

Original/Research Paper

Effect of Orem's self-care model on the quality of life in adolescents with diabetes type 1: A randomized clinical trial

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Abstract

The present study aims to determine the effect of Orem's self-care model on the quality of life in adolescents with diabetes type 1. A randomized controlled trial was conducted at Guilan University of Medical Sciences in Rasht, Iran. Adolescents diagnosed with type 1 diabetes constituted the study's participants. The research enrolled 80 diabetic patients, divided randomly into two groups: the control group and the intervention group. The study employed four blocks labeled A, B, C, and D, selecting the initial block through a lottery-based method. The intervention group received a series of eight training sessions structured by the Orem's self-care model. In contrast, the control group received standard routine education without the structured sessions aligned with the aforementioned model. The data collection instruments used in this study comprised a demographic information questionnaire, an Orem's health status questionnaire, and an SF-36 quality of life questionnaire. The study comprised 80 diabetic type 1 patients, with 40 assigned to the control group and 40 to the intervention group. The average age of the participants was 13.40 (SD=2.25). Notably, a substantial difference was observed in the change of scores about the physical dimension between the intervention and control groups (P=0.03). Additionally, a significant disparity in mental dimension scores was observed between the intervention and control groups (P=0.02). Our investigation demonstrated that the development and execution of an educational training program grounded in the Orem's self-care model yielded an enhancement in the quality of life among adolescent patients diagnosed with type 1 diabetes.

Keywords: Quality of Life, Orem's Self-Care Model, Adolescent, Diabetes Mellitus.

1 | Introduction

Diabetes, a widespread chronic ailment globally, significantly impacts patients' well-being [1, 2]. The World Health Organization estimates around 285 million people grapple with this disease, causing 2.5 million deaths annually, a number on the rise [3, 4]. In Iran, it is estimated that five to seven million individuals are affected, with a considerable proportion being adolescents [5, 6]. Among diabetic adolescents, 10% exhibit metabolic syndrome criteria, significantly impacting Iranian youth [7].

The time of onset of health issues strongly influences individuals' responses to diseases, making adolescence a crucial phase for shaping lifelong health behaviors [8]. Type 1 diabetes, like

other chronic conditions, profoundly affects various aspects of life, often leading to social challenges and diminished quality of life [4, 9]. Quality of life encompasses mental, social, and physical well-being, treatment satisfaction, and concerns about the future [10]. Enhancing quality of life and patient functionality remains a primary treatment objective, achievable through tailored self-care programs and effective solutions [11].

Given diabetes' chronic nature, active involvement in disease management and self-care activities is crucial for patients [10, 12]. Self-care is an evolving process involving education and awareness, enabling individuals to navigate the complexities of diabetes [13]. Nursing practices have evolved to recognize

patients' potential and encourage self-care activities, essential considering that much of diabetic care occurs within familial settings [14].

As a significant portion of daily diabetes care occurs within the individual's family setting, it's crucial to impart diabetic patients with self-care skills [11]. A study conducted in Scotland highlighted the critical role of medical professionals in educating diabetic individuals about managing hyperglycemia symptoms and overall self-care [15]. Addressing patient education and implementing nursing care strategies are essential for delivering appropriate and effective patient education [16].

Self-care stands as a foundational principle in nursing, aiming for favorable health outcomes by ensuring, maintaining, and enhancing individuals' well-being. The Orem's self-care model actively engages patients in their care, placing a strong emphasis on self-care [17, 18]. For diabetic patients, self-care necessitates dietary and lifestyle changes to complement the healthcare team's support, fostering self-esteem and disease management [19]. Individuals well-versed in self-care are anticipated to adeptly manage their condition and lead fulfilling lives. However, reduced self-care activities among diabetic patients can exacerbate disease complications [20]. A study by Hotma *et al.*, concluded that an educational program rooted in the Orem's model can enhance children's quality of life and effectively manage hemoglobin levels [21]. Similarly, another study by Hemati *et al.*, in Iran demonstrated that applying the self-care model for asthma negatively impacted the quality of life among adolescents with chronic asthma, yet proved to be a beneficial approach in bolstering patient control and adherence [22].

Adolescents and children play pivotal roles in a nation's advancement, their health being fundamental for a country's future [23-27]. Considering the Orem's self-care model's focus on individual abilities and needs, our study aims to evaluate the impact of Orem's self-care model on the quality of life among adolescents diagnosed with type 1 diabetes.

2 | Methods

2.1 | Study design

A randomized controlled trial was conducted at Guilan University of Medical Sciences in Rasht, Iran, to investigate the influence of Orem's Self-Care Model on the Quality of Life among adolescents diagnosed with Type 1 Diabetes.

2.2 | Ethics consideration

This study was confirmed by the Research Ethics Committee of Guilan University of Medical Sciences

(IR.GUMS.REC.1397.403). Also, this study has been registered in the Iranian Registry of Clinical Trials (IRCT20171008036651N3). Before participation, all individuals provided informed consent after receiving detailed information about the study's aims. Participants were explicitly informed of their right to withdraw from the study at any time if they chose to do so.

2.3 | Sample size

This randomized clinical trial involved 80 hospitalized adolescents diagnosed with type 1 diabetes. The research sample, determined using G-Power software, comprised 80 adolescents with type 1 diabetes chosen through random sampling methods.

2.4 | Participants

Adolescents diagnosed with type 1 diabetes constituted the study's participants. The research enrolled 80 diabetic patients, divided randomly into two groups: the control group and the intervention group. The study employed four blocks labeled A, B, C, and D, selecting the initial block through a lottery-based method. Inclusion criteria involved diabetic adolescents aged 11 to 18 years old without mental disorders. Exclusion criteria encompassed severe illnesses hindering their participation, unwillingness to collaborate with researchers, absence from training sessions, or failure to respond during telephone training sessions.

2.5 | Intervention

In the intervention group, before starting the self-care program, adolescents' self-care needs were identified through self-assessment, observation, patient records, and guidance from nursing staff. Eight tailored training sessions were conducted based on the Orem's self-care model. These sessions addressed three aspects: general self-care (nutrition, hydration, hygiene, activity, sleep, stress management), self-development (vaccination schedules, menstrual hygiene, support for teens from divorced or financially challenged families, coping with family-related crises), and managing health during illness (medication adherence, doctor visits, hygiene practices, blood sugar control, insulin use, proper diet). Meanwhile, the control group received standard education, including disease management guidance. Quality of life assessments were conducted in both groups after the eight training sessions and again after two months. The data collection instruments used in this study comprised a demographic information questionnaire, an Orem's health status questionnaire, and an SF-36 quality of life questionnaire.

The health status survey form was structured to assess self-care requirements among diabetic adolescents across three

dimensions: general self-care, developmental self-care, and managing health deviations. Nursing diagnoses were formulated within each domain to pinpoint specific needs. Utilizing this information, the study identified learning necessities among the patients and conducted nursing interventions through personalized face-to-face education during hospitalization. Additionally, follow-up consultations and training sessions were conducted over the phone to further address these needs.

The SF-36 questionnaire, comprising 36 questions, evaluates the quality of life across two main dimensions: physical health and mental health. These dimensions encompass 8 multi-item subscales: physical function (assessing activities like self-care and mobility), physical role limitations (related to restrictions due to physical problems), physical pain (evaluating pain and its impact on daily activities), general health perception, vitality (examining energy levels and fatigue), social functioning, emotional role limitations (assessing limitations due to emotional issues), and mental health (measuring feelings of depression and anxiety). The questionnaire utilizes various Likert scales with different response options and includes an assessment of the respondent's overall health status over the past month. Scores range from 0 to 100, with higher scores indicating a better quality of life: 0-35 is considered poor, 35-70 is seen as medium, and 70-100 is indicative of good quality of life. These scales collectively summarize into two dimensions: physical health (physical function, physical role, physical pain, and general health) and mental health (vitality, social function, emotional role, and mental health) [28].

The Orem's health status questionnaire was developed by researchers to assess the educational needs of adolescents. Its validity was ensured through face validity and content validity methods, where experts in internal surgery, pediatrics, methodology, and research methods provided their insights, and the Content Validity Index confirmed its validity. The reliability of the questionnaire, based on the Orem's model, was evaluated using a test-retest approach over a week with 10 patients in a preliminary study. The resulting correlation coefficients of 0.09 and $r=0.88$ were deemed acceptable, indicating satisfactory reliability.

2.6 | Statistical analysis

SPSS software (version 16.0, SPSS Inc., Chicago, IL, USA) was utilized for data analysis. Descriptive statistics, such as means (standard deviation [SD]) for continuous variables and frequencies (percentages) for categorical variables, were presented. The Chi-square test was used to compare qualitative demographic variables, while the independent t-test and paired t-test were employed to compare quantitative variables. A significance level of

0.05 was set to determine the statistical significance of the analysis.

3 | Results

3.1 | Participants

Figure 1 depicts the inclusion of 80 type 1 diabetes patients, divided equally into control and intervention groups. Table 1 outlines the demographic characteristics of the participants, indicating an average age of 13.40 (SD=2.25) years. Of these, 50.00% were female, 93.75% were unmarried, and 85.00% were literate. Moreover, 93.75% lived with their families, and 56.92% of those families had members with diabetes. There were no significant differences between the two groups in terms of demographic characteristics ($P>0.05$).

3.2 | Effect of Orem's self-care model on the quality of life in adolescents with diabetes type 1

As depicted in Table 2, a notable discrepancy was observed in the physical dimension, revealing a significant difference in average scores before and after the intervention within the intervention group ($P=0.04$). In contrast, no significant variance was evident in the control group pre- and post-intervention ($P>0.05$). Notably, a substantial difference was observed in the change of scores about the physical dimension between the intervention and control groups ($P=0.03$). Regarding the subjective dimension, a considerable difference in average scores before and after the intervention was observed ($P=0.03$) within the intervention group, while no significant change was apparent in the control group ($P>0.05$). Additionally, a significant disparity in mental dimension scores was observed between the intervention and control groups ($P=0.02$).

4 | Discussion

This research evaluated the impact of self-care education, aligned with the Orem's self-care model, on the quality of life among adolescents. Self-care plays a crucial role in the quality of life of diabetic adolescents [28]. For individuals managing diabetes, engaging in proper self-care practices is fundamental for effectively managing the condition and minimizing its impact on daily life [29]. By adhering to self-care routines involving medication management, dietary choices, regular exercise, monitoring blood sugar levels, and seeking timely medical care, adolescents can better control their diabetes. Despite the recognized significance of self-care among diabetic adolescents, the existing literature on this subject remains limited.

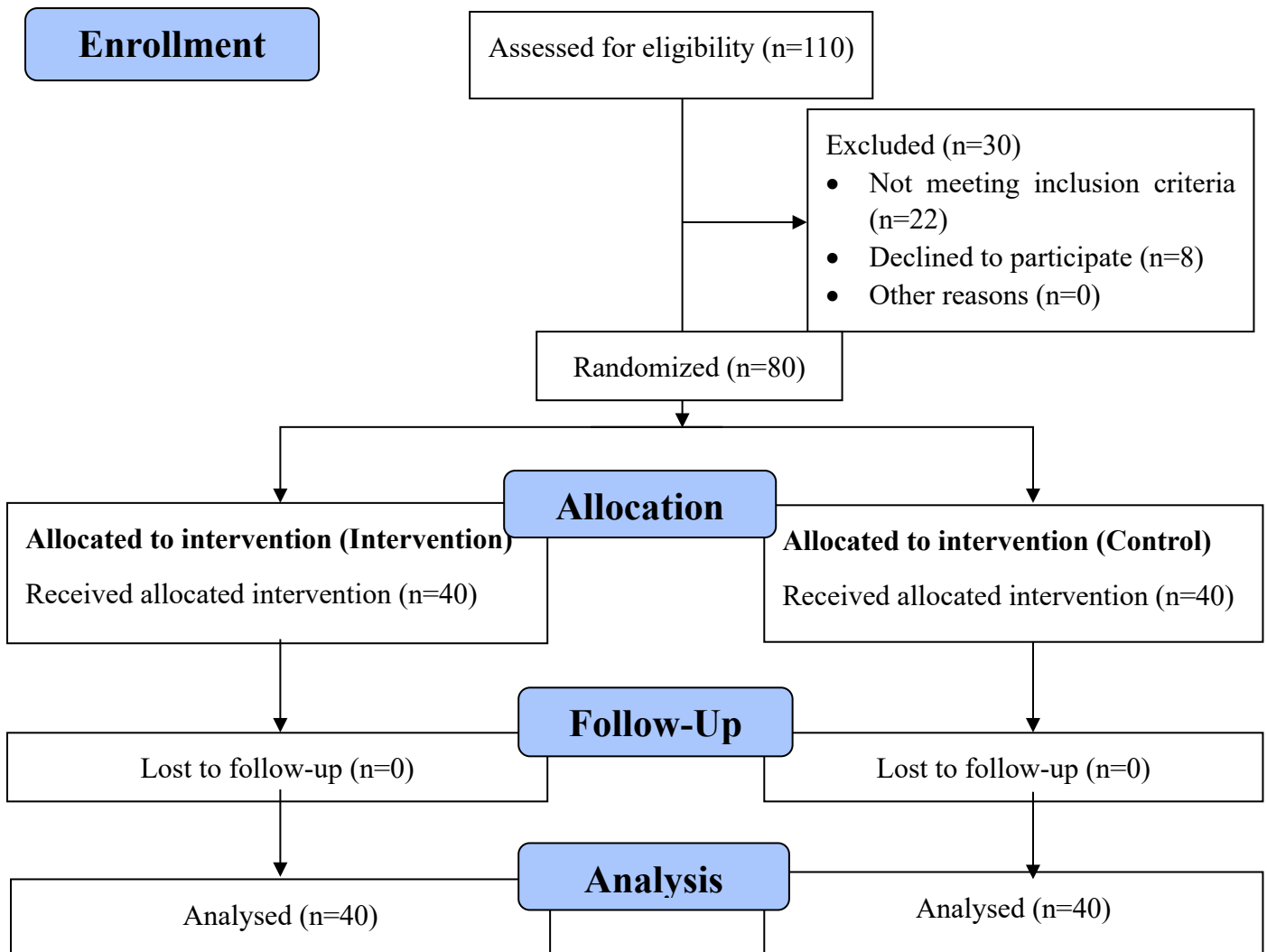


Figure 1. Flow diagram of participants.

Table 1. Individual and clinical characteristics of the participants (N=80).

	Total (N=80)	Groups	
		Control (N=40)	Intervention (N=40)
Age	13.40 (SD=2.25)	13.60 (SD=3.30)	13.20 (SD=1.20)
Sex			
Male	40 (50.00)	15 (37.50)	25 (62.50)
Female	40 (50.00)	25 (62.50)	15 (37.50)
Marital status			
Single	75 (93.75)	37 (92.50)	38 (95.00)
Married	5 (6.25)	3 (7.50)	2 (5.00)
Level of education			
Illiterate	12 (15.00)	5 (12.50)	7 (7.50)
Literate	68 (85.00)	35 (87.50)	33 (82.50)
Live with parents			
Yes	75 (93.75)	39 (97.50)	36 (90.00)
No	5 (6.25)	1 (2.50)	4 (10.00)
Diabetes in family			
Yes	45 (56.25)	25 (62.50)	20 (50.00)
No	35 (43.75)	15 (37.50)	20 (50.00)

Values are given as a mean (SD) for continuous variables and a number (percentage) for categorical variables.

Table 2. Quality of life according to the mental and physical dimensions in two groups (N=80).

	Groups		P-value
	Control (N=40)	Intervention (N=40)	
Physical dimension			
Before	32.00 (SD=1.10)	30.00 (SD=1.20)	
After	31.00 (SD=0.20)	78.00 (SD=2.20)	
P-value	>0.05**	0.04**	
Differences	-1.00 (SD=1.20)	58.00 (SD=1.20)	0.03*
Mental dimension			
Before	33.00 (SD=1.20)	32.00 (SD=1.60)	
After	32.50 (SD=1.70)	76.00 (SD=1.50)	
P-value	>0.05**	0.03**	
Differences	-0.5 (SD=3.20)	44.00 (SD=3.20)	0.02*

Values are given as a mean for continuous variables.

*P-value was obtained with an independent t-test.

**P-value was obtained with a paired t-test.

Notably, the current study revealed no noteworthy distinctions in demographic data between the two groups before the intervention. Our findings indicate that the implementation of education rooted in Orem's self-care model positively influenced various dimensions of quality of life, encompassing both physical and psychological aspects. This observed enhancement can be attributed to the structured self-care training derived from the Orem's model, considering the absence of significant differences in demographic data and quality of life before the intervention among the two groups. A study by Rahimi *et al.*, reported a significant increase in patient self-efficacy after training grounded in Orem's self-care model [30]. Another study by Ghanbari & Kazemnezhad revealed that 60% of patients exhibited inadequate self-care quality [31]. Another investigation highlighted the efficacy of the INKOLA model, based on Orem's self-care framework, in enhancing quality of life and managing Hemoglobin A₁C levels for individuals with type 1 diabetes [21]. Additionally, a study by Hemati *et al.*, underscored the contributory role of Orem's self-care model in augmenting the quality of life among adolescents with asthma, suggesting its potential use as a health intervention to enhance asthma control and patient adherence [22].

The current study substantiates that instructive interventions rooted in the Orem's self-care model yield enhanced quality of life across all dimensions among adolescents grappling with diabetes. Given the pervasive impact of diabetes on various life domains, the application of Orem's self-care education demonstrates promise in ameliorating diverse facets of these adolescents' quality of life. These findings align with and corroborate existing research outcomes. Consequently, nurses should advocate for the integration of this healthcare-nursing model within hospital, school, and college settings, aiming to foster self-care

behaviors and elevate the quality of life for individuals managing chronic conditions.

4.1 | Limitations

A limitation of this study pertains to the singular presence of a specialized children's center within the province, centrally situated, thereby leading to patients with varying cultural and biological backgrounds seeking care in neighboring provinces due to geographical distance. Consequently, the potential withdrawal of these patients might impact the broader applicability or generalizability of the study's findings.

4.2 | Clinical implications for nursing managers and policymakers

The findings of this study offer valuable insights into informing the development of in-service training programs for nurses, aimed at enhancing their proficiency in imparting self-care knowledge effectively.

4.3 | Recommendations for future research

It is advisable to replicate this study across more diverse populations, encompassing individuals with varied cultural backgrounds, distinct parenting approaches, varying family sizes, and considering other influential factors. This broader approach would account for a more comprehensive understanding of the impact while accommodating the potential influence of cultural dimensions and various contextual variables.

5 | Conclusions

Given the potential for enhanced self-care among adolescents managing diabetes to empower them to assume a proactive role in their treatment, and foster greater self-responsibility, the implementation of a self-care program rooted in the Orem's model may

mitigate their anxieties and dependencies. This approach can contribute to bolstering their self-assurance and autonomy, ultimately culminating in an amelioration of their quality of life.

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Authors' contributions

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work: YY, SP, FHS, FF; Drafting the work or revising it critically for important intellectual content: YY, SP, FHS, FF; Final approval of the version to be published: YY, SP, FHS, FF; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: YY, SP, FHS, FF.

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Ethics approval and consent to participate

This study was confirmed by the Research Ethics Committee of Guilan University of Medical Sciences (IR.GUMS.REC.1397.403). Also, this study has been registered in the Iranian Registry of Clinical Trials (IRCT20171008036651N3). Before participation, all individuals provided informed consent after receiving detailed information about the study's aims. Participants were explicitly informed of their right to withdraw from the study at any time if they chose to do so.

Competing interests

We do not have potential conflicts of interest with respect to the research, authorship, and publication of this article.

Availability of data and materials

The datasets used during the current study are available from the corresponding author on request.

Using artificial intelligent chatbots

None.

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