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Non-pharmacological treatment and prevention of diabetes type II

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Thesis abstract

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Diabetes mellitus (DM) is a major public health problem worldwide. Current global estimates indicate that this condition affects 415 million people and is set to increase to 642 million by the year 2040. In addition, 193 million people with diabetes remain undiagnosed since most often have mild or asymptomatic nature of this condition especially in type II DM (TIIDM).

The reduction of exercise, and changes in diet have all contributed to weight gain and thus the increase of Type II diabetes. Being overweight, especially carrying extra pounds around the waistline, adds to Type II diabetes risk. The aim of this literature review was to describe how non- pharmacological approach affect the treatment and management of diabetes type II patients.

The goal of this literature review was to bring more insights into the importance of non-pharmacological treatment and management of diabetes.

The research question is to evaluate how lifestyle changes (diet, exercise, and non-smoking) affect the treatment and prevention of diabetes type II. The research study was based on a literature review. The research was done by collecting evidence-based material from previous literature publications. It was carried out using the following data base such as Cinahl with full text, Ebooks, SeAmk Finna, and Google books.

In order to prevent T2DM, little changes in one's lifestyle can have a huge impact and influence the chances of getting the disease. Diabetes mellitus can be prevented by diet and exercise before the early stages of diabetes or metabolic disorders.

Keywords: Diabetes, Diabetes type II, Non-pharmacological treatment, management, lifestyle changes, prevention.

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Terms and Abbreviations

DM	Diabetes mellitus
TIIDM	Type II diabetes mellitus
WHO	World Health Organization
IDDM	Insulin dependent diabetes mellitus
DPP	Diabetes Prevention Program
TIDM	Type I diabetes

1 INTRODUCTION

Diabetes mellitus (DM) is a major public health problem worldwide. Current global estimates indicate that this condition affects 415 million people and is set to increase to 642 million by the year 2040. In addition, 193 million people with diabetes remain undiagnosed since most often have mild or asymptomatic nature of this condition especially in type II DM (TIIDM). Persistently high blood glucose levels can lead to serious life-changing and life-threatening complications (Oman Med J. 2017, 177-179).

Diabetes mellitus is a cluster of metabolic disorder characterized by various degrees of insulin resistance and insulin deficiency that leads to disturbance in the blood glucose homeostasis (Michael 2008). It is also defined as a disorder due to deficiency or absence of insulin or rarely to impairment of insulin activity (Insulin resistance) causing varying degree of disruption of carbohydrate and fat metabolism (Anne and Allison 2010).

There are basically two types of diabetes mellitus which are type I, in insulin dependent diabetes mellitus (IDDM). Type II, non-insulin dependent diabetes mellitus (IMIDDM). Type I diabetes, most times called insulin dependent diabetes is mainly in children and young adults and its onset is usually sudden. Type II, non-insulin dependent diabetes mellitus (NIDDM) occurs mostly in adults. It is the most common form of diabetes mellitus, accounting for about 90% of cases (Anne and Allison 2010).

Diabetes may be caused by interference or impairment of glucose, metabolism, genetic factors, obesity, drugs, liver diseases, disease of the pancreas. Diabetic patients are present with polyuria, polydipsia, glucosuria, poly-aphagia, dehydration, weakness, fatigue, loss of weight (Famakinwa 2010). For this research, the researcher is mainly concerned with the type II diabetes mellitus.

There have been many benefits in the avoidance, early intervention, or the delay of the progression of diabetes mellitus type II. life expectancy increases as well as the quality of life, in addition to economic positions for the society and the healthcare payers. Most clinical trials and computer modelling simulation scrutinized the

charge-effectiveness of the treatment create at reducing the development of the compromised glucose tolerance to the Type II Diabetes (Alberti, Zimmet, & Shaw 2007, 451-463).

Lifestyle management is essential in diabetes care, by performing or undergoing intensive physical activities, healthy diet and nutrition, health care counselling, self-management education, and support. Diabetes Prevention Program (DPP) shows that a rigorous lifestyle intervention might reduce the incidence of the type II diabetes by 58% over the three years (American Diabetes Association 2017, 142).

In the treatment or prevention of type II diabetes, lifestyle change is essential (Mullaney et al. 2010). An adult with diabetes is responsible for the daily self-treatment, which is influenced by several factors, such as feelings, attitudes, and beliefs (King et al. 2010; Gherman et al. 2011; Sigurðardóttir 2015; Nam, Chesla, Stotts, Kroon & Janson 2011), knowledge, skills, motivation (Shigaki et al. 2010; Fisher, Kohut, Schachner & Stenger 2011).

The purpose of this research is to describe and educate patients on how to manage and prevent diabetes type II non-pharmacologically by maintaining a healthy lifestyle. The objective of the research is to bring more insights into the importance of non-pharmacological treatment and prevention of diabetes.

2 DESCRIPTION OF THE THEORETICAL FRAMEWORK

Theoretical framework of this thesis consists of the descriptions of the Diabetes type I, Diabetes type II, complementary diseases of diabetes, risk factors of diabetes, and treatment of diabetes type II. non-pharmacological, management of diabetes type II.

2.1 Type I diabetes

Type I diabetes usually breaks out under the age of 35, meaning that is most diagnosed in adolescence, but the disease can break out even in old age. The chance of heredity is low, the risk of getting sick is about 10% if a parent or sibling has type I diabetes. In type I diabetes, the insulin-producing cells in the pancreas are destroyed, causing the body to produce no insulin at all. It is an autoimmune inflammation that causes the body to destroy its own cells. According to the current understanding, autoimmune inflammation is a chain of events that causes inflammation of insulin-producing cells in the pancreas and lasts for years. Viral diseases and infant nutritional factors are suspected to trigger inflammation. (Saranheimo & IlanneParikka 2010, 26; Saranheimo & Kangas 2010, 13.)

Blood glucose levels begin to rise, and symptoms of diabetes appear when only 10–20% of the insulin-producing cells remain (Aro 2012, 10, 13–14). Symptoms include thirst, increased urine output, weight loss and fatigue (Saranheimo & Ilanne-Parikka 2011, 26). The treatment is insulin replacement therapy, which replaces the missing insulin in the body. Insulin is one of the key factors affecting balance. In addition to insulin, a good balance between diet and exercise is needed to achieve a good sugar balance. (Kangas 2010, 215; Saranheimo & Kangas 2010, 8-9.)

2.2 Type II diabetes

In type II diabetes, insulin production by the pancreas is deficient or impaired, or often accompanied by both insulin deficiency and impaired insulin. Treatment is oral

drug therapy or insulin therapy. (Diabetes Current Treatment Recommendation 2011.)

Type II diabetes can be linked to be accounting for around 90 per cent of all cases, it is a chronic metabolic disorder, in which the body is unable utilize glucose from food because of the inability of the pancreas to produce insulin or produces insufficient insulin, or the insulin itself is inactive (Naemiratch & Manderson 2010, 83).

Inheritance and environmental factors play a significant role in the onset of type II diabetes. Often a patient is overweight and has high blood pressure or a disorder of lipid metabolism, or both, i.e. metabolic syndrome. (Diabetes, Current treatment 2016.) In metabolic syndrome, the waist circumference of men exceeds 94 cm and that of women 80 cm, in addition to two of the following symptoms: high levels of blood triglycerides, fats in the blood, low levels of HDL cholesterol and high blood pressure. or glucose metabolism is elevated. (Mustajoki, 2015.)

Primary treatment for metabolic syndrome is narrowing of the waist circumference. An effective way to lose weight is a combination of diet and exercise. Even exercise is enough to prevent metabolic syndrome and reduce the harms and risks of comorbidities such as diabetes. (Mustajoki 2015b.)

2.3 (Some) Complementary diseases of diabetes

2.3.1 Neuropathy

Almost all diabetics patients experience some degree of nervous system changes or damage as the disease progresses. These are collectively referred to as neuropathy. The most common symptoms are numbness in the legs. Sometimes sensory disturbance can develop without noticing it. Other symptoms of neuropathy include numbness, tingling, pain, or restless legs. (Diabetes Association 2016c.)

People with lower limb neuropathy have an increased risk of developing a foot ulcer. The feet of every diabetic patient should be examined at least once a year and referred to a podiatrist for further treatment if necessary. (Tarnanen et al. 2013.)

2.3.2 Diabetic retinopathy, retinal disease of the eye

Retinopathy, or retinal disease of the eye, is the most common organ change in diabetics. It affects up to 90% of people who have had diabetes for at least 20 years (Diabetes Association 2016b.) Retinal disease of the eye may be visible as soon as diabetes is diagnosed. All diabetics undergo a fundus scan every 1-3 years (Diabetes Federation 2016b). It is caused by too much sugar in the blood. High sugar levels damage small capillaries and arteries, which can result in diabetic retinopathy. If left untreated, the disease can severely impair vision. (Diabetes Association 2016b.)

2.3.3 Coronary artery disease

Coronary heart disease is very common in people with diabetes. The risk of developing the disease is 3-5 times higher than in non-diabetics, and in addition, the prognosis of the disease is worse than in non-diabetics (Diabetes, Current Treatment 2016).

In type II diabetes, the risk of coronary heart disease is high already in the diagnosis stage of diabetes. (Diabetes, Current Treatment 2016.) The development of arterial disease is known to be associated with risk factors. Most risk factors are due to lifestyle. Heredity also matters. "Smoking and dietary fat are some of the most important lifestyles that increase the risk of coronary heart disease." It is known that about 85% of deaths in type 2 diabetics are related to cardiovascular disease. (Diabetes, Current Care 2016.)

2.3.4 Diabetic nephropathy, kidney disease

Nephropathy is a common name for kidney disease. Diabetic nephropathy is an additional disease or complication associated with diabetes. Its onset can be prevented with good treatment of diabetes and blood pressure. In early stage of kidney disease, a slight increase in protein excretion in the urine, called microalbuminuria, is observed. (Diabetic Nephropathy, Current Treatment 2010.)

Renal function can be monitored by blood tests and urine collection. The diabetic patient is monitored annually. The main risk factors for the development of nephropathy are poor blood sugar balance, smoking, heredity, and high blood pressure. (Diabetic Nephropathy, Current Treatment 2010.)

2.4 Risk factors

Genetic factor, environmental and autoimmune are the main reasons for type I diabetes mellitus, while for type II diabetes are lifestyle (poor nutrition, smoking), the history of the family of type II diabetes mellitus, age mainly older adults, history of diabetes during pregnancy, hypertension, alcohol, obesity, lack of physical activity and genetic factors. These factors expose one to a nonphysical way of living and it has been shown to be most common especially those struggling with weight problems (Ngandu et. al, 2015).

2.5 Treatment of people with diabetes

The goal of diabetes treatment is to keep blood sugar levels as close to normal as possible. The goal is to prevent additional diabetes-related diseases (chronic complications) and to achieve asymptomatic and good quality of life for people with diabetes. In addition to blood sugar balance, goals are also set for blood fat levels and blood pressure. Treatment goals are always determined individually with each person with diabetes. Depending on the individual situation, the implementation of treatment and the achievement of goals are monitored through assessment visits to either a diabetes nurse or a diabetes doctor's office. (Diabetes Current Treatment Recommendation 2011.)

Key elements in the treatment of diabetes include medication (insulin, oral medication), diet, and exercise, and their coordination through blood glucose self-measurements. (Ilanne-Parikka et al. 2011.) In type I diabetes, insulin treatment is always needed because the body does not have its own insulin production. Insulin therapy is carried out individually, considering the daily insulin needs and rhythm of life of each person with diabetes. Long-acting insulin is administered to meet basal insulin

requirements and fast-acting insulin to meet meal insulin requirements. Insulin can be dispensed using an insulin pen, insulin pump or insulin syringe, the most used being an insulin pen. (Ilanne-Parikka et al. 2011.)

If a person's fasting blood sugar is repeatedly above 7 (mmol / l) and / or above 11.1 (mmol / l) 2 hours after a meal, antihypertensive medication should be initiated. It is important for a diabetic patient to monitor their weight and if the weight starts to rise it is advisable to check their medication. Various medications such as, tablets, tablets and insulin or insulin alone can be used in the pharmacotherapy of type II diabetics. There is also an intestinal hormone-like drug on the market that is given by injection (Medicines, Diabetes Association, 2016.) For type II diabetics, metformin is recommended as the first drug. The main effect of metformin is to reduce liver glucose production. Initiation of metformin medication is recommended at the diagnostic stage (Diabetes, Current Care 2016.)

Non-pharmacological treatment is the most important treatment for type II diabetes and starting medication does not diminish its importance. Non-pharmacological treatment means lifestyle changes such as weight management, exercise, healthy eating, and non-smoking. "Smoking increases insulin resistance and thus reduces the effect of insulin in the body." (Medicines, Diabetes Association 2016.)

3 THE AIM, GOAL & RESEARCH QUESTION

The aim of this literature review was to describe how non- pharmacological approach affect the treatment and management of diabetes type II patients.

The goal of the review was to create a clear review that can be used as a guide for diabetes patients, and also to bring more insights into the importance of non-pharmacological treatment and management of diabetes and to bring new perspectives for future research.

Research question:

How can lifestyle changes affect the prevention and treatment of type II diabetes?

4 RESEARCH METHODS

4.1 Literature Review

The structure of the thesis consisted of a literature review and the definition of research questions. The main aim of literature review is to combine thoroughly results of different studies done connected to same topic (Cronin et al 2010). Literature review is a process in which different prior literatures are connected to a definitive topic (Cronin et al 2010). Literature review is to provide a broad picture of the knowledge relating to a specific topic (Cronin et al 2010). The purpose of a literature review to draw and criticize previous studies that has been done in same topic but doing that in an orderly, precise, and analytical method.

A successful literature review is one that creates a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers where research is needed. A literature review is focus on identifying, appraising, selecting, and synthesizing of all the relevant research information belonging to the research question. Its peculiarity and credibility borders on giving the health care workers or readers with the chance to make an informed decision based on health care practice (EPB) through a careful and diligent search fact analysis and synthesized information (Webster & Watson 2012)

4.2 Literature search

The research study was based on a literature review. This research was done by collecting evidence-based material from previous literature publications. It was carried out using the following data base such as Cinahl with full text, Ebooks, SeAmk Finna, and Google books. Reliability and validity of the information were based on the research method. Research words used are non-pharmacological, treatments, approach, management, lifestyle, diabetes type I and type II.

4.3 Inclusion & Exclusion Criteria

Inclusion criteria for the publications included diabetes both type I and type II, they must be written in the past 10 years. It must be evidence-based publications and published by reliable sources. The publications must cover non-pharmacological treatment or approach. Exclusion criteria for the publications include texts which are older than ten years, the topic covers only medication treatment.

Table 1: Inclusion & exclusion Criteria for Data Collection

Inclusion criteria	Exclusion criteria
Not older than ten years (2010-2020)	More than 10 years older
Published by reliable source	Published by unreliable source
Evidence based research	Non evidence base research
Covers non-pharmacological approach, treatment	Covers only medication view treatment
Peer reviewed and in English language	Not peer reviewed and in a language other than English
Full text	Non full text

4.4 Data search process

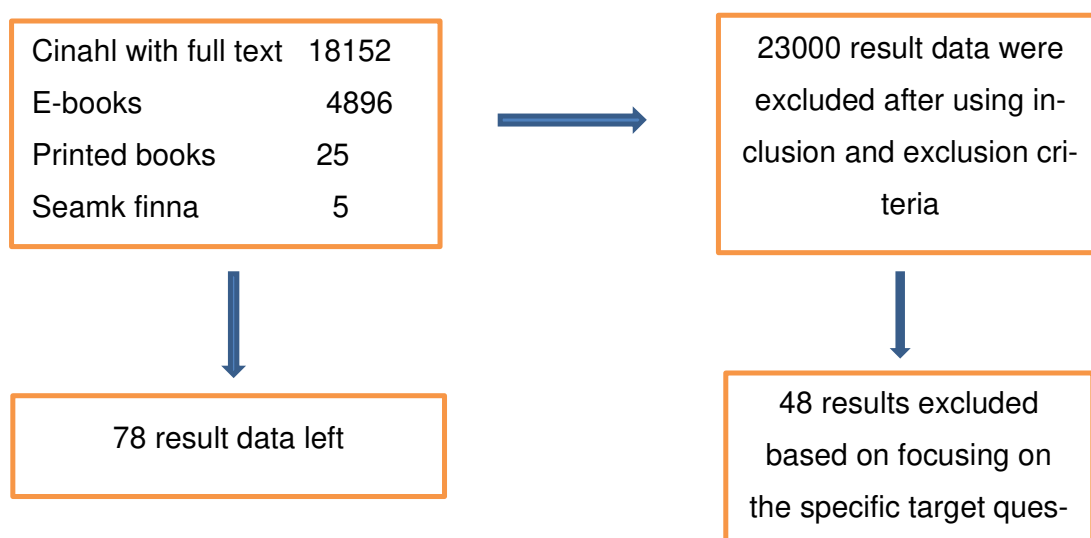
This section elaborates the concise analysis of the literature which elaborates how the research questions were answered. Literature review analysis describes the process by which data and findings from previous studies are drawn together to address a specific formulated research questions (Kiteley and Stogdom 2014).

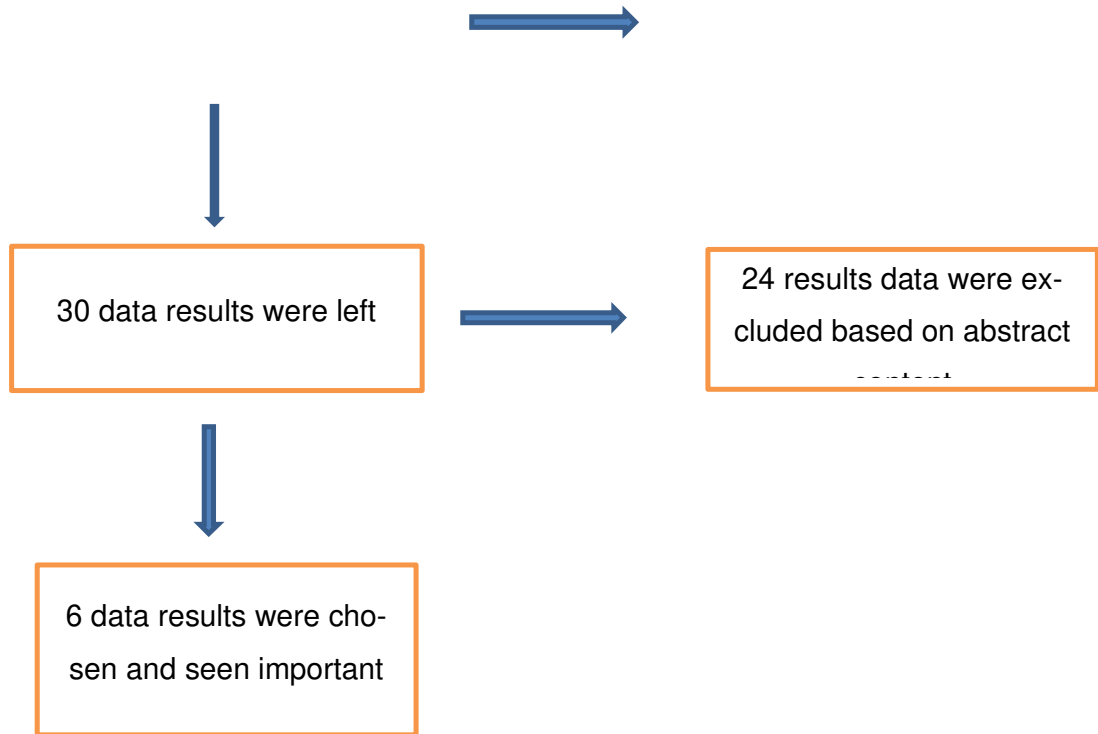
The research comprises of a range of sources such as E- books, online article, and journals, printed books, and online publication. The researched information was limited to the published year from 2010 to 2020. Information was sourced primary in English. Reviews were screened by first reading through various abstract to find information best suited for the topic. Some search information was free and available while some required payment for access.

Information was source separately at first and later combined words together. Research began with diabetes. Then proceeded to search for diabetes type II, non-pharmacological treatment, or approach. At every stage certain criteria inclusion and exclusion were used to limit the extent of result obtained. Full text criteria were also used to limit research result and abstract were quickly read to obtain the best relevant and suitable result.

A total search result of 23078 data was obtained. This result consists of E-books, printed book, article and journals, publication. At the end of the search process, 6 relevant information results were obtained and seen useful.

Table 2. Data search process





5 RESULTS OF THE THESIS

To prevent T1DM, little changes in one's lifestyle can have a huge impact and influence the chances of getting diabetes type II. Therefore, there is a need for action to be taken about the modifiable factors influencing the development of this condition which include lifestyle and dietary habits (Ericson et. al, 2015).

Regardless of the patient's age, cardiovascular diseases are the most common mortality causes among diabetes patients. In order to prevent and manage these conditions, diabetes patients are required to modify their lifestyle such as dietary and nutrition, regular physical exercise, footcare management, stop smoking, weight reduction. These modifications help in controlling the blood pressure and blood sugar levels (Gao et. al, 2016).

5.1 Dietary and Nutrition

Maintaining a good balanced diet has related to the reduction in the risk of getting type II diabetes (Nam et. al, 2011). There is increased emphasis of the consumption of foods rich in whole grains, unsaturated fatty acids, vegetables, and fruits, dairy products that are low in fat, fish, poultry, and reduced consumption of red meat (Gray et. al, 2015). This diet recommendation is also used to avoid the development of type II diabetes not only for the management. This diet prevents weight gain in addition and show improvement in glucose tolerance (Gray et. al, 2015).

Since type II diabetes is a preventable disease, people should take these necessary steps to prevent its onset and should visit health care providers regularly to check for any risk factors that may expose them to early onset of the disease (Peimani, Tabatabaei-Malazy, & Pajouhi, 2010). Nurses should advise the consumption of the following foods to prevent type II diabetes.

Nurses should advise the consumption of the following foods to prevent type II diabetes. Fruit and vegetables both are naturally low in fat and calories and a good source of vitamins, Minerals and fiber, whole grains are a good source of fiber which

helps in digestion, lean meats and fish are high in protein as are beans, pulses, soya and tofu. ” (Mahalakshmi et. al, 2016).

According to Scobie and Samaras (2014), Dietary recommendations for the past 30 years in diabetes mellitus, emphasis more on diets with low saturated fat. Low saturated fat intake is crucial to lowering cardiovascular risk and limiting dietary cholesterol. Macronutrients balancing is vital and differs in dietary approaches depending on individual needs. For example, an overweight individual would compromise energy intake if energy intake results in increased fat consumption regardless of fat quality. Thus, lower carbohydrates and high protein intakes are beneficial in type II diabetes diets (Scobie & Samaras 2014, 74-81).

5.2 Physical Activity

The importance of exercise in the treatment of type II diabetes has been emphasized because, when combined with the right diet, it even prevents the disease, but it also has a significant impact on the treatment of diabetes that has already broken out. Exercise plays a major role in the treatment of type II diabetes, as it is one of the cornerstones of treatment and increases insulin sensitivity. However, exercise must be regular, as it only takes a couple of days for insulin sensitivity to improve. Improving long-term blood sugar balance requires exercising at least every other day. Exercise can also affect factors related to metabolic syndrome such as blood lipids, blood pressure, blood clotting factors, and obesity. (Rönnemaa 2011, 174-175.)

There is a significant relationship that exists between diabetes, obesity, and lack of physical activity. In urban areas people do not usually do any physical activities hence explaining the reason for high prevalence rate of obesity (Borus et al. 2014). While in rural areas, people usually walk as a mode of transportation which is a form of physical activity. Physical activity has multiple benefits that include maintenance of weight, cardiovascular benefits, improved wellbeing psychologically, improved depression, glycaemic control, increment of insulin sensitivity. and improved blood pressure among many other benefits (Colberg et. al, 2016).

Physical activity plays a crucial role as important factor for the type II diabetes mellitus. An increase in physical activity levels is essential in avoiding weight gain and reducing overall weight to manage the development of diabetes. Regular exercise results in an improvement in insulin action, reducing blood pressure, and improvements in lipid profile consequently decreasing the risk of heart disease and stroke (Scobie & Samaras, 2014)

Diabetic individuals are recommended to exercise for 20 minutes, three days per week. Exercising strategies may vary across diabetic patients; there may be certain conditions that can make more protracted exercise problematic. For example, diabetic patients with renal failure, retinopathy should be discouraged from participating in physical activity that could raise blood pressure significantly (Scobie & Samaras 2014, 7481).

5.3 Footcare management

Foot care is one of the most important management therapies among diabetes patients, because its complications are highly common among the diabetics. Those complications include charcoal foot that's foot deformation, ulcers which are open wounds on the foot and amputation (American Diabetes Association, 2016). Foot ulcers which is commonly refer to as a patch of broken skin, can occur either on the upper or lower side of the foot. Research shows that foot ulcers occur in 1 out of every 10 diabetic patients and if not well taken care of, can develop into blisters and small wounds which can lead to amputation (Bonner, Foster, & Spears-Lanoix, 2016).

Additionally, foot care is very important because prolonged high levels of blood glucose leads to diabetes mellitus and may result to loss of circulation to the body extremities as well as damage to the nerves which is referred to as diabetic neuropathy (American Diabetes Association, 2016). When the nerves in the feet become damaged, they lose sensation and can become numb. Unfortunately, most diabetics do not realize that they have a feet problem until the problem reaches an advanced stage. It is, therefore, important to have regular examinations of the feet for diabetic patients (American Diabetes Association, 2016).

5.4 Smoking

Smoking cigarette is considered a modifiable risk factor for some, ailments, including cardiovascular infection. Subsequently, smoking cigarette increase the danger of creating diabetes mellitus type II and enhance both micro and macro vascular problems of type II diabetes mellitus. Study shows smoking, and its addictive effects is an autonomous hazardous factor related with insulin opposition and beta cell work on the pervasiveness of the type II diabetes, to such an extent that insulin and C-peptides reactions to the oral glucose load were essentially higher in the smokers. Smoking contributes and worsens diabetic nephropathy (kidney failure), having antagonistic effects on the diabetic nephropathy in the type II diabetic patients (Chiang 2014).

Smoking is an independent risk factor for type II diabetes mellitus and showed synergistic interaction with the status of low insulin secretion and high insulin resistance for developing diabetes. With the high rates of smoking and growing issues of diabetes in the world, smoking cessation should be considered as one of the key factors for diabetes prevention and treatment programs. Early smoking cessation could decrease the risk for developing diabetes mellitus to that of nonsmokers in the long term (Shi L et al, 2013)

6 DISCUSSION

This current study focused on understanding the effect of non-pharmacological approach in preventing and managing type II diabetes. The study found that lifestyle changes play a major role in type II diabetes. They provide preventive as well as management education to people at high risk or those already suffering from type II diabetes.

TIIDM is a complex disease which obliges changes in several lifestyle, changes such as physical activity, dietary, medication intake and the monitoring of glucose level. The core treatment of diabetes is how to control the blood sugar, slow advancement of the disease and manage complications. A strict regulation of blood sugar can decrease the progression of diabetes and prevent the incidence of complications.

Nurses should educate people on type II diabetes risk factors that include a poor diet that is rich in saturated fats and high sugar content, high blood pressure, lack of physical activity, high levels of cholesterol among other factors (Hjelm, Mufunda, Nambozi, & Kemp, 2013; Munshi et. al, 2016). There are other important factors that are also risk factors especially when combined with those previously mentioned above include smoking and alcohol consumption. Therefore, nurse sensitizes the public on why they should not smoke and avoid or limit their consumption of alcohol (Peimani, Tabatabaei-Malazy, & Pajouhi, 2010).

Based on the articles reviewed it is noteworthy that lifestyle modifications can prevent the risk of type II diabetes. Some of the modifications are increased physical exercises, balanced and healthy diet which helps to reduce the incidence of type II diabetes in individuals considered as high risk (Umpierrez et. al, 2012). No matter the type of risk that one is exposed to, lifestyle modifications can help a patient on suitable prevention and management ways towards type II diabetes.

After writing this thesis, the writer learned some new information for DM complications. Normally most people think prevention of DM complications is hard and it is

nurses' work. They need not do anything. So, in this literature review the writer outlined things patient can do themselves to prevent the sickness. They can change their diet and drink, keep healthy lifestyle and check in the hospital on time.

7 CONCLUSION

The aim of this study was to lay more emphasis on the role that lifestyle changes has in the prevention and management of diabetes type II. Type II diabetes, also sometimes called adult-onset diabetes, is very difficult to treat and the management is very expensive.

Based on the reviewed literature, lifestyle changes play an important role in the prevention and management of type II diabetes. They have a significant role in the prevention of diabetes by maintaining a good healthy diet, engaging in physical activities, avoiding smoking, and drinking. Additionally, management of lifestyle is essential in diabetes care, by performing or undergoing intensive physical activities, good diet, and nutrition.

Diabetes mellitus can be prevented by diet and exercise before the early stages of diabetes or metabolic disorders.

The most important things in this article is, prevention is always better and cost saving than treatment. It may be a little hard for them, but it is effective. It is a persistent challenge. People should know this prevention is significant. If they do not pay attention to this, these complications can even threaten their lives.

The most important thing for preventing diabetes is to report to the doctor or nurse when a person indicates symptoms of diabetes complications. Some of these symptoms includes vision loss, touch and sensitivity loss, any feeling of pain or any damage or blisters on the feet. It is good to avoid smoking and drinking. It is noteworthy that smoking and alcohol increases the risk occurrence of complications. In addition, the right amount of physical activity can help improve insulin sensitivity and is considered to have other health benefits to the body. Eating healthy is also good for preventing complications. When taking a healthy diet to prevent complications, it is recommended to choose fresh food. (Ivy, Lemos&Thomas2010)

7.1 Limitation of the study

The study was limited both in resource and time. Some of the relevant information could not be assessed because it required financial payment allowing the writer to make do with free material what is available to him. There was also time constraint which was a problem due to other tight school schedules.

7.2 Ethics and reliability

Ethics in a very research study is important because it guides researcher conduct throughout a research study. This is important because the quality, standard and reliability of the study depends on the amount of ethical principle complied with by the researcher. According to Wulf (2012, 141), it is important that the research outlines all procedure adopted in the research process. Ethics helps in the avoidance of violating any rules that are associated with the research process. The material used in this thesis were extracted from high-quality databases and academic sources, and this illustrates that the articles were of high quality and integrity. The researcher was very careful to avoid any kind of infringement which could lead to the study being disapproved. In addition, the researcher avoided unethical behaviours such as plagiarism, fabrication of data and falsification which could negatively influence the researcher reputation. The researcher will follow the university guidelines regarding ethical practices as outlined in the thesis guidelines. The articles used for the study were obtained from the databases listed since the researcher had access to them. The data was presented in its original form with no fabrication to ensure trustworthiness in the study

To ensure the ethic and reliability of the research, series of measure were taken to eliminate biases. Information was carefully sourced from reliable data base. Seamk University information data base was used (Cinahl with full text (Ebsco), Ebooks, SeAmk Finna, Google books etc.). Some of the database used in this study required registration to access necessary information while others could be accessed freely

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