

Nurses' Role in Diabetes Care; A review

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Abstract

The prevalence of diabetes is rising in tandem with the increase in the population growth rate and urbanization all over the world. Learning how to deal with the disease and keeping the blood glucose within suitable levels have become the greatest challenge for diabetics, pointing out the importance of patient education as a self-empowerment treatment modality necessary for improving the quality of life in these patients. The vast majority of diabetics believe their physicians are exclusively responsible for educating them in this regard; the role of non-physician health-care providers, however, has gained increasing acceptance in different parts of the world during the past 25 years. Many believe nurses should fulfil a leading role in diabetes treatment and care education as existing clinical and observational clinical trials have shown nurses to be capable of providing an effective quality care at lower costs. Drawing upon the expertise of nurses in providing care for diseases such as diabetes in different clinical, social and educational units, benefiting from nurses in the education programs can reduce not only the number of unnecessary referrals to specialists but also the heavy burden of such visits impose to the society. Policy makers, therefore, are urged to focus more attention on the referral system in different levels of health-care system.

Keywords: Nurses' role, Diabetes care, Education, Self-care

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Introduction

Iran has faced a rapid change in the population pyramid (a relative increase in the growth rate followed by a considerable decline from 3.7% in 1970 to 1.2% in 2001), resulting in a demographic transition during the past two decades. Such changes has also led to aging population and subsequently a rise in the prevalence of chronic non-communicable diseases such as diabetes and its chronic complications in many parts of the country (1). Diabetes, a metabolic disorder characterized by chronic hyperglycemia and disturbances in the metabolism of carbohydrate, protein and fat secondary to an absolute or relative lack of insulin, may contribute to multiple organ damage along with reduced survival rate in the affected individuals (2).

The increasing trend of aging along with the socioeconomic and demographic changes (increasing prevalence of obesity) has turned diabetes into a global health challenge (3). According to the study conducted by Abolhasani *et al.* some 4.67% of the Iranians aged over 20 years suffer from diabetes, adding that some 1.6 million individuals in 2002 and 2 millions in 2006 have been diagnosed with the condition in the country (4). On the other hand, a 198% increase in the incidence of diabetes by 2050 is expected; a condition which per se would be associated with concomitant increases in health care costs (5). The cost of caring for diabetes is 2-4 times more than that spent on non-diabetes health conditions in different parts of the world. It should be noted that the hospitalization cost, which primarily stems from chronic complications of the disease, accounts for more than 80% of the costs imposed by the condition to the society (6).

The direct and indirect economic burden of diabetes in Iran was reported to be about 9472.6 million US dollars in 1999 (1). Apart from its costs, diabetes also imposes a heavy burden to the society. According to the estimated global burden of diseases calculated in 1990, diabetes was ranked as 29th grade (7). A similar report released in 2001 also revealed the condition to be 20th as for Years Lived with Disability (YLD) (8). In the study conducted by Abolhasani

et al. the burden of diabetes and its complications was estimated to be about 306,440 years based on Disability Adjusted Life Years (DALYs), suggesting that in 2002 the disease has not only reduced the life span of the affected individuals but also been responsible for the lost of some 306,440 years of their life due to its subsequent morbidity (9).

The role of optimal blood glucose control in the prevention and management of diabetes and its complications has been well documented by two large, prospective, randomized clinical trial studies, namely "The Diabetes Control and Complications Trial (DCCT)" and "The United Kingdom Prospective Diabetes Study (UKPDS)" (10).

Amini *et al.* demonstrated a deep split between the quality and the standard control criteria of diabetes care in Iran. They reported that 42% of Iranian patients have HbA1C values higher than 9% whereas some 79.8% others suffered from uncontrolled hypertension (based on the National Diabetes Quality Improvement Alliance). The weight and blood pressure of only 9.2% of the 2456 patients studied in 25 provinces of the country was reported to be assessed over the 6-month period prior to the commencement of the study. Compared to men, the care provided for women was reported to be worse. The authors concluded that the incompetence of the Iranian health care system and the dearth of properly trained healthcare providers are the most salient barriers to the improvement of the quality of diabetes care in the country (11). Considering these facts, the present study was therefore designed to assess the role of nurses in promoting diabetes care in the country.

Nurses' Role in Empowering Diabetics

Enhancement in the glycemic control and thus quality of life of those afflicted with diabetes requires the incorporation of education in the treatment modality, aiming to teach diabetics the method through which they can live with and manage their disease on a daily basis (12). Many studies have reported the quality of life dimensions (13) particularly the physical activity and

the feeling of well-being to be worse in diabetics when compared to non-diabetics. Health care providers, therefore, need adequate knowledge in regard with diabetes in order to provide optimal care to those affected ones or those at risk of the condition. In this regard, trained nurses play a critical role in empowering patients to better manage diabetes through self-care and improving the quality of life of these patients through providing them and their families with the required information and consultations (14). Khoshniat *et al.* showed that educating healthcare providers in schools can not only promote the knowledge and perception of children regarding the disease, but also improve the quality of care provided by the health system (15). While a large percentage of diabetics believe they should receive the diabetes care exclusively from their physician, recent studies have pointed out the seminal role of non-physician health care providers in this regard (16). Considering the findings of the DCCT study, nurses have turned into the major contributors of improved quality of care afforded to diabetics in the past twenty years (17).

Making decisions based on one's own lifestyle and certain other metabolic, psychologic and social factors greatly contributes to successful management of diabetes, suggesting that self-management and self-care education have an important role in achieving patients' empowerment goal. In this regards, nurse as a diabetes educator, should consider patient-centered care and effective communication with patients and their family and, also assess patients stress, provide useful problem-solving strategies to help patients making decisions consciously according to medical pros and cons (18).

Many nurses and physicians nowadays believe that the former should play a central role in managing diabetes and its complications (19). Considering the essential differences in the curriculum and teaching strategies of these two groups, they are liable to behave and act differently as healthcare providers. While nurses are socialized within a model that underscores

health promotion and disease prevention but focuses on the individual within a family and community context, the physicians' approach is disease- and treatment- oriented with a greater attention on the illness itself, its differential diagnosis and effective treatment (20, 21).

In this regard, certain simple and less pricey strategies such as benefiting from non-physician health care providers should be adopted in order to implement the guidelines in the clinics and the patients' bedside. Many studies including DCCT have reported the effectiveness of the care provided by nurses in reducing smoking and blood cholesterol levels following a heart attack (22, 23). Compared with usual care, such a care has also shown promising results in improving glycemic control (lowering HbA1C (17 vs. 0.6%, $P < 0.001$) and fasting blood sugar levels (43 vs. 15 mg/dl, $P < 0.001$) in diabetic patients. These results have been corroborated by many other studies even those conducted on large sample size (24-27). Telephone care provided by nurses has also been reported to be effective in controlling diabetes and its complications as well as alleviating diabetes-induced depression (28, 29).

Aiming to provide an acceptable diabetes care, nurses should teach their patients to interpret their blood glucose levels following monitoring accurately, and accordingly use suitable amounts of glucose-lowering medications (oral or injectable). These patients should also be trained in regard with the adaptation of a balanced diet, weight control mechanisms, the importance of daily exercising, the symptoms of hypo and hyperglycemia and their approach, providing a balance between the food intake and the amount of daily medication and activity, daily examination of the foot regarding possible ulcers, controlling blood pressure and cholesterol, visiting a physician on a regular basis for eye examination and renal function testing (30).

Role of Nurses in Diabetes Care

Nurses, accounting for the most sizable population of health care providers all around the globe, play a critical role in

improving the outcome of the patients. In the developed world, clinical nurses are divided into nurse practitioners, clinical nurse specialists, diabetes nurses, and generalist nurses with specified responsibilities in the provision of diabetic care. Nurse practitioners, for instance, are mainly involved in health promotion and disease prevention activities through patient education and counseling. Clinical nurse specialists, on the other hand, act as administrators, leaders, managers and collaborators. This group of nurses is in charge of providing diabetics and their families with the required social and psychological support and of helping them through managing the disease (31). Despite the fact that responsibility sharing is associated with the provision of more skilled and specialized care with a better quality but in a shorter time, such a classification is not yet introduced in developing countries.

The responsibility of these nurses is to provide primary, secondary and tertiary care with the aim of modifying the lifestyle and preventing possible complications in individuals diagnosed with diabetes (32-34). Several randomized clinical trials and observational studies have been conducted hitherto to compare the quality of care provided by physicians and nurses (35). While comparing the efficacy of care provided by nurses and physicians, Lenz *et al.* reported no significant differences in the outcome of patients in the two groups; they, however, found that physicians provided their patients with more acceptable evidences (36). Certain other studies, on the other hand, maintained that trained nurses are more capable of educating patients and promoting health in the society (21, 37, 38). Benefiting from such nurses in monitoring the adherence of the patients to therapeutic recommendations, for instance, was reported to be effective in reducing not only the re-hospitalization rate, but also the annual health care cost in heart failure patients who were recently discharged from the clinic (37). Kinnerseley *et al.* and Sakr *et al.* similarly reported that receiving the necessary education on self-care from their

nurse lowers the unnecessary visits to the specialists considerably (39, 40).

The only published study conducted in this field in Iran dates back to 2001 (1). According to this study, which evaluated the social provision of healthcare facilities in different parts of the country, some 34.24% of the patient education and consultation had been provided by nurses in the country's public and private health sections. The study also revealed that such care was less pricey than that provided by physicians. The mean estimated time spent in the waiting room was reported to be 23 and 69 minutes for a general practitioner and a specialist, respectively, in marked contrast to 9 minutes for a nurse or other non-physician health care providers. Based on this study, from among 3.25 referrals for outpatient care in the public sector, 0.91 were to non-physician clinicians, 0.82 to general practitioners, and 0.81 to the pharmacy. Consequently, it was argued that non-physician health care providers can lessen the number of unnecessary referrals to specialists and reduce the waiting time and expenditures of such visits (1).

The effect of team working in the accurate management of blood sugar is well documented (41). Moreover, diabetes care and treatment is a multidisciplinary approach drawing upon the collaboration of various specialties including physicians, endocrinologists, nurses, nutritionists, psychologists and certain other health care providers. Achieving an acceptable outcome depends on the provision of organized knowledge-based care by skilled healthcare providers (42). Treating foot ulcer, a complication commonly reported in diabetics, should be performed in multidisciplinary mini-clinics, indicating that the close collaboration of a physicians, nurses, dietitians and podiatrics play a critical role in providing the required care and an acceptable follow-up. Teamwork, achieved when everyone harmonize their contribution toward a common goal, is essential not only for promoting interpersonal skills and coordination among healthcare providers, but also for implementing the standard clinical guidelines and improving their knowledge

and skill while reducing the number of unnecessary visits to the specialists. Such an approach can also lead to early diagnosis of at-risk patients while improving preventative measures in the society (43). Many believe skilled general practitioners and nurses can control some two third of diseases even in the absence of a specialist (44); educating unspecialized healthcare providers along with direct and simplified education of patients is considered as the main factor influencing the condition. Some of these educational programs are available in website of Iranian virtual clinic of diabetes (<http://vcemrc.tums.ac.ir/vcemrc>) or by using various published Persian language guidelines in Iran (guideline DF & Diabetes). This is mainly essential for countries such as Iran located in Eastern Mediterranean Region countries (EMRO), where paucity of specialized diabetes centers is of a great concern (44-47).

Nurses and diabetes education

Teaching how to managing diabetes to different age groups is the principal step in diabetes management. Many studies have shown that the care delivered by nurse educators is superior to that delivered by physicians; using this group of health care providers also lowers the cost of quality of care (48). Nowadays, the role of nurses in the education of diabetic patients is well-known all around the world. While, many years ago nurses were confined to hospital, nowadays they are involved in various levels of health care system; their role therefore is not limited to the hospitals and clinics anymore.

Nursing is not limited to the hospital environment as he or she is nowadays expected to play a key role in the prevention and treatment of diseases in various levels of the health care system, from the first level [individuals, schools and houses (nursing centers)] to the fifth (rehabilitation centers).

Davidson *et al.* demonstrated that trained nurses working under the supervision of a diabetologist could distinctly improve the patients' outcomes (49). Olgun *et al.* showed similar results while evaluating the

efficacy of a multidisciplinary approach in diabetes care (50). The attainment of such goal requires educational programs for nurses with a focus on reducing the risk factors of diabetes, monitoring and controlling blood sugar levels along with diagnosing, preventing, and treating hypo and hyperglycemic states. Considering the fact that the care provided by nurses can be delivered in an outpatient setting, this approach would not only reduce the number of hospital visits, but also reduce expenditures particularly on diabetes complications (51).

Similar to their therapeutic needs, the educational needs of diabetic patients vary by patient and in different age groups. Therefore, many groups such as school-aged children, teenagers, pregnant women and senior diabetics need extra trainings. In their study on school children recently diagnosed with diabetes, Kovacs *et al.* (18) reported that some 25% were ridiculed by their classmates because of their disease. Students mentioned that food intake limitations, taking regular meals, continuous monitoring of blood sugar and insulin injection were among the main problems needed to be taught to them. School nurses, therefore, are the most qualified healthcare providers in educating diabetic children, their parents and teachers, aiming to turn school into a safe place for these children. These nurses can also help diabetic students to manage their disease so that they would be able to develop the necessary social skills in the school (18). In other words, school nurses can support diabetic children, providing them a safer situation in which they would learn more without suffering any psychological and psychosomatic problems (15, 52). In collaboration with these nurses, diabetic children can participate in more programs with fewer limitations, overcoming the feeling of disparity between diabetic children and their healthy peers. These nurses, for instance, can arrange the lunch and sport time in a way that the child would be able to exercise normally without experience any hypoglycemic attacks (53). Educating teachers regarding the required treatment in time a child is experiencing a

hypoglycemic attack, the need for taking light food while exercising, the need for monitoring blood sugar and injecting insulin at specific time intervals is of great concern (18, 53). It is reported that increasing the number of nurses and improving the accessibility to diabetic care facilities along with improving the relation between parents and school staff can improve diabetes control among children to some extent (54, 55). As a result, parents should visit the school at the beginning of the school year in order to not only improve such relations, but also to provide the school staff with necessary therapeutic information in this regard (18). In our country, where school nurses are not available, health providers can be used in schools as an alternate.

The educational needs of diabetic expectant mothers differ from children. These women should learn not only about monitoring blood sugar levels at home, but also regarding the influence of diabetes on pregnancy, labor and the unborn (30, 56). Diabetic teenagers should also learn more about puberty and the physiologic changes which occur in this period; so that they would be able to manage their disease without impairing the development that primarily occurs at that time. The study has revealed reduced metabolic control in diabetic teenagers, a condition which leads to recurrent diabetic ketoacidosis (in the absence of any clinical complications) mainly secondary to insulin omissions (18). On the other hand, many teenagers, particularly girls, may face growth problems due to their preoccupation with body image and weight control. The abovementioned facts bring out the need for teaching teenagers about coping and living with diabetes. As for elderly, they should learn about approaching hypo and hyperglycemic attacks along with other general topics in this field. They also need specific information on managing diabetes in association with other underlying comorbidities such as dental problems, indigestion, depression, and movement disorders (18, 57, 58). Considering the

abovementioned facts, it could be concluded that nurses can help diabetics in various situations ranging from houses to school and to nursing homes; in other words, nurses play a critical role in the prevention, treatment and care of various diseases with the aim of promoting the health in the society.

The authors of this study therefore urge policy makers to provide nurses and other healthcare providers with systematic education required for providing more organized care in hospitals, educational and social settings such as schools, aiming to overcome the existing gap in treating diabetic patients in our country.

The present review had some limitations; the majority of which were linked to insufficient knowledge regarding the cost-effectiveness of utilizing non-physician healthcare providers such as nurses in the health care system along with the lack of nurses trained in different specialists, the same as developed countries. Considering these limitations, we were not able to conduct a thorough assessment of the nurses' role in diabetes care in our country. Further studies in this field therefore are warranted.

Conclusion

In view of the complexity of diabetes, a team approach along with the improvement of the skills of the nurses working in this field providing the care in different levels ranging from schools to geriatric nursing homes is needed for improving the quality of diabetes care.

Policy makers in our country are therefore urged to benefit from these skills as the sole effective strategy for reducing the pricey and unnecessary referrals to specialists and improving the quality of care in diabetics (59).

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