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The health behaviour of osteoporosis patients using non-pharmacological treatment

A Literature Review

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Bachelor's Thesis
May 2018
Social Services, Health, and Sport
Degree Program in Nursing

Jyväskylän ammattikorkeakoulu
JAMK University of Applied Sciences

Description

Author(s) Gentry-Scarcia, William Losseva, Kristina Smirnov, Igor Tenhunen, Mikko	Type of publication Bachelor's thesis	Date May 2018 Language of publication: English
	Number of pages 36	Permission for web publication: x
Title of publication The health behaviour of osteoporosis patients using non-pharmacological treatment A Literature Review		
Degree programme Degree Programme in Nursing		
Supervisor(s) Garbrah, William		
Assigned by -		
Abstract <p>Osteoporosis is still quite an unknown disease in many ways and preventing osteoporosis is cheaper option than treating fractures or the expensive pharmacological treatments. Since osteoporosis is not common, healthcare staff should gain more knowledge in osteoporosis and the non-pharmacological treatment</p> <p>The aim of the current study was to highlight the behaviors of osteoporosis patients with non-pharmacological treatment. The purpose of this study was to help inform nurses and other medical staff about the behaviors of osteoporosis patients to better serve them.</p> <p>A literature review was the method used in this study. Data was searched and obtained from numerous article databases, such as Cinahl, Academic Search Elite and Duodecim and Terveyskirjasto. A total of twelve articles were reviewed and analyzed.</p> <p>The results indicate that patients have varying experiences that can be placed into several two main categories and four subcategories as follows: physical activity behavior of osteoporosis patients; eating behavior of osteoporosis patients; gender deference in the behavior of osteoporosis patients; and osteoporosis patients' knowledge and awareness. This study indicate that many factors affect the experiences of patients with osteoporosis such as: cultures, race, ethnicity, gender, previous experiences with physical activity, income, and education level. This is important information for medical professionals to find out the experiences of patients with osteoporosis to better understand them. Along with these experiences there are extrapolations of how staff could increase the positive effect on patients within the results of this study.</p>		
Keywords/tags (subjects HYPERLINK "http://vesa.lib.helsinki.fi/") Experiences, Osteoporosis, Non-pharmacological treatment		
Miscellaneous -		

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1 Introduction

Osteoporosis is most often found in the elderly and is frequently considered the cause of many disabilities and bone fractures (WHO 2010). This incurable disease can cause bones to break and fracture at lower a stress range than normal. The surgical and medical treatments required to repair and heal bone fractures involve long recovery periods and can be expensive if the patient stays in long-term care. Not only can this disease be a monetary inconvenience, but it is also rather painful to experience frequent breaks or fractures. Osteoporosis is becoming one of the main public health concerns. It's affecting more people all the time, and often leading to bone fractures which are expensive to treat (Ruxton 2013, 41). Which is why it is important to learn about the experiences of osteoporosis patients with non-pharmacological treatment. As more is understood about non-pharmacological treatment, the more it is thought that it can be a cheaper and more preventative approach to treating osteoporosis. The aim is to highlight the experiences of patients using non-pharmacological treatment for osteoporosis through existing literature. This will add value to the community by helping osteoporosis patients seeking non-pharmacological treatment find a more suitable path. With more understanding comes better treatment and better intervention.

2 Osteoporosis: Definition, Treatment and Risk Factors.

2.1 Osteoporosis

Osteoporosis is a skeletal disorder that can be diagnosed by recognizing the patient's low bone density, any T-score under -2.5. (Agarwal, Uppin 2016, 67)

Osteoporosis typically has no symptoms other than spontaneous bone breaking and fracturing, because of this it is hard to diagnose in the earlier stages. This disease is characterized by having one's bone density is lower than 2.5 standard deviations (Ruxton 2013, 46) and by bone loss outpacing the growth of the new bone. The risk factor can be increased by: alcoholism, anorexia, and hyperthyroidism, surgical removal of the ovaries, kidney disease, menopause, low estragon, smoking, and lack of exercise.

2.2 Treatment of Osteoporosis

Osteoporosis may be treated via numerous paths. One could use preventive medication, or a non-pharmacological option would be a treatment that includes weight-bearing exercises and special customized diets (Banu, Varela, Fernandez 2012, 22). According to the topic, this research focuses on non-pharmacological treatment and response for osteoporosis, wherein defining non-pharmacological treatment can be simplified as non-medical or treatment without drugs/medication.

For centuries, various human cultures have used plants to treat several common health conditions, including bone fractures. Plants benefit bones via several pathways: some have agents that decrease systemic levels of the pro-inflammatory cytokines associated with bone loss, others contain high levels of calcium, while some others act in the gastrointestinal tract to enhance calcium absorption. Now there are medications that mimic these effects to a higher degree of concentration and mixtures of these plants. This often blurs the line between medical and non-pharmacological treatments. However, these medications may not be enough for some; which is why non-pharmacological treatments are often performed alongside medical intervention to improve bone mass or simply to treat slightly low bone mass before osteoporosis has taken hold. (Banu, Varela, Fernandez 2012, 25-29).

Osteoporosis can be very expensive to treat. For example, when a person with said disease has a minor fall that results in a fracture the patient may need to stay in the hospital for long period of time or the patient could be unable to work during their recovery time resulting in loss of tax revenue for the state, loss of income for the individual and, on a wider scale damage to the economy. Treating Osteoporosis in Finland happens after an individual has had an accident where their bone or bones break. Sometimes a treatment may begin simply because of calculated risk based primarily off age, but also gender and medical history. The prevention of osteoporosis can be a long path that could last anywhere from a few months to several years; furthermore, the treatment of the disease itself is a lifelong process as it is never truly cured. (Mustajoki 2015).

The expenses for individuals are dependent on the country one lives in. Each country has their own set of guidelines and beliefs on how healthcare should be approached and who exactly should be paying those fees. For simplicity and relevancy here is an example of the authors' res-ident country Finland. In the city of Kuusankoski (population 20,392 in 2003) the regional hospital during the period 1.1.1999-31.1.2000 they treated with 106 hip fractures. The total cost for the patient due to hip fracture is individual, "During the year cost average was 13 170 euros. The number of patients who came to the hospital from their home and stayed in permanent institutional care for their fracture the first year medical cost was average of 32 660 euro per person in relation to the price level of 2003" (translated from source: Kouvola 2013; Mäkinen 2011).

If the individual cannot receive these treatments due to lack of personal capital, they cannot improve their quality of life and this can cause incapacitation in the working life. For low-income citizens in a country that does not provide enough support this will decrease the quality of life, "If we don't have money, we don't have choices and it really limits [what we eat]. Just being able to have a basic meal every day is a challenge all on its own". (Hammond, Chapman 2011, 64).

Treating any surgeries or replacements of artificial joint or bones are expensive for individuals and for the government. It is even more expensive if the individual has to stay in the hospital for an extended period of time. Prevention of osteoporosis should be started by age-40. It is cheaper to prevent expensive surgeries and medication than to treat a disease with them. (Mäkinen 2011)

2.3 Risk factors of osteoporosis: race, ethnicity and gender

Osteoporosis can be strongly influenced based on a person's culture, ethnicity, geographic residence and race. Likewise, height, diet, weight and amount of exercise vary depending on culture, ethnicity, geographic residence and race; these things are strongly correlated with osteoporosis. Through arduous research evidence was discovered that "white, Asian, Hispanic, and Native American women are more at risk for osteoporosis than black women." (Evans, Pothiwala, Chapman-Novakofski 2006, 709).

Not all of these risks are not necessarily due to genetics, but possibly due to culture or individual's lifestyle. It is known that higher Bone Mineral Density (BMD) correlates with a higher Body Mass Index (BMI) (Evans, Pothiwala, Chapman-Novakofski 2006) which means that a person from a culture/country with a larger tendency towards a higher BMI has a lower chance of developing osteoporosis (Evans, Pothiwala, Chapman-Novakofski 2006). The genetics from ethnicity have a role as well. For example, "the smaller body size typically found in Asians has been proposed as the reason for lower BMD values for Asians compared with whites" (Evans, Pothiwala, Chapman-Novakofski 2006, 714, 715). Any person that comes from an ethnicity that has a tendency to be smaller also has a tendency to have lower BMD which may increase the chance of finding one's self with osteoporosis. The same goes for the opposite if an ethnicity typically has a larger BMI, they also have higher BMD which results in a lower chance of attaining osteoporosis.

The experiences between various races and ethnicity do not differ much after acquiring the disease when withholding regional treatment considerations. However, the largest concern when considering the client's experience is to take into account their cultural background; whether that be familial or individual. Several patients said that the fragility of their body affected by osteoporosis made them feel extremely weak or scared to leave their homes. This is the most frequent type of expressions found in progressive osteoporosis patients. However, a few patients from more independent cultures who cannot readily to admit fragility of their bodies or seek help, will generally neglect symptoms and live without admitting their illness. With this in mind, one can surmise that the patient's cultural background is an important aspect to focus on when studying patient experiences and feelings. Patients, who are looking for help, usually come from cultures that support their peoples to seek help from healthcare professionals. (Evans, Pothiwala, Chapman-Novakorfski 2006)

Some patients consider their experiences as positive, because of assistance and the guidance of health care professionals in providing physio-therapies and information. At the same time, other patients may complain about having a bad experience, as they refused having any health problem and consequently, refused getting treatment. Consequences of this denial would lead to the faster development of the disease, which would make any future treatment even more difficult. (Baim, Binkley, Bilezikian, Kendler, Hans, Lewiecki, Silverman, Densitom 2008, 10.)

Although ethnicity and geographic residence are important factors, gender is also an influence in the development of osteoporosis, moreover, according to Gammage, Gasparotto, Mack & Klentrou (2012), the disease is often considered a "women's disease" because the high frequency of the illness and percentage of fractures are more often found in postmenopausal women than in older men. "Women have lower levels of BMD and a higher prevalence of osteoporosis than men" (Baim, Binkley, Bilezikian, Kendler, Hans, Lewiecki, Silverman, Densitom 2008, 10). Postmenopausal women have an increased risk for fractures however, older men have a tendency to have worse

consequences after fracture and lower treatment percentage, as there is less information about the disease development in men. Because of this lower risk men themselves rarely recognize their risk of osteoporosis, and behaviours associated with the masculine gender identity may constrain them when it comes to preventive behaviour to avoid osteoporosis and to recognize the disease if it does appear (Solimeo 2008).

2.4 Physical activity and osteoporosis

Health perception is based on patients' understanding of their capabilities and lifestyle (Schröder 2012, 5). According to WHO (2015), one of the most effective tools to stay healthy throughout the ageing process is Physical Activity (PA). The regularity of exercising often improves muscle elasticity, strength, bone density and balance, which helps to prevent falling and fractures. It was found that some specific exercises, such as weight-bearing exercises, are useful in prevention and treatment of osteoporosis. According to Schröder, Knauerhase, Kundt and Schober (2012), physical activity contains advantageous elements like energy, strength and elasticity practice which sends stimulation to a sensorimotor system which plays a key role in both treatment and prevention of osteoporosis. Latest researches have shown the outcomes of sensorimotor exercise to be an invaluable treatment and helpful in preventing the number of falls. (Boyer, Kiratli, Andriacchi, Beaupre 2011)

It is important for healthcare professionals to inspire patients to participate in physical activity. However, physical activity is an extensive and elaborate behaviour. Many factors like; individual, social, and environmental, effect the ability to build a habit around physical activity in both younger and older adults (Bauman, Reis, Sallis 2012). Because of this experienced complexity often patients have their own bias towards the concept

of PA. This makes treatment much more in-depth as the one providing care and recommending PA must look into the patients' experiences and feelings to find a type of PA the patient or client will continuously participate in. Evaluations that healthcare professionals performed have proven that patients with the most motivation often executed the exercises correctly and in this aspect increased the intensity of training. This increase in training helped combat osteoporosis further. (Schröder, Knauerhase, Kundt and Schober 2012, 3).

Increasing intensity and effort is not always the most important thing because having osteoporosis and being physically active inevitably leads to some challenges patients must understand barriers and accept their body limitations. Perceiving these limitations people with osteoporosis accepting the disease as part of their life. It was found that having osteoporosis and recognizing body limitations awakens fear regarding PA. The disease makes elderly people feeling scared of doing even light daily activities (Dohm, Stahle, Skavberg-Roaldsen 2015).

Even though physical activity has an impact on both bone health and fracture risk, to prevent further physical decline and slower osteoporosis development it is necessary to do exercises and stay active (Bauman, Reis, Sallis 2012, 380.).

2.5 Diet and osteoporosis

Diet is a large contributor to the future outcome of an individual's bone density. If the diet does not supply the proper vitamins or minerals then in return the individual will be more likely to develop osteoporosis. The research found that "vitamin D and calcium was associated with a statistically significant 12% reduction in risk of fracture, rising to 24% when compliance was high." (Ruxton 2013). Although those two vitamins

were considered the most effective there are many other vitamins and minerals that were found quite effective in other research. Now table below shows which nutrients are needed for bone health.

Table 1. "Nutrients essential for bone health" (Ruxton 2013; European food safety authority 2009; European commission 2012).

Approved European Union claims for bone health nutrients	
Bone nutrients	Summary of health claims
Protein	Contributes to the maintenance of normal bones
Vitamin C	Contributes to normal collagen formation for the normal function of bones. Contributes to normal collagen formation for the normal function of cartilage
Vitamin D	Contributes to normal absorption and use of calcium and phosphorus. Contributes to normal blood calcium levels. Contributes to the maintenance of normal bones
Calcium	Needed for the maintenance of normal bones
Calcium with vitamin D	Calcium in combination with vitamin D may reduce the loss of bone mineral in post-menopausal women. Low bone mineral density is a risk factor in the development of osteoporotic bone fractures
Vitamin K	Contributes to the maintenance of normal bones
Magnesium	Contributes to the maintenance of normal bones
Zinc	Contributes to the maintenance of normal bones
Phosphorus	Contributes to the maintenance of normal bones

It is recommended that people (especially at-risk persons) consume foods that contain the vitamins mentioned in the table above. Calcium and vitamin D were found to be the most important. It is also recommended that if a person has low amounts of particular vitamins or minerals they could use supplements or vitamin fortified foods to assist with their bone health. Bone health is not only affected by the things one ingests, but also what they do not ingest. Bone health has been found to be negatively affected by smoking and consuming alcohol in excess. For a patient that wants to preserve his bone health it is important to eat the proper foods along with staying away from smoking and excess alcohol. (Hammond, Chapman & Barr 2011, 62.)

According to Hammond, Chapman & Barr (2011), many people who were surveyed had two considerable different experiences. One higher income group and one lower income group. The one group that could afford financially to change their diet to help fight bone density loss typically changed their diet towards a diet focused on overall health instead of just bone health. This group of people experienced an increase in quality of life and had feelings of positivity. Meanwhile, people who were from a lower income background experienced a financial issue when trying to adjust their diet. They mentioned that for them the cost of a bone-healthy diet was too high for them to manage. This lower income group had disparaging feelings and experienced the small quality of life improvements through the duration of the study. This table presents food which contains nutrients needed for bone health.

Table 2. "Food which contains nutrients needed for bone health" (Hammond, Chapman, Barr 2011; NHS Choices 2012)

Dietary sources of bone health nutrients	
Vitamin C	Citrus fruits, peppers, broccoli, Brussel sprouts, sweet potatoes and kiwi fruit.
Vitamin D	Oily fish, for example, salmon, trout and mackerel; eggs; fortified foods such as

	spreads, breakfast cereals and dairy products; and red meat.
Calcium	Milk, cheese, yoghurt, soya beans, tofu, fortified soya milk, nuts, bread made with fortified flour, fish where the bones are eaten for example sardines, and green leafy vegetables such as broccoli, cabbage.
Vitamin K	Green leafy vegetables such as broccoli, vegetable oils, and cereal foods
Magnesium	Green leafy vegetables, nuts, brown rice, wholegrain bread, fish and seafood, meat and dairy foods.
Zinc	Red meat, shellfish, poultry, milk, cheese and dairy products, bread and wheat germ.
Phosphorus	Red meat, dairy foods, fish, poultry, bread, rice and oats.

2.6 Knowledge and awareness of osteoporosis

Knowledge and awareness of osteoporosis are vital for future prevention. A survey was conducted to discover peoples' understanding of osteoporosis. To discover how much people know about osteoporosis Giangregorio, Fisher, Papaioannou, Adachi (2007) created a survey where nurses and nursing students were questioned. The survey showed that out of possible 22 points average result was 13, which means that participants were not fully aware of what osteoporosis is. Over 90% of people who took the survey: were able to correctly identify the basic symptoms of osteoporosis, know that treatment is available to prevent bone loss and that dairy products are the most readily available source of dietary calcium. Over 70% understood that: fragility fractures are a risk factor for future fractures, loss of height may mean that person has osteoporosis, and bone densitometry is used to diagnose osteoporosis. (26, 27–35.)

Participants were asked about where they found information about osteoporosis and the answers were in combinations of sources where: 42% find information in pamphlets, 39 from patient-based cases in hospitals, 10% hospital newsletters, 69% magazines or journal articles, 30% websites, 30% from posters, and 45% from presentations at work. Participants were asked, where they would prefer to get information about osteoporosis and the most common answers were: from work presentations, magazine or journal articles, and pamphlets. And the most common topics about what participants would like to read were: prevention of osteoporosis, new research, benefits and risks of medication, and treatment of osteoporosis. (Giangregorio, Fisher, Papaioannou, Adachi 2007, 27-35.)

This study revealed that there are gaps in osteoporosis knowledge among nurses and nursing students working with individuals who are at risk of osteoporosis fracture. The main gaps of knowledge were topics related to health promotion and management of patients with osteoporosis. Large gaps were in the following areas: prevalence of osteoporosis, recommended intake of calcium, how much calcium is usually in fortified products, recommended intake of vitamin D, and calcium should be taken in divided doses with meals. (Giangregorio, Fisher, Papaioannou, Adachi 2007, 27–35.)

From these statistics it can be concluded that people find basic information about osteoporosis, but the most common information was shallow. This common information cannot be considered accurate. It is difficult for the average person to find reliable and informative sources. These people's experiences change depending on the level of knowledge or schooling. For example, a well-schooled individual may have an experience where they know special databases and can find reliable information easily, but those who have not experienced these databases may rely on magazines and other unreliable sources, this creates a negative learning experience. If the individual is seeking information and unable to find truly reliable sources, then the treatments one could find may have negative results for the patient. This confusion could cause a

stressful experience for the average patient who lacks access to professional health databases. It seems that the awareness of risks is rather low, this could cause a high percentage of people acquiring osteoporosis simply because they are ignorant of prevention and risk. (Giangregorio, Fisher, Papaioannou, Adachi 2007, 27–35.)

However, it does seem once someone knows that they are at risk for osteoporosis their awareness and understanding of the disease increases. It has been found that people who know that they have an increased risk of getting osteoporosis, do not necessarily feel sad or scared, but instead more aware of the disease. (Hammond, Chapman, Barr 2011).

3 Aim, purpose and research question

The aim was to highlight the behaviours of osteoporosis patients with non-pharmacological treatment, through existing literature. The purpose was to reveal the behaviours of osteoporosis patients with non-pharmacological treatment and help inform nurses. This research question to be answered: What are the health behaviour of osteoporosis patients using non-pharmacological treatment?

4 Implementation

4.1 Literature Review

A literature review is a combination and analysis of studies that research a certain topic (Ave-yard 2010, 5-6; Cronin, Ryan & Coughlan 2008, 38; Saks & Allsop 2007, 33). Literature reviews are done to collect the information on a specific question called the research question (Saks & Allsop 2007, 33). The aim of this thesis is to research the health behaviours of osteoporosis patients using non-pharmacological treatment by

looking for data assembled by others, analyzing it, then putting all the data into one place (Aveyard 2010). Collecting the information on one specific topic simplifies the ability of using the data, especially for those who work in healthcare and may not have time to read through a myriad of articles (Aveyard 2010).

A literature review collects published, and unpublished articles related to the research question of the thesis (Aveyard 2010; Cronin et al. 2008). This literature review was based on systematic review to reach better reliability. Systematic review is a review of a clear and defined questions that use a system and categorical method to clarify, single out, and evaluate related research. This also attempts to gather and scrutinize data from studies that are included in the said review. Statistical methods or meta-analysis, could possibly be used to evaluate and sum up the results of the studies used (Cochrane Collaboration, 2014).

The writing of a literature review has four phases; the method of forming research question, planning of the research, then showing and discussing of results (Aveyard 2010). A literature review was chosen as the main method for this thesis. The study was done in one country setting but based on experiences of patients from many countries.

4.2 Scientific article selection process

For identification of articles in the review Cinahl (Ebsco), Academic Search Elite, US National Library of Medicine and PubMed Central were searched with English, Finnish language restrictions. The keywords were: osteoporosis, non-pharmacological treatment, patients, experiences, patients' feelings.

The data for the literature review was collected from numerous article databases. A manual search was achieved through reference lists of promising studies, and subjects. Different combinations of search keywords were tested prior to the data search.

Article search process table demonstrates the data search process. At first only topics and abstracts were read through, then suitable articles were fully read through. Until only the best articles remained and were subsequently used in the thesis. The final decision was made based on the predetermined criteria, which included 12 articles. The primary data search was conducted during winter 2016.

Table 3 Inclusion criteria for selected articles

Inclusion Criteria
Answers the research question
Study is in English or Finnish
Scientific publication
Peer-reviewed
Free full-text access
Study of patients using non-pharmacological treatment
Study is published in 2006 or later

4.3 Analysis and synthesis of data

Data has been analyzed by collecting information from different scientific sources and research-based articles. The data within has been selected using content analysis -

method that allows one to summarize studies in a systematic way involving categorizing and counting themes. (Agarwal, Dixon-Woods, Jones, Noyes, Sutton, Young 2008, 94). The method can be inductive (has its origin from the data) or deductive (has its origin from the theory) (Kankkunen & Vehviläinen-Julkunen 2009.) This study is based on inductive content analysis.

The information has been selected according to the research question of this literature review. After all articles were read through by four researchers, parts of the data from the results and discussion part of the selected articles that answered the research question of this literature review were collected. These were then divided into categories and sub-categories for more detailed information related to the topic. The themes and sub-themes were then described.

5 Results/Findings

The findings of this thesis answers: what are the behaviours of osteoporosis patients with non-pharmacological treatment? The studies were conducted across the world including Canada, USA, Germany, Finland, India, Sweden and UK. All these studies were conducted relatively recent, this gives fairly new and accurate information about the subject. It was found that patients have varying experiences that can be placed into several important categories and subcategories as described in the table below.

Table 4 Results categorized into themes

Raw data	Sub-category	Main category
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"Perceived risk of osteoporosis may lead to decreased physical activity" (Reventlow 2007)	Physical activity behavior of osteoporosis patients	Active behavior of osteoporosis patients
"Most midlife women were not motivated to change their diets..." (Hammond & Chapman 2011)	Eating behavior of osteoporosis patients	
"Men may internalize the association of osteoporosis with women and incorporate it into a sense of perceived invulnerability to the condition, which, in turn, contributes to delayed diagnosis and treatment." (Solimeo 2008)	Gender deference in the behavior of osteoporosis patients	Passive behavior of osteoporosis patients
"Some patients were dealing well with the everyday risk of fracture and pain, while others seemed to be paralysed and limited their everyday life." (Nielsen, Huniche, Brixen, Sahota, Masud 2013)	Osteoporosis patients' knowledge and awareness	

5.1 Active behaviour

Physical Activity behaviour of osteoporosis patients

Many patients and clients feel fearful of physical activity when they learn they have osteoporosis. They tend to lessen the amount of physical activity in their life thus increasing their risk. Others feel the opposite way; they feel they are invulnerable to osteoporosis and believe they do not need to exercise to prevent developing the disease. This however, increases their chance of development or progression of osteoporosis. Both these clients experience similar results with opposing fears and beliefs. (Doheny, Sedlak, Estok, & Zeller 2000; Nielsen, Huniche, Brixen, Sahota & Masud 2013; Solimeo 2008; Svensson, Olofsson, Karlsson, Hansson, Olsson 2015) There is also a third group of people who are so fearful of their disease and increased risk of fractures that they

hide away from any and all physical activity. This lack of activity increases the rate of which their bones deteriorate from osteoporosis. These patients often avoid heavy housework and this causes a diminishing life experience with osteoporosis as their home decays alongside with their body and they are unable to find solace at home or outside. (Reventlow 2007; Stamm, Pieber, Crevenna & Dorner 2016)

Some patients and clients feel a personal responsibility for their new disease and commit hard to fighting it in every way. These people often feel no more fear than the rest of their age group when participating in physical activity. They increase their activity to higher levels than their peers and often experience a better quality of life due to the increased strength of muscles and slowing the progression of their osteoporosis. (Smulders, Lankveld, Laan, Duysens Jacques, Weerdesteyn 2011; Dohm, Stahle, Roaldsen 2016)

Eating behaviour of osteoporosis patients

Individuals can be concerned about their eating behaviours this can cause them to consume less of certain products because they believe them to have too much fat in it. Consuming too much carbonated and caffeine can cause calcium not absorb into the body and most of it will be outputted in urine loss (Ali, Siktberg 2001).

Some individuals who have developmental disabilities can find it difficult in learning how to prepare healthy foods due to many factors such as lack of knowledge, economic background, skills, time or motivation (Johnson, Hobson, Garcia, Matthews, 2011).

Dairy products are considered to have better absorption of calcium than comparing to vegetables that also contain high amounts of calcium. Women who had menopause

and consumed vegetables were linked with osteoporosis (Najia, Fangfang, Keqin, Zihui, Liu, Tang, et al. 2016)

5.2 Passive treatment

Gender difference in the behaviour of osteoporosis patients

Men and women both are susceptible to osteoporosis, however it seems that the two genders react very differently when confronted with both treatment and prevention.

Women seem to commonly acknowledge that they are susceptible to osteoporosis and go through the screening processes to be aware of their current status.

Meanwhile men tend to believe that they cannot get this disease and because of this they do not attempt to be screened or even to be aware of the said disease. (Solimeo 2008; Doheny, Sedlak, Estok & Zeller 2000)

Once treatment begins it seems women take the disease much more seriously than men. Women believe it is their own responsibility to combat the disease with lifestyle changes. In fact, they try so hard to combat osteoporosis that they are often overcome with worry and fear. Men on the other hand have a much harder time accepting that their body is failing. They tend to ignore the diagnoses or feel it isn't serious for them. This results in women using many available treatments and slowing the progress of osteoporosis while their male counter-part withers much more quickly from the disease as the men take the disease and treatments much less serious. (Stahle, Roaldsen, Dohrn 2016; Hvas, Reventlow, Jensen, Malterud 2005; Rothmann, Huniche, Ammentorp, Barkmann, Glüer, Hermann 2014)

Osteoporosis patients' knowledge and awareness

Patients who have increased risk of having osteoporosis and were told about that usually do not have a negative reaction towards that information but they feel more aware about it now. (Hammond, Chapman & Barr 2011) While other study showed that the more patients know about osteoporosis the more scared they become about themselves. (Nielsen, Huniche, Brixen, Sahota, Masud 2008) By comparing these two studies we can understand that more attention needs to be paid towards mental support of patients who get osteoporosis, because for some of them it is very hard to deal with and also it is important that more attention will be paid to share the knowledge about this disease with other people, for example use more advertisements in magazines or posters where it will be discussed about the disease, so people would not be shocked if they will hear that they have a chance of getting it.

6 Discussion

6.1 Discussion of key findings

In this study it emerged that physical activity is an extensive and elaborate behaviour. Thus, some patients feel fearful of physical activity while others feel they are invulnerable (Doheny, Sedlak, Estok, Zeller 2000; Nielsen, Huniche, Brixen, Sahota, Masud 2013; Solimeo 2008). Similarly Bauman, Reis, and Sallis (2012) concluded that many factors like: individual, social, and environmental - effect the ability to build a habit around physical activity. It can be seen here that the previous studies align well with the results. The previous studies claim the behaviour towards physical activity is a very complex one that varies greatly, then in the results it is said that there are opposing and counter behaviours towards physical activity. (Svensson, Olofsson, Karlsson, Hansson, Olsson 2015) This means that to help the patients attain a better quality of life the healthcare staff must analyse the patient and understand which kind of behaviour the

patient has towards a physical activity and then the staff needs to assist the patient mentally keeping this behaviour in mind so that the patient will follow through with their physical activity treatment. For example, if one has a patient who is fearful of physical activity and worried about injury then the staff needs to take the physical activity slowly and be very encouraging. On the other hand, when considering a patient who is excited and ready to work on their physical activity then the staff may give this patient a more demanding physical activity plan.

There is a significant difference in gender's behaviour pertaining to osteoporosis patients. Solimeo (2008); Doheny, Sedlak, Estok & Zeller (2000) indicated that men rarely recognize their risks of osteoporosis, and behaviour associated with the masculine gender identity. This may constrain them when it comes to preventive behaviour (Solimeo 2008; Doheny, Sedlak, Estok & Zeller 2000). Likewise, the results the current study indicate that women use many available treatments and slowing the progress of osteoporosis while their male counterpart's withers much more quickly from the disease as the men take the disease and treatments much less serious. (Dohrn, Stahle, Roaldsen 2016; Hvas, Reventlow, Jensen, Malterud 2005; Rothmann, Huniche, Ammentorp, Barkmann, Glüer, Hermann 2014. This means that women are more likely to focus on getting help and preventing their osteoporosis while men typically ignore their issue or disbelieve their risk of attaining the disease. Medical professionals need to focus more on assisting men and guiding them through their older ages with an emphasis on osteoporosis.

The knowledge and awareness of osteoporosis patients and their behaviour on the matter is an interesting topic. Previous studies (Hammond, Chapman & Barr 2011) state that demonstrating that there has been people who know they have an increased risk of getting osteoporosis, but do not necessarily feel sad or scared, instead

more aware of the disease." which is interesting because with further investigation into different articles there has been a bit of opposition to this theory found. In this paper's results it is written that seemingly the more people know about osteoporosis, the more the fear effects their lives. (Nielsen, Huniche, Brixen, Sahota, Masud 2008) this is a curious conflict of data. This could be due to a difference in selected patients or inclusion of data criteria, but this really means that there needs to be more research on how awareness of the disease effects patients' behaviour.

6.2 General ethical principles

In regard to informed consent this thesis is a literature review, therefore our need to gain informed consent is non-existent. However, it is understood that the informed consent retrieved by the authors whose articles used must be taken into account. This is why all of the article's ethical considerations chapters were reviewed and examined. This examination of the authors' ethics was also preformed to ensure that the data handling and general principles were appropriate for this thesis. All articles used had the appropriate consent. They were checked for: informed consent, respect for confidentiality and anonymity of the research respondents, that the participants participated in each study voluntarily, each article avoided harm to the participants, and that each research was independent and impartial.

During the writing of this thesis the authors made sure to first review the content of the article and the ethical considerations before viewing the countries or names of the authors to help avoid bias. The authors made sure to add everything that was read pertaining to osteoporosis while researching for the thesis to the reference list, therefore giving credit to all authors. It was also assured that all references necessary were

included in the relevant points within the text. In this manner it was guaranteed that no information was stolen or plagiarized.

Each author of this thesis all had their own view and biases to consider, however they attempted to write from a neutral viewpoint. Each piece of written work was reviewed by the authors to ensure there was as little bias as possible. The authors do not consider themselves bias towards any group or race.

6.3 Credibility, validity and reliability

The research articles of this thesis were based on qualitative studies, which are considered to be credible, impartial and clear. Reliability of this thesis is proved by many sources that confirm the same issues and their solution. Several databases were searched to collect required information, making the study more reliable.

Resources that were found for this thesis must be as credible as possible, truthful and reliable within this literature review. Otherwise the data will be invalid. It is impossible to say whether all resources are reliable in regard to lack of writers' experience. The original ideas of authors are presented clear and understandable in this thesis.

The countries that were observed for the research are Finland, United States, Sweden, Denmark, India and Canada. No language restrictions were used, but mainly used languages are English and Finnish. The results that were found do not necessarily apply to the situations in different countries. Studies for this research are mostly concerned on people over 40-years old.

Nurses' individual stronghold and resilience are also highlighted by different authors. In their study, Drury et. al. (2014) concluded that it is resilience that keeps nurses stay in the workforce. Potter et. al. (2013) gives the idea of living intentionally as one part

of their compassion fatigue resiliency program. Living intentionally emphasizes the importance of developing and following the professional calling of doing their best and living by their professional values. Participants in their study prepared their own covenant of how they work and live. Another method to promote resiliency is to ask nursing staff to create a pocket-sized collage as a reminder to emphasize strength and coping mechanism (Wenzel et. al., 2011).

Self-reflection may be developed for example by providing time to think and write about passing patients. Writing journals reminds nurses of the impact they had on patients, which in turn will inspire a feeling of satisfaction and achievement while giving care. (Fetter, 2012) Interestingly, being busy and not having enough time to think and reflect was considered as beneficial and supportive for some nurses (Wenzel, et. al., 2011).

6.4 Conclusions and Recommendations

This thesis has collected and highlighted the behaviours of osteoporosis patients with non-pharmacological treatment from many scientific articles and researches. The aim is to highlight the experiences of patients using non-pharmacological treatment for osteoporosis and this aim was accomplished. The purpose is to reveal the experiences of patient using non-pharmacological treatment of osteoporosis and help inform nurses and other medical staff about said patients' experiences. Hopefully this will help medical professionals choose the best treatment for their client. This thesis finds several ways to impact the experience of patients with osteoporosis in a positive manner as discussed in the summary of the discussion, many factors affect the experiences of patients with osteoporosis such as: cultures, race, ethnicity, gender, previous experiences with physical activity, income, and education level. This thesis is important to the community because it provides a source of information for medical professionals

to find past experiences from patients went through the non-pharmacological treatment of osteoporosis. Along with these experiences there are extrapolations of how staff could increase the positive effect on said patients within the results of this text. Additional studies about osteoporosis patients could make a deeper research about what is the best way to teach medical staff about the disease so patients could get a better care, as this study had shown, big part of nursing staff know only basic information about osteoporosis but since this disease is a common problem nowadays, nurses need to know more than basic knowledge to be able to offer the best care as possible for patients with osteoporosis disease.

Reference

- Agarwal, S., & Uppin, R. 2016. Effect of obesity on osteoporosis: A DEXA scan-based report in urban population of Belagavi. *Indian Journal of Physiotherapy & Occupational Therapy, 10*, 6-10.
- Ali N., Siktberg L. 2001. Osteoporosis prevention in female adolescents: calcium intake and exercise participation. *Pediatric Nursing, 27*, 132-148.
- Banu, J., Varela, E., & Fernandez, G. 2012. Alternative therapies for the prevention and treatment of osteoporosis. *Journal of Nutrition Reviews, 70*, 22-40.
- Bauman, A., Reis, R., Sallis, J., & et al. 2012. Correlates of physical activity: why are some people physically active and others not? *The Lancet: Physical Activity, 380*, No. 9838, 258–271.
- Bombak, A. E. and Hanson, H. M. 2016. Qualitative Insights from the Osteoporosis Research: A Narrative Review of the Literature. *Journal of Osteoporosis, 6*, 1-17.
- Boyer, K., Boyer Kiratli, B., Andriacchi, T., & Beaupre, G. 2011. Maintaining femoral bone density in adults: how many steps per day are enough? *Osteoporosis International, Journal, 22*, 2981- 2988.
- Chahal, A., Multani N. K., Rao, H. K. 2016. Impact of Therapeutic Interventions in Patients of Osteoporosis. *Indian Journal of Physiotherapy and Occupational Therapy, 10*, 61-65.

- Cosman, F., de Beur, S. J., LeBoff, M. S., Lewiecki, E. M., Tanner, B., Randall, S., & Lindsay, R. 2014. Clinician's Guide to Prevention and Treatment of Osteoporosis. *Osteoporosis International, Journal*, 25, 2359–2381.
- Doheny, M., Sedlak, C., Estok, P. & Zeller, R. 2007. Osteoporosis knowledge, health beliefs, and DXA T-scores in men and women 50 years of age and older. *Orthopaedic Nursing Journal*, 26, 243-250.
- Dohrn, I.M., Stahle, A., & Roaldsen, K. 2016. You Have to Keep Moving, Be Active: Perceptions and Experiences of Habitual Physical Activity in Older Women With Osteoporosis. *Physical Therapy*, 96, 361-370.
- Evans, E., Pothiwala, P., & Chapman-Novakofski, K. 2006. Ethnic Variation in Risk for Osteoporosis among Women: A Review of Biological and Behavioral Factors. *Women's Health Journal*, 15, 709 – 719.
- Ford, M., Bass, M., & Keathley, R. 2007. Osteoporosis knowledge and attitudes: a cross-sectional study among college-age students. *International Journal of Advances in Medicine*, 56, 43–47.
- Giangregorio, L., Fisher, P., Papaioannou, A., & Adachi, J. D. 2007. Osteoporosis Knowledge and Information Needs in Healthcare Professionals Caring for Patients with Fragility Fractures. *Orthopaedic Nursing Journal*, 26, 27–35.
- Hammond, G., Chapman, G. & Barr, S. 2011. Healthy midlife Canadian women: how bone health is considered in their food choice systems. *Journal of Human Nutrition and dietetics*, 24, 61-67.
- Hvas L., Reventlow S., Jensen H.L., Malterud K. 2005. Awareness of risk of osteoporosis may cause uncertainty and worry in menopausal women. *Scandinavian Journal of Public Health*, 33, 203-207.
- Johnson C., Hobson S., Garcia A., Matthews J. 2011. Nutrition and food skills education for adults with developmental disabilities. *Canadian Journal Of Dietetic Practice & Research*.
- Mäkinen, E. 2011. *Uusintamurtumien ehkäisy kaatumisen aiheuttaman yläraajamurtuman kokeneilla yli 50-vuotiaalla henkilöillä*. Finland, Turku.
- Mustajoki, P. 2015. *Osteoporoosi (luukato)*. Kustannus Duodecim Oy. Accessed on 2nd December 2016. Retrieved from: http://www.terveyskirjasto.fi/terveyskirjasto/tk.koti?p_artikkeli=dlk00053
- Najia L, Fangfang Z, Keqin Z, Zihui T, Liu N, Tang Z, et al. 2016 A community-based cross-sectional study for relationship of frequency of vegetables intake

and osteoporosis in a Chinese postmenopausal women sample. *BMC Women's Health*.

Nielsen, D., Huniche, L., Brixen, K., Sahota, O., Masud, T. 2013. Handling knowledge on osteoporosis [Qualitative research]. *Scandinavian Journal of Caring Sciences*, 27; 516–524.

Reventlow, SD. 2007. Perceived risk of osteoporosis: restricted physical activities? *Scandinavian Journal of Primary Health Care*, 25, 160-165.

Rothmann, M. J., Huniche, L., Ammentorp, J., Barkmann, R., Glüer, C. C., Hermann, A. P. 2014. Women's perspectives and experiences on screening for osteoporosis. *Archives of Osteoporosis*, 9, 192.

Ruxton, C. 2013. Dietary approaches to promote bone health in adults. *Nursing Standard*, 13, 41-50.

Schröder, G., Knauerhase, A., Kundt, G., Schober, H. 2012. Effects of physical therapy on quality of life in osteoporosis patients - a randomized clinical trial. *Health and Quality of Life Outcomes*, 10, 101.

Sebastian A, Frassetto L. 2016. A neglected requirement for optimizing treatment of age-related osteoporosis: Replenishing the skeleton's base reservoir with net base-producing diets. *Journal of Medical Hypotheses*, 91, 103-108.

Smulders, E., Lankveld, W., Laan, R., Duysens J., Weerdesteyn, V. 2011. Does osteoporosis predispose falls? a study on obstacle avoidance and balance confidence. *BMC Musculoskeletal Disorders*, 3, 12.

Solimeo, S. 2008. Osteoporosis in older man: feelings of masculinity and a "Women's disease". *Generations*, 32, 73-77.

Stamm, T. A., Pieber, K., Crevenna, R., Dorner, T. E. 2016. Impairment in the activities of daily living in older adults with and without osteoporosis, osteoarthritis and chronic back pain: a secondary analysis of population-based health survey data. *BMC Musculoskeletal Disorder*, 28, 139.

Svensson H. K., Olofsson E.H., Karlsson J., Hansson T. and Olsson L.E. 2015. A painful, never ending story: older women's experiences of living with an osteoporotic vertebral compression fracture. *Osteoporosis International Journal*, 27, 1729 – 1736.

World Health Organization. 2010. Global recommendations on physical activity for health, ages 65 years and above. *WHO Library Cataloguing-in-Publication Data*.

World Health Organization. 2010. Prevention and management of osteoporosis. *WHO Library Cataloguing-in-Publication Data*.

Appendix Summary of reviewed articles

Author/s, (year), country	Aim	Participants	Data collection and analysis	Key results
Doheny et al (2007), USA	To compare the knowledge of osteoporosis, revised health belief model variables (RHBM), and DXA (dual energy x-ray absorptiometry) T-scores among men and women 50 years of age and older.	218 participants	A codebook was prepared, and data analysis techniques included correlations, analyses of variance, t tests, and chi-squares. Major analysis of the data set was preformed using SPSS.	More than half of the sample had abnormal bone density scans. Knowledge of osteoporosis was low for women and even lower for men. Women perceived osteoporosis to be serious and that they were susceptible. Men did not perceive osteoporosis to be serious or that they were susceptible
Hammond et al (2010), Canada	To understand ways in which midlife women consider bone health in their personal food choice systems.	36 participants	To understand ways in which midlife women consider bone health in their personal food choice systems.	Most midlife women were not motivated to change their diets, few had deliberately increased their intake of calcium and vitamin D through foods and supplements, and few others had simplified their food decisions.
Dohm et al (2016), Sweden	This was a qualitative interview study applying interpretive content analysis with an inductive approach.	18 women	Individual semi structured interviews were selected for the capacity to generate rich data, and an interview guide with open-ended questions was developed.	The women perceived that PA was an important tool to maintain health with osteoporosis and believed that they had a responsibility to use this tool.

Nielsen et al (2013), Denmark	To increase understanding of the importance of osteoporosis information and knowledge for patients' ways of handling osteoporosis in their everyday lives.	26 patients	Critical psychology was used as a theoretical framework for the data analysis, which aimed at shedding light on patients' ways of conducting everyday life with osteoporosis.	Conclusion and implications for practice Two patterns were prominent regarding the way in which patients dealt emotionally with knowledge about fracture risk. Some patients were dealing well with the everyday risk of fracture and pain, while others seemed to be paralyzed and limited their everyday life. Surprisingly, patients with no fractures and few risk factors often responded by limiting their activities. In contrast, other patients found it crucial to keep up as many activities as possible and to hope for improved health in the future, despite a severe level of osteoporosis.
Solimeo (2008)	To describe how men, suffer from osteoporosis as men and explore the impact of the "sexing" of osteoporosis as a diagnostic category by examining the illness narratives of men living with this condition.	23 men	This paper reports on qualitative data gathered from 23 community-residing men who have an OP diagnosis.	Men may internalize the association of osteoporosis with women and incorporate it into a sense of perceived invulnerability to the condition, which, in turn, contributes to delayed diagnosis and treatment. Limited male-specific treatment and support options as well as social expectations of male gender performance play roles in men's health behavior.

Bombak, Hanson (2016)	To identify knowledge gaps and inform the design of future qualitative research, a narrative review was conducted to consolidate and synthesize the existing in-sights available within the qualitative osteoporosis re-search.	N/A	Search terms reflecting the domains of osteoporosis and qualitative research were entered into the Scopus database to generate a comprehensive survey of qualitative research in the area of osteoporosis. Articles were thematically analyzed.	Potential resources for patients with osteoporosis have been reported following qualitative inquiry. Similar to other studies, these participants described the need for more information on hip fractures and recovery, and the difficulty of questioning healthcare providers. One recommendation was the dissemination of a recovery map to help patients understand the recovery process.
Rothmann et al (2014), Denmark	To investigate women's perspectives and experiences with screening for osteoporosis. Screening was accepted due to life experiences, self-perceived risk, and the preventive nature of screening.	31 women	Was developed a qualitative interview study. Was designed an explorative study using both focus groups and individual interviews.	The women interviewed in this study displayed a general acceptance of the osteoporosis screening program. Health behavior was interpreted as a balance between perceived susceptibility and severity of osteoporosis, and benefits or harms of participating in the screening program.
Hvas et al (2005), Denmark	A study was undertaken to explore how menopausal women are affected by awareness of potential risk of osteoporosis.	1261 women chosen at random	The interviews were audiotaped and transcribed verbatim. Analysis aimed to elicit descriptive knowledge derived from everyday experience. All interviews were browsed for text concerning considerations regarding risk of osteoporosis.	Making individual women uncertain and worried must be considered a potentially serious side effect of health promotion

Svensson et al (2015)	The aim of this study was to illuminate the experience of living with a VCF.	10 women	The transcribed interviews were analyzed using a phenomenological hermeneutical approach, and the process of interpretation was continued through a dialectic dialog between the naïve understanding and the structural analysis in order to formulate a comprehensive understanding.	The narrative provided descriptions of living in turmoil and chaos, unable to find stability in their life with little improvement regarding pain and physical function. Shifts from periods of constant pain to periods of fear of constant pain created a loss of confidence and an increased sense of confinement
Reventlow (2007), Denmark	To explore elderly women's physical activity in relation to their perception of the risk of osteoporosis.	16 informants	Data analysis aimed to elicit knowledge derived from everyday experience and systematically followed the steps in the analysis as guided by Malterud. Interpretation and the resulting pattern were guided by an understanding of ill health and health risks and related behaviour as perceived and given meaning within a sociocultural context, related to the specific time, place and situation.	Perceived risk of osteoporosis may lead to decreased physical activity and hence actually increase the risk of osteoporosis. When a bone scan is considered, a dialogue comprising the patient's interpretations, ideas, and feelings about the health risk is needed. This might also help to make the meaning of the language and words used clear, so misunderstanding can be avoided.
Stamm et al (2016), Austria	The aim of this survey was to explore the limitations in the ADLs in older adults in a population-based survey in Austria.	3097 subjects	Descriptive statistics were used to calculate frequencies of problems in the ADLs. As co-variables in regression analyses sex, age, education level, pain intensity	People with musculoskeletal conditions were significantly more often affected by ADL problems than people without these diseases. The ADL domain which caused problems in the highest proportion of people

			and presence of anxiety or depression were used.	was "doing heavy housework" (43.9 %). It was followed by the ADL domains "bending or kneeling down" (39.3 %), "climbing stairs up and down without walking aids" (23.1 %), and "walking 500 m without walking aids" (22.8 %).
Smulders et al (2011)	The aim of the study was to investigate whether obstacle avoidance ability was affected in persons with osteoporosis compared to a comparison group of a community sample of older adults	85 persons at least 65 years old	For the analysis STATA.10 and SPSS12.0.1 were used. The level of a was set on 0.05.	Furthermore, persons with osteoporosis did not experience more fear of falling than the comparison group