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RESEARCH ARTICLE

THE EFFECTIVENESS OF SELF-MANAGEMENT EDUCATION WITH TYPE 2 DIABETES PATIENTS IN SAUDI ARABIA: SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Background: Although there has been significant improvement in both understanding and treating type 2 diabetes, there is no indication of a decrease in its prevalence. This trend has led to an hypothesis that are still risk factors that have not been fully understood and dealt with and patient need effective treatment programs to help them deal with such. For along time, medical experts have emphasized the need for diabetic patients to exercise lifestyle changes such as dieting and engaging in physical exercise in order to maintain their conditions.

Objectives: Self-care is increasingly becoming an important for diabetic patient seeking to manage their conditions. Consequently, this study is geared towards evaluating the efficiency level of self-care programs among type 2 diabetes (T2D) patients in Saudi Arabia. It will also describe the self-care programs' effects on the outcome of disease and patients' quality of life, and the importance of associated educational programs.

Methods: This is a systematic review of published studies exploring the quality of self-care management, as well as its effect on promoting quality of life among T2D patients in Saudi Arabia. This review revealed 11 published papers which included Prospective cohort study, uncontrolled quasi-experimental intervention study with pre–post assessment, non experimental retrospective cross sectional survey, naturalistic observation, case control study, and qualitative interview.

Results: The results from this review indicated that a significant percentage of T2D patients do not observe, or are selective with the type of self-care management they use. This habit leads to reduced quality of life, prolonged stay at the hospital, and extended recuperation period. The reviews indicated that educational programs have promoted self-care management among T2D patients. An educational program promotes self-care management among T2D patients and provides additional training for healthcare to facilitate and encourage self-care activity among the patients to minimize the growing number of T2D patients.

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INTRODUCTION

Currently, the World Health Organization has recorded that there are over 347 million people around the world that are afflicted with diabetes (WHO, 2013). Although this disease was previously associated with rich countries, people living in third world countries have also become vulnerable to diabetes because as many people attain economic stability they engage in sedentary lifestyles that promote obesity. This change in lifestyle elevates the prevalence for diabetes. Data from the review articles further revealed that 8 out of 10 diabetes patients die in countries with low to middle income classification.

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For instance, in 2004 3.4 million people died from the consequences of having elevated serum levels of glucose for prolonged periods of time. Data released by the WHO in 2015 revealed an overwhelming1.5 million deaths from diabetes alone. This is reflective of the statistics of 2010 (WHO, 2013). On the other hand, the International Diabetes Federation (IDF) indicated that there were 382 million people living with diabetes worldwide in 2013.WHO predicts that diabetes will be the seventh leading cause of death in the world if the current worldwide prevalence of the disease is not addressed properly (WHO, 2013). The prevalence of diabetes in the Middle East and North Africa (MENA) is relatively high. This increase is driven by a range of factors including rapid economic development and urbanization, changes in lifestyle that have led to reduced levels of physical activity, an increased intake of refined carbohydrates, and a rise in obesity (Majeed *et al.,*

2014). For instance, employing housemaids and cleaners has significantly reduced the Saudi people's opportunity to engage in physical activities in their homes. In addition, cultural restrictions prohibit females from engaging in any form of outdoor sport activities (except walking). The reduction in physical activities, coupled with a decline in quality and nutritional foods in diets has spurred the rate of obesity. Many studies have successfully established a correlation between obesity and chronic diseases such as diabetes. To combat the diabetes, the Gulf Cooperation Council (GCC) is attempting to implement a number of treatment strategies that seek to minimize high rate of diabetes and control its prevalence (Aljohani, 2011). The reviewed papers focused on self-management techniques, which form acrucial approach in reducing the incidence of micro- and macro-vascular complications and in instituting improvements to the general quality of life. According to Al-Shahrani, *et al.* (2012), diabetes self-management education is a method for giving patients the information and skills required to enable them to apply self-care, manage crises, and make necessary lifestyle changes to manage the diabetes successfully. The major goal of this approach is to provide patients with a good chance to make themselves the primary personas responsible for managing their disease.

self-care management among T2D patients in various healthcare institutions and hospitals in Saudi Arabia, to improve both the quality of life of the patients and the overall outcome of the disease. This study also demonstrated how a significant percentage of healthcare professionals and doctors are not convinced of the effects and importance of self-care management. The study further looked into the correlation between the number of healthcare providers and doctors that believe in the importance of self-care management and the quality of services they provide to patients and the overall progress in the conditions of the patients. This study also explored the importance of an educational program to the attitude of patients towards self-care management, before, during, and after hospitalization. It also looked at the probable reasons for not performing any self-care management activity and its impact on the quality of life.

MATERIALS AND METHODS

Search Strategy and Data Extraction

This review searched for articles and papers published between 2009 and 2014 about T2D patients in Saudi Arabia.

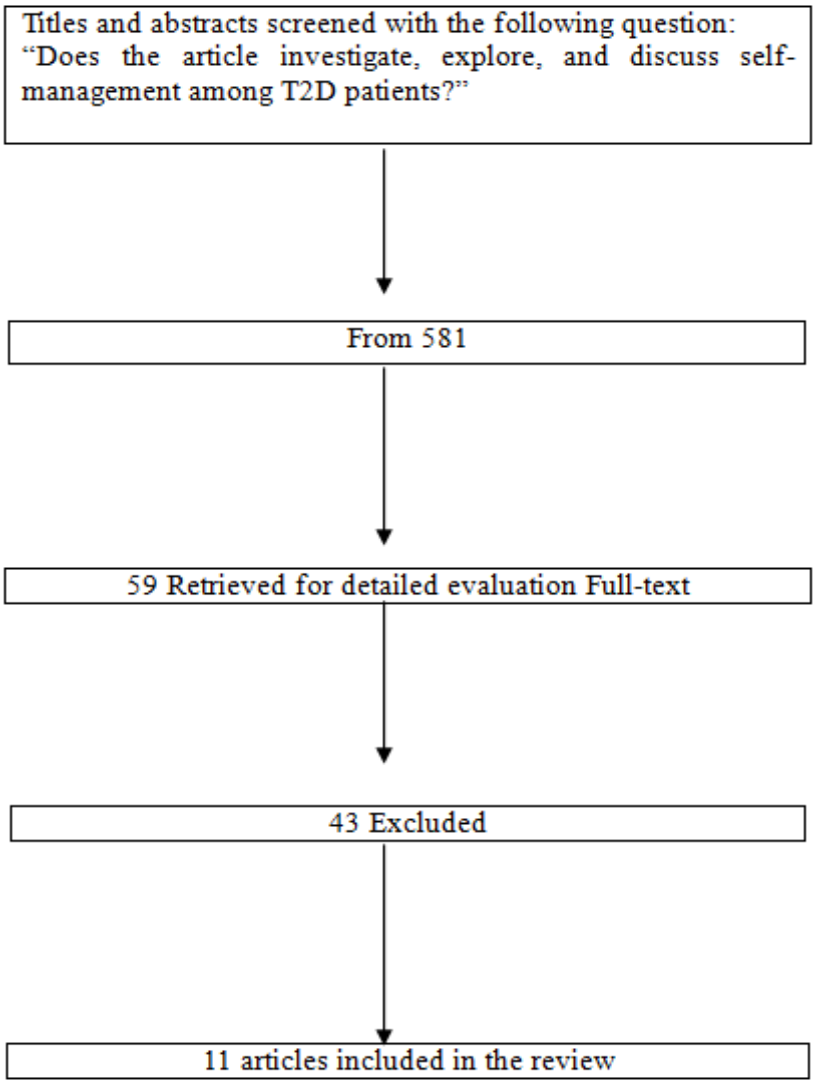

Figure 1. Schematic diagram summarizing the course and procedure of vetting and inclusion criteria

in retrieving these articles and papers included Saudi Arabia, T2D Mellitus, chronic condition, and self-management. Further, the selections were narrowed down by choosing the most appropriate studies that dealt with the issues of self-care management and T2D in Saudi Arabia. Identifying appropriate and relevant keywords was a prerequisite to searching these articles. The first keywords used with self-management education as a component of T2D treatment. For this, all relevant studies were searched and considered to ensure that all relevant studies are included. These keywords were organized into sets, yielding different number of search results, as shown in the Table 1.Data were extracted based on the quality of articles, its characteristics, and its contribution to self-management education on T2D. The study also examined the study design, outcome measures and impact of administered intervention. In addition, sampling frame, recruitment methods, and sample size were examined in each reviewed study

Table 1. Search Query Results of keywords used in this study in the three databases of academic articles and papers

Search query	Google Scholar	PubMed	Medline	Cinahl
		Result	Result	Result
"Saudi Arabia "AND "Type 2 Diabetes Mellitus"	-	133	153	11
"Saudi Arabia" AND "Chronic condition" And "self-management"	-	8	0	0
"Saudi Arabia AND Type 2 diabetes Mellitus AND self-management"	271			
"Saudi Arabia" AND "Type 2 diabetes Mellitus" And "Self-Management"	-	4	1	0
Total		581		

Inclusion and Exclusion Criteria

The criteria for considering studies in the review were based on the following PICO question: *Does diabetes self-management education and training improve patients' outcome?*

RESULTS

Results were attributed to responses about the issues of self-management among T2D patients in Saudi Arabia. The search generated 581 results but only 59 were considered for further evaluation. While taking into consideration the initial conditions required of the studies, 43 articles were excluded they did not match either the search keywords or the study site, leaving 11 articles for review. The schematic diagram (Figure 1) summarizes the course and procedure of vetting and inclusion criteria.

DISCUSSION

Of the many diseases that afflict humans all around the world, diabetes is one of those diseases requires self-care and management as part of the maintenance and treatment process. Self-care or self-management is a set of necessary regulatory functions deliberately performed and initiated by patients that operates concurrently with medical treatment.

In a way, self-care is somewhat akin to preventive medicine since the goal in both is to prevent the onset of more serious disease. They also seek to alleviate complications associated with a present condition (such as diabetes) or with the advancement of disease into an acute state. The modern approach to chronic conditions involves self-management and education, aimed at ensuring that patients live the best possible quality of life, despite their chronic condition. The studies investigated the relationship between self-care, quality of life, and outcome of the disease in patients, and revealed a positive correlation between the three. For instance, the study conducted by Alshehri (2010) revealed that self-management is highly instrumental in reducing the amount of H1bAc among T2D patients. The study further revealed that when blood monitoring is performed along with self-management activities, such as foot care and exercise, they result to improved reduction of H1bAc levels. More importantly, blood monitoring has been demonstrated to be the primary key factor in the reduction of H1bAc, since it provides a means for patients to gauge the results of their self-management practices. Blood monitoring also provides motivation as it allows patients to gain an insight into how their condition is progressing. The importance of self-management education is illustrated in the study by Aljohani (2011, p. iv). He concluded that "the fact that only 15% of participants had controlled glycaemic level despite a high level of dependence on medications is very good evidence that medication alone, is not the complete answer to the effective management." In another separate study, Al-Shahrani *et al.* (2012) indicated that this observation has proven to be recurring one. Improved adherence to medications was one of the most important observed results among the many desirable outcomes. Education and information dissemination is another key component in self-management. Studies performed by Al-Shahrani *et al.* (2012) revealed that even with minimal or no supervision at all, subjects exhibited improvement in their lifestyle and self-management practices, which further resulted in controlled and improved condition and quality of life. While there are areas in Saudi Arabia that are yet to benefit from educational programs about T2D and self-management, the advancement in information technology and the promise of establishing support and assistance remotely through various communication tools offer another layer of promise for patients. For instance, the study conducted by Al Hayek, *et al.* (2012) revealed that there is a marked difference between the percentages of patients following a prescribed diet or exercise routine after they are subjected to an educational program.

Table 4. This is a Summary table for the included Studies inthis Systematic Review

Author	Design	Sample	Results
Al Asmary *et al*. (2013)	Uncontrolled Quasi-Experimental Intervention Study With Pre–Post Assessment	N=41; adult patients (male and female) > 18 years of age with type II diabetes who received their diabetic care at the chronic diseases' clinic.	Triglycerides, HbA1c, FBG, and total cholesterol were found to be significantly reduced by 16.0%, 18.5%, 21.0%, and 15.5% respectively. The decrease in the amount of HbA1c is also observed to be negatively affected by the presence of other diseases (25.7% for those with diabetes without comorbidities or other contributing diseases, 12.6% for those with cardiovascular disease and/or dyslipidemia, and 0.3% for those with kidney disease/problems. Furthermore, while the level of LDL was reduced by 10.5%, HDL and blood pressure levels showed no change in the post-intervention stage.
AlHayek *et al*. (2012)	Prospective cohort study	N=104; (originally, there were 113, but 9 of them withdrew from the study within the 6-month duration of the study; M=71, F=33) These are patients afflicted by diabetes who received care from a major tertiary hospital in Riyadh, Saudi Arabia.	The education program effectively increased the number of patients who followed the prescribed dietary program from 12.9% to 39.4%; the number of patients who perform a minimum of 30 minutes of workout increased from 11.5% to 41.3%; and the patient who took the initiative to monitor their own blood-glucose levels increased from 21.1% to 44.2%, thereby effectively establishing a positive correlation between educational programs and glycemic control among diabetic patients.
Al-Hayek *et al*. (2011)	Cross sectional study analysis	N=147; M=99, F=48 Subjects were patients identified to have type 2 diabetes and were within the age range of 18–70 years.	On average, subjects were found to be diagnosed to have diabetes mellitus after about 12.7 years with a margin of error of 7.3 years. The data reveals that 91 of the patients with uncontrolled glycemic level (HbA1c ≥7%) failed to follow the prescribed dietary plan, which signifies that the self-care management practices observed among patients with poorly controlled diabetes mellitus are poorer. Data further reveals that 92 (87%) of these patients did not participate in any physical activity that lasted 30 minutes, and 90% did not conduct self-monitoring of blood glucose (SMBG). The size of the sample limits further evaluation of the correlation between depressive symptoms and T2D; however, patients were observed to have significantly higher levels of anxiety and depression on the Hospital Anxiety and Depression Scale. Overall, the study reveals that poor diabetes self-care management behaviour, elevated levels of anxiety and depression, and low adherence to medicine correlates with poor glycemic control.
Aljohani (2011)	Phase 1: Survey research Phase 2: Survey research Phase 3: Survey research/interview	First Phase: N=243 (first sample=33, second sample=210 Second Phase: N=210 Third Phase: 36 (24 type II diabetes patients and 12 healthcare providers)	The study reveals that the locations used in this study do not use and follow the international self-management recommendations set forth by the American Diabetes association. Furthermore, self-care outcomes were revealed to be affected by factors such as the characteristics of the communities and T2DM patients, the healthcare system, and the Saudi-Arabian culture.
Al-Kadi (2012)	Meta-analysis	n/a	Preliminary research reveals that while the spread of chronic diseases like diabetes is increasing in third-world countries and GCC states, the resources remain limited and continue to dwindle over time. On the challenges and factors affecting healthcare in Saudi Arabia, one of the most influential is the terrain (which is mostly dessert), which hampers or delays the delivery of the aforementioned service. Thus, the Ministry of Health only provides healthcare services to 60% of the population. The remainder of the population receives the required services from other government institutions and from private sectors and agencies. The study established, overall, that there is a need to enlist and employ the services of telecare for the management of diabetes in Saudi Arabia, which healthcare authorities are now considering to be getting closer to becoming an epidemic. Telecare is believed to expand the reach of healthcare services and improve its efficiency.

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Al-Shahrani, *et al*. (2012)	Naturalistic observation	N=438; males=280, females=158	The subjects exhibited significantly positive results after a year, including improvement in body weight, blood pressure (both systolic and diastolic), fasting blood sugar, triglycerides, total cholesterol, and low-density lipoprotein. Although improvements in the HLD levels were observed, they were found not to be sufficiently significant. The result demonstrates the efficacy of an intensive education program provided by trained and professional healthcare team in instituting changes in the lifestyle and bringing about positive changes in the health of diabetic patients.
Alshehri (2010)	Non-experimental retrospective cross-sectional survey research design	N=412 patients	The study revealed that self-management correlates with improvement (or positive effect with) of the clinical outcomes (such as a significant reduction in HbA1c). The reduction of H1bAc level (to about less than or equal to 7%) is attributed best to blood-glucose self-monitoring, exercise, and foot care. Of these three factors, the most influential in terms of achieving the target H1bAc level is self-monitoring of blood glucose. Those who engage in diabetes self-management are also observed to avail fewer health services, and that self-management does not interfere the patient's day to day activites.
Ismaeil, *et al*. (2011)	Case control study	N=400; These are diabetic patients registered at two primary healthcare centres in Abha City, Kingdom of Saudi Arabia	In general, the study reveals that diabetes self-care for patients in all components is low. Of the components of diabetes self-care, the most frequently performed by patients are foot care and specific diet. Furthermore, the study reveals that the younger the patient is, the higher his/her engagement in diabetes self-care. Of the components of diabetes self-care, male patients tend to prioritize more the general diet and exercise while female patients tend to engage more in foot care. Education was also shown to correlate with better self-care. The difference in how educated and non-educated patients engage in self-care is significant in all areas except with diet.
Khan, *et al*. (2010)	Cross-sectional survey	N=122	A study revealed that male physicians scored better compared to female physicians, and rural physicians scored better compared to urban physicians. This means that male and rural physicians are better and more knowledgeable that female and urban physicians respectively. The study also revealed that the weakness of physicians with regard to diabetes mellitus is with its epidemiology. Furthermore, 28 or more than a quarter of physicians do not know the diagnostic criteria of T2D. In addition, only 34.7% of the physicians knew the angle at which insulin injection must be correctly administered. The tendency of the physicians to agree to the Diabetic Self-Management Education is inversely correlated with experience—that is, those with 1–5 years of experience tend to agree with it while those with more than the said amount of experience tend not to.
Midhet *et al*. (2013)	Qualitative Interview	N=169	Indoor education has insignificant (minimal) effect and impact on the physical activity and diet of patients after they are discharged from the hospital.
ZechariahJebakumar *et al*. (2014)	Review	N/A	Prompt medical intervention is the key to reducing the risk of complications with T2D. The intermediary factor, however, that hampers T2D patients from receiving this is the lack of awareness. In addition, most T2D patients are insufficiently informed about the need to control glucose, their management targets, and the conditions associated with the disease. Stigma about the condition and the stigma faced by the patients is also a key factor since it prevents people from tackling the issues or from seeking out relevant information and educational programs.

These are the two most important factors in glycemic control, but patients find it difficult to institute changes in these factors. The aforementioned study has strongly established a positive correlation between educational programs and glucose control among diabetic patients. The benefits derived from the educational program are realized through the improvement in self-management practices. This shows that self-management is not only an effective tool in addressing the growing number of T2D patients but also a significant part of T2D treatment to ensure that patients can return to as many normal life activities as possible before diagnosis. Reinforcing education programs further increases the potency of self-care and self-management. Activities and programs designed to educate and inform patients also provides them with avenues for socialization and releasing anxiety and tension. The over whelming emotional effect of diabetes is a factor that demotivates a patient from improving or continuing with their self-care activities. A study performed by Al-Hayek, *et al.* (2011) has demonstrated the negative effect of depression and anxiety on self-care management. This study highlighted the fact that poor self-care management, depression, and anxiety have been observed to correlate with poor glycemic control. The type of education program and the timing at which it is administered does not appear to matter. All forms of education program delivered at every stage of the disease have been observed to produce positive results in self-care management. An interview conducted by Midhet *et al.* (2013) shows that indoor education provided to patients admitted to hospitals results in improvement in their diet and physical activity after they have been discharged from hospital.

The idea of solely depending on medical authorities when it comes to dealing with chronic diseases such as T2D has also been identified as controversial. This is not only because of the limitations of medical practitioners and the present technology to cure the disease, but also because of the lack of knowledge on how important self-management education can be Khan *et al.* (2010) stated that, most of physicians in various hospitals do not consider diabetic Self-Management Education to be an essential part of diabetic care. This is alarming because, while doctors' personal biases dictate otherwise, data from various studies reveal the importance of self-management education. Overall, studies agree that self-management *must* be an essential part of a T2D patient's life. Studies have suggested that not only does it benefit a patient, but also it does not significantly interfere with a person's lifestyle or activities. Self-management results in reduced incidence of mortality, reduced utilization of public resources for the disease, improved life quality, and better control of the condition. The reviewed studies favour the need to educate people, both diagnosed patients and the healthy population as it prevent onset of diabetes. The government is thus left with no excuse not to strength the self-management education programs, which will encourage people to participate in self-management activity.

Although careful and critical analyses were performed on the 11 studies, since they are observational and are vulnerable to the existing beliefs and biases of the proponents (even though they tried to eliminate these) full confidence in the results cannot be readily attained. However, the agreement between and within these studies, backed by experimental results, is sufficient to provide reliable conclusions. The conclusion derived is not only consistent but points to a single recommendation: the institution of educational intervention as a preferable or indispensable element of diabetes patient care. The most important conclusion that can draw from these studies is that self-management education is a crucial and vital component of T2D treatment and that its benefits and its role both in facilitating recuperation and restoring the quality of life of patients is undeniable. There is unanimous agreement across all 11 reviewed articles that self management education is an effective strategy and has been successfully used by T2D patients for quite a time now. Moreover, it could also be concluded that self-management education is a critical success factor in diabetes patient care in general.

Recommendation

The majority of the articles refer to handouts, pamphlets, and one-to-one counselling in order to provide education to patients about how to perform self-care at home. This is interested finding compar to the years from which this review was undertaken (2009 to 2014), as these are all low-tech methods that do not utilise advanced technology. One interpretation of this surprising finding is that technology has not made significant inroads with regard to self-management education until fairly recent times. Another explanation is that none of these techniques require a large up-front (fixed cost) investment (such as CDs or cartoons, for example). Although a simple pamphlet-like website does not require much investment, the ongoing maintenance costs (variable cost) may make this more expensive in the long run, especially with rising expectations for websites in general. Moreover, in developing countries there is also the issue of accessibility and availability of advanced technology.

Limitation

The small number of studies is a limitation of this review. Other limitations include the restriction of the search of English language publications to five years (2009–2014).

Conclusion

In conclusion, the aim of this review was to examine evidence of the effectiveness of self-management education on the treatment of T2D in order to investigate the role of self-management in T2D treatment alone. Diabetes is acknowledged as rampant in developing and developed countries alike. The component of the review considered studies that focus on patients from Saudi Arabia, specifically those with T2D mellitus patients. The articles searched were within the 2009–2014 period in databases using a systematic analysis approach. Eleven studies were included into the study after satisfying the inclusion criterion. An examination of all the 11 studies revealed that education programs yield desirable outcomes in self-management of diabetes. A number of studies have shown that educational programs in diabetes self-management improve diet compliance, including adherence to dietary plans, spacing of carbohydrates, and avoidance of foods with high content of fat. This study recommended that education programs on diabetes management should be considered as pivotal and healthcare systems should strive to integrate them into health planning entailing diabetes care teams, families of patients, and education community policymakers.

Conflict of interest

The authors declare that they have no conflict of interest.

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