is leading cause of disability after heart disease. Some community studies have reported that more than eighteen per cent of the individuals over the age of 65 years are affected by depression annually. In addition, ten to twenty-five percent of elderly are with the symptoms of depression. It has been identified that depression is as a major health concern and is one of the top two conditions for quality improvement among elderly. Thus, depression is a major health care concern among frail elderly. Prevalence of depression in elderly ranges from fifteen to 36.8 percent. (Fulbright 2010, 386; Waugh 2006, 27.)

3.2 Assessment of depression in elderly

There are many instruments for the assessment of depression. However, GDS (Geriatric Depression Scale) is the most widely used and has been tested with the elderly population. Thus, assessment of depression can be done by using GDS which is a self-report scale designed by Yesavage, Brink, Rose, Lum, Huang, Adey and Leirer. GDS is simple to administer and do not require the skills of a trained interviewer. The scale includes 30 questions to answer yes or no. The scores depend on each answer. The most common version of the scale that includes 15 items has been devise by Shiek & Yesavage. (Matteson et al. 1997, 636; Yesavage, Brink, Rose, Lum, Huang, Adey & Leirer 1983, 37; Burns, Lawlor & Craig 2002,163.)

The scale that includes 30 questions is a Long Form GDS. On the other hand, scale including 15 questions is a Short Form GDS. The Short Form GDS is more easy to use with cognitively impairment elderly and does not take long duration of time. GDS has been used in acute, community and long-term care settings. It is used with both healthy and cognitively impaired elderly population. The validity and reliability of GDS have been supported through clinical practice and research. Moreover, it is useful screening tool for the assessment of depression in elderly in various clinical settings. Thus, GDS may be used to monitor depression over time among elderly in all clinical settings. Depending on age, education and complaints scores of 0-4 are considered as normal. However, scores between 5 and 8 is considered as mild depression. Moreover, scores of 9-11 suggests moderate depression and 12-15 indicates severe depression. (Kurlowic & Greenberg 2007.)

3.2 Depression in long-term care

Fifty percent of elderly people in long-term care experience depression (Zauszniewski, et al. 2005. 59). Depression disorder has high prevalence in institutional care causing disability in frail elderly which is often overlooked, under diagnosed and under treated. Up to 35% of residents in long-term care facilities may

experience either major depression or clinically significant depressive symptoms in long-term care facilities. In long-term symptoms of depression are often under diagnosed for at least two reasons. One reason is that the focus of physicians and nursing personnel is not on depression. The other reason is that depression is frequently combined with other problems like cognitive impairment, medical illness and functional impairment that are common in long-term care. (Thakur & Blazer 2008, 82-86.) Furthermore, eighteen per cent of the individuals living in the nursing homes over the age of 65 years are affected by depression annually. (Fulbright 2010, 386; Waugh 2006, 27.).

Furthermore, depression in Long-term care in elderly is associated with dependence in basic activities of daily living. The relation between symptoms of depression and health status are mingled by social support and nutritional status, both of which result depression and poor outcomes in elderly. In addition, the use of standard criteria for major depression may result into underdiagnosis of depressive disorder in elderly in long-term care. Hence, even in the absence of major depression in elderly, the symptoms of depression along can lead into worse out comes in long-term care among older people. (Covinsky, Fortinsky, Palmer, Kresevic & Landefeld 1997, 422-424.)

3.3 Nurses' role in the recognition of depression in elderly in long-term care

Depression should be well recognized by multidisciplinary team for the treatment of depression in elderly in Long term. In Long term care, information is generally provided by nurses and nursing assistants. Usually, nurses are the most prevalence disciplines in long term care. They have a very close contact with the elderly people who are residing in Long term care. Hence, nurses have greater opportunity to recognize the symptoms of depression in elderly. (Brühl, Luijendijk & Muller 2007, 441.)

Although, nurses and nursing assistants do not diagnose depressive symptoms but they play a significant role in observing the mental and emotional status and behavioral pattern of the elderly. Moreover, they report the physical and psychological well being of the elderly to the doctor in charge. The multidisciplinary approach is very important for the identification of depression in elderly. Furthermore, nurses and nursing assistant should have the adequate knowledge of assessing the depression among elderly in long term care in order to prevent the prevalence of depression in elderly in long-term care. (Brühl et al. 2007, 441.)

4 ELDERLY AND MALNUTRITION

4.1 Nutrition in elderly

Nutrition is the process of receiving and using the nutrients through the process of digestion and absorption from the environment by the living organism, in order to promote vital activities. The nutrients are classified as protein, fat, carbohydrate, minerals, vitamins and water. (Barker 1996, 3.) Nutrition can be one of the factors affecting the health of elderly .The effect of illness in elderly leads to a poor nutritional status. Nutritional decline may be disregarded in elderly because of their symptoms for example, muscle wasting and weight loss are, considered to be the process of ageing. However, the aging process can cause nutrition decline. The physiological factors such as: altered gastro -intestinal, esophageal motility leads to less secretion of saliva and causing impaired swallowing, dry mouth, ill fitting dentures, sensory changes, medications like diuretics, anticonvulsants and anti depressants may lead to nutritional decline in elderly. (Holmes 2008, 49.) Hence, nutritional status in elderly is influenced by health, chronic disorders, immobility, psychological and socio-economies issues. Moreover, institutionalization effect on eating behavior of the elderly. Lack of homely environment, structured institution routine may result in reduced appetite or loss of interest in food. (Murray 2006, 19.)

Body Mass Index (BMI) is a simple index consists of weight-for-height that is commonly used to classify underweight, overweight and obesity. It is defined as the weight in kilograms divided by the square of the height in meters (WHO 2012.) The current Body Mass Index categorized by WHO is applicable to adults across the age range where under nutrition is defined as a BMI less than 18.5 kg/m² (Hankey & Leslie 2011, 286).The world Health Organization (1998) classifies normal weight as a BMI of 18.5–24.9 kg/m², overweight as 25–29.9 kg/m² and obesity as ≥ 30 kg/m². In elderly, a BMI reference range of 20-25 kg/m² is used to determine under nutrition. (Cook, Kirk, Lawrenson & Sandford 2005, 314-315.)

However, BMI is not an appropriate tool to use for determining underweight in elderly. Absolute error might be possible in elderly because of their body composition. Stature of the individuals depends on age. As the age increases stature decreases because of senile kyphosis, shortening of the spinal vertebrae and thinning of weight bearing cartilages. Moreover, measurement of standard height can be difficult to obtain in elderly because of frailty or spinal deformity. Elderly may have poor movements of their arms and unable to extend their arms horizontally so error can be possible regarding mid-arm circumferences. Thus, malnutrition can be detected in the elderly by the percentage weight loss than by BMI or mid-arm muscle circumferences. (Cook et al. 2005, 314-315.)

Loss of lean body mass and loss of fat mass cannot be distinguished by using BMI. Moreover, BMI is not an indicator of protein-energy malnutrition. Comparison of current weight with usual body weight is a sensitive and personal measure and is less likely to be diluted and misinterpreted, as may occur when calculating BMI. Converting weight to a BMI using a height or proxy needs additional time and equipments, and error can be possible. When assessing under nutrition in individual elderly the use of BMI is not recommended. Disease history and physical changes including weight measurement need to be considered when assessing malnutrition in elderly. . Hence, measurements of weight and weight change over a period of time

are sensitive measures to determine malnutrition in elderly. (Cook et al. 2005, 315-316.)

In older people, ageing can accompany with degenerative changes which includes loss of sensations of smell and taste, deafness, poor sight, osteoarthritis, osteoporosis arterial diseases, reduction of glucose tolerance and decline in muscle bulk and strength. Elderly people are vulnerable to the disease as the age increases which reduce appetite and food intake. The nutritional requirement varies to the elderly individual. It is same as of the younger people but varies in less energy and needs high nutritional quality. (Barker 1996, 130-131.)

4.2 Malnutrition in elderly

Malnutrition is inadequate amount of one or more nutrients (Barker 1996, 3.) In addition, it is defined as under nutrition, over nutrition or imbalance nutrition. In elderly people malnutrition or weight loss is frequently underestimated. However, malnutrition can be controlled and managed by early nutrition intervention. (Sampson 2009, 507). The risk of malnutrition and protein energy malnutrition is higher in older people who are living in hospitals and institutionalizations (Vellas, Garry and Guigoz, 199, 133). Malnutrition in elderly can be generalized malnutrition, deficiency of a specific nutrient and subclinical malnutrition. Depression can be the cause of malnutrition. The lack of adequate supplies of several nutrients is the characteristics of generalized malnutrition. The risk of malnutrition is associated with the increase frailty of extreme old age. Malnutrition in the elderly is precipitated by other social, physical or medical problems. The common causes of malnutrition are such as social isolation and loneliness, loss of appetite, mental disturbances, physical disability, therapeutic diets, teeth and dysphagia. Swallowing problem is also known as dysphagia. (Barker 1996, 132-133; Callen & Wells 2005, 141; Robbins, Langmore, Hind & Erlichman 2002, 543.)

In addition, there are the ranges of social, environment and physical factors that influence the nutrition intake of elderly people especially in the institutions where elderly people are being cared by the health professionals. At least 26 factors have involved in making the elderly people at the risk of malnutrition who are residing in institutions. Factors such as monotonous menu, poor presentation of food, rushed meal, no help in feeding, lack of fiber-rich of foods in menu, lack of food containing vitamin D, lack of food containing vitamin c, poor cooking method and no involvement of residents in menu planning. Three main risk factors that make elderly vulnerable to malnutrition is on the Table1. However, depression is the greatest factor for causing weight loss in elderly people. Hence, there is an existence of independent relationship between nutritional deficiency and depression. (Sampson 2009, 509; Barker 1996, 135-137.)

TABLE 1 Risk factors for malnutrition

Physical	Social	Medical
Anorexia	Financial restraints, poverty	Polypharmacy
Lost taste and smell	Limited knowledge and skills in food, nutrition and cooking	Drug nutrient interactions and adverse effects
Poor dentition		
Dysphagia	Living alone, social isolation, loneliness	Infections
Texture modified diets and thickened fluids	Reduced mobility and lack of transport	Fractures
Early satiety	Lack of assistance with ADL	Wounds and pressure sores
Physical impairment restricting activities of daily living (ADL) and ability to self feed	Restrictive diets (eg. Vegetarian, halal, kosher, low fat)	Dementia
		Depression
Unintentional weight loss	Excessive alcohol intake	
Muscle wastage		

(Sampson 2009, 508.)

4.3 Assessment of Nutritional status in elderly

Nutritional assessment is the measurement of nutritional status based on anthropometric and biochemical data, and dietary history (Barker 1996, 3). Institutionalized elderly seem to be more affected by malnutrition than independently living elderly. More than fifty percent of elderly living in hospitals or nursing homes gets affected by malnutrition. (Sampson 2009, 508.) Hence, malnutrition is a frequent condition that occurs in elderly which is associated with increased morbidity, mortality, institutionalization and a lower quality of life. However, malnutrition is related to institutionalization and covers more than forty percent of elderly persons. (Drescher, Singler, Ulrich, Koller, Christ-Crain & Kressig 2010, 887.) Several multidisciplinary nutrition support teams are working in the institutions to maintain and assess the best possible nutrients status among elderly (Vellas et al 1999, 133).

There are several screening and assessment tools for malnutrition. The most established tool for screening nutritional status in elderly is the Mini-nutritional assessment (MNA), which is developed in 1994. MNA includes six items, where as further assessment of the nutritional status is based on twelve additional items. The additional items predict mortality and functional status in geriatric patients. Furthermore, the nutritional risk screening 2002 (NRS) has been in used universally as a screening tool for malnutrition. It is used in institutionalized patients by assessing body mass index, weight (BMI), weight loss, appetite and severity of disease. NRS screening tools is applicable in nearly all patients and takes less time to perform. (Dresher et al. 2010, 887-888.)

4.4 Nurses' role in nutritional care of elderly in long-term care

Long –term care provide enough energy and nutrients. However, more than forty per cent foods are wastage. The food wastage results in energy and protein intake less than eighty per cent of that recommended intake level. It has been reported that

elderly patients do not receive enough assistance during mealtimes and most of the portion of the food are left uneaten. Nurses often tend to overestimate elderly actual food intake. In addition, they often seem to overlook the poor nutritional status and nutrition deficiency of elderly in long-term care. Thus, there is a lack of documentation about the nutrition deficiency of elderly in long-term care. Nurses' inadequate knowledge about nutritional issues may affect the nutritional status of elderly and results malnutrition in elderly. Absence of nurses during the mealtimes may have an effect in elderly to poor intake. (Suominen 2007, 17-50.)

Improper eating position of the elderly may result into the poor intake of food. Careful attention must be paid by nurses and other care givers to positioning the elderly who needs feeding. In addition, Nurses should instruct the elderly with sensory impairment to swallow the food. Nurses need to recognize the importance of normalizing food intake. Failure to provide nourishment to the elderly in a normal manner by the nurses fosters under nutrition. (Matteson et al. 1997, 779.)

Nurses are additional factors that influence nutritional status of elderly who can assess the ability of elderly to chew and swallow foods. In addition, nurses help elderly in feeding and provide assistance in the process of eating. Thus, Nurses have a significant role in influencing the nutritional status of elderly. (Evans 2005, 4-5.)

5 PURPOSE AND AIM OF THE STUDY

Purpose of this study was to review elderly people with malnutrition in long-term care and to clarify whether there is relation between depression symptoms and malnutrition in elderly in long term care. The aim of this study was to gather information on the co-relation between depression and malnutrition in long-term care in elderly so that the quality of life status of the elderly can be improved.

1. Does depression have an effect on malnutrition in elderly in long term care?

2. Does malnutrition have an effect on depression in elderly in long term care?

6 CONDUCTING THE LITERATURE REVIEW

6.1 Method

This thesis is based on the method of literature review. Literature review evaluates and interprets all available research evidence relevant to a particular question. Literature review systematically identifies, assesses the quality and synthesizes the result of the article. Systematic literature review is widely used to accomplish evidence-based decision making. In addition, it helps to solve the question about the effectiveness of health care interventions. Thus the literature review is a method of locating, evaluating the quality of the articles and synthesizing them. (Glasziou 2001,1; Petticrew 2001,98.)

In health care services systematic review has an important role in evidence-based approaches and in decision making. On the other hand it enables information and research about health and social care to be viewed within its particular contexts and set amid other similar information. Literature review helps the health personnel to implement the recent developments and research on any health topics in their professional lives. (Petticrew 2001,98-99; Aveyard 2010,5-6.)

In literature review databases and original articles are assessed and retrieved. Full protocol is written in advance and in details while conducting the literature review. The questions are framed and the appropriate methods are chosen. The features of the questions are expressed as an aim. The research questions determine the process of conducting the review and help to refine the ideas of the review into a set of precise objectives. The research questions are expanded into of full protocol later which forms method section of the review. The databases are searched by using the different search terms. The original articles are retrieved. Relevant data is extracted on outcomes and quality. The appropriate articles are chosen for the review. The

results of the articles are written. Finally the discussions and conclusion are made. (Aveyard 2010, 10; White& Schmidt 2005, 56-59.)

6.2 Data collection

The electronic searching process was conducted on April 2012. In the initial stage of the searching process, the keywords were created and combined by examining the different combinations in different databases. The combined keywords were divided into three parts which includes: “Long-term care AND Malnutrition AND Depression”, “Old AND Malnutrition AND Depression”, and “Elderly AND Malnutrition and Depression”. The electronic search was carried using the databases Ebsco, SciVerse and Cambridge Journals Online. The articles available as free full text were only searched. The articles published between years 1999-2012 were searched.

6.3 Article selection

The selection of the articles was done thoroughly. The articles were selected based on the topics of this review. The focus was on depression and malnutrition among elderly in long term care. The articles related to those terms were chosen. Articles that fulfill the criteria by topics were chosen first. Secondly, the articles were chosen based on abstract that relates and fulfill the criteria of the topics. Lastly, the articles were chosen by full texts that fulfill the criteria of the topics.

TABLE 2. Criteria for articles

- The Scientific Journal articles addressing the keywords relating to the research questions
- Article written in English
- No literature reviews
- The articles available as free full text

Altogether 1929 articles were found. The articles had to address both depression and malnutrition in elderly or malnutrition associate with depression in elderly in long –term care. Many articles were excluded. The excluded articles were addressing either depression or malnutrition in long term care in elderly. The focus of this review was on the association of malnutrition with depression among elderly in long term care. Thus, the articles addressing malnutrition associated cognitive disease such as: Delirium, Alzheimer’s and dementia, gastro-intestinal disease, malabsorption syndrome and chronic infection, psychotropic medications and old related disease were excluded. There was an article about home-living older population. It was included because of the association of malnutrition and depression in elderly. In addition, the article showing the association of swallowing and depression was also included because swallowing is a risk of malnutrition.

In the selection process 14 articles were found. Duplicated articles of those were excluded. Finally, 10 articles were selected for the literature review. The process of the selection of the article is mentioned on the table 2-4.

TABLE 3. Searched database: EBSCO

Keywords	Results	Chosen by topic	Chosen by abstract	Chosen by full text
Long-term care AND Malnutrition AND Depression	2	1	1	1
Old AND Malnutrition AND Depression	8	5	4	2
Elderly AND Malnutrition AND Depression	10	5	4	1

TABLE 4. Searched from database: SCIVERSE

Keywords	Results	Chosen by topic	Chosen by abstract	Chosen by full text
Long-term care AND Malnutrition AND Depression	192	12	1	1
Old AND Malnutrition AND Depression	266	9	2	2
Elderly AND Malnutrition AND Depression	323	35	3	3

TABLE 5. Searched from database: Cambridge Journal Online

Keywords	Results	Chosen by topic	Chosen by abstract	Chosen by full text
Long-term care AND Malnutrition AND Depression	58	5	2	1
Old AND Malnutrition AND Depression	516	7	6	1
Elderly AND Malnutrition AND Depression	554	13	5	2

6.4 Analysis and synthesis

The selected articles were published between the years 2005 and 2011 in the following journals: Journal of Advanced Nursing, Journal of Clinical Nursing, Journal of the American Geriatrics Society, Journal of BMC Psychiatry, The European e-Journal of Clinical Nutrition and Metabolism, Journal of Clinical Nutrition and British Journal of Nutrition. The studies had done in Taiwan, Sweden, United States of America, Norway, Finland, Turkey, Australia and German following the various study designs. The study methods of the articles were cross-sectional studies (n=6),

longitudinal aging study (n=1), qualitative study (n=1), prospective longitudinal study (n=1) and prospective cohort study (n=1).

There are no any applicable technical tools for the analysis of qualitative data. On the other hand, there are different perspectives and approaches to handle the data in systematic way. There are many alternatives to do the analysis of the data. The analysis needs to break down, disassemble, assemble, defragment, supplements - divide and rule. The process of dividing the full data into smaller parts is coding. Coding is useful for structuring the data and reviewing them. The aim was to compress the data in order to understand and interpret how the data could answer to research questions. (Saaranen-Kauppinen & Puusniekka 2006.)

Synthesis of the studies involves the combination of facts extracted from the studies using appropriate techniques, whether quantities, qualitative or, both. It is possible to combine different analysis approaches freely, the main point is to explain and justify the selection that has been done. Synthesis of qualitative literature can be separated and divided into the various stages. The explanation makes the research credible and as reliable as possible. The process is controlled continuously by the research problem. (Saaranen-Kauppinen & Puusniekka 2006; Okoli &Schabram 2010, 6, 31.) The qualitative synthesis is well established in social sciences and information systems. However, it is used for mapping all provided information to evaluate the data, fit it according to the one's review and structuring the review. In addition, the synthesis is also described as transitioning the data from an author to concept-centric focus. The analysis of qualitative material synthesis by interpretation and explanation. (Okoli &Schabram 2010, 31-32.)

The articles have been analyzed following the process of literature review. In the beginning, the selected articles were printed out and read thoroughly. Purpose, aim and method of the studies were marked by different colored pens. The information gathered from the studies was collected to APPENDIX 1. Qualitative synthesis was

made. The factors of the association of depression and malnutrition were marked with colorful pen and collected to the APPENDIX 2. The factors were created as groups and categorized as classes. Thus, two different aspects of affects were found. These aspects were titled as co-relation between depression and malnutrition and mechanism of affects. Further, the chart of co-relation of depression and malnutrition (Tables 6) and mechanism affects (Tables 7) were made.

7 RESULTS

All the articles (n=10) showed depression malnutrition in elderly. Most of the articles (n=9) showed depression and malnutrition in elderly in long-term care. One of the articles (n=1) has been chosen that showed associations between depression and malnutrition.

7.1 Depression and malnutrition co-relation

All the articles (n=10) re-marked the co-relation between depression and malnutrition. Depression associated strongly to malnutrition (n=2). In addition, Depression was strongly associated with the risk of malnutrition (n=1) and depression was the important prediction of malnutrition (n=1). Depression was important predictor of malnutrition (n=1). It was possible to find out the risk for forthcoming malnutrition and strategies for preventing malnutrition (MNA < 24) when combined with symptoms of depression (GDS-20 > 5) (Johansson, Bachrach-Lindström, Carstensen & Ek 2005, 1362).

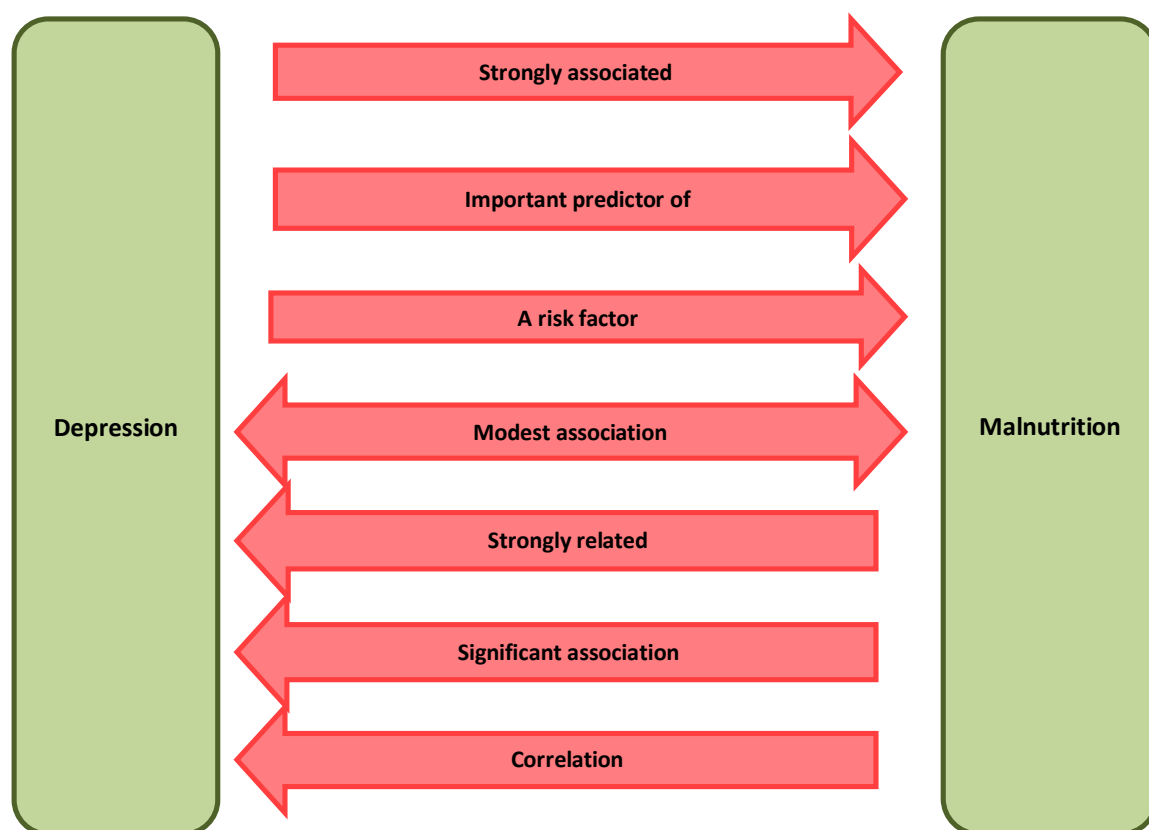
The SCL-10 symptoms showed that there was a significant association for developing risk of malnutrition among men and women (Kvamme, Grønli, Florholmen & Jacobsen 2011, 5). Furthermore men with symptoms of depression had higher risk of developing malnutrition. (Johansson et al. 2005. 1363). The relationship between BMI (Body Mass Index) and the proportion of individuals including men and women with significant SCL-10 symptoms (SCL-10 score ≥ 1.85) has been found (Kvamme et

al. 2011,5). SCL-10 is the Hopkins Symptoms Checklist-10 that has been used to find out symptoms of anxiety and depression (Kvamme et al. 2011, 3).

Malnutrition was strongly related to depression (n=1). Nutritional status was co-related to geriatric syndromes includes depression (n=1). Malnutrition had a significant association to depression (n=3). Malnutrition had a co-relation with depression (n=1). Nutritional status was significantly associated with PWB. There was a higher MNA score which was a significant predictor of the highest class of PWB (PWB \geq 0.80) PWB is defined as Psychological well-being which consists of one dimension of QOL. QOL (Quality of Life) is multidimensional concept. (Muurinen, Soini, Suominen & Pitkälä 2010, e26.) There was increased number of geriatrics syndromes resulting low MNA score. Geriatric syndrome includes visual disturbances, hearing loss, incontinence of urinary and fecal, psychosis, dementia, neurological disorder, diabetes, dizziness, falls, insomnia along with depression. (Saka, Kaya, Ozturk, Erten & Karan 2010, 746-747.)

Depression and malnutrition had modest association (n=1) to each others. GDS and malnutrition (MNA) had significantly co-related (Smoliner, Norman, Wagner, Hartig, Lochs & Pirlich 2009, 1665). A relation between depression and malnutrition is mentioned on the Table 6.

TABLE 6 Co-relation between depression and malnutrition



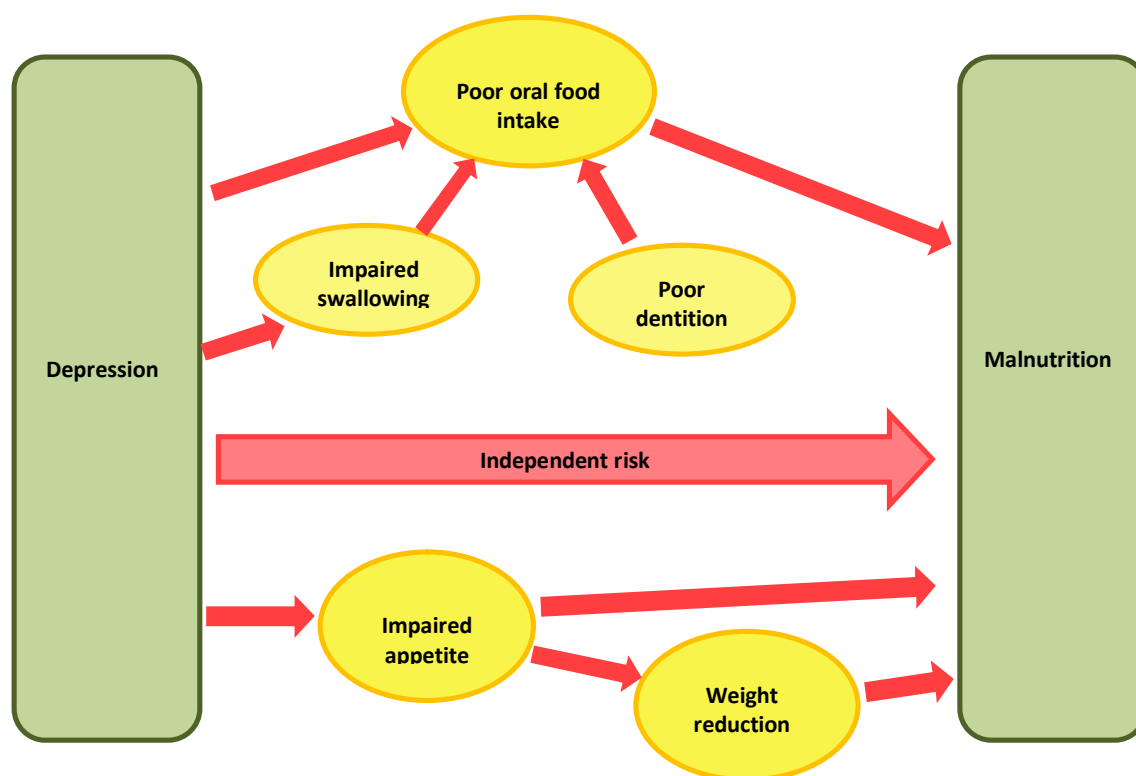
7.2 Affects of depression and malnutrition

The affect of depression was both direct and indirect related to malnutrition. Risk of malnutrition was possible to find out when combined with depression (n=1)

Depression was the risk factor for the poor oral intake (n=3) and impaired swallowing (n=1). In addition, impaired swallowing and poor dentition (n=1) decreased oral food intake. Thus, poor oral food intake was the risk of malnutrition.

Depression affected impaired appetite (n=4). Poor appetite had an effect on weight reduction (n=2) that resulted into malnutrition. Depression had an independent risk of malnutrition (n=1).

TABLE 7 Mechanism of Affects



8 DISCUSSION

8.1 Discussion of results

This literature review followed the principles of literature review and identified that there was the prevalence of depression and malnutrition in elderly in long-term care. The review clarified that due to the co-existence of other physical impairment, depression was mainly under diagnosed by health personnel in long-term care. Hence, depression could be the risk factor for developing malnutrition leading to the several physical impairments in elderly. In addition, depression had strong and independent relationship with malnutrition. There was a co-relation between depression and malnutrition in elderly facilitated by long-term care. The co-relation was probably by the influence of depression on appetite and food intake.

On the other hand, depression resulted impaired swallowing which might lead to poor oral food intake causing malnutrition. Moreover, impaired appetite was the affect of depression that caused weight reduction which lead to malnutrition. Thus, the review suggested that depression was the cause of various physiological problems such as: impaired swallowing decreased oral food intake, impaired appetite, poor appetite, loss of taste and smell and weight reduction. On the other hand, the review found that malnutrition had modest and significant association with depression. There was not mentioned how malnutrition was the cause of depression. However, the various evidence based study found that malnutrition was important factor which had an association with depression.

This review found that there was a strong association between depression and malnutrition in elderly in long-term care. Depression found to be the cause of somatic diseases in elderly which had both modest and strong relation to malnutrition. On the other hand, malnutrition was predictor for developing depressive symptoms. It was unfortunate to find out that depression in elderly was underdiagnosed in long-term care.

It was found that over half of the elderly patients in long-term care were at risk for malnutrition. Signs of depression can be the cause of impaired appetite and weight reduction in elderly. The information obtained from this review could be useful for health personnel working among elderly in long term care to understand the prevalence and affect of depression and malnutrition. Furthermore, this review can promote the health personnel for screening depression and malnutrition regularly so that the prevalence of malnutrition and depression can be prevented. However, this study can be suggestive for health personnel not to underestimate and overlook depression in frail elderly with many functional disabilities, which has strong co-relation with malnutrition.

8.2 Reliability of the review

Articles for the literature review were searched by using library databases. The databases extracted from the articles were from the research done by the researcher. Hence, the articles fulfilled criteria of high quality. The studies were done in different countries and have been published in international nutritional-, health-, and medical scientific journals. The article selections process was restricted and limited to the research questions.

In qualitative research, the process of analyzing is written step by step in order to fulfill the ethical questions and how the results have been found (Saaranen-Kauppinen & Puusniekka 2006). In this review, the literature search has been done systematically. The analysis and the process of the study have been explained well and able to study and review by someone. Thus, the review is reliable.

One of the tools of ethical view is validity. The validity of the qualitative research means that the research has done in depth and the results are “right” (Saaranen-Kauppinen & Puusniekka 2006). This study results fulfilled the research questions exactly. On the other hand this review is done by one reviewer which may effect on reliability.

8.3 Conclusion

Depression among elderly in long- term care is a common problem and appears as a risk factor for malnutrition. Moreover, signs of depression in elderly may give an impaired appetite and weight reduction and cause the development of malnutrition. Health personnel in long-term care may fail to recognize depression in elderly because it may coexist with medical conditions like cardiovascular, neurological and musculoskeletal. Hence, in long-term facilities there must be the regular visit of psychiatrist who provides periodic services to decrease the prevalence of depression

in elderly. When making the care plan for the elderly, co-relation between nutritional status and psychological well-being should be taken into account.

In long-term care the assessment of depression in elderly should not be based on the diagnosis criteria. However, it should be based on the assessment of formal caregivers or nurses. Diagnostic criteria of depression may optimize diagnosis and treatment of depression in elderly. Therefore, there should be more education to improve formal caregivers' or nurses' knowledge about assessing depressive symptoms in elderly.

This study indicates the association between depressive symptoms and malnutrition. An adequate food supply can be useful for the treatment of malnutrition in elderly. However, it will not be necessarily enough. Other causative factors for malnutrition needed to be addressed and treated. There should be regular observation of food quality and food intake by the care givers in long-term care. In addition, regular documentation regarding nutritional status of elderly in long- term care is essential. Moreover, assessment of both depression and nutritional status can increase the well-being of the elderly population. In addition, mental status and nutrition dietary must be included in the nursing care plan in order to diagnose and treat both depression and malnutrition. Education relating mental status and nutrition of elderly, however, can prevent the prevalence of both malnutrition and depression among elderly in long- term care.

Thus, relation between depression and malnutrition in elderly in long- term care is complex. It is unclear whether depression in elderly is the cause of impaired nutritional status. For the topic of future research, focused should be on the regular screening of depression, treatment and assessment of malnutrition among elderly.

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APPENDICES

APPENDIX 1: Table of the articles included in the review

	Authors, Country, Year, Title	Purpose/ Aim	Method / Tools	Central finding about depression and malnutrition
1.	Lin, Wang, Chen, Wu and Portwood. Taiwan. 2005. <i>Depressive symptoms in long-term care residents in Taiwan</i>	To investigate the prevalence and risk factors for depressive symptoms in elders in long-term care facilities.	N= 1221 aged 28-102, median age 78 in long-term care facilities in Taiwan, qualitative study, Assesment tools: GDS, BI, SPMSQ, Mastication ability	Decreased functional ability, impaired swallowing and type of institution were significantly associated with depressive symptoms.
2.	Johansson, Bachrach-Lindström, Carstensen and Ek. Sweden. 2008. <i>Malnutrition in a home-living older population: prevalence, incidence and risk factors. A prospective study.</i>	To prospectively investigate and describe the prevalence and incidence of malnutrition among home-living older people.	N=1016 aged 75 years in home-living in a municipality in South Sweden prospective longitudinal study Assesment tools: MNA, GDS-20, MMSE, PGCMAI	Symptoms of depression among older people were common problem and appear as a risk factors of malnutrition.
3.	Engel, Siewerdt, Jackson, Akobundu, Wait and Sahyoun. USA. 2011. <i>Hardiness, Depression, and Emotional Well-Being and Their Association with Appetite in Older Adults</i>	To examine the associations between hardiness, depression and emotional well-being and appetite in older adults.	N= 292 Aged 60 and older in assisted-living facilities in Washington/ Baltimore area, cross-sectional study, Assesment tools: DRS-II, GTDS-5, SNAQ	Depressive symptoms were associated with poor appetite.
4.	Kvamme, Grønli, Florholmen and Jacobsen. Norway. 2011. <i>Risk of malnutrition is associated with mental health symptoms in community living elderly men and women: The Tromsø Study</i>	To assess the associations between anxiety and depression and both the risk of malnutrition in community living elderly.	N=4017 Aged 65 to 87 in community-living elderly in Tromsø, Norway, cross-sectional study Assesment tools: MUST, SCL-10, BMI	Depressive symptoms were predictive of malnutrition.

5.	Muurinen, Soini, Suominen and Pitkälä. Finland. 2010. <i>Nutritional status and psychological well-being</i>	To examine the relationship between the nutritional status of aged over 65 years in service housing.	N= 1475 Aged over 65 in service housing unit in Helsinki and Espoo, Finland, cross-sectional study, Assesment tools: MNA, CDR	Nutrition status was significantly associated with psychological well-being like depression.
6.	Ülger, Halil, Kalan, Yavuz, Cankurtaran, Güngör and Anogul. Turkey. 2010. <i>Comprehensive assesment of malnutrition risk and related factors in a large group of community-dwelling older adults</i>	To determine the malnutrition risk and its correlates in geriatric outpatient.	N= 2327 Aged 65 years or older in outpatient clinics of division of geriatric medicine in Turkey, cross-sectional study, Assesment tools: S-GDS, Barthel-index of ADL, IADL, GUGT, MMSE, S-MNA	The risk of malnutrition was associated with several factors like depression.
7.	Saka, Kaya, Ozturk, Erten and Karan. Turkey. 2010. <i>Malnutrition in the elderly and its relationship with other geriatric syndromes</i>	To asses the nutritional status in elderly patients and its assosiation with other geriatric synrdomes.	N= 413 Aged 65 or older in geriatrics outpatient clinic in Turkey, cross-sectional study, Assesment tools: Lawton scale, MNA, MMSE, GDS	There were different mechanism involved in the development of malnutrition. Depression was associated with decreased oral food intake.
8.	Mudge, Ross, Young, Isenring and Banks. Australia. 2010. <i>Helping understand nutritional gaps in the elderly (HUNGER): A prospective study of patient factors associated with inadequate nutridential intake in older medical inpatients</i>	To describe the prevalence of inadequate nutritional intake in older medical inpatients and to identify the factors associated with reduced energy-intake.	N=1227 Aged 65 and older in general medical wards of women's hospital in Brisbane, Australia, prospective cohort study, Assesment tools: Tanita HD351 Scale, MNA, MMSE, GDS, 6 point ordinal scale	A high prevalence of risk factors suggest to contribute to poor intake such as depressed mood.
9.	Smoliner, Norman, Wagner, Hartig, Lochs and Pirlich. Germany. 2009. <i>Malnutrition and depression in the institutionalized elderly</i>	To assess associations between nutritional status and depressive symptoms and impact on self-caring capacity and quality of life.	N= 114 Aged 84 or older in elderly nursing home residents in Berlin, Germany, cross-sectional study, Assesment tools: GDS, MNA	Modest association between depressive symptoms and malnutrition.

10.	<p>Schilp, Wijnhoven, Deeg and Visser. The Netherlands. 2011.</p> <p><i>Early determinants for the development of undernutrition: Longitudinal Aging Study Amsterdam</i></p>	<p>To determine the early incident and risk factors for the development of undernutrition in community-dwelling.</p>	<p>N=1120 Aged 65-85 years in Amsterdam, the Netherlands, longitudinal aging study, Assessment tools: MMSE, BMI</p>	<p>Psychological factors which include depressive symptoms was associated with future development of undernutrition.</p>
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APPENDIX 2 The factors of the association of depression and malnutrition

