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Original Research Article

Diabetic self-care practice and quality of life among diabetes patients in the Hail region of Saudi Arabia

Farhan Alshammari[1], Arshad Hussain[2]*, Kashifullah Khan[2], Mukhtar Ansari[2], Norah Bandar Alshammary[3], Rahaf Saleh Alsaif[4], Adel Ahmed Alreshidi[5], Abdulaziz Salamah Alshammari[6], Bushra Alshammari[7]

[1]Department of Pharmaceutics, [2]Department of Clinical Pharmacy, College of Pharmacy, University of Hail, [3]Al-Barak Pharmacy, [4]Internal Pharmacy, Salamat Medical Groups, [5]Nahdi Medical Company, [6]Zaad Addwaeih Medical Company, [7]Medical Surgical Nursing Department, College of Nursing, University of Hail, Hail, Saudi Arabia

For correspondence: **Email: ar.hussain@uoh.edu.sa; **Tel:** +966-552976021*

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Abstract

Purpose: *To determine the association between type 2 diabetic patients' adherence to self-care routines, medication use, and health-related quality of life (HRQoL).*

Methods: *This analytical and cross-sectional study was conducted in Hail Region of Saudi Arabia. The sample population comprised 400 men and women diagnosed with type 2 diabetes, all above the age of 18 years. A modified Euro QoL-five-dimensional (EQ-5D) health questionnaire was utilized to evaluate self-care habits and their association with health-related quality of life.*

Results: *Participants' mean age ± standard deviation (SD) was 53 ± 9.4 years, with 50.5 % being female. Non-adherence rates measured were 32.7 % for foot care, smoking (28.2 %), diet (28 %), insulin usage (26.2 %), exercise (23.2 %), and blood sugar monitoring (15.2 %). Mobility challenges were reported in 14.2 % of cases, 26.2 % self-care, 28.2 % everyday activities, 48.2 % pain or discomfort, and 28.2 % anxiety or depression. Significant associations occurred between poor foot care and mobility difficulties (58.2 %), impairment in everyday activities (53.7 %), and experiencing pain and discomfort (63.9 %) with p-values of 0.002, 0.003, and 0.03, respectively. Likewise, significant correlations ($p < 0.05$) exist between self-care (47.5 %), pain/discomfort (58.7 %), anxiety/depression (31.1 %), and non-adherence to exercise. Regression analysis indicated a positive correlation between respondents' EQ-5D index and oral hypoglycemic agent non-adherence ($R^2 = 0.25$; $p = 0.001$). A significant relationship exists between EQ-5D index and smoking non-adherence after normalization ($p = 0.003$; 95 % CI: 0.0001 to 0.0001).*

Conclusion: *In Hail region of Saudi Arabia, the health-related quality of life for diabetics diminishes as self-care practices are neglected.*

Keywords: *Diabetes mellitus, Self-care practices, Foot care, Health-related quality of life, Non-adherence, Hail Region*

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INTRODUCTION

The severity of diabetes varies with age, and its management is significantly influenced by lifestyle and diet. Diabetics can benefit from weight management and exercise. In Saudi Arabia, 18.5 % of the population suffers from diabetes, representing a substantial public health challenge. This condition necessitates diligent self-care, which this study aims to investigate,

particularly how it enhances the quality of life for patients with type 2 diabetes. Social, biological, behavioral, and cultural factors can aggravate diabetes and other chronic diseases, making treatment challenging [1,2]. The financial burden on individuals, families, healthcare systems, and nations will rise [3]. Globally, 80 – 90 % of people have type 2 diabetes [4]. A report highlighted that diabetes incurs costs of $ 0.87 billion in Saudi Arabia, impacting both public and private sector productivity through disease-related complications, such as decreased quality of life, reduced life expectancy, and increased unemployment due to disability and premature death [5]. In 2013, 8.3 % of the global population, or 382 million people, were diagnosed with diabetes, with Saudi Arabia ranking among the top 10 countries at a prevalence rate of 23.9 % [3,6]. Between 1980 and 2014, type 2 diabetes diagnoses increased from 108 to 422 million, according to the WHO.

Diabetes caused 1.6 million deaths in 2016 [7]. The prevalence of DM type-2 patients in Bahrain, Kuwait, KSA, Qatar, the United Arab Emirates, and Oman has increased significantly over the past 20 years, reaching 96.3 % by 2035 and 24 % by 2050 [8]. Loss of awareness about physical well-being, changes in beliefs and attitudes, and lifestyle trends shape the health and fitness landscape of various Middle Eastern countries, but physical activity, poor eating habits, and obesity are the main factors [9]. Furthermore, a common misconception among patients is the belief that diabetes can be cured with short-term treatment without needing to alter their diet or lifestyle, provided they continue taking antidiabetic medication [10]. These self-care routines may enhance economic and therapeutic outcomes for diabetic individuals as diabetes therapy becomes more complex and expensive worldwide. Globally, 9.3 % of 20 to 80 year old patients have diabetes [11]. The 10th edition of the International Diabetes Federation (IDF) Diabetes Atlas projects that by 2045, 783 million people will be living with diabetes, highlighting the global impact of this condition across all ethnicities and regions [12]. Thus, diabetes treatment impacts all ethnicities and regions. Remarkably, diabetes ranks as the leading cause of death in South Korea [13].

Lifelong medication is essential for individuals with diabetes, yet adherence to prescribed treatment is markedly low. Effective blood sugar control, beyond standard medication, can significantly reduce the risk of complications such as nephropathy, retinopathy, and neuropathy. Controlling diabetes requires self-care. The American Association of Diabetes emphasizes that diabetes self-care not only improves the quality of life but also minimizes the risk of complications [14]. This underscores the critical need for enhanced self-care practices. Given the pressing nature of this issue in Hail region, this study aims to determine how self-care practices influence the health-related quality of life among individuals with diabetes.

METHODS

Survey population

The present cross-sectional survey was carried out in Saudi Arabia's Hail region between March and May of 2022. Participants included male and female diabetic patients from the Hail region. With a population of 731,147 as of 2019. Hail region is one of Saudi Arabia's thirteen provinces or regions and is located in the northwest of the Country. Eligible study participants were individuals over the age of 18 with type 2 diabetes who could understand and speak Arabic and/or English and who consented to participate. Type 1 diabetics, children, and women who were pregnant were excluded from this study.

Survey tool

The survey tool was the modified Euro QoL-five-dimensional (EQ-5D) health questionnaire. Patients self-reported their health in five categories (pain/discomfort, accessibility, self-care, routine activities, and depression/anxiety). Each dimension has five intensities: none, mild, moderate, severe, and extreme. The levels go from 1 to 5. The EQ-5D measurement was conducted using the Level Sum Score (LSS). Health statuses vary from 5 (the best) to 15 (the worst) on the scorecard. Demographic information about the participants was included in the questionnaire's initial section, which was followed by inquiries about health-related quality of life (EQ-5D). The surveys were translated into Arabic in order to obtain accurate responses as the study's participants were Saudis. The questionnaires' Arabic to English translation followed the WHO norm [4]. The translated version of the study tools was validated using the forward and reverse translation procedure.

Determination of sample size

The International Diabetes Federation (IDF) reported in 2021 that 18.7 % of Saudi Arabia's adult population is diabetic [6]. The prevalence-based formula ($n = Z^2*P(1-P)/d^2$), where n is the necessary sample size, P is the disease prevalence (18.5 percent, P = 0.18), Z is the confidence level (95 percent, corresponding to a

standard value of 1.96), and d is the margin of error, was applied to a sample size of 232 participants (standard value of 0.05).

Sampling technique

A multistage random sampling was employed. The first step involved selecting four randomly selected regional geographic regions. Following a random selection of two hospitals from each region with a diabetes clinic, a random selection of patients was made in the second step. With prior approval from the director or administrative chief of each hospital, the list of type 2 diabetes patients (the target group) was obtained from the data banks of the chosen hospitals. The data collector greeted the patients in the hospital clinic waiting areas as they awaited their turn and gave them an explanation of the study. Patients were given a consent form, study information sheet, and a copy of the questionnaire after agreeing to participate (EQ-5D).

Validation of questionnaire

The study tool's reliability was assessed using Cronbach's alpha, which yielded a value of 0.87 after being piloted among 15 people (good reliability). Academics, epidemiologists, and healthcare specialists evaluated the tool's face and content validity.

Analyses of data

IBM SPSS Statistics 21.0 was used for the computation and evaluation of data for descriptive and inferential analysis. The relationships between the five aspects of health status and the demographic variables were investigated using multivariate logistic regression analysis. The visual analogue scale (VAS) and quality of life were also examined to see if they were connected to the characteristics of diabetic patients applying the Kruskal-Wallis and Mann-Whitney tests. *P*-values < 0.05 were considered statistically significant.

Each piece of data was kept secret and anonymous. Also, all the data was fully encoded and coded for use with computer programs, mainly for statistical analysis. The Saudi Ministry of Health granted ethical approval for this study, which was registered with the code H-08-L-074.

RESULTS

The average age of the patients was 53 ± 9.4 years, with 83.5 % categorized within the middle to upper middle age group. Of the participants, 51 % were female, and 74 % were married. Educationally, 36 % had completed primary and secondary schooling, while approximately 35.5 % belonged to upper-middle-class families, originating from lower-income backgrounds. A total of 39 % of patients were employed, and 40.7 % of patients were jobless. Regarding treatment, about 57 % of the patients were on oral anti-diabetic drugs, and 26 % were using both oral hypoglycemic agents (OHA) and insulin.

Figure 1 displays the patients' non-adherence rate. About 15.2 % of people neglected to monitor their blood glucose (BG). Dietary non-adherence was at 28 %, foot care was at 32.7 %, and exercise was at 23.2 %. Approximately 28.2 % of people who received advice continued to smoke. OHA non-adherence was 10.7 %, whereas insulin non-adherence was 26.2 %.

Mobility issues were reported by 14.2 % of the patients, difficulties with self-care by 26.2 %, challenges in completing routine tasks by 26.2 %, pain or discomfort by 48.2 %, and feelings of anxiety or depression by 28.2 % (Figure 2). Table 1 shows the association between patient HR-QoL and levels of nonadherence to self-care practices. The association between patient HR-QoL and degrees of non-compliance with self-care regimens is displayed in Table 1. A total of 53.7 % of people had mobility issues, and there was a significant correlation between not taking OHA (p = 0.04) and having poor mobility.

Self-care proved to be the exception, where only 38.2 % of people had problems and the relationship was significant (p = 0.03). Those who did not follow foot care instructions had issues with mobility (58.2 %), activities (53.7 %), pain and discomfort (63.9 %), and these associations were significant; p = 0.002, p = 003, and p = 0.03, respectively.

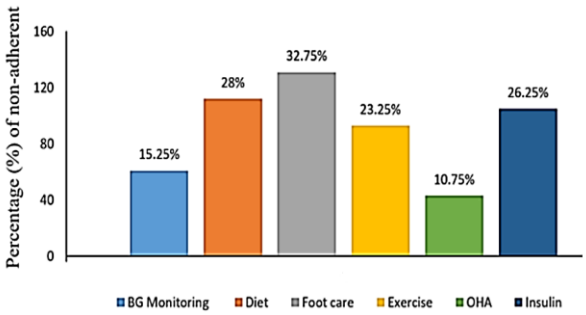

Figure 1: Patient distribution is based on non-compliance with self-care practices and medication.

Table 1: The association among health-related quality of life and compliance with self-care practices (n = 400)

HRQoL	Non-compliance					
	Blood glucose monitoring (%)	Diet (%)	Care for the foot (%)	Exercise (%)	Using OHA (%)	Using Insulin (%)
Accessibility						
No problem	58.9	47.2	41.8	35.7	46.3	46.9
Problem	41.1	52.8	58.2	64.3	53.7	53.1
P-value	0.43	0.17	**0.002***	**0.001***	**0.04***	0.12
Self-Care						
No problem	67.2	73.5	61.8	52.4	62.5	64.8
Problem	32.8	26.5	38.2	47.6	37.5	35.2
P-value	0.31	0.24	**0.003***	**0.002***	0.13	0.41
Usual activities						
No problem	59.4	62.4	46.3	63.2	47.8	37.4
Problem	41.6	37.6	53.7	36.8	52.2	62.6
P-value	0.38	0.39	**0.04***	0.21	**0.06**	**0.003***
Pain/Discomfort						
No problem	53.7	55.4	36.1	41.3	28.4	32.6
Problem	46.3	44.6	63.9	58.7	71.6	67.4
P-value	0.74	0.41	**0.03***	**0.001***	**0.04***	0.29
Anxiety/Depression						
No problem	56.3	59.6	32.4	68.9	27.6	37.7
Problem	43.7	40.4	67.6	31.1	72.4	62.3
P-value	047	0.73	0.11	**0.002***	**0.05***	**0.007***

Note: Results were given as a percentage (%); where cells had an anticipated count less than five (< 5), Fisher's exact test was performed; the significance threshold was set at *$p \leq 0.05$

Significant correlations were observed between self-care (47.6 %), pain/discomfort (58.7 %), anxiety/depression (31.1 %), and non-adherence to exercise ($p < 0.05$). Studies using multivariable linear regression were conducted to find possible indicators of the patient's quality of life. All six variables—non-adherence to BG monitoring, food, foot hygiene, exercise, OHA, and insulin were simultaneously included in the regression model. Three distinct models were fitted individually for each of the three that showed a significant correlation with the EQ-5D index: non-adherence to foot care, exercise, and taking OHA. The average EQ-5D score was 7.14 ± 1.828. About 26 % of the patients had the best health status, 70.7% had moderate health status, whereas 3.7 % had the worst health status. The results indicate that, following adjustment, there was a significant correlation between the EQ-5D score and non-compliance with foot care ($p = 0.001$; 95 % CI: 0.069 to 0.213). An R^2 of 0.21 ($p = 0.001$) was found for the complete multi-regression model that was utilized to evaluate the EQ-5D index predictions with non-adherence to foot care. (Table 2). The EQ-5D index predictions showed a significant ($p = 0.001$; 95 % CI: 0.116 to 0.196) relationship between respondents' quality of life and their noncompliance with exercise, with an R^2 of 0.23 and a *p*-value of 0.001. (Table 3). Regression analysis revealed that both the respondents' EQ-5D index and non-compliance to taking OHA were strongly predicted ($R^2 = 0.25$; $p = 0.001$). After normalization, there was a significant correlation between the EQ-5D index and smoking non-compliance ($p = 0.003$; 95 % CI: 0.0001 to 0.0001) (Table 4).

Table 2: Multivariable regression study to determine the dependent variable representing the respondents' non-adherence to foot care as indicated by the EQ-5D index value (n = 400)

Variable	B1 ± SE	Beta	*P*-value	95% CI for B	
				Lower	Upper
Gender	−0.012±0.002	−0.323	0.003*	−0.235	−0.127
Marital status	−0.251±0.028	0.463	0.110	−0.121	0.063
Age	0.043±0.029	−0.172	0.001*	−0.022	−0.015
Education Level	0.035±0.015	0.131	0.005*	0.023	0.052
Employment level	−0.008±0.016	−0.149	0.238	−0.017	0.078
Monthly income (SAR)	−0.010±0.022	−0.083	0.521	−0.019	0.083
Type of treatment	−0.031±0.009	−0.098	0.002*	−0.061	−0.012
Non-adherence to foot care	0.052±0.021	0.174	0.001*	0.069	0.213

Note: *$P \leq 0.05$ vs. control

Table 3: Multivariable regression study (n = 400) uses the respondents' non-adherence to exercise as indicated by the EQ-5D index values as a dependent variable

Variable	B1 ± SE	Beta	*P*-value	95% CI for B	
				Lower	Upper
Gender	−0.132±0.092	−0.278	0.001*	−0.286	−0.212
Marital status	0.112±0.067	0.023	0.686	−0.063	0.104
Age	−0.002±0.003	−0.179	0.002*	−0.012	−0.007
Education Level	0.037±0.023	0.119	0.004*	0.024	0.126
Employment level	−0.012±0.027	−0.031	0.472	−0.059	0.46
Monthly income (SAR)	−0.017±0.048	−0.049	0.387	−0.045	0.074
Type of treatment	−0.039±0.028	−0.082	0.024*	−0.028	−0.013
Non-compliance to exercise	0.152±0.043	0.194	0.001*	0.116	0.196

Note: Overall model F-test, $p = 0.001$. * Significant ($p \leq 0.05$)

Table 4: Multivariable regression study of respondents' non-adherence to OHA and EQ-5D index value (n = 400)

Variable	B1 ± SE	Beta	*P*-value	95% CI for B	
				Lower	Upper
Gender	−0.237±0.084	−0.396	0.001*	−0.324	0.195
Marital status	0.028±0.047	0.027	0.542	−0.064	0.073
Age	−0.014±0.012	−0.213	0.0001*	−0.012	−0.008
Education Level	0.046±0.024	0.107	0.028*	0.018	0.053
Employment level	−0.021±0.011	−0.042	0.393	−0.058	0.036
Monthly income (SAR)	0.003±0.028	−0.012	0.874	0.037	0.062
Type of treatment	−0.032±0.015	−0.085	0.025*	−0.049	−0.018
Non-adherence to OHA medication	0.0001±0.0001	0.071	0.003*	0.0001	0.0001

Note: Overall model F-test, $p = 0.001$. *$p \leq 0.05$ vs. control

DISCUSSION

In this cross-sectional study, the impact of non-adherence—to self-care behaviors on health-related quality of life (HRQoL) was assessed in type 2 diabetes patients from the Hail region of Saudi Arabia. It was observed that participants generally exhibited low self-care practices and correspondingly low HRQoL. It was further observed that non-adherence to self-care practices such as foot care, exercise, intake of oral hypoglycemic agents (OHA), and administration of insulin negatively impact the HRQoL associated with mobility, daily activities, pain, and anxiety. Data from hospital and community-based studies revealed a similar pattern, indicating that the prevalence of self-care among diabetics was very low [15,16].

A significant proportion of the study's participants (32.75 %) in this study didn't adhere to the diabetic foot ulcer self-care. This neglect significantly impaired HRQoL, particularly affecting mobility, daily activities, and the experience of pain/discomfort. Physical activity is essential for managing diabetes because it has a positive effect on glucose tolerance, weight loss, insulin activity, and the avoidance of complications, in addition to diet and medication. [17]. This study demonstrated a substantial ($p \leq 0.05$) correlation between mobility issues, self-care, pain/discomfort, anxiety, depression and non-adherence to exercise The lack of physical activity among participants could be partly explained by the demographic finding that 47 % of them were aged between 50 – 69 years, potentially limiting engagement in exercise due to age-related factors.

It is significant to note that the vast majority of the participants in this study had anxiety or depression, mobility issues, and pain or discomfort. In a study from the USA, more than half (57.8 %) of diabetic patients reported experiencing moderate to severe pain, and 55.1 % reported having at least moderate physical activity limitations as a result of pain.

The use of medications is a crucial component of diabetes management. Patients should be encouraged to take the medications that have been prescribed to them. In this study, the non-adherence rates for OHA and insulin were 10.75 and 26.25 %, respectively. In Malaysia [18], non-adherence to the intake of antidiabetic medications was 53 %, whereas in Iran 35 % of diabetics always and 65 % of them frequently did not adhere to their treatment regimen. Even though the adherence rate in this study is higher than in other studies, there are still some common reasons why people don't take their medications. These include people who fail to take their prescriptions on time, costly medications, use multiple medications at once, experience side effects, and do not show any

symptoms of the disease. The average rating score for the EQ-5D index in this study was 0.55. The EQ-5D index was found to be significantly correlated with medication use, physical activity, and failure to comply with foot care guidelines. The current study's patients generally had low HRQoL. The current study's findings demonstrated that a larger percentage of failure to adhere is associated with a lower quality of life for diabetic patients.

CONCLUSION

The findings of this study underscore that a significant decline in the quality of life among patients is closely associated with non-adherence to self-care regimens. This revelation emphasizes the critical need for educating individuals with diabetes on effective self-management practices and encouraging the utilization of available healthcare resources. Enhancing diabetic patients' health literacy, along with their knowledge and skills for successful diabetes self-management, is essential for preventing the onset of further complications. Such educational interventions are pivotal for fostering an overall improvement in quality of life for those living with diabetes.

Furthermore, to broaden the applicability of these findings, it is recommended to conduct future study on self-care practices within multicenter community-based settings.

DECLARATIONS

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Ethical approval

None provided.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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