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YOUNG PEOPLE WITH TYPE 1 DIABETES MELLITUS AND SELF-CARE



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The burden of diabetes is increasing globally, particularly in developing countries. Diabetes Mellitus is still a challenging issue worldwide. There is still need of proper management and coping strategies for young adults (WHO, 2011). In Finland the incidence and prevalence of T1DM in children and adolescents rates among the highest in the world (Tuomilehto et al. 1992).

This project is under eMedic, which belongs to Central Baltic INTERREG IV A programme. The aim of the project is to improve the quality of life of adults by providing useful information about young people with Type 1 DM, monitoring, and coping with type 1 DM. The task of the project is to establish a webpage which will be available on Terveystieto, where the public can get useful information about how to monitor, and cope with type 1 DM.

Diabetes Mellitus is a life-long disease; it needs continued information for managing the disease process. This study should be considered as a step or contribution to ways of managing diabetes mellitus. Tele-medication is not spread worldwide, young people who are especially in the developing countries might not fully benefit from it. So more efforts are needed in technological domain.

KEYWORDS:

Diabetes mellitus type 1, juvenile diabetes, coping, coping-strategies, self-management, adolescents, youths, young people, monitoring, monitoring methods, monitoring devices

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LIST OF ABBREVIATIONS

T2D	Type 2 Diabetes
T1D	Type 1 Diabetes
DM1	Diabetes Mellitus 1
DM2	Diabetes Mellitus 2
WHO	World Health Organization
SMBG	Self-monitoring of blood glucose
CGMS	Continuous glucose monitoring system

1 INTRODUCTION

Diabetes Mellitus is still a challenging issue worldwide. There is still need of proper management and coping strategies for young adults. It is necessary to have more detail knowledge about how to organize and deliver effective programs, which types of programs are best for different types of patients. (WHO, 2011).

The burden of diabetes is increasing globally, particularly in developing countries. (WHO, 2011). In Finland the incidence and prevalence of T1DM in children and adolescents rates among the highest in the world. Overall, the yearly incidence of childhood diabetes in Finland from the year 1987 to 1989 was an estimated 35.2 per pupil. In boys it was 38.4 making it higher than in girls at 32.6 (Tuomilehto et al. 1992, 32). According to the Diabetes Mondiale (DIAMOND, 1999, 90-92) project launched by WHO in 1990 to expand the surveillance of T1DM worldwide, the incidence of diabetes is rising at an alarming rate and even faster, on average 4.1% annually, between 1992-2005. From 1997 to 2001, the incidence of T1DM in 0-14-yearold Finns was 49.1 per 100,000/year, and there was a slight male predominance with a male/female ratio of 1.08. It is worth noting that several studies on childhood-onset T1DM including the age group of 15-19 show that the peak in the incidence is during puberty between 10 and 14 years further growing into adolescence. (Lammi N, 2009, 2).

Important facts to note on Diabetes are as follows: Diabetes is predicted to become the seventh leading cause of death in the world by the year 2030; Total deaths from diabetes are projected to rise by more than 50% in the next 10 years; Type 1 diabetes (previously known as insulin-dependent, juvenile or childhood-onset) is characterized by deficient insulin production and requires daily administration of insulin; Diabetes has become one of the major causes of premature illness and death in most countries, mainly through the increased risk of cardiovascular diseases (CVD). It accounts to between 50 -80% of deaths among people with diabetes; Diabetes is a leading cause of blindness, amputation and kidney failure. Lack of awareness about diabetes, combined with insufficient access to health services and essential medicines, can lead to

complications such as blindness, amputation and kidney failure; DMT1 cannot be prevented but can be managed. (WHO, 2011.)

Central Baltic INTERREG IV program is playing a vital role in battle against diabetes mellitus with the help of project e Medic. The main aim of e Medic is to build up new practices for the treatment of diabetes mellitus by providing effective consultation in medicine especially for diabetes mellitus and children. E Medic will create new scientific applications and monitoring devices to raise understanding of needs and importance of e health services (e Medic).

Despite great advances in diabetes care, type 1 diabetes is still linked with considerable premature mortality resulting from both acute and chronic complications of diabetes (Harjutsalo et al, 2011). Young diabetic patients constitute a challenging group in diabetic care. In adolescence self-image is being constructed and diabetes self-care becomes an integral part of daily life. It is the most appropriate time for diabetes education to instill a mastery over everyday care as well as an informed and right attitude towards diabetes (Tulokas, 2011,26). Taking all the above mentioned facts, there is no doubt that this is a very relevant and current topic.

The aim of our project is to improve the quality of life of adults by providing useful information among young people with Type 1 DM about monitoring, and coping with type 1 DM. The task of our project is to establish a webpage where public can get helpful information about how to monitor, and cope with type 1 DM.

2 PROJECT AIM AND TASK

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3 DIABETES MELLITUS

Pathology and Types of Diabetes Mellitus

Diabetes mellitus is a faction of persistent metabolic circumstances, every of which are categorized via prominent blood glucose levels ensuing commencing the body's incapability to manufacture insulin or confrontation to insulin accomplishment, or together. Type 1 Diabetes Mellitus, which causes from autoimmune beta-cell devastation in the pancreas and is categorized via a comprehensive need of insulin manufacture; type 2 Diabetes Mellitus, which builds up while there is an irregular amplified confrontation to the accomplishment of insulin and the body could not manufacture adequate insulin to defeat the confrontation (American Diabetes Association 2006.)

Type 1 diabetes is responsible for 5% to 10% of all types of diabetes. Its hazard factors contain autoimmune, genetic, and environmental. Until now, there is no acknowledged method to avoid type 1 diabetes. Type 2 diabetes is responsible for 90% to 95% of all types of diabetes. This type of diabetes commonly starts as insulin confrontation plus, as the body is not capable to create adequate insulin to deal with the confrontation, the pancreas might decrease the manufacture of insulin or finally discontinue manufacturing it. (Deshpande et al. 2008, 2.)

Gestational diabetes is a type of glucose intolerance which is responsible for a number of women through pregnancy; as well as a faction of other types of diabetes which are because of particular genetic defects of beta-cell utility or insulin act, illnesses of the pancreas, or else medicines or substances (American Diabetes Association 2006). Pre-diabetes is a sign of situation to diabetes in which someone has high blood glucose levels however does not congregate diagnostic criterion for diabetes. Someone in the company of pre-diabetes may contain damaged fasting glucose or harmed glucose tolerance, or has both condition together (Deshpande et al. 2008, 2).

Risk Factors for both types of Diabetes Mellitus

Risk factors for type 1 diabetes contain family history, race, and assured viral infections through upbringing. Risk factors for type 2 diabetes contain age, race or ethnicity, family history, history of gestational diabetes, and low birth weight. (Deshpande et al. 2008, 3.)

Genetic factors as well take part in a responsibility; lifestyle risk factors emerge to be the major cause (Schulz et al. 2006, 1866). Lifestyle risk factors contain amplified body mass index, physical inactivity, poor nutrition, hypertension, smoking, and alcohol use (Zimmet et al. 2001, 782). Total caloric assumption, also the particular mechanism of diet such as sophisticated carbohydrates and fats, has been simultaneous to diabetes expansion. Restrained alcohol apply might diminish the hazard for budding diabetes (Narayan et al. 2006, 2114). However smoking has been exposed to be a sovereign hazard aspect for diabetes (Will et al. 2001, 540). Psychosocial features such as depression, increased stress, lower social support, and poor mental health status as well are connected with an amplified hazard for the expansion of diabetes (Strodl et al. 2006, 57).

3.1 Complications related to Diabetes Mellitus and its risk factors

Complications related to diabetes could be categorized as micro-vascular or macro-vascular. Micro-vascular complications contain nervous system damage or neuropathy, renal system damage or nephropathy as well as eye damage (retinopathy) (American Diabetes Association 2006). Macro-vascular complications contain cardiovascular disease, stroke, as well as peripheral vascular disease. Peripheral vascular disease might guide to bruises or injuries that do not restore to health, or eventually lead to elimination (Deshpande et al. 2008, 4).

Cardiovascular disease effects to 65% of the entire passing away in people with diabetes (Geiss et al. 1995, 233). Ischemia heart disease with stroke effects for the utmost percentage of morbidity connected with diabetes. Risk factors for cardiovascular disease amongst people with diabetes are alike to the people who are devoid of diabetes and have hypertension, hypercholesterolemia, plus smoking (Deshpande et al. 2008, 5).

Peripheral arterial disease is originated via the tightening of blood vessels that transmit blood to the arms, legs, stomach, and kidneys; it is a main risk aspect for lower extremity amputation (Deshpande et al. 2008, 6). For people who have diabetes, the hazard for peripheral arterial disease is amplified by age, extent of diabetes, and attendance of neuropathy. Additional factors connected with cardiovascular disease, such as C-reactive protein levels and homocysteine levels, as well are linked with a bigger hazard for peripheral arterial disease (King et al. 2005, 87).

Diabetic retinopathy is the mainly frequent micro-vascular complication with people who have diabetes and fallout in greater than 10,000 new happenings of blindness very year. Additionally, retinopathy is connected with expanded hyperglycemia, it is time-consuming to extend, and there is some proof that it could initiate to grow as early as 7 years earlier than clinical diagnosis of type 2 diabetes mellitus (Harris et al. 1993, 1113). Length of diabetes is the mainly important interpreter of visual impairment with people who have type 2 diabetes mellitus. A large amount as 90% of blindness because of retinopathy among the people who have diabetes might be avoidable as diagnosed and treated as early as possible. Once a year, the eye examinations are suggested for every people with diabetes to take (American Diabetes Association 2006).

Diabetic nephropathy is explained as unrelenting proteinuria in people with no urinary tract infection or other diseases causing the proteinuria. In people with type 1 diabetes, growth of scientific nephropathy is a quite late event; yet, in people with type 2 diabetes, diabetic proteinuria might be in attendance at finding. (Deshpande et al. 2008, 6.)

Metabolic regulation is one of the significant amendable hazard aspects for expansion of diabetic nephropathy. For people who are with either type 1 or type 2 diabetes mellitus, authoritarian metabolic control directs to an important diminution in the danger of budding micro-albinuria and the hazard of development to persistent proteinuria (Wang et al. 1993, 1306). Though, it is yet uncertain that blood pressure at diabetic onset forecasts afterwards expansion of diabetic nephropathy. Other risk factors, as well as cigarette smoking, obesity, anaemia, and genetic factors, furthermore have been discovered (Jerrmendy et al. 2007, 100)

Diabetic peripheral neuropathy is a frequent complication approximate to have an effect on 30% to 50% of persons with diabetes (Candrilli et al. 2007, 306). The major risk feature for diabetic peripheral neuropathy is hyperglycaemia (Shaw et al. 1999). Other sovereign hazard factors contain age, duration of disease, cigarette smoking, hypertension, elevated triglycerides, higher body weight, alcohol consumption, and taller height (Tesfaye et al. 2005, 165).

Diabetic peripheral neuropathy guides to an amount of damages and functional boundaries. People with diabetic peripheral neuropathy are at elevated danger for foot ulceration and consequent lower-extremity amputation (Gonzales et al. 2000, 80). Other possible complications of diabetic peripheral neuropathy, such as falls, are a lesser amount of noticeably attributable to the disease; though, they could end in important functional boundaries (Deshpande et al. 2008, 7).

Non-traumatic lower-extremity amputations are an overwhelming complication of diabetes. Many as 15% of people who have diabetes may have these amputations throughout their life span. People with diabetes are 10 to 20 times more possible to have non-traumatic lower-extremity amputations than those who are without diabetes. People of 65 years old or older, are accounting for about 55% of patients with diabetes who had non-traumatic lower-extremity amputations. (Sugarman et al. 1998, 777.)

There are some risk factors for non-traumatic lower-extremity amputations, as well as increasing age, being male, being African American, having peripheral neuropathy, and having chronic ulcers; disability as a consequence of a lower-extremity amputations is quite frequent (Deshpande et al. 2008, 8). There is also disagreement regarding the advantage of primary minor amputation versus primary major amputation. The advantage of primary minor amputation is that there is a poorer risk for new major amputation and superior possible rehabilitation (Larsson et al. 1995, 181).

Control the risk factors of Diabetes Mellitus related complications

The three mainly important risk factors are hyperglycaemia, high blood pressure, and hypercholesterolemia. It has been recommended that enhancements in glycaemia control, blood pressure, and cholesterol level could decrease a person's hazard for

complications (Centres for Disease Control and Prevention 2005). Implementation of suitable diet and exercise behaviours and devotion to medication treatments would consequence in better glycaemia control, alongside with controlled blood pressure and blood lipids, would significantly decrease the risk of diabetes complications (Deshpande et al. 2008, 9).

3.2 Type 1 Diabetes Mellitus and young people.

Young people's knowledge of Type 1 Diabetes Mellitus

More than 180 million people globally have diabetes, and it is possible that this number would be more than twice by 2030 (The World Health Organization, 2008). The beginning of type 1 diabetes characteristically takes place in youth or adolescence (Centres for Disease Control, 2005). Research demonstrates that children and young people with superior knowledge levels have better metabolic control compared with the youths with inferior knowledge levels (Auslander et al. 1991, 213). Generally, young people with diabetes achieve comparatively high on tests of knowledge of diabetes. It was also established that young people who have more general knowledge about what to eat and what to do when they have an insulin reaction than problem-solving knowledge, for example information about the effects of illness and nervousness of insulin requirements (Johnson et al. 1982, 708; Auslander et al. 1991, 213; Coates & Boore 1996, 7).

There is a report of a study carried out to illustrate what children and young people who have type 1 diabetes recognize and want to be familiar with about the disease. A qualitative, descriptive design was followed in the research. In this qualitative study, purposive participants of 58 children and adolescents between the ages of 8-18 years with type 1 diabetes mellitus were interviewed in 2005 about what they knew and would like to know more about their disease in the diabetes management clinic of a major regional hospital in the western USA. During a process of orientation, major themes were recognized from the data. (Olsen et al. 2009, 1.)

In the study, six mainly themes were identified from the interviews: Care, Physiology, Consequences, Cure, Effects on the Family and Experience at Diagnosis. Three Care subcategories came out from the analysis: Physical Care, Emotional Care and Ambiguous Care. Physical care: Participants pointed out that they knew how to handle with their diabetes, as well as how they applied medical equipment to manage the illness, how they took care of their bodies, and what they had to do to control the disease. Emotional care: Participants as well gave replies of Emotional Care, which implicated coping with the emotional or psychological features of the illness, together with how parents helped and encouraged the young people. Ambiguous Care: for example, when researchers asked, 'What have you talked about?' a 15-year-old girl replied: 'Just about taking care of myself and how to prevent...further discomplications'. When asked what do they knew about diabetes, a 13-yearold boy answered: 'How to take care of myself in most every way' (Olsen et al. 2009, 3.)

The second mainly common theme was Physiology. Answers in this grouping associated to information about how the body systems work, how diabetes influences the body, what are the happenings in the body to originate diabetes, the science and history of diabetes mellitus, and new diabetes researches which are being carried out. Approximately 50 percent of the participants talked about the consequences of carrying diabetes. They recognized short-term and long-term consequences and the term where the time-period was unknown. Many consequences were negative; however some children explained positive consequences. More than 15 per cent of the participants discussed about Cure, which is what had to be done with whether or not the disease could be cured, how it could be cured, or when it would be cured. Another category identified was Effects on the Family. A few participants discussed about how their families helped them physically to deal with their diabetes. Some participants as well talked about their Experience at Diagnosis. They illustrated discussing with their parents about their experience when the illness is diagnosed. Some essential themes were in addition identified through all the interviews. These themes present insights into the inimitable challenges for young people with type 1 diabetes mellitus and replicate their feelings and the meanings drained from their experiences. (Olsen et al. 2009, 5.)

Overall, children and young people with type 1 diabetes mellitus have amount of knowledge about their illness, however still have a need to increase more knowledge concerning the care, physiology and consequences of type 1 diabetes. This knowledge might manipulate their management of diabetes and decrease the complications of the illness. Nurses, diabetes educators and parents are encouraged to supply contexts in which children and young people could liberally raise questions about their situations as well as give developmentally suitable knowledge for diabetes care and management. Children and young people themselves are breathing with a persistent situation, and so as type 1 diabetes mellitus, it is a multifarious and intense individual occurrence. The study has furthermore exposed that young people can communicate their points of view when they are given the openings. (Olsen et al. 2009, 8.)

Young people's general physical and psychological functioning with Type 1 Diabetes Mellitus

Young people who have type 1 diabetes mellitus build decisions engaging in self-management behaviours. They are similar to every young people, they have to as well make judgments concerning engaging in other health-promoting and health-compromising behaviours such as occurrence in substantial activity and experiencing with alcohol, cigarette smoking, and other illegal substances (Tercyak et al. 2005, 2). In the situation of young people who have type 1 diabetes mellitus, whose health behaviours take on continuous superior significance, it is building their close relation to metabolic control (Tercyak et al. 2005, 3). Specially, physical activity has been showing to be instantaneous with metabolic functioning in youngsters who have diabetes mellitus (Arslanian et al. 1990, 9; Austin et al. 1993, 7).

There was a study to describe the health attitudes, beliefs and risk behaviours and psychological functioning of young people with diabetes and to evaluate these psychosocial features of health to those of young people without diabetes. An total of 72 young people who have type 1 diabetes participated in the outpatient diabetes clinics at two major metropolitan area teaching hospitals. 42% of the participants were women, 50% were Caucasian, and the average median area-based household income level was about \$65,000. 16% of the participants participated in a state-supported insurance plan,

and 92% of the participants were registered in school on a full-time root. Data were attained by the research assistants from participants using a self-report questionnaire including of individual survey items and standardized scales. (Tercyak et al. 2005, 4-6.)

In the outcome of the study, average ratings in Descriptive statistics advocate they consider on their health a reasonable quantity but do not frequently believe about becoming unwell. Their general health ratings imply they analysis themselves as being in fine health, and their generally attitudes about smoking advocate they do notice it like addictive. On average their disclosed depression symptoms were in safe limits. (Tercyak et al. 2005, 8.)

When measured up to to healthy youngsters, young people with diabetes had extra recurrent opinions concerning health and illness, priced their health as poorer, and thought smoking as less addictive. Young people with diabetes as well stated superior indications of depression, and greater disclosure to smoking in their households, but fewer smoking trialling. (Tercyak et al. 2005, 9.)

In outline, it might emerge that the health attitudes, beliefs, and risk behaviours and general psychological functioning of young people who have diabetes allocate together likeness and variation with those of young people without diabetes. (Tercyak et al. 2005, 13.)

Young people with Type 1 Diabetes Mellitus and their parents in intensity

Parent-teenagers conflict acts a crucial part in every of the existing theories of youngster growth process (Laursen et al. 1994, 197). Therefore, conflict is a common part of teenager growth that rises in speed and intensity; and it is supposed to happen during early or mid-youth hood (Levya et al. 1986, 441). The unenthusiastic sentimental feature of conflict is in maximum when conflict with family (Laursen, 1993, 535). It as well has been connected with pessimistic youngster results such as negligence, behaviour disorders (Patterson & Bank, 1989, 139; Patterson, Capaldi, & Bank, 1991, 139), absentee and suicidal behaviour (Adams et al. 1985, 715).

There was a study to explain parent-youngsters conflict occurs in the families of young people with type I diabetes and to find out if the cases of conflict were alike to those in a similar non-distressed group from a previous study. The participants were 161 young people with type 1 diabetes mellitus and their families checked conflict via the Issues Checklist. The families include two-parent and single-parent families. There were 126 mothers and 124 fathers from two-parent families. Of the two-parent families, 28 families included step-parents. There were 34 single-parent mothers and 1 single-parent father. There were 127 white and 34 African-American young people in the research. The mean ages of the subjects were as follows: adolescents' is 12.8 years old, mothers' is 40.3 years old, and fathers' is 43.1 years old. There were 80 female young people and 81 male young people. (Viikinsalo et al. 2004, 3.)

Young people described that the mainly intense problem with their fathers were talking back to parents and fighting with siblings, and lying. Having problem in school, building too much noise, and obtaining low grades were the next mainly intense problem. In general, the intensity of reported issues in young people with diabetes was alike to the non-distressed group. Results of the research points out, that general parent-youngster conflict in young people who have type I diabetes mellitus is similarly to non-distressed group. Thus, having type I diabetes does not increase common developmental conflicts. (Viikinsalo et al. 2004, 6-9.)

Young people with Type 1 Diabetes Mellitus and supporting

Young people with diabetes have an amount of confronts at the period for alteration to mature life, a development becoming additional frequent due to the shift of diabetes beginning throughout childhood instead of in early adulthood (Pundziute-Lycka et al. 2002, 783). This stage is categorized by mainly poor glycaemia control and occasionally decreased motivation for positive self-management of diabetes. These situations contribute to a difficult period for the young people, their families and friends, and also to diabetes care providers (Weissberg-Benchell et al. 2007, 2441). Family members and friends are found to be an important part in supporting self-management of young people with diabetes and as well influence observance with self-care (Kyngas et al. 1998, 760).

There was a study to discover the meaning of support from parents and other significant parts for young adults who have type 1 diabetes mellitus. A group of chosen equivalent age participants registered at two diabetes clinics for children and adolescents in Sweden. Concentrated interviews (Charmaz 2006, 7) with young people and parents were carried out by the first author in 2006–2007. (Sparud-lundin C et al. 2009, 2.)

In the findings, Parents have turn out to be more of a reminder of self-care matters and occasionally their supporting position reallocates through this period, signifying a alteration of the previous relationship. Parents with diabetes themselves have become a role model for their children by sharing their own experiences and facilitating the children to set up confidence in their own capability. Parents' own experiences have helped understanding of shortage of compliance and negligence and they recognize the intense trouble of existing with diabetes. Parents expressed their struggle of encouraging confidence in terms of discussing instead of controlling. Parents are also particularly supportive by problem-solving in specific situations and they are still the first choice for emergency support for their children. Comforting support of parents is given, when children's frustration over fluctuating glucose levels occurs. (Sparud-lundin C et al. 2009, 6.)

Siblings do not appear to have a major supporting role during this period. As an alternative, they seem to have a 'stand by' function in daily life. Though, sharing diabetes experiences with a sibling brings a special type of support. Some siblings show more active support, such as improving dietary habits after co-habiting has been started, giving practical support and occasionally even taking own idea in order to improve control. Others contribute with more common support by joining visits in the adult diabetes clinic and taking actions when invited to support self-management. Young people with type 1 diabetes mellitus appreciate friends' empathy during unstable periods and trust reliable friends to interfere in critical situations. Some young people voluntarily share routines and incorporate friends by letting them give practical help, and sometimes even let friends take control by monitoring them when they get too drunk. Also sharing experiences with strangers who have diabetes can be a contradictory interchange. (Sparud-lundin C et al. 2009, 7.)

3.3 MONITORING

Type 1 diabetes is an autoimmune disease in which the immune system destroys the insulin-producing beta cells of the pancreas that help regulate blood glucose levels. Diabetes is a long life condition which needs structured management, self care and monitoring to reduce the risk of mortality and morbidity of the disease. Monitoring blood glucose level is a fundamental part of diabetic management and care. It is a tool for client and healthcare workers to supervise the illness and complications related to it. Monitoring plays a vital role to maintain a healthy and enjoyable lifestyle by providing the safe glycaemic level to avoid micro and macro vascular complications associated to diabetes. Proper monitoring, management and coping strategies are major factors to increase the quality of life among the young people living with type 1 Diabetes Mellitus.

For the duration of the last two decades, blood glucose monitoring has been recognized as a significant element of type 1 diabetes treatment. Results from the Diabetes Control and Complications Trial and former studies suggests that BGM is vital for intensive management of diabetes, since the association among BGM and glycaemic outcomes in populations with type 1 and type 2 diabetes and the relation between hyperglycaemia and long-term complications(Hood,Butler,&Volkening,2004). The glucose monitoring is vital due to its role in assisting to attain the goal of best possible glucose management and therefore minimizing diabetic micro vascular complications for example nephropathy, retinopathy, and neuropathy (Rizvi and Sanders, 2006 ,12).

Monitoring blood glucose

Advance technology and telemedicine has a key role in the care of diabetes. There are several choices available for diabetic patients and clinicians to monitor blood glucose level.(Kozier;Erb's;805) Monitoring glucose can be achieved by laboratory analysis of blood glucose, self-monitoring of blood glucose(SMBG) with the help of glucose meters, Continuous glucose monitoring system(CGMS), Gluco watch biographers and HbA1c levels. For the effectiveness of the treatment clients data can be recorded on log books and on memory, meter downloads and data management system (Rizvi and Sanders, 2006, 12)

Provision of accurate and easy to meters for domestic use, diabetic patients have the independence and flexibility of checking their own glucose level at time. Strict glycaemic control can diminish micro vascular complications in individuals with type 1 or type 2 diabetes mellitus. Self-monitoring is crucial and indispensable for an individual likely to recurrent or severe hypoglycaemia. *SMBG* enables patients to measure their response to therapy. It helps them to gauge whether glycaemic goals are being achieved, also it can be useful in preventing hypoglycaemia. *SMBG* is helpful in adjusting medications, medical nutrition therapy, and physical activity. Several techniques are accessible to diabetic patients to calculate the efficacy of a management plan for glycaemic control (Rizvi and Sanders, 2006, 11). *Glucose metres* or glucometers are the commonest and reliable tool used to detect the glucose level in blood. However the glucose meter values are only individual points in time and may not discover fluctuations in glucose, particularly postprandial and overnight. Checking glucose more regularly or using continuous glucose monitoring can help identify unnoticed hyperglycaemia (Hood,Butler,&Volkening,2004)

The *Glucowatch* biographer is a gadget that is used to check regular and automatic glucose values noninvasively, to assist the short- and continuing care of diabetes. The *Glucowatch* biographer is well tolerated by children and adolescents and significantly improved glucose control compared with standard therapy. The utilization of the biographer with an alarm to sense night-time hypoglycaemia has the capability to increase the safety of diabetes management in children (H. Peter Chase et al 2003, 790). The device has been considered safe, and the glucose levels have correlated well with finger stick blood glucose levels in adults (Garg SK et al 1999, 1708).

The haemoglobin *A1c (HbA1c)* test is a useful tool and indicator of a patient's average blood glucose level from the past 2 to 3 months and is the generally established measure for evaluating glycemic control in diabetics (Ziel & Davidson, 1987, 269). Assessing glycated haemoglobin (*HbA1c*) is a precise way of monitoring long-term glycemic control (Larsen, 1997, 303).A large number of diabetic patients do not check for *HbA1c*, and that a significant percentage of diabetics are inadequately regulated (Sando, ym 1994,47-54). The Diabetes Control and Complications Trial (DCCT, 1993)

has acknowledged particular recommendations for HbA1c levels, like maintaining results values possibly close to the normal range (80–120mg/dl; 4.44–6.66mmol/L) to achieve significant reductions in long-term health complications.

Monitoring complications

Although blood glucose level monitoring is an integral part of monitoring diabetes but several other complications are associated with the disease which should be ruled out timely and regularly due to the fluctuating glycaemic levels of blood. These complications include Hyperglycaemia, Hypoglycaemia, Retinopathy, Nephropathy, Neuropathy, cardiovascular disease, obesity, and vascular changes.

Hypoglycaemia which is low glucose levels in the blood is the complication of diabetes and is related to the diabetes treatment with insulin. Occasionally treatment with insulin can lead to hypoglycemia. Taking too much insulin, omitted a meal or snack, or demanding exercising may initiate hypoglycemia. Also, hypoglycemia can arise with no visible cause. A child can present irritable, shaky, or confused. When blood glucose levels drop very low, person may become unconsciousness or seizures may develop (NDEP 2011).

Hyperglycemia which is high levels of glucose in the blood is another complication related to diabetes mellitus. Causes of hyperglycemia comprise of forgetting to take medications on time, ingesting too much carbohydrates, and doing less exercise. Sometime hyperglycemia may arise without any obvious reason. Infections can elevate blood glucose levels eventually; hyperglycemia can lead to damage the eyes, kidneys, nerves, blood vessels, gums, and teeth (NDEP 2011).

Diabetic retinopathy is a complication of diabetes that affects the eyes. This complication is initiated by damage to the blood vessels of the retina which is light-sensitive area at the back of the eye (Mayo clinic). It is the leading cause of blindness in adults aged 20-74 years in United States. Among 12,000 and 24,000 new cases of blindness from diabetic retinopathy arise every year (Monahan, ym. 1118). For children diagnosed with type 1 diabetes, the first ophthalmologic assessment should be done at the age of 10 years or older and having diabetes for 3 to 5 years. In type 1 and type 2

diabetes, yearly regular follow-up is usually recommended. Less regular assessment may be prescribed by the eye care professional (NDEP 2011).

Diabetic nephropathy is the disease of kidney caused by damage to the small blood vessels or nephrons in the kidneys that filters the blood, disease presents first with hyper filtration, renal hypertrophy, micro albuminuria, and hypertension, and later proteinuria and end-stage renal disease (medical dictionary). Diabetic nephropathy is a primary cause of last phase of renal disease in USA, responsible for approximately 43% of new cases. Among all diabetic patients, 20% have developed nephropathy. In the year 2000, 41,046 diabetic patients started treatment for advanced renal disease. If proper monitoring and aggressive treatment is not started in early stages of diabetes, nephropathy develops progressively and can advance to renal failure and patient may need dialysis and in some cases renal transplant (Monahan, ym 1120). To decrease the risk or slow the development of nephropathy, optimize glucose and blood pressure control. For children with type 1 diabetes, yearly check-ups for micro albuminuria should be carried out when the child is 10 years old and has had diabetes for 5 years (NDEP 2011). Annual retinal screening programs should provide assessment of both fundi from dilated pupils, by means of a retinal camera or slit-lamp indirect ophthalmoscope.(Gallichan 2005).

For children with type 1 diabetes, yearly screening for *micro albuminuria* should be done when the child is 10 years of age and had been diabetic for 5 years. To lower the risk and slow down the progress of nephropathy, optimize glucose and blood pressure control (NDEP 2011). An annual blood test for serum creatinin is necessary for all diabetic patients and if a dipstick test for urinary protein is negative, an early-morning urine test should checked for micro albuminuria. If there is positive result for micro albuminuria, a midstream urine sample should be analysed to rule out infection. If micro albuminuria or proteinuria is positive, the test should be repeat two times in a month if possible (Gallichan 2005, 30-1)

Diabetic neuropathy, a functional disturbance or pathological change in the peripheral nervous system, affects 60% to 70% of people with diabetes mellitus. Generally lower extremities of the body are affected initially because they hold the longest nerves in the

limbs, however upper extremities may be involved later. Complete monitoring is vital because majority of the patients stay asymptomatic with mild to moderate neuropathy, even with severe neuropathy patient may not have any symptom (Monahan,ym. 1121). The DCCT (Diabetes Control and Complications Trial) has shown definitively that in type 1 diabetic patients, the risk of diabetic neuropathy and autonomic neuropathy can be reduced with improved blood glucose control.

Even though it is unclear whether foot examinations are significant in children and adolescents, once a year foot assessment are necessary. Foot examination is a painless procedure and it provides chance for foot care education. The threat for foot complications such as diabetic foot is higher in people who have been diabetes mellitus more than 10 years (NDEP 2011).

Complete *lipid profile* (HDL and LDL cholesterol, and triglycerides), monitored minimal once annually, together with blood glucose control, blood pressure, family history of cardiovascular disease and abdominal adiposity, albumin secretion rate and smoking status(Gallichan, 2005).In children over 2 years with a family history of total cholesterol greater than 240 mg/dl, or a cardiovascular episode before age 55, or if family history is not known, achieve a lipid profile after diagnosis of diabetes and when glucose control has been achieved. If family history is not the contributing factor, then lipid profile should be carried out at puberty. At the age of puberty diabetic children, a lipid profile should be performed at the time of diagnosis when glucose control has been achieved. If lipids are not in normal range, oversee annually. If lipid test results are inside the recognized risk levels (LDL-cholesterol less than 100 mg/dl), lipid profile should be performed every 5 years (NDEP 2011).The target for LDL-cholesterol in children and adolescents with diabetes is not more than 100 mg/dl. If the LDL-cholesterol is over of 100 mg/dl, the child should be managed with exercise and a Step 2 American Heart Association diet. Following 6 months of diet and exercise, the LDL-cholesterol level sustains above 160 mg/dl, a statin should be given. If, the LDL-cholesterol is ranging 130 and 160 mg/dl, the patient has risk of one or more cardiovascular disease (NDEP 2011).

Overweight and obesity are often calculated by the body mass index (BMI). Normal or healthy weight regarded as BMI 18.5-24.9 kg/m², overweight as 25-29.9 kg/m², and

obese as above 30 kg/m². Waist circumference is also a very vital indicator of cardiovascular disease. A waist perimeter more than 88 cm in female and 102 cm in male is sign of increased risk of cardiovascular disease (Gallichan, 2005). Young people with diabetes mellitus have need of pursuing a dietetic plan or menu chart which should be organized by a registered dietician, diabetes educator, or doctor. For young people having diabetes mellitus, the meal chart must supply suitable nutrition for growth. Family support for observing the food plan and scheduling organized meal times are essential for successful management, particularly when the young person is on insulin therapy (NDEP 2011).

3.4 ADOLESCENTS AND THEIR COPING STRATEGIES IN DIABETES 1 MANAGEMENT

Adolescence can be a difficult time when persons have to be confronted with several developmental tasks such as increase autonomy from parents and mounting peer interaction. (Luyckx et al. 2010, 1424 -1429). Adolescence is characterized by speedy biological, physical, cognitive, emotional, and societal transformations. (Grey 2011, 70). Being diagnosed with type 1 diabetes compels numerous supplementary burdens on the young person, occupying all facets of his or her life. (Luyckx et al. 2010, 1424 - 1429). Teenagers take on experimentation and thrill-seeking attitudes that could negatively have an effect on self-care and medical outcomes. Preceding studies have come up with the deduction that the phase of teenage years is frequently related with disregard of self-monitoring, nourishment treatment recommendations, and pharmacological treatments. (Grey 2011, 70).

Adolescents with type 1 diabetes are confronted with a multifaceted set of growth changes the same altering hassles of the disease. Modification predicament may mutually influence emotional welfare and the track of the disease by contributing to reduced self-management and improper metabolic control. While coping skills are fundamental for emotional and community maturity in the midst of youthful people as an entity, youngsters with diabetes 1 are confronted with supplementary demands. (Graue et al. 2004 1313).

According to Weinberger et al 2005 during adolescence the prefrontal cortex, the area in the brain in charge of verdict, way of thinking, resolution making, and problem solving, is still growing, which may elucidate the reason behind young people inappropriate reaction to multifarious diabetes self-management situations.

Life transitions are critical times of transformation, which augments stress and have an effect on analytical and coping skills. Changeovers connected stressors consist of moving out of home, commencing study, starting new relationships and the labour force and parenthood

Changes in life patterns influence diabetes supervision and frequently necessitate intricate decisions and are worsened by the expectations and reactions of others, not leaving out health professionals. (Rasmussen et al. 2010 1981-1982). Diabetes supervision needs a whole lot of self-discipline and is considered as being extremely demanding. As a result

Several studies imply that adolescents with diabetes are at a bigger menace than their fit peers for rising psychosomatic symptoms. (Graue et al. 2004, 1313; Luyckx et al. 2010, 1424). Consequently, this section shall briefly examine the coping strategies of adolescents and what can be done to further motivate them in taking through this courageous part thereby enhancing better glycaemic control, better metabolic control and as a result efficient self-management.

Coping methods

Coping styles refer to characteristic, routine preferences for habits of handling troubles and may be considered as strategies that people usually employ to manage across an extensive choice of stressors. (Graue et al. 2004, 1313). Coping is a difficult procedure that can be defined as “continually altering cognitive and behavioural efforts to deal with precise outer and/or inner burdens that are seen as overbearing beyond the limits of the person.” The primary phase in coping is cognitive appraisal. After weighing the state of affairs, persons know how to implement coping strategies to diminish suffering or handle the crisis. (Grey 2011, 71). Problem-focused coping refers to efforts made towards handling the issue at hand, rationally and it is meant at altering the

circumstances causing anguish. While Emotion focused coping implies efforts to diminish emotional suffering caused by the demanding happening and to deal with or adjust emotions that may go with or act as a consequence from the stressor. In young people with diabetes, avoidance coping and venting emotions have been established to forecast reduced illness-specific self-care activities nevertheless were not linked to metabolic control. Contrarily, habits of coping with stress have also been acknowledged as an essential feature as far as metabolic control is concerned. (Graue et al. 2004, 1313).

Coping skills for youths

Using coping skills training for youths with type 1 diabetes is based on the supposition that ameliorating coping skills could perk up young peoples' aptitude to deal with the troubles they encounter on a every day in handling diabetes. Adolescents who are given coping skills training have lower A1C levels, better diabetes self-efficacy, and less agony about coping with their diabetes than young people getting intensive management only. More so, adolescents who receive coping skills training can effortlessly handle their diabetes and thus experience less of a harmful impact from diabetes on their quality of life than those who do not get the training. In male participants, coping skills training did not influence unfavourable consequences such as hypoglycaemia, diabetic ketoacidosis, or weight gain, but in female participants, coping skills training decreased the incidence of weight gain and hypoglycaemic episodes. (Grey 2011, 72).

Social problem solving

This is a process whereby individuals learn to think through the steps of having a problem and reaching a decision about how to deal with that problem. The process equally helps each and every one to look at all possible outcomes of situations and the subsequent consequences of their decisions. This is very useful for adolescents when they are confronted with peer or family pressures or any situation in which they are faced with an uncompromising situation like being diabetic. (Foreman 1993, 5).

Six main problem-solving steps have been identified; First and foremost identifying the problem. Then follows determining what goals one wants to achieve. Generating and seeking alternative solutions. Examining the consequences of what the act could lead to. Choosing the solution to the problem. Lastly evaluating the outcome of the decisions. (Foreman et al.1990, 69).

A study done from April 2000 till January 2000 which was approved by the regional ethics committee and performed according to the Declaration of Helsinki; covered a cross sectional survey where coping styles were assessed by the following subscales. (Graue et al. 2004, 1314).

Table.1

Subscales of Coping styles	Methods used
Active coping	Taking of direct action to get around the problem
Planning	Making a plan of action which they try to follow
Seeking social support for instrumental reasons	This involves being advised by someone who is versed with the subject about what to do
Seeking social support for emotional reasons	Sharing and discussing one's feelings with someone thereby getting reassurance and feeling much better after
Behavioural disengagement	Admitting to one's self that the situation is impossible to deal with, and quit trying. This is a very escapist tendency which unfortunately is a way of coping for some adolescents
Mental disengagement	Switching activities to take the mind off things; thereby getting the utmost distraction from the subject at hand

(Carver et al.1989, 270)

Three subscales from other coping style scales; according to Vitaliano et al. (15) suggest the following coping strategies:

Table.2

Subscales for Coping styles	Methods devised
Accepting responsibility	Realization that the problem has been brought upon them
Aggressive coping	Getting irritated and unbearable
Self-blame	Thinking that one is entirely responsible for whatever has befallen them

Previous research initially involving a total of 116 adolescents and further cut off to 113 all between the ages of 13 and 18 ,inclusion criteria being onset of diabetes before age 15, and being diabetic for at least 1 year. It demonstrated that children and adolescents with diabetes differ considerably depending on their ages and in their methods of coping with the diseases. Younger ones mostly coped by expressing feelings through yelling and arguing, whereas the older ones mostly coped by using the avoidance behaviour. (Graue et al.2004, 1314).

According to Hanson et al. though poor adherence to treatment often has been linked with developmental problems in adolescence, poor adherence to treatment is mostly caused by the incapability to adapt to coping styles rather than age. It has been demonstrated that strategies that increase the adolescents' ability to cope with. Both psychosomatic and metabolic adaptation could be prejudiced by those methods that boost the young people's coping capabilities with the illness. (Thuen and Bru, 20).

Following research findings, the next phase of Coping is going to illustrate on the fact that Young people and adolescents would cope and manage T1DM better if they have enough support from these three main sources. Namely support from school, peer support and parental or family support. (Yueh-Ling et al.2010, 258).

School

Research has given enough evidence to show that schools play a fundamental part in young peoples' diabetes management. Research have equally gone a long way to prove that enhanced school-based diabetes heed for adolescents is equal to improved diabetes supervision and quality of life (Wagner, Heapy, James and Abbot 2006,766). For numerous youngsters, school is a dominant power in their lives as most of their time revolves around it. Recently, a literature review came up with the result that school connectedness accounted not only to adolescents' academic performance but also to their health and welfare. (Waters, Cross, and Runions 2009, 519).

It is rather unfortunate that, previous studies have demonstrated that many schools do not make available sufficient support for students with T1DM. In many situations, school staff did not have enough mastery of the disease and were not sufficiently taught (Amillategui et al.2007,1074).In some cases the healthy foodstuff provided by the school was limited, some school rules were not flexible thereby intruding with the personal supervision of the young people. Furthermore, teenagers felt stigmatized or discriminated upon by the school staff. (Hayes –Bohn et al.2004,).

Numerous painful situations may take place at school. Amplified compassion to peer reaction can have an effect on the teenagers perceptions of diabetes, their feelings are tampered with, and their diabetes self-management attitudes. They may experience humiliation, or livid when people turn their concentration to them or ask excessively susceptible questions and they don't like to be made fun of. When they are faced with these embarrassing situations their very first move is the use of evading strategy. For example, the young people may possibly desire to maintain diabetes clandestine or attempt to diminish calling notice to diabetes self-management-based attitudes. These evasive attitudes gives them a sense emotional contentment, while physically, it is detrimental to their health and affect their diabetes self-management as well. The boy explained how he omitted testing his blood glucose as a result of social pressure. As the lone health professional at schools, school nurses ought to ardently assemble their specialized competencies in diabetes care and illustrate expertise in both caring for

diabetic students, and cultivating school contemporaries and the student body about T1DM and its management. (Yueh-Ling et al.2010, 260).

Peer

Peer relationship expansion is an intricate issue for adolescents who have type 1 diabetes mellitus. (Grey 2011, 70).

Despite the fact that, young people are increasing freedom and self-determination, they experiment their limits through tentative actions for the formation of their self-identities. This is mostly achieved by being part of a peer group, or being allowed into one. Hence peer interaction becomes of ultimate importance and significance to them thereby making them very aware of peer perspectives and peer approval (Simpson, 2001). The interchange amid these manifold developmental alterations makes puberty a period of active revolutionization. Youngsters are faced with the battle of seeking for equilibrium between their desires as they mature, and diabetes self-management necessities (Sayer et al., 1995). Early teenagers would like to be looked upon, the equivalent as their peers rather than be treated in a unlikely manner. The fear of rejection by their peer group and being left out from peer actions is so domineering that they may make adolescents unwilling to divulge their diagnosis. This fright constantly causes young people to intentionally overlook blood glucose monitoring and insulin injections or boluses, in addition to that, they consume inadequate foods devoid of taking the proper insulin, all of the above mentioned are linked with a turn down in metabolic control. (Grey 2011, 70).

It is a tight spot for teenage diabetes victims to reveal their illness. Perhaps, deciding to do so, may enhance their peers to be even more conscious and sensitive to their wants, and lend their support if need be. That is putting on the line the fact that, ignorant and childish peer reaction may hurt their emotions and harm their ego. For this purpose, researchers propose that, adolescents and parents should cautiously contemplate who to tell, what to tell, when to tell, as well as how to say it, and how much to reveal concerning the ailment to guard the teenagers psychological and corporal safety. (Davidson et al.2004, 74).

Even though studies have demonstrated that acquaintances furnish important emotional backup to youths with diabetes, lots of youngsters show scepticism as regards friends' comportment to their diabetes-related self-management tasks and procedures. (Grey 2011, 70).

Diabetes instruction ought to be enforced in schools to amplify the magnitude of peer indulgence of adolescent diabetes victim circumstances and requirements. (Amillategui et al. 2007, 1079).

Parental or Family Support

Family is the primary focus when it comes to provide support to the diabetic adolescents. Family members are the ones who are will possibly lend a hand with routine burdens. Family members are most liable to counsel or sway a young person with diabetes about matters of disease supervision and an overview of healthcare. In addition, they represent a model for health behaviour, as well as nutritional habits, work outs, and communications with the healthcare personnel.

It has been demonstrated that family effectiveness affects diabetes monitoring and metabolic control in children and youngsters. *Análise Psicológica* (1998,101-113) mentioned that family members, particularly parents, are likely to serve as primary sources of support for adolescents with diabetes. Indeed, studies have found that adolescents with supportive, cohesive families have better disease management and glycaemic control. Parents of adolescents with type 1 diabetes are involved in a challenging transition: the transfer of primary responsibility for diabetes management from themselves to their children. The ways in which parents are involved (performing tasks, making decisions, providing support, and communicating) would be beneficial for health care professionals too. Administrating assistance to youths is another means through which parents get involved and at the same time fostering the adolescents' growth of diabetes management competence and responsibility. Also it has been mentioned that, adolescents report that parents provide more support for diabetes management tasks than do friends. (Kathleen, M. 2003, 184-187).

Involvement of relations in diabetes care can be extremely supportive in supporting a vigorous way of life; on the other hand, it is obvious that not all forms of family participation in diabetes care are supportive. This is obvious with young people diagnosed with diabetes and within their circle of acquaintances. For adolescents with diabetes, the contribution of family in diabetes supervision is yet further insecure. As a result of the character of teenage maturity, young people crave more autonomy from their parents. (Harris, M 2006).

Living with diabetes is devastating and nerve-racking from both the physical and emotional perspective. Psychosomatic pain has a direct effect on health and ultimately alters an individual's enthusiasm to keep their diabetes in check. When motivation is diminished, the commitments required for effective self-care are difficult to maintain. (AADE, 2012). Every individual reacts differently after being diagnosed by diabetes. Some need more help in coping with psychological stress while some might need more help in coping with lifestyle management. Proper diet and nutrition, regular blood glucose-monitoring, exercise and weight management as the basic rules to follow when it comes to diabetes. In addition, psychological therapies can support an individual in coping strategies. (Delamater, M. 2001, 1286-1292)

In conclusion, maintaining the routine and changing lifestyle is always challenging for adolescents. As, living with a disease declines the level of confidence among the adults, educating them how to cope with diabetes is the responsibility of health care providers.(AADE, 2012). There are various factors, which can be applied in coping strategies. The factors mentioned above are found to be common and helpful in coping with diabetes.

4 EMPIRICAL IMPLICATION

More than 180 million people globally have diabetes, and it is possible that this number would be more than twice by 2030 (The World Health Organization, 2008). The beginning of type 1 diabetes characteristically takes place in youth or adolescence (Centers for Disease Control, 2005). Research has illustrated that children and young people who have type 1 diabetes recognize and want to be familiar with about the disease (Olsen et al. 2009, 1). Young people with type 1 diabetes mellitus have amount of knowledge about their illness, however they still need more information related to care, physiology and complications of type 1 diabetes mellitus (Olsen et al. 2009, 8).

Our project in this thesis was inspired by eMedic. eMedic belongs to Central Baltic INTERREG IV A programme. The commissioner of this project is Sari Kallio Kökkö. eMedic develops and anchors new e-services for health care based on diverse modern technological applications and monitoring tools. eMedic services offers opportunities to develop treatment of patients with chronic diseases so that the treatment will understand, speed, easiness, joint expertise and cost-effectiveness. (See appendix. commission paper).

The literature part will focus on the monitoring, managing and coping strategies for type 1 DM. It will provide important information and possible options about how to deal with type 1 DM. Furthermore, an educational webpage will be published via Terveystieto for the public which will focus on management of type 1 DM.

Method of literature review was used for thesis work. Relevant data was collected from academic database such as CINAHL, Medline plus and Pub med. The objective was to search for the significant articles based on information on diabetes mellitus type 1 in young people, monitoring and coping strategies for the self-management of diabetes mellitus type 1. Key words used for search were diabetes mellitus type 1, juvenile diabetes, coping, coping, strategies, self-management, young people, monitoring, monitoring methods, monitoring devices. For inclusion criteria search article must be about young people, the research must be carried out by the experts; the selected articles must publish in any of the academic journals.

The thesis work is going to be presented to the web site Terveysnetti. In website, the information and services must not be complicated for consumers to understand and use. Sites should demonstrate information and portray the content in language that is plain, simple to read, and suitable for anticipated users (eHealth code of ethics, 2000). Authors have followed these guidelines while creating web page and has explained difficult terminology in simple understandable language. The language of the webpage is English which is more common in the world. All scientific and medical terms are placed in parenthesis (see appendix).

Related to design of web page special attention was paid to color and font size of the web page. When navigate for information on internet, people examine the design of the website first and then consider other things and information depending on the content classification (Consumer web watch). Authors were agreed to use contrast of lavender color for the background and black for written information so that background color does not interrupt with the text. Foundry built in was used for the background of the web page where a dark lavender colored flower is in the middle and two leaves are spreading out from it on the bottom of the page. This design and font color remains same on all pages. Authors have agreed to choose the font size big enough to read and to make the information more visible and easy to comprehend for the users.

There is use of picture in the web pages to make it more attractive for the young people. Pictures are easier to look at, tells the story by itself and relevant to the information on the webpage. There will be relevant pictures presenting the topic clearly on webpage. All the pictures will be taken by authors and under the permission of participants in the pictures for publishing.





Web sites that present useful information to people achieve credibility points for highest expectations about information (Consumer web watch). On home page there is introduction of the topic and list of main content. These main contents are for the convenience of the consumers and easy to navigate for particular information. There is a picture presenting a group of young people which represents the target population of the whole work. The structure and content of information on webpage is clearly divided into three categories which are Introduction where user can find information about pathophysiology of diabetes mellitus, risk factors of diabetes mellitus, young people and type 1 diabetes.

The second main part of the webpage will address monitoring Type 1 Diabetes Mellitus, where users are provided with the information about monitoring blood glucose and monitoring complications related to diabetes mellitus type 1. There will be two pictures under monitoring part, one illustrating school nurse teaching student how to use glucose meter to check glucose level in the blood which is integral part of diabetes mellitus treatment and management. The purpose of this picture is to demonstrate the use of technology in the area of self care management of diabetes mellitus. Second picture

comprises of the glucose measuring meter and thing to monitor blood glucose. Purpose of this picture is to show the commonest device used for self monitoring blood glucose at home.

The third Main content of the web page will present coping with Type 1 Diabetes Mellitus where users can have information about positive coping strategies negative coping strategies and main sources of coping. Under coping strategies there will be picture illustrating a group of young people sitting in a fast food restaurant eating with a friend. The purpose of this picture is to show peer support. As peer interaction is of crucial and significance to diabetic young people thereby making them very aware of peer perspectives and peer approval, which may lead to consume inadequate food, however good companionship leads to a boost in metabolic control. The other picture will demonstrate the school nurse roll in the education of young people having diabetes mellitus. Health care personnel, like school nurse is the most informed of the school staff therefore regular visits to them and consulting them in difficult moments is essential. School's nurse plays a fundamental part in young peoples' diabetes management. There will be two pictures of food in coping strategies presenting the dietary concern for young people having diabetes mellitus. Appropriate food with good calories for young people plays important role in management of diabetes mellitus. Vegetarian or other food products, school should provide healthy foodstuff, proper to diabetic regime. Family members are the main source of support and they are the ones who will possibly lend a hand with routine burdens. In this page about parental support there will be picture of young girl with father discussing about printed information related to disease. In this case the father is providing his support and counselling the young girl, and supervising her coping process

5 DISCUSSION

5.1 Reliability and ethical issues

This study is based on literature review on Diabetes mellitus type 1, its monitoring and coping strategies. The study has a specific target population of young people and the information is expected to provide educational tool to young people on how to understand, monitor and cope with the disease. However the information provided this work is designed to support, not replace, the relationship that exists between a patient and physician (HONcode, 2011).

Considering the value of the topic, authors ensured to compose it as perfect and reliable as possible by using the standard academic databases. All medical content of work has to have a specific date of creation and a last modification date, also provide a precise link to the sources and references in relation with the content referred (HONcode, 2011). Relevant articles were appropriately reviewed and the important points were extracted. Also continuous supervision and guidance from supervisors were observed during the whole search process.

In the research process, violation of the ethical rules is firmly avoided. Ethical guidelines from reliable websites were observed such as HONcode, Consumer Web Watch and eHealth code of ethics. All the articles used for the information are not under copyright violation. They were extracted from the academic databases with official access and with continuous supervision of the supervisors in entire process. All quotes and information are not copied and referenced properly.

5.2 Discussion

In the process of reviewing materials, it is essential to focus on the aim and task of the study. Efforts were made to choose the relevant points so as to come up with concrete points for the usefulness of the study.

Type 1 diabetes mellitus is a metabolic disease that depends on insulin for continued existence. It is generally identified in the course of childhood and adolescence. According to a worldwide longitudinal research study, the prevalence of type 1 diabetes is increasing universally at annual rate of 2.8%, demonstrating the significance of addressing the influence of the disease. For normal growth and development, patients with T1DM must maintain a balance between insulin dose, nutritional intake, and physical activity according to self-monitoring results of blood glucose. These targets are not certainly attained or maintained.

Two main methods are available for health workers and patients to monitor the usefulness of the care plan on glycemic control: patient self-monitoring of blood glucose (SMBG) or interstitial glucose, and A1C (American Diabetes Association, 2011). Management of hypoglycemia and hyperglycemia is termed as one of the eventual methods to avoid diabetes complications. Even with appropriate management of hyperglycemia, frequently leads to diabetic complications, such as cardiovascular, microvascular, nephropathy, and neuropathic diseases, which escalate the morbidity and mortality of DM. Additionally the treatment with consistent medications, food and exercise programs are effective to regulate hyperglycemia and hypertension. (Jin et al. 2009).

Coping is a multifaceted process that can be referred as “continuously varying cognitive and behavioral manifestation to accomplish specific external and internal demands” (Lazarus et al. 1984). It has been revealed that approaches that increase the youths’ capacity to cope with the disease might impact both psychological and metabolic alteration (Grey et al. 1998).

Authors are beginners in research field; research might not be perfect academically as it is expected. Diabetes Mellitus is a very broad topic; a lot of researches have been done in this area. It has a possibility of repeating the same information. Authors have limited access to all the relevant research articles. There are many articles and journal in Finnish and foreign languages. The time allocated for research is short, more information could be found out, if there is more time. The study is under the project of e medic, which is under development, so not much information is accessible.

5.3 Conclusion

It has been advocated that enhancements in glycemic control, blood pressure, and cholesterol level can moderate a person's hazard for complications (Centers for Disease Control and Prevention 2005). Consumption of appropriate nutrition and exercise behaviours and compliance to medication treatments will effect in tighter glycemic control , along with controlled blood pressure and blood lipids, will significantly diminish the burden of diabetes complications (Deshpande et al. 2008, 9).

The study has also revealed that young people are able to coherent their perspectives when given the chance (Olsen et al. 2009, 8). It would give the impression that the health attitudes, beliefs, and risk behaviours and general psychological functioning of teenagers and young adults with diabetes share both likenesses and variances with those of teenagers and young adults without diabetes (Tercyak et al. 2005, 13). Outcomes of the study point out that overall parent adolescent clash in young people with type 1 diabetes alike to non-diabetic families. Thus, having type I diabetes does not amplify normal growing conflicts. (Viikinsalo et al. 2004, 6-9.)

Adolescence is a specifically crucial time for effective T1DM management because of the complications of harmonizing diabetes self-management and growing needs. School is an significant environment for adolescents with T1DM. Because their diabetes self-management attitudes are mutually stimulated by and affect their growth, the support they obtain for diabetes self-management from school personnel such as schoolteachers and school nurses should be heightened. They equally pay importance to peer relationships and are more aware of peer views and peer approval. Peer pressure and the fear of being rejected can push them to decrease sticking to their diabetes routine, which might compromise their safety.

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