Original article

Effects of roy's adaptation model in nursing practice on the quality of life in patients with type II diabetes

Sayed Reza Borzou[1], Safura Khan Mohammadi[2], Gholam Hossein Falahinia[3*], Saeed Mousavi[4], Zahra Khalili[5]

(Received: 21 Jan 2014; Accepted: 20 Jul 2015)

Abstract

Background and Purpose: Diabetes has adverse effects on the quality of life of patients. Roy's adaptation model could be used to enhance quality of life among diabetic patients. This study aimed to evaluate the effects of Roy's adaptation model in nursing practice on the quality of life in patients with type II diabetes.

Methods: This quasi-experimental study was conducted on 60 diabetic patients randomly divided into two groups of experiment and control (N=30) at Hamadan Diabetes Research Center. Data were collected using Diabetes-Specific Quality of Life Scale (D-39) in five dimensions, which was completed before and after intervention in both groups. Educational care programs were executed based on Roy's adaptation model only for experimental subjects in five sessions during one month. Data analysis was performed using independent and paired t-test in SPSS.

Results: At the beginning of the study, both groups were matched in terms of demographic characteristics and quality of life dimensions (P>0.05). Comparison of mean scores of quality of life areas between the two groups before and after intervention was indicative of a significant difference in the aspects of diabetes control, energy and mobility and social support (P<001). However, there was no significant difference in the dimensions of stress, anxiety and sexual activity (P>0.05).

Conclusion: According to the results of this study, use of Roy's adaptation model has positive effects on some dimensions of quality of life in patients with type 2 diabetes; these domains were diabetes control, energy and mobility, and social support. However, further studies with longer durations are required as to investigate the efficacy of this model in the areas of anxiety and sexual activity.

Keywords: Adaptation, Diabetes, Nursing theory, Quality of Life

Introduction

With the ever-increasing rate of urbanization around the world and problems such as the need to control communicable diseases and changes in population structure, researchers have been concerned about the high prevalence of chronic diseases, such as cancer, cardiovascular diseases, brain stroke and diabetes (1).

According to the American Diabetes Association, sweet diabetes is one of the major diseases causing physical and mental problems in different populations (2). Prevalence of sweet diabetes, also known as silent epidemic, is on a rising trend across the world, especially in developing countries (3).

In Iran, it has been estimated that approximately 6% of the population (over 4,000,000 people) suffer from sweet diabetes (4). Considering the high prevalence of this disease in the world and Iran, its short-term and long-term complications, and heavy treatment costs, enhancement of quality of life seems to play a key role in the treatment of patients with chronic diseases (5).

[1] Department of Medical-Surgical Nursing, Chronic Disease Home Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[2] Medical-Surgical Nursing, Nursing and Midwifery Faculty, Hamadan University of Medical Sciences, Hamadan, Iran
[3,*] Corresponding author: Department of Medical-Surgical Nursing, Chronic Disease Home Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran. Email: falahinia@umsha.ac.ir
[4] Department of Biostatistics & Epidemiology, Hamadan University of Medical Sciences, Hamadan, Iran
[5] Nursing and Midwifery Faculty, Chronic Disease Home Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Quality of life is defined as a feeling of well-being arising from satisfaction with different aspects of life, which are particularly important to an individual (6). Previous studies on the evaluation of quality of life indicate that diabetes complications have significant adverse effects on all the domains of quality of life among the patients. The majority of diabetic patients are reported to have poor quality of life since diabetes adversely influences physical and mental health (7,8), physical function and individual and social communications (9).

Given the importance of quality of life in diabetes, various nursing models could be used to enhance this parameter among diabetic patients. One of the efficient nursing models in this regard is Roy's adaptation model (4), which is widely used owning to its simplicity and accessibility (10). The innate theory of this model has a great capability to describe different individuals, embracing a broader scope compared to other adaptation theories. Therefore, clinical managers are increasingly turning to the application of this model in clinical settings (11).

According to Roy's adaptation model, individuals should attain and improve their physical and psychological adaptability (12). In general, three main stimuli affect adaptability, and manipulation of these stimuli during health care programs results in the enhancement of adaptation (13).

Through accurate investigation of different individual aspects (e.g., physiological aspects, self-perception, role play and independence), this model determines the causes of inadaptability (main and background causes, other stimuli). This helps to design a comprehensive program to develop healthy behaviors in individuals (14). Furthermore, this model could be used in the treatment of patients with chronic diseases and plays a key role in the effective execution of medical procedures (15).

Several studies have confirmed the efficacy of Roy's adaptation model in the treatment of fatigue in patients undergoing hemodialysis (16), psychological adaptation of diabetic patients (4), mental adaptation of patients with heart failure (17), and improving self-esteem in elderly patients (18). Literature search in different databases revealed that no studies have been conducted in our country evaluating the effects of this model on the quality of life among diabetic patients.

This study aimed to investigate the efficacy of Roy's adaptation model in nursing practice on the quality of life among patients with diabetes. If the positive impacts of this model are demonstrated, it could be used to develop efficient medical programs, reduce physical and mental problems, decrease medical costs, enhance adaptation level, and promote quality of life among patients with type 2 diabetes.

Materials and methods

This quasi-experimental study was performed using a pretest-posttest method. For data collection, we used two forms and one scale, which were completed by the patients, as follows:

A) Demographic Information Forms/Personal and Social Information

This form contained such information as age, gender, education level, place of residence, marital status, disease duration, type of treatment, family records and number of hospitalizations due to diabetes.

B) Investigation of Type 2 Diabetic Patients based on Roy's Adaptation Model

This form was used for the primary investigation of our medical program in the experimental group. It consisted of four dimensions, including the physiological aspect, self-perception, role play and independence. In the physiological aspect, questions were about physical activity, resting, nutrition status, excretion, bloodstream, oxygenation, liquids, electrolytes and endocrine glands. In the domain of self-perception, there were questions regarding the state of mind, personal feelings and imagination of the subjects about their body. As for role play, the questions concerned relationships with family members, family roles (e.g., role of spouse and mother) and family expectations. With regards to independence, the questions focused on individual and social communications and habitual behavior of the subjects.

This form was extracted from reputable scientific resources, and the content was approved by the researchers (19). Reliability of questionnaires has been confirmed using the retest method in a study

conducted by Sadegh Nejad et al. (r=0.75) and Faze Asgarpour (r=0.79) (16.4).

C) Diabetes-Specific Quality of Life Scale (D-39)

This scale has been designed for the evaluation of quality of life among diabetic patients (20). It consisted of 39 items in 5 dimensions of diabetes control (12 items), energy and mobility (15 items), social support (5 items), stress and anxiety (4 items), and sexual activity (3 items), which were scored on a Likert scale (1-7).

Accordingly, score one was interpreted as the lowest effect, and score seven was indicative of the most significant effect on the quality of life of diabetic patients. Score range was 39-273, and higher scores represented lower quality of life (21). Reliability of this scale has been previously investigated in a transformative psychological paper (22).

In our study, value of Cronbach's alpha was estimated at 0.95 in diabetes control, 0.66 in stress and anxiety, 0.90 in social support, 0.96 in sexual activity, and 0.87 in energy and mobility. Additionally, forms prepared by researchers were used for 10 patients within one-week intervals. Reliability of these forms was confirmed by Cronbach's alpha estimated at 0.94.

Inclusion criteria were as follows: 1) minimum age of 25 and maximum age of 70; 2) history of diabetes treatment for six months; 3) absence of mental disorders and 4) patient consent for participation.

Exclusion criteria were as follows: 1) presence of diseases affecting quality of life; 2) decease of the patient and 3) refusal of patient to participate in the research. It should be noted that four patients left the study due to illness or traveling and were replaced with other patients.

Objectives of the study were explained to the participants, and they were granted terms of confidentiality. In addition, patients were allowed to leave the experiment at any time. Informed consent was obtained from all the participants, and demographic questionnaires and quality of life scale (D-39) were completed by the subjects. Medical care program based on the Roy's adaptation model was performed on the intervention group.

For each patient, different factors such as incompatible behaviors, main stimuli, background stimuli and remaining stimuli were determined according to the completed questionnaires. Afterwards, based on the demands and conditions of patients, educational courses were held at the diabetes center of Hamadan during one month in five 2-hour sessions.

Educational team consisted of the physicians of our diabetes center, nurses (researchers), nutrition experts and clinical psychologists. Topics discussed in the sessions were as follows: nature of diabetes, causes and risk factors, symptoms, and treatment of diabetes (first session); early and late complications of diabetes and effects of exercise on diabetes (second session); diabetes, stress and anxiety (third session); diabetes and nutrition (fourth session); diabetes and self-esteem (fifth session).

At the end of the sessions, D-39 quality of life scale was completed again by both study groups, and the obtained data before and after intervention were analyzed using independent and paired t-test.

Results

According to the demographic data in this study, women constituted the majority of participants in the control (69.2%) and experimental groups (65.5%). Most of the participants in the control group (41.8%) were within the age range of 50-60 years, and experimental subjects were mostly (37.4%) over 60 years of age. Results of Chi-square test indicated that the study groups were matched in terms of demographic characteristics ($P>0.05$) (Table 1).

In this research, we first verified the normality of quality of life dimensions using Kolmogorov-Smirnov test. Afterwards, we compared the mean scores of quality of life dimensions in the control and experimental groups before the intervention using independent t-test; accordingly, both groups had the same mean scores ($P>0.05$). Moreover, obtained results were indicative of a significant difference between the study groups after the intervention in terms of diabetes control, energy and mobility, and social support ($P<0.001$) (Table 2).

Paired t-test was performed to compare the mean scores of quality of life dimensions before and after intervention in both groups; these results are presented in Table 3.

Table 1. Demographic characteristics of patients in experimental and control groups

Demographic Information		Experimental Group		Control Group	
		Relative Abundance	Absolute Abundance	Relative Abundance	Absolute Abundance
Education Status	Basic Education	62.1	18	61.5	16
	High School Diploma	24.1	7	19.2	5
	Undergraduate	6.9	2	7.7	2
	Postgraduate	6.9	2	11.5	3
Duration of Diabetes (Year)	<1	0	0	3.8	1
	1-5	23.8	7	53.2	14
	5-10	30.6	9	15.2	4
	10-20	23.8	7	22.8	6
	20-30	3.4	1	15.2	4
Treatment	Tablets	62.1	18	46.2	12
	Insulin	37.9	11	42.3	11
Family History	Yes	65.5	19	61.5	16
	No	31	9	38.5	10
History of Hospitalization due to Diabetes (Frequency)	0	62.1	18	61.5	16
	1	24.1	7	19.2	5
	2	10.3	3	11.5	3
	3≥	0	0	7.7	2

With respect to diabetes control, mean score of experimental group was 58.86±8.91 before intervention and 35.37±10.13 after intervention, which was indicative of a statistically significant difference (P<0.001). However, the difference was not significant in the control group (P>0.05).

In the dimension of social support, mean score of experimental group was 22.17±2.73 before intervention and 13.86±4.38 after intervention. As for the control group, these values were 13.96±4.61 before intervention and 13.57±4.47 after intervention, which were indicative of a statistically significant difference between the study groups (P<0.001).

Regarding energy and mobility, mean score

Table 2. Comparison of mean and standard deviation (SD) of quality of life dimensions in study groups

Quality of Life Dimensions		Experimental Group		Control Group		
		Mean	SD	Mean	SD	
Diabetes Control	Before Intervention	58.86	8.91	37.88	11.04	T=0.71 P=0.48
	After Intervention	35.37	10.13	37.42	11.07	t=-7.78 P=0.000
Anxiety	Before Intervention	13.55	2.59	13.03	4.89	t=-1.20 P=0.24
	After Intervention	14.44	4.66	12.88	4.96	t=-0.49 P=0.62
Social Protection	Before Intervention	22.17	2.73	13.96	4.61	t=0.24 P=0.81
	After Intervention	13.86	4.38	13.57	4.47	t=-8.11 P=0.000
Sexual Activity	Before Intervention	7.96	2.95	6.61	5.32	t=-0.80 P=0.43
	After Intervention	7.75	5.19	6.61	5.35	t=-1.18 P=0.24
Energy and Mobility	Before Intervention	51.2	7.74	40.3	12.54	t=-0.02 P=0.98
	After Intervention	39.75	11.87	39.69	11.7	t=-3.89 P=0.000

Table 3. Comparison of quality of life scores in different dimensions before and after intervention in study groups

QualQuality of Life Dimensions	Experimental Group			Control Group		
	Before Intervention	After Intervention		Before Intervention	After Intervention	
Diabetes Control	8.91± 58.86	10.13± 35.37	t=-8.81 P=0.00	11.04± 37.88	11.07± 37.42	t=-2.06 P=0.05
Anxiety	2.59± 13.55	4.66± 14.44	t=1.02 P=0.31	4.89± 13.03	4.96± 12.88	t=-0.75 P=0.46
Social Protection	2.73± 22.17	4.38± 13.86	t=-8.57 P=0.00	4.61± 13.96	4.47± 13.57	t=-3.07 P=0.00
Sexual activity	2.95± 7.96	75.19± 7.75	t=-0.21 P=0.83	5.32± 6.61	5.35± 6.61	t=0.00 P=1.00
Energy and Mobility	7.74± 51.20	11.87±39.75	t=4.81 P=0.00	12.54± 40.3	11.7± 39.69	t=-1.07 P=0.29

of experimental group was 51.20±7.74 before intervention and 39.75±11.87 after intervention, which was indicative of a significant difference (P<0.001). In the control group, there was no significant difference between the mean scores before and after intervention (P>0.05).

In the dimensions of stress, anxiety and sexual activity, there was no significant difference between the mean scores between the groups before and after intervention (P>0.05).

Discussion

In the present study, we investigated the impact of Roy's adaptation model in nursing practice on the quality of life of patients with type 2 diabetes in the city of Hamadan, Iran. According to the results, use of Roy's adaptation model in medical practice could positively affect quality of life among diabetic patients in the area of diabetes control. In this regard, Krapk et al. (2004) reported that adherence to appropriate drug regimen and medical recommendations plays a key role in the control of diabetes (21). Moreover, some researchers have reported that adaptation to the disease is an important factor in the control of diabetes (23).

Social support is another area of quality of life. In the present study, the intervention had a significant effect on this dimension in the experimental group. In another study, Alipour et al. (2009) observed a significant relationship between different types of social support (e.g., emotional, structural, functional and material) and quality of life (24). Furthermore, Gao et al. suggested that social support could positively affect blood sugar control in diabetic patients (25).

Another area of quality of life is energy and mobility. In our study, use of Roy's adaptation model significantly affected this dimension in the experimental group. In another research, Saremi (2011) stated that exercise and mobility play a pivotal role in the prevention and control of resistance to insulin among diabetic patients (26). Similarly, Esteghamati et al. (1999) suggested that exercise has a positive effect on the management of diabetes treatment (27). In addition, Sadeghnejad et al. (2011) reported that use of Roy's adaptation model in the health care program could significantly enhance psychological and physical adaptation of patients with type 2 diabetes (4).

With regard to the areas of stress, anxiety and sexual activity, the results obtained by D-39 scale in the current study indicated no significant difference between the mean scores of these domains between the study groups before and after the intervention. This could be due to the duration of the intervention, as well as the unwillingness of some participants to express their private issues. In this regard, Adolfsson et al. (2006) evaluated the effects of education on patients with type 2 diabetes and concluded that education enhances the self-esteem of diabetic patients (28). On the other hand, Bayazi et al. (2012) reported that 12 sessions of cognitive and behavioral intervention could not reduce anxiety and depression in patients with cardiac diseases (29).

Conclusion

In conclusion, our results indicated that use of

Roy's adaptation model in medical practice could positively affect some dimensions of quality of life, such as diabetes control, energy and mobility and social support, among patients with type 2 diabetes. However, this medical plan had no effects on the areas of stress, anxiety and sexual activity. It is recommended that further research with more educational sessions be conducted in this regard. The main limitation of the present study was the small sample size and short duration of interventions.

Conflict of interest

There was no conflict of interest in this study.

Author's contributions

All the authors participated in writing the scientific proposal, data collection and writing the manuscript.

Acknowledgements

The present study is a master's degree thesis which has been approved and financed by Hamedan University of Medical Sciences. This study has also been registered in Iran Clinical Trial Center under code no. 2012090110707. The authors would like to thank the patients who cooperated with this study.

Reference

1. Mohammadi Zeydi E, Heidar Nia AR, Haji Zadeh E. The study of cardiovascular patient's lifestyle. Daneshvar 2006; 13(61):49-56 (Persian).
2. Issa BA, Baiyewu O. Quality of life of patients with diabetes mellitus in a Nigerian teaching hospital. Hong Kong J Psychiatry 2006; 16:27-33.
3. Bagheri H, Abrahimi H, Taghavi N, Hasani MR. Evaluation of quality of life in patients with diabetes mellitus, based on its complications, referred to Emam Hossein Hospital, Shahroud. J Shahrekord Univ Med Sci 2005; 7(2):50-6 (Persian).
4. Sadeghnejad Forotaghe M, Vanaki Z, Memarian R. The effect of nursing care plan based on Roy Adaptation model on psychological adaptation in patients with diabetes type II. J Urmia Nurs & Mid Faculty 2012; 1(1):5-20 (Persian).
5. Karlsson I, Berglin E, Larsson PA. Sense of coherence: quality of life before and after coronary artery bypass surgery—a longitudinal study. J Adv Nurs 2000; 31(6):1383-92.
6. Sammarco A. Perceived social support, uncertainty, and quality of life of younger breast cancer survivors. Cancer Nurs 2001; 24(3):212-9.
7. Bagheri H, Abrahimi H, Taghavi N, Hasani MR. Evaluation of quality of life in patients with diabetes mellitus, based on its complications, referred to Emam Hossein Hospital, Shahroud. J Shahrekord Univ Med Sci 2005; 7(2):50-6.
8. Sadeghieh Ahari S, Arshi S, Iranparvar M, Amani F, Siahpoosh H. The effect of complications of type II diabetes on patients' quality of life. J Ardabil Univ Med Sci 2008; 8(4):394-402 (Persian).
9. Harris MD. Psychosocial aspects of diabetes with an emphasis on depression. Curr Diab Rep 2003; 3(1):49-55.
10. Mylys AI. Theoretical Nursing-Development and Progress [M. Shokati Ahmad Abd, Trans]. 4th ed. Tehran: Prospective Publication; 2009.
11. Dehghan Nayeri N, Jalalinia F. Nursing Theory and Theories. Tehran: Nashre Bashari; 2004.
12. Fiona R. Roy's Adaptation Model of Nursing, Learning Disability Nursing. Birmingham: School of Nursing and Midwifery; 2010. P.16.
13. Gholamzadeh S, Hazrati M. The Application of Adaptation Model on Patient Care. 1st ed. Tehran: Salemi Publication; 2005. P.144 (Persian).
14. Morgan PD, Gaston JB, Mock V. Spiritual well -being, religious coping, and the quality of life of African American breast cancer treatment: a pilot study. Dep Nurs, Fayetteville State Univ J 2006; 17:73-7.
15. Patton D. An analysis of Roy's Adaptation Model of Nursing as used within acute psychiatric nursing. J Psychiatr Ment Health Nurs 2004; 11(2):221-8.
16. Fazel Asgarpoor A, Amini Z, Zeraati A, Esmaeli H. The effect of a care plan based on the Roy Adaptation Model on level of Fatigue in hemodialysis patientsEvidence Based Care. J Evidence-Based Care 2012; 1(1):77-90 (Persian).
17. Naeim Hassani S, Tabiee S, Saadatjoo SA, Kazemi T. The effect of an educational program based on Roy adaptation model on the psychological adaptation of patients with heart failure. Modern Care J 2014; 10(4):231-40 (Persian).
18. Maghsoodi E, Hemmati M, Sheikhi S, khalkhali HR. The effect of care plan application based on Roy Adaptation Model on the self-esteem in elderly people in Urmia

nursing homes. J Nurs & Mid, Urmia Univ Med Sci 2015; 12(10):926-34.

19. Fawcett J. Analysis and Evaluation of Conceptual Models of Nursing. Philadelphia: F.A. Davis Company; 2008. P.247-87.
20. Boyer JG, Earp JA. The development of an instrument for assessing the quality of life of people with diabetes. Diabetes-39. Med Care 1997; 35(5):440-53.
21. Krapek K, King K, Warren SS, George KG, Caputo DA, Mihelich K, et al. Medication adherence and associated hemoglobin A1c in type 2 diabetes. Ann Pharmacother 2004; 38(9):1357-62 .
22. Bazazian S, Rajab A. Assessing the pscichometric properties of the quality of life scale for diabetics (developing over aged 20-60). Iran J Developmental Psychol 2010; 6(24):317-28 (Persian).
23. Gåfvels C, Wändell PE. Coping strategies in men and women with type 2 diabetes in Swedish primary care. Diabetes Res Clin Pract 2006; 71(3):280-9.
24. Alipoor F, Sajadi H, Forozan A, Biglarian A. The role of social support in elderly quality of life. J Social Welfare 2010; 8(33):149-67 (Persian).
25. Gao J, Wang J, Zheng P, Haardörfer R, Kegler MC, Zhu Y, et al. Effects of self-care, self-efficacy, social support on glycemic control in adults with type 2 diabetes. BMC Fam Pract 2013; 14:66.
26. Saremi A. Sporting exercises and diabetes mellitus type 2. J Cell & Tissue 2011; 2(3):171-81 (Persian).
27. Steghamati A, Hasabi M, Halabchi F. Prescribe exercise in patients with type 2 diabetes. Iran lipid & Diabetes J 2008; 7(3):251-65 (Persian).
28. Adolfsson ET, Walker-Engström ML, Smide B, Wikblad K. Patient education in type 2 diabetes—a randomized controlled 1-year follow-up study. Diabetes Res Clin Pract 2007; 76(3):341-50.
29. Bayazi MH, Ahadi H, Fata L, Danesh Sani H. The effectiveness of a short cognitive behavioral group intervention on depression, anxiety and stress in patients with chronic coronary heart disease: a randomized controlled trail. J Fundamentals Mental Health 2012; 14(1):110-21 (Persian).