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SELF-CARE IN TYPE 2 DIABETES:

A *Systematic Literature Review on Factors Contributing to Self-Care among Type 2 Diabetes Mellitus Patients*

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ACRONYMS

BP- Blood Pressure

CASP-Critical Appraisal Skill Programme

DCCT- The Diabetes Control and Complication Trial Research Group

DSME- Diabetes Self-Management Education

HbA1c/ A1c- Glycosylated hemoglobin

SMBG- Self Monitoring of blood glucose

Type 2 DM- Type 2 Diabetes Mellitus

UK- United Kingdom

USD- United Stated Dollar

US- United States

ABSTRACT

Background: Self-care is a multi-dimensional concept and has different definitions. Among the definitions, Orem's definition of self-care is more consistent. Orem (1995) argues that, self-care is a personal activity to take care and maintain of own self health and illness and prevention of disease related complications.

Aim: The aim of the paper was to investigate the factors that contribute to self-care behavior among patients with Type 2 DM as argued in the literature.

Method: data was collected from the following electronic databases: CINAHL, PubMed, LibHub, SweMed and Google Scholar-to find full texts. Data was analyzed through Critical Appraisal Skill Programme. To ensure validity and reliability the author were blinded to reduce study bias and articles were selected according their quality.

Result: 31 relevant studies were included in the review, among the major findings of the study were; Age, Social support/network, high income level, high educational attainment and long Type 2 DM diagnosis history had a positive predictor in Type 2 DM patients self-care contributing factors.

Conclusion: To improve a Type 2 DM patients self-care activities the present study concluded that Demographic, Socio-Economic and Social support factors are among the positive contributors in patients of Type 2 DM successful Self-Care activities.

Key words; Blood glucose self-monitoring, self-administration, Self-care, self-medication, Type 2 Diabetes.

CONTENTS

INTRODUCTION

Diabetes has become an interesting area of study in the medical field over the years. The interest is mainly attributed to increasing number of people suffering from the disease. Issues of management of patients with diabetes have also taken a Centre stage especially among the nursing professionals. There have been calls for self-management of disease by the patients themselves while others feel that institutionalized care is the best form of management. Historically, self-care of diabetes at home level begun in the 1980s through monitoring of blood glucose, and the glycosylated hemoglobin (HbAlc) level became well-known as a pointer of metabolic control and in 1993, the results of Diabetes Complication and Control trials (DCCT) were released. The findings showed that maintaining of near to normal glucose level could prevent or slows the progression of diabetes related complications (The Diabetes Control and Complication Trial Research Group (DCCT), 1993).

"Type 2 diabetes is characterized by insulin resistance and relative insulin deficiency, either of which may be present at the time that diabetes becomes clinically manifest. The diagnosis of type 2 diabetes usually occurs after the age of 40 years but could occur earlier, especially in populations with high diabetes prevalence. There are increasing reports of children developing type 2 diabetes. Type 2 diabetes can remain undetected, i.e. asymptomatic, for many years and the diagnosis is often made from associated complications or incidentally through an abnormal blood or urine glucose test." (International Diabetes Federation, 2006).

The occurrence of Type 2 DM is mainly associated with some factors among them; Obesity, unhealthy lifestyles such as diet and physical inactivity, growing old, insulin resistance, family history, and ethnicity (ibid).

In line with the above Type 2 DM is a heterogeneous chronic disease that results from adverse environmental and genetic risk factors. Formerly it was called as non-insulin dependent type of diabetes mellitus and characterized by altered insulin secretion and insulin resistance. Particularly, insulin resistance is the main manifestation of type 2 DM. the nature of Type 2 DM is a serious and progressive chronic disease and yet has no curable treatment (UK Prospective Diabetes Study Group, 1998).

BACKGROUND

Traditionally, Self-care is a multi-dimensional concept and has different definitions. Among the definitions, Orem's definition of self-care is more consistent. Orem (1995) argues that, self-care is a personal activity to take care and maintain of own self health and illness and prevention of disease related complications. This can be done through managing and continuing healthy lifestyle activities in areas of physical activity, nutrition, medication and so on. In line with this, Orem described that as a self-care agency- which is the ability of oneself to assess, monitor, and take decision on behalf of own life situation. Self-care is learning and an ongoing process which is more associated with the concept of self-care agency. This means the goal oriented (i.e., health and well-being) performance, maintenance, and self-regulation of a patient (ibid).

In line with the aforementioned definition, different scholars have defined self-care differently, among them is Schoenberg (2001) who defines it as an individual's task and a result of lay decisions about proper behavior to profit health, prevent additional illness, limit illness, reestablish health, and maintain independence based on rules of adherence and on factors arising from individual perspective. In addition to this, other scholars such as Maillet et al (1996) defined it as self-management of diabetes by self-administration of therapeutics; synonymous with control of symptoms and management of the disease (Mollem et al, 1996; Schultz et al, 2001).

Cooper et al, 2003; Paterson and Thorne (2000) defined self-care management as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context.

Anderson et al., (1995) and De Weerdt, et al., (1990) argued that self-care in diabetes is a critical factor to keep the disease under control and about 95 per cent of care of the diseases usually carried out by the affected individual or their families consists of self-monitoring of blood glucose (SMBG), nutrition, physical activity, and compliance to medication. In addition, Herschbach et al., (1997) stated that self-care encompasses not only performing these activities but taking consideration of the interrelationships between them and implementation of appropriate changes in the regular life cycle is crucial. To accomplish self-care the patient requires physical skills, cognitive, and knowledge of how mental health affects self-care. Cognitive skills are helpful in the problem solving settings of an individual which is applied through thoughts rather than in practical or action (Rubin et al., 1993; Bandura, 1977).

In line with what the above scholar (Rubin and Bandura) say, self-care is an going learning process where the patient's endeavors to learn different kinds of self-care strategies that determine what is essential for appropriate lifestyle and life condition (Hernandez et al.,1999; Peterson and Thorne, 2000). While, adherence or compliance to self-care does not always lead to worthy metabolic control, however, poor self-care is more likely to lead to poor metabolic control (Toljamo and Hentinen, 2001).

Previous study done by Nauck et al's demonstrated that care of one self's diabetes should be laid on the individual. This could cover monitoring of blood glucose, compliance to treatments, and adherence to healthy lifestyles (Nauck et al., 2009).

Global Burden of the Type 2 Diabetes

Diabetes poses a great economic challenge on the individual, national healthcare system and economy as a whole. It was estimated that Healthcare expenditures on diabetes were expected

to total 11.6% of the total healthcare expenditure in the world in 2010.Some estimates were that preventing and treating diabetes related complications would rise from USD 379 billion in 2010 to over USD 490 billion. Of the estimated expenditure on diabetes treatment and prevention, 80 % of that expenditure would be from the developed countries while the middle and least developed countries would account for less than 20 % even though the later countries account for 70% of morbidity and mortality of the disease. The estimates further show that the expenditure would vary according to age and gender. The estimates furthermore revealed that more than three-quarters of the world's expenditure in 2010 were to be used for persons who were between age group of 50 and 80 years. Also, more money was expected to be spent on diabetes care for women than for men (International Diabetes Federation, 2006).

Literature shows that the financial burden borne by people with diabetes and their families as a result of their disease to a greater extent depends on their socioeconomic status and the health policies of their countries. People in developing countries the carry much burden such as in paying the cost of treatment and care than those in developed countries. Larger for instance in Latin America, families pay over 40% of medical care expenditures. In the very poor countries, people pay every on their own without the help of the state. Socioeconomic status thus plays an important role in complicating the burden of diabetes in the world (ibid).

Type 2 DM is the fourth most common cause of death in most developed countries (UK Prospective Diabetes Study Group, 1998). The prevalence of Type 2 DM increases with age and the occurrence is 1 in 10 of those aged 65 years, in addition the lifetime risk of having the disease in the United Kingdom is more than 10 per cent (Leese, 1992).

Significance of the Study

In the field of caring science and philosophy of health care there is high demand in exploration and investigation of successful self-care ability of chronic diseases particularly in type 2 diabetes (Svenaeus, 1999; Bullington, 1999). There have been a number of systematic literature reviews which focused on self-care and Type 2 DM but they were focused on interventions and patient challenges rather than contributing factors on self-care in patients with Type 2 DM and generally with broad perspectives.

The following are among the previous reviews; Spency and Williams (2006) carried out a study focused on barriers to and facilitators of self-care from perspective of patients with diabetes (Type 1 and 2). Heinrich et al's (2010) study found that self-management interventions are effective for diet, SMBG, knowledge, and T2diabetes related quality of life. Cardona-Morrell et al's (2010) findings revealed that lifestyle interventions during clinical settings have positive contribution at the reduction of diabetes related risks. However, they are limited in clinical outcomes.

Norris et al's (2002) found that DSME is effective at the community level particularly among Type 2 diabetes adults with multiple age and ethnicity groups. Further, DSME is also effective at home level among Type1diabetes patients of children and adolescents.

Most of the above studies were focused on self-care interventions rather than contributing factors on self-care in patients with Type 2 DM. Hence, the need to carry out this present systematic review study.

THEORETICAL FRAME WORK

Orem's Self-Care Theory

Research in the field of caring science and self-care activities of chronic disease (i.e. Type 2 DM) supports Orem's theory of self-care through various definitions and relationships. Therefore, this current study is carried out within the context of Orem's self-care theory (1995).

Orem's (1995) self-care theory has two strong concepts which are associated with successful self-care. These are: therapeutic self-care demand and self-care agency. Therapeutic self-care is a summation of the measure of one's ability to perform the demands of self-care in relation to his/her's life condition. Self-care agency is an individual's ability to perform self-care activities, or health endorsing behaviors, on one's own behalf to maintain a healthy lifestyle. It is a complex phenomenon and develops through day to day practices. Also, it can be adapted through the help and guidance of health professionals. This could incorporate self-care ability and is mostly to be applied and developed in mature people to control, manage and regulate decision making surrounding their own health. Self-care agency constitutes three concepts: i) the capability to engage in estimative and productive activities of self-care; ii) the estimative activities of self-care; iii) the productive activities of self-care. These components are integrated with each other, and none of them can stand alone. Generally, the concept of number-ii and -iii shows the type of actions, and enables the number-i component specific power (Orem, 1979; Orem1991). In general, estimative activities of an individual are the action systems accomplished with a purpose of determining what is to be achieved with respect to self-care. Productive activities are accomplished with the objective of meeting existing and known self-care requirements by using particular technologies (Orem, 1979).

When patients are able to produce effective self-care, it shows that they have awareness about themselves and their disease condition. Similarly, their estimative activities' objective is to define what is to be achieved with respect to self-care and the relevant knowledge or awareness encompasses internal and external conditions of the individual (Orem, 1995). The maintenance and development of self-care agency depends on the individual's age, marital status, level of education, socio-economic status, and so on (Carter,1998; Mapanga and Andrews, 1995).

Health promoting lifestyles (healthy diet, regular exercise, and maintaining normal body weight) are the basic lifestyle modifications in public health promotion (The US Department of Health and Human service, 2009).

RESEARCH PROBLEM

People suffer from Type 2 DM in pandemic proportions worldwide. The effect of the disease, and its life-long impact, represents a significant burden for many healthcare settings, and a number of ill persons struggle to accomplish healthy outcomes (through the internationally recommended lifestyle modifications). Existing approaches of prevention and management of the disease failed to slowdown the pandemic and its prevalence, not to mention the complications associated with morbidity and mortality (Mybanya, 2009).

Theoretical knowledge on how the disease should be managed is available. Such information includes how to maintain a healthy lifestyle and how to engage in appropriate self-care activities (Bodenheimer et al., 2002; Sevick et al., 2007).

A systematic review of the published literature suggests that there have been many approaches to address the problem; however, as the prevalence of Type 2 DM continues to increase, and few patients are able to manage the lifestyle modifications, it is difficult to determine whether a single approach—or a combination of approaches—would be better. From the aforementioned point of view, it can be seen that care of Type 2 DM, has different approaches.

Although studies has been done on the areas of self-care and diabetes, but most of the studies were focused on broad perspectives such as self-care intervention, organization and patient challenges. At present time there is inadequate information on self-care of what factors could contribute to improve self-care activities among Type 2 DM patients.

Hence, there is a great need to carry out this systematic literature study. Therefore, this current review will contribute to the existing understanding and information on what contributes to Type 2 DM Patients self-care behavior.

AIM

The aim of the paper was to investigate the factors that contribute to self-care behavior among patients with Type 2 DM as argued in the literatures.

Research Questions

1. What is the relationship between demographic factors of patients with Type 2 DM and their self-care behavior?

2. To what extent do socioeconomic conditions of patients with Type 2 DM affect their self-care management?

3. What is the role of social support in the self-care behavior of patients with Type 2 DM?

METHODS

Data Sources

In consultation with the Linnaeus University librarian (Växjö, Sweden), data was collected from the following electronic databases: CINAHL, PubMed, LibHub, SweMed and Google Scholar-used for searching of full texts after their abstract was extracted from the data bases of CINAHL, PubMed, LibHub, SweMed. The key search words were: diabetes, patient, self-care, blood glucose, self- monitoring, self-administration, self-medication, diabetes mellitus,

type 2, nutrition and metabolic diseases. Apart from that, I also searched the reference lists of the articles that I included in my study for additional scholarly sources.

Study Selection and Data Extraction

The researcher reviewed the articles based on clear criteria for instance; the year they were published. The targeted period was from January (2004) to April (2011) (figure 1). The reason behind was most of the studies on the areas of what factors could contribute to self-care of patients with Type 2 DM was done since to the above mentioned period of time. In addition there were no particular studies done on this area prior to 2004. As for inclusion criteria, the articles had to: 1) have participants aged 18 years and above, 2) had to have participants with diagnosed Type 2 DM, 3) be in English.

The researcher extracted the following data from the articles that met the specifications of the research: aim, sample, clinical area (Type 2 DM), year of publication, age and gender of patients, control, intervention, measurements and how the collected data was analyzed. Others were the results of the study, and statistical significance of the studies, (Appendice-1). Many of these studies were qualitative (i.e. 20) and fewer were quantitative (i.e. 9), and about two (2) were mixed methods (i.e. qualitative and quantitative) methods in nature.

Among the qualitative studies were (Aikens et al, 2005; Baumann et al, 2010; Carter-Edwards et al, 2004; Chiou et al, 2009; Heisler and Piette, 2005; Hosler and Melnik, 2005; Ingram et al, 2007; Jones et al, 2008; Montague et al, 2005; Oftedal et al, 2009; Olshanky et al, 2008; Ortiz et al, 2010; Polonsky et al, 2005; Rhee et al, 2005; Shigaki et al, 2010; Tang et al, 2008; Tengblad et al, 2007; Wen et al, 2004; Wu et al, 2007 and Zanetti et al, 2010). In addition the following were among the quantitative studies; (Bell et al, 2005; Boeing et al, 2010; Bogner et al, 2010; Boyd et al, 2006; Carthron et al, 2010; McEwen et al, 2010; Munir et al, 2009; Samuel-Hodge et al, 2008 and Xu et al, 2010). Further, among the mixed method studies were; (Murrock et al, 2009 and Plotnikoff et al, 2007).

The thorough search for the articles resulted in 896 articles containing the key search words for the articles. Of these, 31 were chosen for analysis that met all of the mentioned above inclusion criteria.

The starting point for the screening procedures was through the electronic search, followed by a manual search by this researcher, using the inclusion criteria as a guideline. The relevance of each title was assessed, followed by the abstracts. If the abstracts were significant, the full text article was obtained. To ensure reliability of the data selection and extraction the reviewer repeated the screening process, by typing in various combinations of the key words. For every single study, this researcher repeated the process of categorizing and appraising the study's quality. One single form was used to collect and appraise the studies.

Validity and Reliability

To ensure accuracy (validity) and consistency (reliability) of the study, Polit and Beck, (2010: p 89) state that; *"In major journals, the rate of acceptance is low-it can be as low as 5% of submitted articles. Thus, consumers have some assurance that journal articles have already been scrutinized for their merit by other nurse researchers."* this helped to integrate both qualitative and quantitative data as well as to overcome the shortcomings of each method and to raise the validity of the conclusion (ibid). In line, a quality assessment standard criterion was made and table of evidence was made. Critiquing were also focused on the scientific merits, advanced consultation of expertise was involved (Rutledge, De Palme, and Cunningham, 2004).

Analysis

Critical Appraisal Skill Programme (CASP) (2006) was used to measure the inclusion and exclusion criteria. After gathering and reading the 31 articles that dealt directly or indirectly with the self-care in Type 2 DM, the researcher began categorizing process in table form. The researcher systematically went through each article, then placed every piece of relevant data under the extensive material that reflected each of the bases of Orem's self-care theory that Orem identified as key to what factors could contribute to self-care of patients with Type 2 DM. When one quote or finding was relevant to one or more of the bases of to what factors could contribute to self-care of patients with Type 2 DM, the researcher included it under all the relevant categories. Also when found does not reflected the Orem's theory to what factors could contribute to self-care of patients with Type 2 DM, the author grouped these into categories of their own.

Ethical Considerations

To adhere the ethical considerations and to reduce biases the study was done under the context of standard quality appraisal tool as well as the reviewer was blinded for author's names, country of study, and among others.

Search Strategy

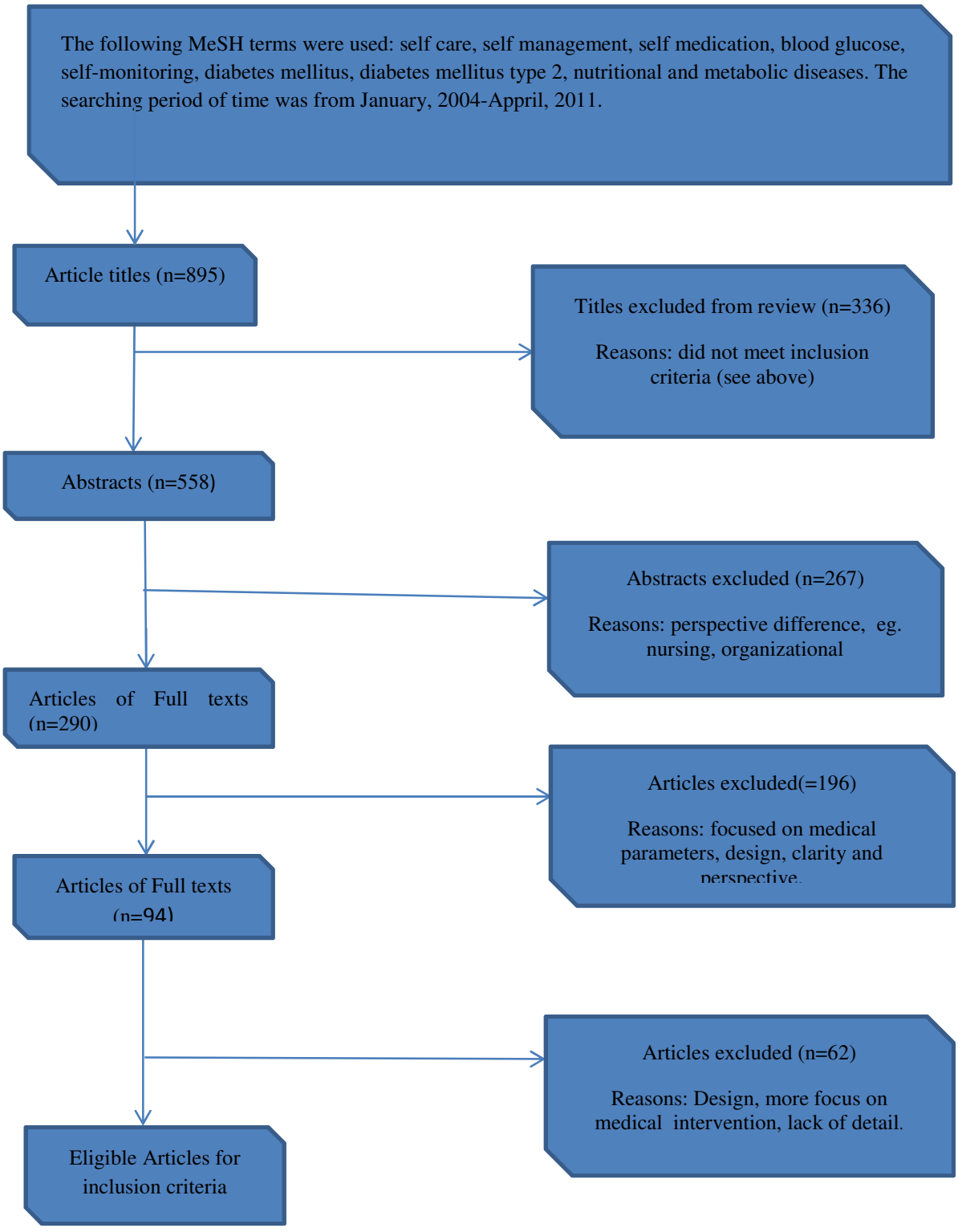

Figure 1. Search and study selection process.

RESULTS

Overall, 895 abstracts were searched, and of these, 291 were examined in greater detail (full text). 95 of these were screened for relevance, and 31 studies fulfilled all of the inclusion criteria for this present review (Figure 1), the articles' characteristics and the reviewed outcomes are presented in Appendix 1.

Most of the studies were carried out in the USA (n=21), but the other nationalities represented are as follows: Germany (n=1), UK (n=1), Sweden (n=1), Norway (n=1), Canada (n=1), Uganda (n=1), Taiwan (n=2), Brazil (n=1) and Mexico (n=1) (Appendix1). The following studies described self-care in relation to one other factor: Eleven studies on age, seven studies on gender, two studies on spirituality, seven studies on education, thirteen studies on social support, three studies on income, and four studies on the length of time since a diabetes diagnosis. See Appendix 1 for more details. Moreover, in most of the studies, positive outcomes were observed regardless of the method used. However, a study done by Wu et al.'s (2007) revealed that there was no statistical significance between self-care and age.

The following are summaries of the lists of the findings or articles;

10 of 11 studies found that there was a positive correlation between self-care and age (Bogner and Vries, 2010; Hosler and Melnik, 2005; Olshanky et al, 2008; Rhee et al, 2005; Samuel-Hodge et al, Shigaki et al, 2010, Tengblad et al, 2007; Wen et al, 2004; Xu and Pan, 2010; and Zanetti et al, 2010. However, Wu et al, (2007) discovered that there were no statistically significant relationship between self-care and age.

5 of 7 studies on gender revealed a positive correlation between the two variables; self-care and gender. Among these studies were (Baumann et al, 2010; Chiou et al, 2009; Montague et al, 2005; Ortiz et al, 2010 and Plotnikoff et al, 2007). However, two studies revealed that there were no significant relationship among the above mentioned variables. Among these studies were a study done by Boeing et al, (2010) and the second study done by Tengblad et al., (2007). Two (2) studies showed a positive correlation between self-care and religion. Among these studies were; (Chiou et al 2009, and Samuel-Hodge et al 2008).

seven (7) of 7 studies showed a positive correlation between self-care and the level of education. Among these studies were; (Bell et al, 2005; Chiou et al, 2009; Hosler and Melnik, 2005; Polonsky et al, 2005; Samuel-Hodge et al, 2008; Tang et al, 2008 and Xu and Pan, 2010). all the nine (13) studies found a positive correlation between self-care and increased social support. Among these studies were (Aikens' et al, 2005; Baumann et al, 2010; Boyd et al, 2006; Carter-Edwards et al, 2004; Chio et al, 2009; Heisler and Piettel, 2005; Ingram et al, 2007; Jones et al, 2008; Murrock et al, 2009; Oftedal et al, 2009; Tang et al, 2008; Wen et al, 2004 and Xu and Pan, 2010).

Three (3) studies found that there is positive correlation between self-care and high Income. Among these studies were; Chiou et al, (2009); Hosler and Melnik (2005) and Plotnikoff et al, (2007). all the four (4) studies revealed positive correlation of self-care and longer duration of disease. Among these studies were; (Bell et al, 2005; Chiou et al, 2009; Wu et al, 2007 and Xu and Pan 2010).

Demographic Factors

Age as contributing factor to Self-Care among Type 2 DM Patients

The reviewed articles in this study reviewed that there is a correlation between age and regular Type 2 DM self-care. The studies discovered that those in old age were associated with good and regular Type 2 DM self-care (Zanetti et al, 2010). It was also discovered that adults who used oral agents with SMBG had improved their health and had low medication consumption (Tengblad et al, 2007). It was also discovered that advanced age was associated with high level of physical activity, adherence to recommended eating, and carryout foot care (Xu and Pan, 2010).

Further, other studies such as those by (Shigaki et al, 2010; Bogner et al, 2010; Rhee et al, 2005; Wen et al, 2004; Hosler and Melnik, 2005; Olshanky et al, 2008; Samuel-Hodge et al, 2008 and Wu et al, 2007).

Shigaki et al, (2010) discovered that Ageing or older adults were associated with less likely to exercise. A study done by Shigaki et al, (2010) and Wen et al, (2004) also discovered that old age were associated with high level of diet and medication adherence, low glycosylated Hemoglobin level and few symptom of diabetes related depression. Another study done by Rhee et al, (2005) revealed that older adults were more adherent to appointment, and were associated with low level of HbA1c, and visiting health care professional for HbA1c test.

Hosler and Melnik (2005) revealed that Young age were associated with low adherence for A1c test, Blood Pressure lowering medications, and Aspirin. In addition, Olshanky et al, (2008) discovered that young age being Type 2 DM was associated with ability to shifting of view or mentality and motivation to engage in healthy lifestyles. Further, Samuel-Hodge et al, (2008) revealed that older adults (old age) were associated with poor coping self-care ability.

However, a study done by Wu et al (2007) discovered that there were no statistically significant correlation was among self-care and age. Meaning better self-care behavior were associated with previous Type 2 DM education and long duration of Type 2 DM diagnosis.

Gender as contributing factor to Self-Care among Type 2 DM Patients

Baumann et al (2010) found that Men experienced more regular physical self-care activity and women were scored more adherence to recommended diet and also they experienced high concern about diabetes complications.

Chio et al (2009) found that Male has statistically significant self-care than women. Montague et al (2005) discovered that Women in their reproductive age were used or consumed few anti-T2 DM medication and women with previous diabetic education or knowledge had low diabetic related pain, and they had high social life.

Ortiz et al (2010) found that Men had more physical exercise experience than women. Plotnikoff et al, (2007) found that Women were used non leisure types of physical activities.

Boeing et al, (2010) revealed that there were no relationship between gender related mortality and self-care related medication usage. Further, Tengblad et al (2007) revealed that there were no correlation between gender and self-care related frequency of SMBG & HbA1c level.

Duration /Length of Type 2 DM diagnosis as contributing to Self-Care among Type 2 DM Patients.

This present review revealed that long Type 2 DM diagnosis and treatment has positive correlation on the improved self-care activities, which is developed through experience, and view changes from feeling ill to living as others with. The following are among the studies which showed the mentioned relationship;

Chio et al (2009) found that Long duration (mean = 14.29 years) of Type 2 DM diagnosis history were associated with high self-care ability. Further, a study done by Xu and Pan discovered that Long duration (mean duration 9 years) of Type 2 DM had a positive relationship with adherent to recommended medications & monitoring of regular blood glucose (Xu et al, 2010). There were statistically significant correlation among long (average 5.8 years) Type 2 DM history & good self-care ability (Wu et al, 2007). Long duration (>10years) of diabetes diagnosis were associated with high foot self-care (Bell et al, 2005).

Socio-Economic Factors

Education as contributing factor to Self-Care among Type 2 DM Patients

The reviewed articles in this study reviewed that there is a positive correlation between education and regular diabetic self-care. These studies discovered that those with high educational attainment were associated with good and regular Type 2 DM self-care. It was also discovered that higher educational attainment were associated with less dependence on medications, high level of physical activity, and SMBG regularly and were associated with positive support behavior or attitude (Chiou et al, 2009; Tang et al, 2008 and Xu and Pan, 2010).

In line to the above point of view, another studies discovered that even Brief diabetic education or awareness and also received health care provider's education about foot self-care related were associated with improved diabetes self-care activities (Bell et al, 2005 and Polonsky et al, 2005).

Another study discovered that about the disadvantage of the low educational attainment and awareness. Among these studies were; a study done by Hosler and Pan and Samuel-Hodge's et al revealed that Low educational attainment were associated with low A1c test, taking blood lowering medication and Aspirin and with poor coping self-care ability (Hosler and Pan, 2005 and Samuel-Hodge et al, 2008).

All the mentioned above articles revealed the importance of education and expanding awareness and its contribution to the level of enhancement of self-care among Type 2 DM patients. Meaning the more educated and received awareness the more take care of themselves.

Another study that showed the relationship between education attainment and safe-care is that by Bell et al (2005), the study found that Attainment of foot self-care education & received foot self-care through health professional were associated with high foot self-care ability. Samuel-Hodge et al (2008) found that Low educational attainment were associated with poor coping self-care ability.

Income level as contributing factor to Self-Care among Type 2 DM Patients

The reviewed articles revealed that there is strong relationship among income level and self-care of patients with Type 2 DM. The following are among the findings and studies which show the above mentioned relationship.

Chio et al (2009) found that high income was correlated with high self-care ability or low income was associated with low self-care ability than those middle & high income patients. Plotnikoff et al, (2007) found that high income were associated with physical exercise self-care activity at well-equipped & leisure environments. Which includes aerobic classes, strength training and Low income were associated with physical activities in non-leisure environment which includes walking for errads, and house work activities.

Hosler et al, (2005) found that Low income (socioeconomic) patient had low A1c test, Blood lowering medication & Aspirin. It is thus appropriate to state that there is a positive correlation between self-care and low income of an individual. The high the income the more they take care of themselves.

Religion as contributing factor to Self-Care among Type 2 DM Patients

The reviewed articles revealed that there is clear relationship between spirituality/religion and self-care among Type 2 DM patients. The following are among the studies which showed the

relationships.

Chio et al (2009) found that more spiritual Type 2 DM patients had poor self-care than those loose or non- spiritual patients. Meaning instead of adhering to the health care professional recommendations they were believed they can be cured by praying to god and other religious related beliefs. On the other hand, Samuel-Hodge et al (2008) found that more spirituality were associated with poor Type 2 DM coping self-care ability.

Hence, the findings revealed that there was a positive correlation between less religious and good coping self-care ability. This means those who do not pray much had good coping ability and belief to the health care provider's advice and recommendations.

Social Support/Network

Social Support as contributing factor to Self-Care among Type 2 DM Patients

The reviewed articled revealed that there is positive relationship between social support or network and self-care among Type 2 DM patients. The following are among the studies which showed the above mentioned relationships;

Chio et al, (2009) and Jones et al, (2008) found that sufficient social support was correlated with high diabetes self-care ability. Other studies such as those by Oftedal et al (2009) found that belonging to similar social group were associated with positive outcomes of metabolic

control self-care ability. Heisler and Piette, (2005) on the other hand found that Peer support calls (telephone) were helpful in improving patients' self-care activities.

Among the reviewed articles revealed that Patient-provider communication was significantly associated with the high self-care outcomes (i.e. Glycemic control, mental function, & physical function). Further, Family support had positive correlation on the self-care coping ability among Type 2 DM patients. In line to this, living with family was associated with higher diet self-care ability among Type 2 DM patients (Aikens et al, 2005; Baumann et al, 2010; Wen et al, 2004).

In line to the mentioned above point of view, Peer support (network) was also associated with improved diabetes self-care activities & well-being. Social network thus contributed to patients feeling of strong, opportunity to share healthy lifestyles. Social support (network) thus had significant correlation with improved glycemic control (Murrock et al, 2009; Carter-Edwards et al, 2004; Ingram et al, 2007 and Jones et al, 2008).

Studies done by Tang's et al and Xu and Pan found that married patients were less likely to take or treat through anti-diabetic medications. Tang's et al discovered that that married patients had high social support, high support satisfaction, and high positive support behavior. In addition, they were less likely to take or treat through anti-diabetic medications (Tang et al, 2008 and Xu and Pan, 2010). In line to this, Boyd et al (2006) revealed that social interventions which focused at the high income patients have positive correlation with improved diabetes self-care activities. The implication of the above is that social networks/support and significant others play an important role in the lives of people with Type 2 DM patients.

DISCUSSION

Old age is among the demographic factors which contributes to good and regular self-care among Type 2 DM patients. In addition, gender is also another predictor of performing adhering to healthy lifestyle modifications. High academic and awareness attainment was also among the positive contributors for high Type 2 DM self-care abilities. Further, Sufficient social support has also positive contribution to high self-care of patients with Type 2 DM. High income was also among the predictors for better self-care ability. Long diagnosis history of type 2 DM is among the positive predictors of good Type 2 DM self-care abilities.

Discussion of Methods

The method of this study was a Qualitative Systematic Review. Ropka and Spencer-Cisek, 2001, p: 1588) discovered that systematic review provides *"a concise, current, rigorous syntheses of best research evidence about a clinical problem"*.

Strength

The following were among the strengths of the study;

The researcher used a method of Critical Appraisal Skill Programme, this method of analysis provides as Polit and Beck, (2010) stated *"In major journals, the rate of acceptance is low-it can be as low as 5% of submitted articles. Thus, consumers have some assurance that journal articles have already been scrutinized for their merit by other nurse researchers."*

And also the researcher focused on the most important concepts and the findings in the articles. Hence, this reduced the probability of being biased in my selection of articles. The researcher did not concentrate on the authors' names or where the study was done. This is among the advantages of the Systematic literature Review. According to Hemingway and Brereton (2009: p 5) "*Systematic Reviews preserve the integrity of findings of the different types of studies by using appropriate type of analysis that is specific to each type of finding."*

The inclusion/exclusion criteria adopted by this study allowed for selection of only relevant articles, this increased the validity and reliability of the study.

This study was focused on self-care in Type 2 DM; hence, it will contribute to the knowledge to the caring sciences and knowledge on self-care management in Type 2 DM patients. More so there were no studies done prior 2004 in this area.

Limitation

The study, like many other studies had its own limitations. However, the limitations had little bearing on the overall findings of the study. The following were some of the limitations:

The study was supposed to be done by two (2) peer reviewers but the author however did it alone since the other potential reviewers were not interested my area of study. They had their own focus of study (ibid).

Some studies were not detailed enough hence the information was somewhat superficial (did not contain the desired data).

The allocated reviewing time was not sufficiently enough. So it restricted the researcher from reviewing extra data bases.

Weaknesses

Not all the material that was collected would be regarded as the strongest form of medical evidence. The collected 31 articles but not all were relevant. Hence, not all systematic reviews are reliable. Some reviewed articles were found to contain outdated information- this can mainly be attributed to constant advancement in the field of caring science.

Discussion of Results

Demographic factors

Age as contributing factor to Self-Care among Type 2 DM Patients

According to Orem's theory-self-care agency is an individual's ability to perform self-care activities or health endorsing behaviors on one's own behalf to maintain lifestyles (i.e. health and well-being) and is complex phenomenon and develops through day to day practices and it can be adapted through help and guidance of health professionals. This could be incorporated with the self-care ability and is mostly to be applied and developed in mature people to control, manage, regulate, and decision making of their own health (Orem, 1979 and 1991). This ties in well with the findings of this study. According to the results there is a correlation between age and regular diabetic self-care. The older the patients the more they took care of themselves. On the other hand the study discovered that patients who were young in years were less likely to exercise self-care.

As much as the findings relate to the theory, studies such as the one done by Wu et al (2007) discovered that there was no statistical significant correlation were among self-care and age. However, as much as the studies showed that there was no statistical significant between age and self-care the results still showed that adults were more cautious about their diabetes than the young ones.

Socio-Economic factors

Education as contributing to Self-Care among Type 2 DM Patients

The theory of Orem further states that when patients produce effective self-care, it shows they have acquired awareness or knowledge about themselves and their disease condition. In line with this their estimative activities objective is to define what is to be achieved with respect to self-care and the relevant knowledge or awareness encompasses internal and external conditions of the individual (Orem, 1995).

In line with the mentioned above Orem theory, the findings of this study are also congruent with studies done by Carter (1998) and Mapanga and Andrews (1995) who state that the maintenance and development of self- care agency depends on the individual's age, marital status, level of education, socio-economic. This theory correlates well with the findings of this

review. According to the results there is a positive correlation between high educational or awareness attainment and high diabetes self-care activities. This shows that the results of this study fit in the theory of Orem.

Income level as contributing to Self-Care among Type 2 DM Patients

The maintenance and development of self-care agency depends on the individual's age, marital status, level of education, socio-economic (Carter, 1998; Mapanga and Andrews, 1995). This tied well with findings of the present review. According to the findings there is positive correlation between diabetes self-care and income. The higher their income the more they take care of their own self-care activities.

Social support/Network

Social Support as contributing to Self-Care among Type 2 DM Patients

According to Orem's theory self-care is an individual's ability to perform health endorsing behaviors on one's own behalf to maintain lifestyles (i.e. health and well-being) and is complex phenomenon and develops through day to day practices and it can be adapted through help, assistance and guidance such as health professionals. This could be incorporated with the self-care ability and is mostly to be applied and developed in mature people to control, manage, regulate, and decision making of their own health (Orem, 1979 and Orem, 1991).

The above mentioned theory of Orem correlates with the findings of this study. According the findings there is significant correlation among Type 2 DM self-care and social support. The more received social support and assistance, the more performed diabetes self-care activities (Chio et al, 2009; Oftedal et al, 2009; Heisler and Piette, 2005).

Conclusions

This Review revealed that it is clear that the Demographic, Socio-Economic and Social support factors are among the positive contributors in patients of Type 2 DM successful Self-Care activities. The key positive contributors are growing old which through adhering and compliance to the standard recommendations. Further, gender had significant correlation with better self-care activities. For instance, gender men were associated with better self-care such as physical activities than women. Education-high literacy (education) level was associated with effective Type 2 DM Self-care activities. In line to this high income and social support or network are among the strongest predictors in the Type 2 DM Self-Care activities.

Implications for practice

Overall, the findings of the reviewed articles support the concept of Orem's self-care theory in which various aspects of self-care contributory factors defined in this theory appears to be very important in Type 2 DM patients and policy makers also can utilize it for practice.

Implication for future Research

There is need for further field research in developing countries on the perceptions of patients with low socioeconomic status (with Type 2 DM) on the effectiveness of their self-care management so that resources for Type 2 DM can be used efficiently. In addition, Most of the studied available are done under the context of developed societies so there is need for further research on developing societies for instance in African continent and elsewhere.

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APPENDIX: 1

Table of Critical Appraisal Skill Programme and/ or Quality Assessment Criteria.

Author, year, country	Aim	Study Design, collection	Sample, age, No	Clinical area	Control	Intervention	Measures	Analysis	Result	Reviewer's Comments
Aikens et al. 2005. USA.	Determine whether diabetes self-care behaviors mediate the association between patient-provider communication & diabetes outcomes.	Interview,	N=752, age+=21yrs	T2DM			Demographics, Comorbid, patient provider communication, self-care behaviors, & functional status	statistical	Eating behavior was related to both glycemic control, & mental functioning. Exercise was related to physical function & medication taking was related to glycemic control. Generally diabetes-specific patient provider communication was significantly associated with all above self-care behaviours.	Patient-provider communication is a significant predictor of overall patients diabetes self-care ability.
Baumann et al.2010. Uganda.	Describe illness beliefs & diabetes self-care behaviours	Cross sectional, interview.	N=340, adults, sex=both	T2DM			Coping & self care behavior	Statistical	Patients reported that their self-care exercise were included work related activity 8walking to job). Men were more experienced regular program of exercise. Women were adherent to recommended diet (limited fatty & sweet foods). Women were more concerned with complications than men. Patients reported that family support has great contribution on their diabetes self-care.	Gender is a predictor of performing and adhering for the healthy lifestyle modifications, and recommendations.
Bell et al.2005. USA.	Assess the level of foot self-care performed in a rural, multiethnic population of older adults & to identify factors associated with foot self-care	Survey	N=688, age+=65	Foot care			Demographic & health predictors	Descriptive statistics	Foot self-care were higher among those with long duration (>10yrs). Median foot care was higher among patients who had seen a doctor for diabetes related care (nerve). Self-care were higher among those who had self-care education & on patients those who had received /shown on how to care of their feet.	Long Length of diabetes diagnosis and acquired education or knowledge self-care management has positive outcomes on enhancing patient's diabetes self-care ability.

Boeing et al. 2010. Germany.	To estimate the reduction in mortality that could be achieved if people with diabetes did not smoke, had a body mass index less than 30 kg/m2, perform physical activity for more than/equal to 3.5h/week, reported better dietary habits, and consumed alcohol moderately.	Prospective cohort study	N=1263 m=708, w=555, age 35-65yrs	Diabetes Mellitus				Multivariate cox regression / statistical analysis	Premature death reduced with the increment of favorable lifestyles. Having 3 or more favorite factors was associated with 63% reduction of all causes of mortality. The reduction of mortality risk for patients with one favorable factor were 34% No relations with sex and insulin treatment. The reduction of risk with 3 or more favorite factors contributes to the longevity of the patients (i.e. by 3 years). Among the predictors Never smoking has statistically significant prediction. While, physical activity was among the weakest predictors for all causes of mortality.	Declining of mortality is associated with high self-care habits. There was no correlation among gender & insulin treatment. Reduction of mortality was strongly associated with never used to smoke.
Bogner et al.2010. USA.	To examine whether integrating depression treatment into care for type 2 diabetes mellitus among older African Americans improved medication adherence, glycemic control, & depression outcomes.	Pilot randomized control trial	N=58, Age +=50 years	T2DM			Sociodemographic, adherence & mini mental examination	Statistical analysis	Patients from the intervention group who had high medication adherence had low glycosylated hemoglobin & fewer symptom of depression	Old age is a predictor of high medication adherence, low glycosylated Hemoglobin & few symptom of diabetes related depression.
Boyd et al. 2006. USA.	Form a partnership between a community health center to improve access to exercise for low-income patients.		N=130, 19+= years	T2DM			Outcomes of A1c, BP, & LDL	statistical	Alc, BP, & LDL levels were reduced significantly. Blood glucose control was improved by Alc declining.	Social interventions which focused at the socio-economically disadvantaged patients have positive correlation with improved diabetes self-care activities.

Carthron et al.2009. USA.	Compare diabetes self-management activities of African American primary caregiving grandmothers before & after the initiation of caregiving & to compare the diabetes self-management activities of African American primary caregiving mothers to diabetic women who were not.	Nonexperimental comparative Cross-sectional	N=68, age=55-75	T2DM			Demographic & self-management activities	statistical	Following initiation of care for their grandchildren the number of days eating a healthy diet has reduced, SMBG frequency/week has reduced, & fewer than those non care givers. No statistically significant difference has noted in number of days engaging in at least 30 min of exercise, medication adherence, number of self-foot examination /week , number of eye examination per year & healthy diet.	Old age (55-75) with taking care of kids was a predictor of diminishing the healthy self-care activities (diet, SMBG). But There were no statistically significant difference among age and exercise, medication adherence, number of self-foot examination /week, number of eye examination per year & healthy diet.
Carter-Edwards et al. 2004. USA.	Evaluate the relationship between perceived social support among African America women with T2DM & Diabetes self-management.	Qualitative, focus group	N=12, age=35-55yrs,	T2DM				Thematic	Family/friend help/support was based on the patient's sense of being strong. Help-physical assistance (financial), sharing chores, direction on how to cook a healthy meal. Support-emotional understanding (i.e. understanding or knowing what a women with diabetes bêtes), provide physical assistance without being asked, respecting her situation by refraining from threatening her sense of power & control.	Social support is a key factor on making strong patient's mentality and facilitating positive self-care's.

Chiou et al. 2009. Taiwan	To examine the factors related to self-care behaviour in type 2 diabetes patients aged 65 years or more and to test the effect of the explanatory factors on self-care behaviour.	Interview,	Mean age=72.8Yr ,N=165	T2DM					Gender-male had statistically significant high self-care behavior than females. In relation to educational status there were significant differences. This was senior high school, university or college education holders they had high self-care behaviour than those illiterate patients or than those with only elementary schooling. In relation to finance (income) there were statistically significant differences. Which were those who had low income had low self-care behaviour than those with middle and high income patients. In relation to religion there was statistically significant difference. Which were spiritual patients had poor self-care behaviour than those non spiritual counterparts. There were also statistically significant correlation between disease duration and economic status with self-care behaviour. Which were those with high economic status and long disease duration had high self-care behaviour than those with the reverse of status. In relation to social support there were statistically significant correlations. Which were those who had sufficient social support had high self-care behaviour than those with insufficient.	Gender (i.e. Male) is a strong predictor for high self-care performance. In addition, education is also a strong predictor for high self-care performance (i.e. higher levels of educational attainments). in contrast, low educational attainment is a poor predictor for good self-care performance (i.e. illiterate, elementary levels). High income earning is a strong predictor for high self-care performance. Religion is also has strong predictor on the self-care performance i.e. non-religious correlated with high self-care performance. While, more religious associated with poor self-care performance). Long diabetes diagnosis is a predictor of high self-care performance. Social support is also a strong predictor for high self-care performance (i.e. sufficient social support).
Heisler and Piette. 2005. USA.	Evaluate the feasibility & acceptability of using an interactive voice response-IVI-based plat form to facilitate peer support among older adults with diabetes	Pilot study, semi structured interview,	N=38, age=	Diabetes Mellitus			Depressive symptoms, diabetes self-care efficacy, & diabetes self-management behaviors	Descriptive	Peer support calls were helpful in managing diabetes symptoms, learning new about how to take care of their diabetes, concern about each other were effective in their diabetes self-care to kept stay healthy. No correlation was for medication.	Social network is a predictor of improving diabetes self-care ability.

Hosler and Melnik. 2005.USA.	Assess the status of diabetes medical care & self-management among adults		N=606, age+=18	Diabetes M				Statistical	Low education level, income & young age were less likely to receive annual A1c Cholesterol test, BP lowering medication &aspirin.	Education, income, and age are a predictors on patient's diabetes self-care performance.
Ingram et al. 2007. USA.	Describe the effect of a promotora-driven intervention to build social support as a means to affect self-management behaviors & clinical outcomes.	qualitative	N=70, age average 60yrs				Perceived support & self-management	Statistical	The emotional support & advocacy groups had significant correlation with improved glycemic control & patients felt more comfortable to talk with their families, friends 6 physicians about their diabetes care issues.	Social support is significant predictor on the success of diabetes self-care ability.
Jones et al. 2008. USA.	Examine the impact of family & friends on the management of persons with diabetes & their willingness to be involved in a culturally tailored program.	Qualitative, quasi experimental	N=21 patients & 6 family/friends, age+=18yrs, sex=both	T2DM			culturally tailored patient, family or friends involvement.	Descriptive content analysis	Family and peer involvement had strong correlation on patients' diabetes self-care ability.	Social support/network is a positive predictor in diabetes self-care.
McEwen et al, 2010.USA.	Test the efficacy of a culturally tailored diabetes self-management social support intervention for Mexican American adults with T2DM.	Pre-test & post-test, self-reported Questionnaires	N=21	T2DM			Behavioral outcomes (i.e. physic exercise, diet, diabetes distress) & diabetes knowledge & HbA1c & BMI.	Descriptive statistical	There were significant improvements in exercise, diet & foot care from baseline to post intervention. There were significant decreases from pre-post intervention of the SMSS (decrease in sitting time/week. There were decline in distress related to diabetes regimen. There were no statistically significant changes in HbA1c & BMI in post intervention.	Social support is a strong prediction of improvements of self-care activities of exercise, diet, & foot care & diabetes treatment related distress. There was no statistically significant correlation social support with HbA1c & BMI changes.

Montague et al. 2005. USA.	Describe demographic & medical characteristics, self-efficacy, locus of control, self-management (i.e. functional status, hemoglobin HbAlc outcomes, &the relationships among these variables based on age group differences (25-44yrs,45-64,& 65-88 years) in African American women with type 2 diabetes.	Descriptive pilot study, interview,	N=75,	T2DM			Self-efficacy, locus of control, & medical outcomes & demographic	Descriptive statistics	Women in their reproductive age (25-44) were significantly used few anti-diabetic medications than in middle & old age. Women who had diabetic education had statistically significant low diabetes related pain & high social & mental health.	Women reproductive age is a predictor of not being dependent on self-care activity of medications.
Murrock et al. 2009. USA.	Test dance intervention & explore the role of peer support to improve the diabetes outcomes of A1C,Weight,body fat, & BP	Mixed, randomized, focus group	No=70, age+=18, sex=W	T2DM	36	34		Statistical	Dancing would help manage diabetes & their overall health through-lowering BP, exercising better shape, & lose some weight, keep motivated to start doing more and being in the group created laughter, acceptance, and socialization (gain new friends).	Social (peer) support has strong contribution on overall patient's self-care outcomes.
Munir et al. 2009. UK.	Examine the self-management of health behaviours carried out by older aged (50-69yrs)& younger workers aged(20-49) with chronic illness.	Cross sectional survey, questionnaire.	N=759, age=20-49 & 50-69yrs				Using prescribed medivation, monitoring & responseing to symptoms, managing an appropriate diet & exercising.	statistical	Older (50-69) workers reported significantly higher use of medication, & diet adherence at work place & significantly able to manage their symptoms at work. In addition they were also more significantly to use exercise as a self-care/management.	Old age is strongly associated with high self-care ability i.e. medication, exercise, & diet adherence & capability of caring of disease manifestations.

Oftedal et al. 2009. Norway.	To identify life values in adults with type 2 diabetes & to describe their experiences of how these values may influence self-regulation behavior.	Qualitative, descriptive/exploratory focus group.	N=19, Age30-65, mean age=51, sex=both	T2DM					Eating healthy food were associated with body well-being.. Self-regulation has positive impact on the body maintaining (i.e. reduction of weight, & maintaining physical activity. Suitable or separate exercise places (gym) has positive contribution on the self-care (i.e. patients with patients, fat with fat, slim with slim to avoid body image. The freedom & commitment among patient-provider to choice their owns disease treatment & improved diabetes self-care. Being happy with job has positive contribution on diabetes self-care. Belonging to a fellowship or similar social group has positive impact on the diabetes self-care (i.e. exercise, cooking, and hiking) and contributes to the successful metabolic control.	Old age (mean 51) is a predictor of self-care activities of healthy diet, preferring physical activity at suitable socioenvironment, body well-being maintenance.
Olshanky et al.2008. USA.	Explore perceptions of people with diabetes about their experience of living with & managing their diabetes.	Qualitative, inductive, focus group	N=39,Age+=21	Diabetes mellitus				Constant comparative	Living with diabetes represented motivation to engage in positive lifestyle behaviours to achieve overall health. Being diagnosed a diabetes represents a significant change in their lives & engaging in healthier lifestyle behaviours (diet, exercise, Blood glucose checking, eating at specified time depending on blood glucose level, exercise at specified time, & being constrained in social situations in regard to food. Conceptual move from viewing themselves as diabetic to a person with diabetes.	Early age is predictor of engaging in healthy self-care activities and adjusting diabetes related perceptions.

Ortiz et al. 2010. Mexico.	Analyse self-care behaviors (diet, exercise, monitoring and medication) and their relation with health indicators like HbAlc, cholesterol, triglycerides, BMI, waist circumference & body fat percentage; to describe the influence of age, schooling, gender and education/previous understanding about diabetes on self-care & health indicators & to determine differences in self-care behaviours according to gender, age & schooling.	Descriptive correlational	98, Age average=47yrs	T2DM				Multivariate analysis	Better self-care was associated with lowering HbA1c levels (better glycemic control). Men were practiced more exercise than women. In addition the relationship of self-care among triglyceride, body fat and BMI were significantly negative.	Gender is a predictor of better physical activity self-care ability (i.e., men). While, there is no significant correlation among self-care & such health outcomes (i.e. triglyceride, body fat and BMI).

Plotnikoff et al. 2007. Canad.	Explore the patterns in physical activity behaviors & the meaning & personal significance of social cognitive theory constracts on physical activity, across gender & income groups among people with T2DM.	Mixed-method, self report questionnaire & semi structured interview	N=1614, Age+=18,	T2DM			Leisure time physical activity, gender & income	Statistical=quantitative, content analysis=qualitative.	Women were apt to do nonleisure lifestyle activities (i.e. taking stairs, parking further away, playing with children, & occupational activities. Patients with high income were more likely to report participating in leisure activity (jogging/hiking, aerobics classes, strength training & sports. In contrast, low income patients were more likely to report walking for errads & activities of daily living including house work & yard work.	Gender and socio-economic are a predictors of physical activity of socio-environmental preference.
Polonsky et al, 2005.USA.	Evaluate the ability of brief educational program to enhance patients self-care behavior & their familiarity with the meaning & utility of 5 of the major clinical tests in diabetes (A1c, BP, LDL, microalbumin, &dilated eye examination)	Qualitative	N=221, age+=18,	mixed			Clinical test & awareness	Statistical	Following brief self-care training, patients improved their self-care meal planning, exercise, BGM and test awareness (i.e. A1c, BP. LDL, Cholesterol & microalbumin.	Education has a positive correlation on diabetes self-care ability.
Rhee et al, 2005. USA.	Assess the influence of appointment keeping & medication adherence on HbA1c.	Retrospective	N=1560, mean age 55yrs,	T2DM				Statistical	Adherence to appointments & medication had significant contribution on lowering HbA1c (glycemic control). Older adults were more adherent with appointments. Patients those who had both high medication adherence & appointment, had lowest follow up HbA1c levels. While those with poor adherence were the reverse.	Old age is a strong predictor on recommendation compliance and registering positive health (self-care) outcomes.

Samuel-Hodge et al.2008. USA.	Describe how coping styles among African Americans with T2D relate to diabetes appraisals, self-care behaviors, & health related quality of life.	Cross sectional, RCT	N=185, age+=20	T2DM			Psychosocial, diabetes & general health status, perceived competence & self-efficacy, spirituality, physical activity, diet & so on.	Statistical	passive coping experience were associated with more spiritual personality. While active coping experience were associated with less spirituality. Older and low level educational attainment were associated with passive form of diabetes coping.	Elderly age /later life is a stage which predicts weak diabetes adopting /coping self-care. Further, spirituality is strong predictor on the performance of diabetes self-care ability as well as education is a strong predictor of diabetes self-care ability.
Shigaki et al.2010. USA	Examine the relationship between autonomous motivation & diabetes self-care activities among individuals with diabetes.	qualitative	N=77, age+=18,	T2DM			Frequency of adhering to recommendations (i.e. diet, testing BG& exercise), autonomouse motivation (self-efficacy, social support) duration of diabetes diagnosis.	Statistical	Autonomous motivation was the only significant predictor of blood glucose testing & frequency of testing & maintaining diet frequency. Older adults were less likely to have exercised.	Self-care activities such as Blood Glucose testing, frequency of testing & maintaining diet frequency were highly associated with autonomos motivation.
Tang et al. 2008. USA.	Examine social support & its relationship to diabetes-specific quality of life & self-care behaviors in African Americans with T2DM.	Cross sectional observation	N=89, age+=40	T2DM			Diabetes-specific quality of life, self-care behaviors, demographics & diabetes related social support.	Statistical analysis	Married patients were more received social support & had greater satisfaction with support & more positive support behavior than those unmarried. Patients with more years of education were less likely to be satisfied with their support & receive more positive support behavior (i.e. those who more satisfied with social support were experienced better quality of life (healthy eating plan, spacing out carbohydrates & exercising at least 30min. the above mentioned findings were statistically significant	Social support and educational attainments are the predictors of to enable patients to manage and feet strong with their disease.

Tengblad et al. 2007. Sweden	To explore the use of SMBG & its association with glycaemic control in patients with type 2 diabetes.	Cross sectional observational. Interview,	N= 6495, M=3299, W=3196, Age= +/_65.	T2DM			SMBG, HbA1c.	Statistical	Medical records showed that adults of non-users of SMBG treated only with diet were more frequent to be on diuretics than those on SMBG, patients who used oral agents with SMBG had low level of creatinine than those not on SMBG. Patients on SMBG had low use of calcium channel blocker than those not SMBG users. There were no correlations of SMBG & HbA1c levels among both groups. In relation to age & gender there were no correlations between frequencies of SMBG & HbAlc level.	Elderly age (65) has strong correlation on the positive outcomes of Self-care activity of SMBG with oral agents which are reduction of creatinine level. In addition, elderly age self-care activity of SMBG in lowering consumption of such medications i.e. calcium channel blocker. In contrast, there were no correlation among age & gender on the frequency of SMBG & HbA1c level.
Wen et al.2004. USA.	Examine the relationship between diabetes-specific family support & other psychosocial factors with regard to diet & exercise self-care behavior among olders.	Exploratory, Nonexperimental	N=138, age+ =55	T2DM			Family support, self-efficacy, self-care activities.		Stronger perception of positive support & stronger perceptions of self-efficacy were associated with higher levels of diet self-care. Older adults reported higher levels of diet self-care. Household status was a significant predictor of self-care(i.e. living with family reported higher levels of diet self-care. Stronger perception of positive support & stronger perception of self-efficacy were associated with higher levels of exercise self-care.	Social support is a factor which contributed on making change of patient's view, adopting healthy self-care modifications/ ability.

Wu et al.2006. Taiwan.	To explore differences in self-care behaviour according to demographic & illness characteristics & relationships among self-care behaviour & demographic & illness characteristics, efficacy expectations & outcome expectations of people with type 2 diabetes in Taiwan.	Self-administered questionnaire,	N=145. Age>=30	T2DM			Ability to manage Blood sugar, diet, &exercise & outcome expectations	Descriptive statistical	Patients who did not have complication & had previous patient education had better self-care behaviour than those vice versa. There were no statistically significant relationships between age & self-care behaviour. There were statistically significant correlation between duration of diabetes & self-care behaviour (i.e. patients who had long diabetes history had better self-care behaviour. Self-care behaviour had significant correlation with efficacy expectations & outcome expectations (i.e. patients who had higher efficacy expectation & outcome expectation had higher self-care behaviour.	Received education on diabetes was associated on the improvement of self-care activities. Duration of diabetes is a strong predictor of high self-care activities i.e. long duration was associated with good self-care activities.
Xu and Pan. 2010. USA.	Examine the level of diabetes self-management & its association with demographic & diabetes related characteristics in Chines Americans	Cross sectional survey, Questionnaire	N=211, age +/=18 yrs	T2DM			Demographic & Duration & no medication-diet/exercise, insulin alone, oral medication alone & both oral & insulin	Descriptive Statistical	Those who had longer duration of diabetes treatment were more adherent to prescribed medications than those short. Married & higher educational level attainment were less likely to take medications (insulin). The exercise levels were increased with age & educational level. Employed patients were less likely	Duration of diabetes diagnosis is a strong prediction in self-care activities i.e. long duration of diabetes were correlated with more adherent to recommended medications & monitoring of regular blood glucose. As well as social

	with T2DM								to exercise. Those with longer duration, higher education & used insulin were more likely to monitor their BG daily. Older adults were more likely to follow dietary recommendations & carryout foot care.	support (marriage) is a predictor of better diabetes self-care
Zanetti et al. 2010. Brazil.	To examine Self-care ability of type 2 diabetes mellitus patients and relates it to socio-demographic and clinical variables.	Cross sectional and descriptive. Structured interview of questionnaire and self-care ability scale.	Age 30-80yrs. N=251	T2DM			Self-care ability scale	Descriptive & correlation statistics	Advanced age (70-80yrs) was associated with good self-care. Inline to this regular self-care ability were also associated with advanced age (70-80yrs). The self-care ability in relation to schooling were having advanced educational level were associated with positive self-care ability. in relation to self-care ability and religion and disease evolution there were no significant difference among different religious groups and length of disease evolution.	Elderly age is a predictor of better diabetes self-care. In addition, schooling up to higher level is among the factors which improves diabetes self-care ability. While, religion & duration of diabetes have no significant impact on one's self care performance.