

Review Article

Client Education Plan for Improving Diabetes Management during Primary Health Care in Saudi Arabia

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Abstract

Diabetes is a worldwide health problem that has a high prevalence rate in the Saudi Arabia community. These high numbers have encouraged Primary Health Care (PHC) services in Saudi to increase clients' awareness about management of diabetes. The management of diabetes focuses on diabetes information, lifestyle alterations, diet, exercise, and medications. Several studies the significance of the diabetic education programs in reducing diabetes complications, which increase diabetes treatment costs. PHC centers play a significant role in providing diabetic educational programs. As a result, the PHC centers need to have an effective diabetes educational program to help RNs to teach clients with diabetes properly by following clear educational guidelines. RNs will have a significant role by using the educational program to increase clients' awareness about diabetes management and motivating them. This educational program will help PHC managers, RNs, and other health care providers change their behaviors to assist clients to change their behavior of managing their diabetes. This project proposes an educational plan for improving diabetes management during PHC centers in the southern region of Saudi Arabia. In this project, Lewin's change theory was utilized to support the planned change.

Keywords: Diabetes; Saudi Arabia; Diabetic complications; Causes; Behavioral change motivation, Primary health care and lifestyle; Diet and exercise change

Abbreviations

PHCs: Primary Health Care centers; RNs: Registered Nurses; MOH: Ministry of Health

Introduction

Diabetes is a wide spread disease noted by a combination of factors including an imbalance of glucose in a client's blood stream, a lack of insulin due to the destruction of insulin-producing beta cells in the pancreas, and insulin resistance in which the body's muscle, fat, and liver cells do not use insulin effectively [1]. Diabetes affects people around the world of all ages. Clients usually present with signs and symptoms such as frequent urination, hunger, thirst, dizziness, fatigue, unexplained weight loss, slow healing, losing feeling in the feet, and blurry eyesight [1]. Diabetes requires planned care, teaching, and treatment methods to control blood glucose. Primary Health Care centers (PHCs) are part of the ministry of health to provide essential health care – preventive and curative - that accessible for the society. Primary care providers in Saudi Arabia play a very significant role in managing the country's public health. Many clients with diabetes do not have the "knowledge and awareness about diabetes, its risk factors, complications and management that are important aspects for better control and better quality of life" (para. 14) [2]. Registered Nurses (RNs) and other healthcare providers such as Registered Dieticians at primary care centers (PHCs) have an opportunity to address these issues with clients to improve the management and control of their diabetes.

Background of the project

Developments in Saudi Arabia over the last three decades have changed many aspects of the population's life styles, particularly as a result of socioeconomic improvements [3]. Partially as a result of diets changing in response to socioeconomic and lifestyle factors, diabetes has become an epidemic health issue across the country. Increased food portion size, and widespread increase in consumption of fast food have caused increased incidence of obesity, a risk factor of diabetes. Exercises as a part of lifestyle do not exist in most of the populations' routines; Saudi adults do not routinely exercise unless they have an issue that convinces them to workout. Four million people in Saudi Arabia have been diagnosed with diabetes [4]. This represents 23.7% of the nation's population, creating the highest percentage of diabetes prevalence in the world [2]. These statistics indicate the importance of developing an educational program to help clients effectively manage diabetes. The health of its citizens is a high priority of the Saudi government. The government allocates a significant amount of funds through the Ministry of Health (MOH) to provide high quality health care at no cost to its citizens. While some health care services are provided through the private sector [5] most Saudis choose hospitals and PHC facilities that are operated by the government. This choice is based upon the reduced cost at governmental facilities. A crowded environment currently exists in health care facilities, and this has eroded the quality of care clients receive. Additionally, there are many PHCs, which provide primary care for clients; these centers only schedule specific days to address long term diseases such as diabetes and hypertension. Furthermore,

nurses and physicians in these centers do not provide adequate, clear, and accurate educational materials to teach patients about their disorders. Creating educational units within a PHC will help clients with diabetes establish quality self-care and healthy lifestyles, improve their ability to control their blood glucose, and adhere to an appropriate treatment schedule [6]. By creating educational programs inside each PHC center, clients may be more successful in keeping their blood glucose at normal levels and the incidence of diabetes complications may be decreased [7]. Furthermore, the burden which complications place on the Saudi public health system may also be reduced. With appropriate diabetes control, emergency room visits and hospital stay rates will be reduced which will lead to reduce treatment cost [6].

Types of diabetes

PHC centers addressed clients with type 1 and type 2 diabetes, as well as gestational diabetes. Patients with either type 1 or 2 do not have the ability to produce insulin or utilize it properly, a hormone that helps process glucose in the blood stream.

Diabetes type 1: In type 1 diabetes, the pancreas cannot produce an adequate or sometimes any insulin and is often due to harmful substances, viruses, or bacteria attacking the cells inside pancreas that make insulin [1]. Clients with type 1 diabetes are usually young children and adolescents, and they must take insulin every day. Among US clients diagnosed with diabetes, 5% had type 1 diabetes. Type 1 risk factors include genetic predisposition and exposure to a virus that may contribute to an immune disease 1 [8].

Diabetes type 2: This type's prevalence is between 90% and 95% of the population with diabetes. With type 2 diabetes, the pancreas releases an adequate amount of insulin to bloodstream, but the body cells do not receive the insulin molecules. Insulin helps the body break down sugar, producing energy for body systems. In the case of type 2 diabetes, the body cells ignore receiving insulin, leading to a decline in glucose levels inside body cells, causing body cells to starve for energy and increasing levels of blood sugar [9]. Additionally, these body cells such as muscle, liver, and fat create a resistance to insulin. As a result, the pancreas continuously releases more insulin to the blood stream without using it. Over time, the ability of the pancreas to produce the insulin will be insufficient, so clients need to be diagnosed and with treatment starting as soon as possible [1]. Most significant risk factor for type 2 is obesity especially abdominal and visceral adiposity. Other risk factors are age and family history [8].

Gestational diabetes: This type is defined as a high blood glucose level developed during pregnancy. Physicians test for this type of diabetes between 24 and 28 weeks of pregnancy [10]. With gestational diabetes, pregnant women produce hormones which resist insulin function [1]. Gestational diabetes usually happens with women who are overweight or women who gain inappropriate weight during pregnancy. Usually, this kind of diabetes ends after delivering the baby, but these women and their babies are at an increased risk to have diabetes type 2 [1]. Diabetes causes chronic and acute complications that require client education. Client education plays a fundamental role in providing quality care for clients and significantly increases their ability to practice self-care [11]. Education regarding complications will help to reduce the complication incidence and cost of treatment [11].

Problem statement

Diabetes can cause chronic and acute complications, which clients need to understand. Client education plays a fundamental role in providing quality care for clients and significantly increases a clients' ability to practice self-care [11]. Also, educating diabetes clients regarding complications helps in reducing the complication incidence and cost of treatment [11]. This paper presents a plan to provide clients who have diabetes with management education at PHC centers in Saudi Arabia. Many Saudi clients with diabetes are unaware of the major ways to manage diabetes. Therefore, comprehensive orientation programs are needed to overcome this problem. Enhancing health is a goal of the Saudi public health system. The PCH centers can play a significant role in providing holistic care and education for the clients with diabetes by providing an appropriate educational program.

Project purpose

This Project presents an educational program for PHC managers, RNs, and other health care providers to provide effective teaching for clients with diabetes to manage their diabetes. The educational program will be conducted by RNs at PHC centers in the southern region of Saudi Arabia. The project will present a program using a variety of approaches to encourage PHC managers and RNs to promote clients' knowledge and awareness regarding life style choices and other strategies used in diabetes management.

Review of the Literature

A search of the literature was conducted using the following key words: diabetes, management, causes, types, complications, prevalence, barriers, client motivation, PHC, and patient education. Particular focus was given to the relationship of these topics with respect to Saudi Arabia. Kurt Lewin's change theory will provide a framework for motivating acceptance of the educational plan for the PHC centers in Saudi Arabia. Lewin's theory focuses on changing behaviors by using a three-step process, which includes unfreezing, moving, and refreezing [12].

Primary health care in Saudi Arabia

The Ministry of Health (MOH) in Saudi Arabia is responsible for monitoring both public and private health sectors [13]. The public health sector includes 259 hospitals and 2259 PHC centers of various sizes distributed across Saudi Arabia [13,14]. In large provinces, these centers feature sizeable facilities due to the high numbers of population compared to the size of facilities in smaller districts. Operated by the Saudi government, PHC centers provide services at no cost to clients. The healthcare is provided mainly to those clients with chronic disease such as diabetes and hypertension [14]. Much like their counterparts in the US, PHC centers in Saudi Arabia are staffed by physicians and nurses who provide vaccinations and medications to clients. These centers also feature a pharmacy, x-ray capability, physical therapy, and laboratory facilities [13,14]. While the centers have the ability to refer clients to larger hospitals if patients need comprehensive care, these centers contribute to decreasing the emergency overload in hospitals and offer an avenue to increase the populations' health literacy.

Diabetes management at PHC centers in Saudi Arabia

In Saudi Arabia, the PHC centers do not provide an adequate plan

to educate clients with diabetes. Physicians had the ability to provide knowledge for clients with diabetes to assist them in managing their diabetes properly [15]. The physicians used a checklist to guide them to educate their clients but did so only verbally and only in limited consultation time [15]. This way of managing education, which was not effective for the clients, still exists until this decade in the PHC centers. Many private centers such as the International Medical Center in Jeddah has educational programs for the clients with diabetes management [16]. There is also an electronic web site, which was known as Saudi National Diabetes Registry that focused on e-health services, which were not available in many areas of Saudi Arabia such as the Southern region. This electronic organization did work monitoring tool for medical, social, and cultural bases for primary and secondary prevention programs [17].

Prevalence of diabetes in Saudi Arabia

The population of Saudi Arabia reached 24,573,000 in 2005, and the growth rate of the population is expected to reach 4.4% by 2030 [18,19]. In 2012 diabetes affected between 23% and 30% of the Saudi population aged 30 years and above, reflecting the status of the Saudi population as having the highest incidence in the world [2,20]. The Saudi Ministry of Health (2014) reported a total of 736,843 people who had diabetes in the entire country in 2012. As indicated by these numbers, Saudi Arabia experiences one of the highest prevalence of diabetes around the world. The increasing incidence of the disease in Saudi may be related to the increasing age of the population [2,21]. The prevalence of diabetes is greater in urban areas than rural areas, as those living in rural areas often make better lifestyle choices because they do not have the factors that help increase the prevalence of diabetes such as fast food and inactivity [22]. The increasing prevalence of diabetes in Saudi Arabia is related to many aspects. However, these aspects can be broadly divided into causes of diabetes and client awareness regarding diabetes and its management. These aspects gave a clear idea of why the prevalence has increased in Saudi communities.

Causes of diabetes in Saudi Arabia: Saudi Arabia has experienced extensive socioeconomic development, which has created lifestyle changes for its citizens [19]. Not all of these changes have been positive and some impact the incidence of diabetes. Changes include greater tobacco use, increasingly sedentary habits, and unhealthy diets [22].

Clients' awareness: Regional differences in Saudi regarding clients' awareness and control of diabetes are apparent. Each region exhibits particular socioeconomic and cultural circumstances, and knowing this helps health care providers appropriately provide holistic care for each region. Clients in urban areas should have the ability to manage their diabetes more effectively because they have more available health facilities than rural areas, and these facilities have better quality health care services [23]. The prevalence of diabetes among the population in urban areas is 25.5% more than the population who live in rural areas [21]. This difference was attributable to unhealthy lifestyles in urban areas, including unhealthy food choices and limited physical activity. One study conducted among 1039 clients with diabetes in Mecca, which is considered an urban area, revealed that 39% misunderstood the treatment process, and that 23% believed they could maintain unrestricted diets as long as they took their medications [19].

Genetic predisposition: The increasing prevalence of diabetes in Saudi Arabia is related to lifestyle changes and to genetic factors and family history [22]. Genetic predisposition and family history play a significant role in developing diabetes within the Saudi community. In Saudi Arabia, arranged marriages increase the prevalence of diabetes, as some families strongly believe in relative marriage without considering the practice's effect with regard to health issues [22].

Role of the registered nurse in primary health care center

PHC is considered the first line of curative, preventive, and community health for Saudi Arabia. APNA described the nursing roles in the PHC center as "health promotion, illness prevention, treatment and care of sick people, education and research, and community development" (para 9) [24]. In Saudi Arabia, PHC nurses provide care for patients, in addition to addressing increasingly numerous documentary and administrative tasks [25]. Although the nurses provided high quality care for their patients, the nurses in PHC centers often do not have the opportunity to educate patients. Client education was primarily performed by physicians who provided the education only verbally. As a result, patients did not receive complete information regarding their disease, leading to inappropriate care [25]. Furthermore, nurses in PHC centers did not have adequate educational programs or materials to assist in educating patients with diabetes [26].

Ways of managing diabetes

There were many issues related to the management and control of diabetes, but an especially significant one was that clients should practice self-care through adequate health education [27-29]. An example of such education included a program which, addressed diet, exercise, smoking cessation, oral hypoglycemic drugs, insulin, and aspirin therapy [15,27,29]. In Saudi Arabia, lifestyle and cultural factors created barriers to diabetes management [22]. Unhealthy diet coupled with few opportunities for activity made management of diabetes difficult for patients [22]. Clients needed motivation and support to help understand that diabetes was a life-long condition, and that they would experience complications throughout life if they did not manage their diabetes appropriately [22,30].

Complications of diabetes

In Saudi Arabia, diabetes complications were wide spread because patients were not properly educated to avoid complications such as cardiovascular disease, neuropathy, and retinopathy [20,22]. The most common issues among Saudi patients with diabetes were cardiovascular complications and neuropathy [31]. Neuropathy and diabetic foot ulcers affected 82% of Saudis with diabetes [32]. Treating clients with diabetes and preventing complications cost \$465 billion in 2011 and was projected to reach \$595 billion in 2030 [33].

Client motivation for lifestyle changes

Diabetes educators must know how to motivate clients to follow instructions regarding control of blood glucose. Clients with diabetes must follow proper lifestyle measures and specific medications to control blood glucose level [34]. In Saudi Arabia, motivating clients should be based on clients' preference. For example, some clients may be motivated by listening to physicians, nurses, or their relatives. If the client listens to a specific person in the family, health care providers should motivate the clients by asking that person to participate with the client when he or she receives information.

Clients with diabetes should be informed about needed behavioral changes such as taking medication, changing lifestyle, and self-managing of glucose level [35]. An acronym to motivate clients called Rule. Resisting the righting reflex; understanding and exploring the patient's own motivations; listening with empathy; empowering patients, encouraging their hopes and optimism" (p.37) [35]. This method can be applied to motivate clients in Saudi Arabia.

Change Theory

Kurt Lewin's change theory will be used to facilitate behavioral change related to this project. Kurt Lewin was a German-American social and behavioral scientist whose most significant contributions to the field addressed change theory [36]. Lewin concentrated on addressing social struggles through changing behaviors [36]. His theory presented three steps to changing behavior in organizations and societies [12]. These steps included unfreezing, moving, and refreezing.

Unfreezing step

Lewin suggested that the steadiness of behaviors was grounded on a quasi-stationary equilibrium supported by a combination of driving and restraining forces [12]. Old behavior must be changed or eliminated in order for new behavior to become established [36]. The unfreezing step helps to motivate to change, but does not predict or control the direction of change [36]. Regarding clients with diabetes, driving forces must be maximized and restraining forces minimized to encourage movement away from the clients' existing behavior.

Moving step

In this step, clients move from old behaviors to new ones. This movement will be built on changing clients' perceptions that their old behavior is inappropriate. Furthermore, when the clients recognize the importance and benefits of changing, they will be encouraged to move from previous behaviors to new ones.

Refreezing step

The refreezing step solidifies the new behaviors at a new quasi-stationary equilibrium [12]. Crucially, refreezing must merge with learners' personality, behaviors, and environment to ensure continuance of the process without returning to a new cycle of disconfirmation [12]. In this step of the change model, clients should have adopted new behaviors which improved self-care and reduced complications. Balancing new driving and restraining forces will help steady the new equilibrium.

Summary

PHC centers in Saudi Arabia have been responsible for providing holistic care and education for clients with chronic diseases such as diabetes. There is a high prevalence of diabetes in Saudi Arabia compared to other countries, suggesting the importance of providing an educational program to improve client's health care literacy in an effort to reduce complications related to the disease. Developing educational programs regarding diabetes within PHC centers in Saudi Arabia will help improve the quality of life for those with the disease.

Project Implementation

PHC centers in Saudi Arabia have a significant role in providing

holistic care for all citizens, and particularly for clients with diabetes [20]. Saudi Arabia is experiencing the greatest diabetes prevalence in the world [2]. Much research has been performed regarding diabetes in Saudi Arabia, especially regarding definition, prevalence, and complications [2]. However, comprehensive educational programs for clients with diabetes do not exist at most of the country's PHC centers. Developing educational programs at PHC centers for diabetes management will help clients manage the disease and reduce complications. This project will create diabetes management educational programs at PHC centers in Saudi Arabia. The goals of this project are to increase clients' health literacy regarding diabetes management, encourage collaboration among health care professionals to provide high quality of care and education for clients with diabetes, and reduce diabetes complications which will in turn reduce treatment and hospital costs. Lewin's change theory will be used to implement the project by addressing the three steps of unfreezing, moving, and refreezing [36].

Unfreezing step of diabetes management

Lewin's unfreezing step focuses on two aspects, driving forces and restraining forces [36]. This project will focus on controlling those forces to help RNs, PHC managers, and other health care providers change behaviors to implement diabetes management program at PHC center. The project will assist RNs in realizing the need to assist clients with diabetes in changing inappropriate behaviors into desirable ones to manage their diabetes.

Driving forces: Several research studies have shown that diabetes is pervasive, affecting between 23% and 30% of Saudi population [20]. The increasing prevalence of diabetes and its complications in Saudi Arabia reflect the imperative nature of applying this educational program, thereby reducing the governmental cost to treat diabetes and decreasing the incidence of complications related to untreated diabetes. This project will assist PHC Managers and RNs to understand the necessity to support the implementation of this program. The driving forces for the change concentrate on the PHC manager. The manager is essential for helping to apply the program inside a PHC center and motivating the changes.

Authority at PHC: Managers in PHC centers have the authority to make administrative decisions such as approving programs, defining roles to maintain high standards of quality of care, and encouraging employees to participate in activities or programs. These managers can be administrators, physicians, or nurses. The staff of PHC centers has the responsibility to promote health and prevent disease prevalence. Since this program's goal is congruent with the mission and vision of PHC centers, PHC managers and RNs will help the project's success by using this program and recommending the project to the Ministry of Health (MOH) for application for all PHC centers around the country. Meeting with PHC managers will help illustrate the importance of this project, explain its implementation, and secure its acceptance at PHC centers. Statistical data will be presented in the meeting regarding the prevalence of diabetes in Saudi Arabia, how this program will reduce treatment costs related to diabetic complications, and how the quality of education affects diabetes management. PHC managers will also be shown the content and operation of the program, and that the objectives of the program will be measurable and reliable. Specifying an expert diabetes educator to educate the RNs inside the PHC centers will make the

program very attractive to the managers because the RNs will get their education at the PHC center which will decrease the overload of RNs tasks. These educators will be paid from PHC center's budget. This method of education will provide education and guidance to RNs within the PHC. The other way of educate the staff is to send them to a certification program outside the PHC, one which may be supported by MOH to be a driving force to implement the program. After securing agreement from the PHC administration, managers will then meet with RNs and other health care providers to explain this project's necessity. The manager will use the administration's authority to set up rules for implementing the project.

Motivation for change: Showing statistics regarding the prevalence of the diabetes, illustrating that a suitable diabetes management program in the country does not exist, and creating a program unique among other PHC centers will motivate managers to establish educational program. After the managers agree to implement the program, then other health care providers such as RNs will need to be motivated to be a part of this program. Managers at PHC centers particularly play a very important role in motivating their employees, as they may offer financial and other incentives to encourage participation. Managers could select a nurse and a dietitian to be responsible for the program and offer an opportunity to attend training courses to be diabetes educators, providing professional advancement along with a monetary incentive. In addition to such extrinsic motivation, health care providers should have strong intrinsic motivation to engage in diabetes management education, as doing so enables them to provide more appropriate care for clients. Religious factors could have a substantial motivational role in the control of diabetes and motivate RNs as well [32]. Expatriate non-Muslim RNs working at PHC centers are very rare [37]. Because of the overwhelming majority of Saudi RNs and their patients are Muslims; RNs may use their connection to Islam and the Quran to communicate scripture related to maintaining health, and avoiding risk. RNs should recognize that the verses in the holy book which address these issues to establish the significance of following a program for diabetes management. With regard to non-Muslim RNs, PHC centers should collaborate with other faith communities to address various religious beliefs in health promotion and disease prevention. Such collaboration will help motivate RNs and provide culturally appropriate education for those clients. Additionally, the PHC manager will remember and remind RNs what the prophet Mohammed said: "All of you are guardians and are responsible for your subject," (Riyadh Alsaliheen). This phrase reflects managers' and RNs' commitment to provide high-quality, holistic care for their communities. This will further encourage PHC managers to implement the program at the PHC center and motivate their staff to participate in the program. In addition, PHC center reputation level has a significant effect in motivating RNs to implement the educational program. There are many PHC centers distributed in Saudi Arabia, with great diversity regarding the resources and services each provides. Each PHC center tries to be the most effective in providing holistic care for their clients. When PHC managers, RNs, and other health care providers know they are going to be the best by implementing this educational program, they will work hard to achieve the goal of implementing this program. The first PHC center which successfully implements the project will become notable

among the MOH and other PHC centers as the only center where effective diabetes management is located. Due to this recognition, the PHC manager and RNs will be motivated to continue and improve this educational program. Furthermore, successful implementation of this program will encourage other PHC centers to follow. Thus, reputation plays an important role in motivating PHC managers and the RNs to change their behavior toward education of diabetic patients.

Restraining forces: Restraining forces are those which oppose change or support the status quo [38]. Restraining forces can be reduced to help PHC managers and RNs move from the old behaviors to new ones [12]. The restraining forces against this program could be related to lack of essential health care facilities provided by the MOH, as well as lack of motivation among RNs to apply this project.

Lack of healthcare resources: The MOH has many responsibilities to provide facilities and resources for health care sectors including hospitals and PHC centers. The MOH may not provide training courses for RNs to become diabetes educators due to a shortage of resources. In PHC centers, the availability of nursing training programs is limited because the primary focus of MOH programs is on hospitals. Were this to happen, RNs and other health care providers would not be able to participate in such a diabetes education program. However, in this case, the PHC centers will use their own budget to bring expert diabetes educators to educate the RNs at the centers. This will increase managers and RNs desires to participate in the educational program because there is a part of the PHC center's budget for the education, so they will spend this part for effective educational program properly.

RN work load and self-confidence: Other barriers could be related to RNs' self-confidence, low self-efficacy level, and workload. Specifically, workload could be affected by lack of time as it relates to the country's nursing shortage. Meeting with RNs to discuss the distribution of nursing tasks and duties can solve this issue. The manager will facilitate this task by scheduling participation in the training program as a priority for the RNs and other health care providers too. RNs will recognize the importance of the project and improve their efficacy by attending a meeting in which their roles in this program are explained. The RNs will need a training to be more effective regarding diabetes care and education. The educators will explain to the RNs regarding how to teach the clients in the training session, which will help the RNs to be confident enough to participate in the program. Also, the dialogue created between diabetes educators and RNs will play an important effect to increase RNs' efficacy and confident.

Moving step of diabetes management

In this step, RNs will be helped to understand their roles to address the target group of clients with diabetes. This program will provide content that addresses many aspects of diabetic education, including understanding blood glucose targets, hyperglycemia, hypoglycemia, diabetes management tools, preventing long-term complications, and other factors to help clients manage their diabetes. This project will be developed at a PHC center in the southern region of Saudi Arabia.

Program applicant standards: As a first step in guiding the PHC manager and the RNs, potential program applicant standards will

be presented. In this program, RNs will focus on clients with type 1 and type 2 diabetes. The RNs will be aware of the program, and will encourage clients diagnosed with diabetes to participate without any restriction regarding age. The PHC managers and RNs will encourage clients to bring close relatives for help or support. Because Islam requires separation of genders during the delivery of services, the program to provide culturally appropriate education by addressing men and women in separate educational sessions. The RNs will be well trained to enroll the clients in the program after a physician's visit.

RNs roles: The RNs will be taught to consider the following concepts regarding implementation of the educational program at the PHC center. These concepts include teaching strategies, family support, communication skills, and client assessment.

Teaching strategies: Providing effective teaching strategies for the RNs may also motivate them to deliver information for the clients. Healthcare educators use a variety of materials, which improve clients' awareness of diabetes, including "audiovisual materials, games, group participation, guest speakers, and printed materials" (p. 355) [39]. RNs will be able to address these methods with simple language will help clients understand the importance of diabetes management. RNs will be taught to understand that clients' engagement in multiple learning styles, some of them auditory, visual, and kinesthetic or a combination of all. Knowing these styles will help health care professionals provide an effective educational program for the clients as well as prepare suitable materials.

Family support: In Saudi Arabia, RNs will be taught that family support plays an enormous role in changing behavior and achieving goals for Saudi clients. This kind of support increases the willingness of clients to change from a previous behavior to a new one. Furthermore, RNs must involve the clients' family and social system to encourage clients to adopt advice from health care providers. For instance, mothers and fathers in Saudi Arabia receive great respect from their sons and daughters, so parents may be invited to participate in support of their son or daughter's diabetes management and help RNs properly deliver the educational content. Additionally, healthcare providers could also ask clients about the best person close to him or her who could participate in support of the client's efforts. RNs will be reminded in the orientation to the project that the family presents a strong social resource to ensure that clients can manage their diabetes.

Communication skills: RNs and other health care providers will be taught to have good communication skills to deliver information properly. RNs and other health care providers will also be reminded that clients' behaviors cannot be changed through force [40]. RNs will be further reminded that failure to change client behaviors may indicate that health care providers made some mistakes, such as not creating a rapport with the client, micromanaging the client, misunderstanding the client's regarding the importance of changing the behavior, being unaware of the client's confidence to achieve the changes, or arguing with clients and blaming them if they did not start or understand behavioral changes [40]. However, when the clients trust and create a professional relationship with health care providers, the behavioral changes are more likely to change, and the clients' desire to change will be increased.

Assessing clients' awareness: RNs will be taught to assess the client's awareness regarding diabetes management before being referred to the program. RNs will be able to evaluate clients' awareness at the first visit by verbally asking some questions (appendix A). Based upon clients' responses, the healthcare provider will recognize what the clients want to know, understand the clients' excitement to learn, and know the barriers of learning for each client [39]. According to the literature review, the content of the diabetes management program will concentrate on improving and changing RNs' behavior, which will in turn help clients change their behaviors such that clients can manage their diabetes all the time.

Objectives of this program

Following presentation of the diabetes management program, the RNs will be taught to help clients to be able to:

1. Recognize the definition of diabetes type 1 and 2, hyperglycemia, and hypoglycemia.
2. Monitor their blood glucose accurately.
3. Understand the optimal target for blood glucose levels.
4. Administer diabetes medication properly.
5. Comprehend long term complications of ignoring diabetes management.
6. Manage their diabetes by following program instructions appropriately.

Implementing program

RNs will be aware about participating in the diabetes management program will be necessary for all clients with diabetes at the PHC center as a required of their treatment plans. This program will be applied one day every week for 3 hours to give the opportunity for RNs to deliver education materials, the clients to learn more and exchange some of their experiences. This program will be located in a classroom environment which will be assigned specifically for diabetes management program purposes at PHC centers. Each class or session should have no more than 10 clients in a group class or one client for individual classes. Educational materials such as booklets and brochures will be provided by PHC centers. RNs will be trained to use different educational methods to increase clients' awareness. In that regard, RNs will be qualified to educate clients to understand the following aspects for diabetes management.

Blood glucose target: RNs will teach the clients with diabetes to increase their knowledge and understanding about the nature of normal and abnormal readings of different glucose tests. RNs assist clients in identifying the readings of A1C, FPG, and blood glucose tests two hours after the start of meals (Appendix B).

Hyperglycemia and Hypoglycemia: RNs will help clients to understand the differences between these two disorders and the methods of treating each. Information regarding these two disorders could be provided by the PHC centers in a brochure given to the clients to read regularly (Appendix C).

Diabetes monitoring tools: RNs will ask clients to bring their blood glucose monitors to help them understand how to use the monitors and how to read their results accurately. In addition, clients

should record blood glucose results, dietary intake, and exercises times (Appendix D). The center should have a method to download each monitor's testing history, which will help health care providers create trended data reflecting a given client's history and progression in the program.

Diabetes medication: In this diabetes management program, RNs will explain for clients to know the importance of taking medications regularly, as well as how to administer the medications. RNs should clarify to clients that medications are considered a method of prevention to regulate blood glucose in the body and reduce the incidence of complications [41]. RNs should illuminate for clients how the medications work such reducing the release of glucose from the liver, addressing insulin production, or increasing insulin sensitivity in cells (Appendix E). Furthermore, the RNs will help clients to know the method of administering the medication whether oral or injected, and they need to know how much to take. If the medication is given by self-injection, they will need the opportunity to practice injection technique with RNs until they become comfortable [41].

Life style: The literature review reflected the effectiveness of life style changes on managing diabetes in Saudi Arabia. RNs improve clients knowledge regarding the importance of changing life styles in such ways that help clients to manage diabetes, including addressing such issues as diet and exercise. There are many factors that will help change behaviors such as "knowledge, skills, values, beliefs, and attitudes" (p. 342) [42]. In this program, diabetes educators will provide useful materials to explain and clarify appropriate food and exercise choices for clients. Diet has a significant role in decreasing obesity and managing diabetes. In collaboration with dieticians, RNs will have an opportunity explain and construct food schedules for each client. In addition, clients will be provided clear guidelines regarding how to change their eating behaviors by explaining the food categories of carbs, fats, and proteins, and the relationship of these foods to diabetes. RNs will also provide other tools to the clients to help them make their own meals, such as a 9-inch plate planner divided into three sections: $\frac{1}{2}$ vegetables and fruits, $\frac{1}{4}$ protein, $\frac{1}{4}$ carbs, and glass of milk to drink (Appendix F). Also, providing a list of option within each category helps clients create a variety of meals, helping them to continue following the diet. RNs will provide a meal during each educational session, allowing clients to experience what happens after two hours of eating the meal and showing clients the importance of healthy eating as it relates to diabetes management. After this experience, clients will know they must change their behavior to manage their diabetes. Optumrx publishes a helpful guide for preparing and eating wisely by following the following steps [43].

1. Plan ahead: plan for three daily meals at specific times and quantities. Eat small amounts of rice from a separate small plate rather than from a large platter with your family or friends to avoid unnecessary calories.

2. Take food home: When eating at a restaurant, get food to "carry out" which helps to avoid ordering extra food when finished with the meal. The atmosphere and food smells often encourage more eating and spending more money.

3. Protein control: if possible, eat small portions of meats including beef and chicken.

4. Low fat: select low fat food such as chicken breast, goat, and lamb.

5. On the side: eat light salads containing such items as greens, tomato, onion, cucumber, low fat yogurt, and garlic.

6. Choose beverages carefully: choose beverages that do not contain many calories such as water, non-fat milk, and unsweetened tea. Amounts of Arabic coffee should be reduced because it can add more calories.

Secondly, exercise plays a significant role in managing diabetes and keeping clients' bodies healthy. RNs encourage clients with diabetes to exercise at many different places including homes, fitness centers, or public parks. There are many kinds of popular exercises such as walking, swimming, and soccer. In PHC centers, RNs will help clients check their blood glucose level and then take a little walk for 10 minutes, after which the client will take another reading of their glucose to help them understand the effectiveness of exercising on managing diabetes. According to Optumrx, there are 10 tips to exercise safely [44].

1. Before starting exercising ask your physician about recommended exercises, and have a physical exam to ensure you may safely exercise.

2. Pick your favorite exercises that you enjoy doing from the list that your physician provided.

3. Be ready to face any abnormal reactions to the exercises by having some carbs readily available in case your blood sugar drops too low.

4. Check your blood sugar before starting your exercises. If your blood sugar level is less than 100 mg/dl, eat a small meal then start exercise. However, if the level of blood sugar is more than 300 mg/dl, wait until blood sugar returns to a safe range. If your blood sugar is 250 mg/dl at the early morning and you have ketones, do not exercises.

5. After finishing your exercise, check your blood sugar because it may drop.

6. Have identification that shows you have diabetes, such as a bracelet or pin.

7. Carry a bottle of fluid to drink before, during, and after exercise. The fluid should work to compensate and balance fluid inside your body.

8. Eating after exercising is beneficial to avoid having blood sugar drop too low.

9. Protect your feet. You should choose appropriate shoes and socks which fit and protect your feet. Check your feet before and after to see if there are any signs of cuts or blisters.

10. The appropriate duration of exercise is 30 minutes every day.

Prevention of long-term complications: RNs will teach clients with diabetes that they may experience healthcare problems over time if they improperly maintain blood sugar. With unmanaged or with high blood glucose, blood vessels will become damaged over the time.

As a result, RNs will explain about managing blood glucose levels will help avoiding any further complications. The complications could affect a client in the following ways [41].

1. Eye problems such as retinopathy or glaucoma.
2. Tooth and gum problems including periodontal disease which could lead to teeth and bone loss.
3. Blood vessel diseases leading to circulation problems, heart attack, or stroke.
4. Kidney diseases including nephropathy.
5. Nerve problems such as neuropathy.
6. High blood pressure, causing an overload on heart and vessels.
7. Serious foot infection leading to loss lower extremities if the infection is not treated or diagnosed properly and early.

Factors to help clients to continue managing their diabetes

RNs should provide many methods of checking clients' health status routinely. The PHC centers will have many services to maintain and reinforce participation in the program. Without appropriate reinforcement, the clients may return to their former behaviors [38]. After completing the program, RNs should encourage the clients to be routinely evaluated to ensure they are following directions. There are many ways help RNs to reinforce clients' new behaviors, including encouraging clients to regularly follow up at the PHC center, engaging in Tele-care services, and reading educational materials.

Regular follow up: RNs will explain the importance of visiting their physicians to evaluate their health issues and explore appropriate treatments. RNs should think critically while interviewing the clients to ensure that clients follow the program directions. Following up with the physicians will help to ensure clients are still practicing preferred behaviors, and give the clients an opportunity to attend the diabetes management program many times if they need it. During the follow up, health care providers may assess and evaluate clients' health literacy, giving an indication of the clients' ability to manage their diabetes. Also, RNs should tell their clients to bring their records and their blood glucose monitors to confirm they routinely measure blood glucose, take medications, choose healthy food and exercise, and understand the best way of managing their diabetes.

Tele-care: Using Tele-care may be an effective way to follow up with the clients, giving them the feeling that they and their health are important, and that the PHC centers will keep in touch with their clients' health situations. RNs should emphasize this service for the clients who live a considerable distance from their preferred PHC [45]. Administrators, who are responsible for this service, will be required to call and communicate with the clients. If there is any abnormal situation, the administrators will report it to health care providers and record it in the clients' health records. Then, health care providers will discuss these abnormal records in next available visit to see reasons and solutions of these abnormalities.

Educational materials: RNs should provide visual and auditory educational materials related to diabetes management to help the clients understand diabetes management implementation with

consideration of the clients' level of literacy. For example, some clients cannot read, so RNs should consider this issue in teaching methods and instead provide audiovisual materials such as videos. PHC centers will provide these materials without charge for the clients. These materials will serve as reference information should the client need it. These materials will contain the same important information as was addressed in the program regarding managing diabetes such as diet, exercise, and basic information about the disease.

Refreezing Step of Diabetes Management: Refreezing requires hard work to maintain new behaviors over time [38]. The most important part of refreezing is reinforcing the new behavior and program. In this step of Lewin's change theory, the educational program should be an integral part of the PHC centers. RNs and other health care providers should be encouraged to continue the program as a role within their jobs and, in turn, continue to inspire clients to improve the maintenance of their diabetes. The refreezing step will help to keep the educational program effective and stabilize clients' new behaviors. PHC managers and RNs will collaborate with each other to maintain this program effective. RNs play an important role maintaining program effectiveness by giving accurate feedback through an evaluation survey. Results from the survey can be used to keep the program updated with new developments and can be tied to rewards for RNs.

Evaluation survey: The PHC manager will establish two different surveys, one to measure RNs' feedback and one to address clients' satisfaction. These surveys could be online or paper based, but both will help to improve the quality of care and education at PHC centers. The RNs' surveys will focus on their roles as educators, the quality of education materials, work environment, and program challenges. This feedback will help to improve the program outcomes and make necessary changes which reinforce the program. These evaluations will be provided every six months. The clients' survey will be provided to ensure they receive the benefit of this program and give their feedback to help RNs improve their educational effectiveness. This survey also helps RNs and other health care providers to know clients' perceptions toward the program. RNs will distribute this survey for the clients after three months following the start of their program at PHC centers. The clients will provide information regarding their health improvement and any problems they faced during practicing the program.

Keeping program updated: RNs have an important role to explore new information related to diabetes by attending related conferences and meetings with expert professionals inside or outside Saudi Arabia. Returning to their facilities with new information, PHC RNs may improve and further develop the program. Additionally, arranging regular meetings between RNs and PHC managers to discuss issues related to the program and demonstrate the differences in clients' health status over time will help to refreeze the program at PHC centers.

Rewards: Refreezing may also be aided by presenting awards to RNs. PHC centers or MOH will provide these rewards to RNs and PHC managers. Such rewards will create positive competition between RNs at the PHC center, as well as among other PHC centers, particularly if the rewards are supported from the MOH. Rewards encourage RNs and PHC mangers to improve the educational program

due to the feeling of doing something very significant for themselves, the PHC center, and their clients. There are many ways of rewarding the PHC managers and RNs such as giving certification of completing the training course, as well as rewarding them with a title for having this certificate which will give the RNs the opportunity to receive a higher salary and position. PHC manager should create encouraging thank-you cards for each RN who participates in implementing the program. These rewards will increase RNs' productivity in this program and will help the program to be implemented at the PHC center over time.

Conclusion

Managing diabetes is a very significant task which can be managed at PHC centers with a suitable educational program. RNs, other health care providers, and PHC managers will play an important role in implementing a diabetes management program which helps clients to increase their awareness about diabetes self-care management and change their behavior to control their diabetes. The clients will know about diabetes in general, diet, exercise habits, treatments, monitoring, and complications. Improved knowledge of these aspects will help clients to live a more healthy life, reduce hospitalizations, and decrease treatment expenses. Using Lewin's theory to apply the program will help RNs provide education content appropriately, and encourage clients to successfully manage their diabetes.

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