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Original Article

Relationship between self-care behaviors with psychological wellbeing, perceived social support, and self-efficacy among patients with type 2 diabetes: a structural model analysis

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Abstract

Effectively managing type 2 diabetes depends on self-care activities. This study aimed to examine the relationship between self-care behaviors and psychological wellbeing, perceived social support, and self-efficacy among patients with type 2 diabetes. The current study was conducted on 300 patients referred to the diabetes clinic. The patients were chosen through a random sampling technique based on specific inclusion and exclusion criteria. Data were collected using five questionnaires: the demographic questionnaire, the Toobert Diabetes Self-Care Questionnaire, the Zimet Multidimensional Perceived Social Support Questionnaire, the Diabetes Management Self-Efficacy Scale, and the Ryff Psychological Wellbeing Questionnaire. The collected data were analyzed using SPSS software (version 22) and Amos software (version 16). The significance level for the analysis was set at below 0.05 to determine statistical significance. The findings showed that the effects of psychological wellbeing, self-efficacy, and social support had a significant impact on self-care (P<0.001). Self-efficacy was impacted by the medical care dimension and social support from friends and family (P<0.001). An increase in psychological wellbeing led to an increase in self-efficacy (P<0.001) and social support (P<0.001), which in turn led to an improvement in self-care activities. Psychological wellbeing and self-care are closely linked, while social support and self-efficacy have a strong relationship. Accordingly, to enhance the self-care behaviors of patients with type 2 diabetes, it is essential to engage in thorough planning and offer counseling aimed at improving psychological health, fostering social support, and improving their ability to manage their condition.

Keywords: mental wellbeing, social support, self-efficacy, self-care, type diabetes 2

Introduction

Due to rapid economic growth, notable changes in lifestyle trends, and a growing elderly population, type 2 diabetes mellitus (T2DM) has emerged as a major global public health issue, particularly in developing nations [1, 2]. It is one of the fastest-growing diseases globally; there have been approximately 537 million cases of diabetes worldwide [3], and it is expected to affect over 693 million adults by 2045, an increase of more than 50% compared to the 2017 statistics [4]. The diabetes-associated complications include vision disorders,

kidney dysfunction, cardiovascular disease, poor wound healing, diabetic foot ulcers, and even death. It is also reported that diabetic patients are hospitalized at a rate approximately 2.4 times higher than people with other chronic diseases. Moreover, the life expectancy of diabetic patients is five to fifteen years less than that of individuals without diabetes [5, 6]. Risk factors for type 2 diabetes include age over 45, being overweight or obese, a sedentary lifestyle, polycystic ovary syndrome, high blood pressure, lactose intolerance, an unhealthy diet, and smoking [7, 8]. It is essential to prioritize self-care (SC) behaviors to keep ideal blood glucose levels and reduce the chances of enduring long-term complications. Engaging in self-care practices plays a pivotal role in managing diabetes, necessitating adherence to treatment plans. While the adherence rate for physical activity stands at 74%, only 16.50% of individuals adhere to self-monitoring of blood sugar, and 37% stick to diet management [9]. Self-care behaviors play a crucial role in controlling diabetes, and improving these behaviors can help patients better manage their disease [10]. Self-care involves ongoing learning and mindfulness to enhance quality of life and foster resilience against stress. It encompasses all actions individuals take to maintain their wellbeing, relying on their knowledge and abilities. Neglecting self-care practices poses a significant risk of developing type 2 diabetes [11]. Non-adherence to self-care principles is the leading cause of death in people with diabetes. Studies have shown that adhering to self-care can increase life expectancy, reduce or delay complications of the disease, and improve the quality of life for diabetic patients [12]. However, despite its importance, research indicates that only 16.2% of diabetic patients adhere to self-care behaviors [13]. Individuals with diabetes frequently endure diminished psychological wellbeing as a result of the challenges associated with controlling the condition, such as following dietary restrictions, restricted physical activity, regular monitoring of blood sugar levels, daily insulin injections, ongoing physical complications, and frequent hospitalization [14].

The focus of diabetes care guidelines is primarily on the medical aspects of initial management; however, it is important to recognize that untreated psychosocial problems can lead to psychological disorders [15]. These conditions are associated with various negative outcomes, including poor self-care behavior, unfavorable metabolic results, increased mortality, functional limitations, higher healthcare costs, decreased productivity, and a reduced quality of life. Healthcare providers need to address the psychological well-being of individuals with diabetes to improve overall health outcomes [16, 17].

Social support plays a vital role in enhancing diabetes self-care activities by boosting diabetes self-efficacy (SE) and reducing diabetes distress [18]. Patients with diabetes require social support to effectively manage their daily emotional adjustments and cope with the disease. Studies show that perceived social support (PSS) is closely linked to psychological factors such as diabetes distress, implying that it is likely to influence diabetes distress. Family, friends, neighbors, colleagues, peers, healthcare providers, and organizations can all provide social support for individuals with diabetes. It aims to encourage and facilitate coping behaviors and assist patients in managing diabetes [19–22]. Social support can be a crucial factor in managing patients with type 2 diabetes (T2DM). It positively impacts controlling blood sugar levels, which is primarily influenced by self-efficacy, adherence to the prescribed diet, lifestyle, and medication [23]. A study by Mundir *et al*. found that social support had no significant effect on blood sugar control among men. In contrast, it is positively associated with good glycemic control in women [24]. Additionally, a study by Fortmann *et al*. revealed that increased functional social support was associated with poorer glycemic control [25].

A critical factor contributing to poor diabetes self-care behaviors is low diabetes management self-efficacy [26]. Self-efficacy is a strong predictor of diabetes self-care behavior, and some intervention programs focusing on self-efficacy have proven helpful in improving diabetes self-care behavior [27]. However, not all patients with high self-efficacy exhibit good diabetes self-care behavior [28]. This suggests that some adverse factors disrupt the process from self-efficacy belief to achieving self-care behavior. Self-efficacy refers to people's belief in their ability to perform the necessary behaviors and actions to achieve specific functional outcomes [29]. People's behaviors are often predicted by their beliefs about their ability to control their motivations, behaviors, and social environment. Self-efficacy determines what people do with knowledge and skills related to expected outcomes. It is one of the key determinants of expected outcomes among people with diabetes [30]. A previous study demonstrated that self-efficacy is positively correlated with self-management of health, blood sugar, and blood sugar control in diabetic patients [31].

Diabetes can evoke a range of psychological responses, and the relationship between patient weight and these responses is not well understood [32]. These

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psychosocial factors can impact diabetes management and healthcare involvement [33]. Understanding these factors is crucial for promoting self-care behaviors and enhancing the lives of individuals with diabetes [34].

Research questions

Research Question 1: What is the relationship between self-care behaviors and psychological wellbeing in patients with type 2 diabetes?

Research Question 2: How does perceived social support influence self-care behaviors and psychological wellbeing in this patient population?

Research Question 3: What is the role of self-efficacy in mediating the relationships between self-care behaviors, psychological wellbeing, and perceived social support?

Research Question 4: Can a structural equation model effectively capture the interdependent pathways between self-care behaviors, psychological wellbeing, perceived social support, and self-efficacy among patients with type 2 diabetes?

Research Question 5: What are the key factors within this structural model that significantly promote better self-care and overall wellbeing in type 2 diabetes patients?

Material and methods

Study design

This cross-sectional correlational study was conducted over 8 weeks using a random sample to examine the relationships among psychological well-being, perceived social support, self-efficacy, and self-care behavior in adults aged 18 to 85 living with type 2 diabetes (T2D) in Shushtar, Iran. This study design collected data at a set point in time.

Recruitment and participants

The study was conducted with 300 randomly selected participants from 875 medical records of patients admitted to the diabetes clinic of Khatam Al-Anbia Hospital (PBUH) in Shushtar, Iran. Before completing the questionnaires, participants were informed about the study's purpose and asked for their cooperation. In adherence to ethical research standards, a consent form outlining the use of their information, including their willingness to participate and ongoing cooperation, was presented to the patients before they completed the questionnaire.

Instruments

This study used five questionnaires, demographic questionnaires typically ask for details such as age, gender, marital status, number of children, occupation, level of education, duration of diabetes, type of treatment, and HbA1c level. The Diabetes Self-Care Activities Questionnaire, developed by Toobert *et al.* (2000), is a 15-question self-report questionnaire. It assesses the self-care standards of patients over the past seven days. It covers various aspects of diabetes treatment, including a general diet, a special diet for diabetes, exercise, blood sugar testing, insulin injection or antidiabetic medication, foot care, and smoking cessation. Each behavior is scored from zero to seven, except smoking behavior, which is scored from zero to one. The total compliance score is calculated by summing the scores of each question, resulting in a total score ranging from 0 to 99 [35]. This questionnaire was evaluated and confirmed in Iran by Hamadzadeh *et al.* (2013). The Content Validity Index (CVI) and Cronbach's alpha coefficient were 84.9 and 78.0, respectively [36].

Zimmet *et al.*'s (1988) Multidimensional Perceived Social Support Scale is a tool designed to assess perceived social support through three subscales: friends, family, and significant others. It consists of 12 questions, and the scoring is done on a 7-point Likert scale. The subjects get a score from 1 to 7 on each question of this scale, with a total score for each subscale fluctuating from 4 to 28 and for the whole scale from 12 to 84 [37]. This questionnaire has been utilized in numerous research studies in Iran, and its reliability and validity have been confirmed [38].

The Diabetes Management Self-Efficacy Scale (DMSES) comprises 20 questions and is scored using a Likert scale. It has four sections: nutrition or diet, medicine and foot examination, physical activity, and medical care. Each participant's response range is between 0 and 10, with 0 indicating that they know nothing at all and 10 indicating that they are completely able to do it. The total score is 200, and the highest score indicates greater self-efficacy [39]. This scale was validated in Iran and has been used in several studies [40, 41].

The Ryff Psychological Well-Being Scale questionnaire (1989) is a shortened version of the original 120-question questionnaire. The scale consists of 18 items and is scored on a six-point Likert scale, ranging

from 1 (completely disagree) to 6 (completely agree). The minimum score that can be obtained on this scale is 18, and the maximum score is 108. It consists of six components, each with three questions, and a total score. Questions 3, 4, 5, 9, 10, 13, 16, and 17 are scored in reverse, and the rest are scored directly [42]. This questionnaire was validated in Iran and has been used in several studies [43, 44].

Ethical approval

This study was performed following the declaration of Helsinki and approved by the Biomedical Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (AJUMS)(Reference Number: IR.AJUMS.REC.1402.331).

Statistical analysis

The data was analyzed using SPSS version 22 software. Both descriptive and analytical statistical methods were employed to describe the data. The data was analyzed using the correlation coefficient test, regression analysis, and structural equation model. The maximum precision method was used to estimate the parameters.

Table 1: Demographic characteristics of the patients(n=300).

Demographic characteristics		Number (percentage)
Gender	Male	122 (40.7)
	Female	178 (59.3)
Job	Unemployed	187 (62.3)
	Employed	113 (37.7)
Wife's job	Unemployed	145 (57.5)
	Employed	107 (42.5)
	Unanswered	48 (16.0)
Education	High school	172 (57.3)
	Diploma	63 (21.0)
	University	65 (21.7)
Duration of diabetes	Less than a year	28 (9.3)
	Between one and five years	103 (34.3)
	More than five years	169 (56.3)
Treatment method	Pill	218 (72.7)
	Insulin	40 (13.3)
	Pill and insulin	42 (14)
The economic situation	Weak	50 (16.7)
	Medium	154 (51.3)
	Good	81 (27.0)
	Excellent	15 (5.0)
Marital status	Single	19 (6.3)
	Married	252 (84.0)
	Widowed/divorced	29 (9.7)
	Mean±Standard deviation	
Age	56.54±11.28	
Number of children	3.42±1.96	
HbA1C	8.13±1.80	

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Table 2: Correlation between some demographic variables and self-care (n=300).

Variable	Level of variable	Mean±SD	The correlation coefficient	P-value
Age		56.54±11.28	-0.228	<0.001*
Job	Unemployed	41.41±11.43	-3.080	0.002*
	Employed	46.17±12.26		
Level of education	High school	41.67±11.43	4.755	0.009*
	Diploma	44.68±11.64		
	University	46.74±13.25		
The economic status	Weak	38.94±13.92	7.733	<0.001*
	Moderate	42.37±10.56		
	Good	46.42±11.54		
	Excellent	52.53±14.56		

Results

The study investigated the demographic characteristics of a group of people. The findings showed that out of 300 people, 178 (59.3%) were women, and 122 (40.7%) were men. Additionally, nearly 60% of the participants were unemployed and had less than a high school diploma. The majority (84%) were married, while 16.7% had a poor economic status. It was also found that 9.3% of the participants had been diagnosed with diabetes for less than a year.

The average age of the participants was 56.54±11.28, and the average number of children was 3.42±1.96. The average HbA1C level was 8.13±1.80 (Table 1).

The correlation coefficient test – Pearson and Spearman – revealed a meaningful relationship between age, Job, education level, economic status, and self-care. It means that people of older age and those who are unemployed have lower self-care; on the contrary, people with a higher level of education and economic status have improved self-care (Table 2).

All three variables—psychological wellbeing, self-efficacy, and social support—significantly impacted self-care. Furthermore, a one-unit increase in psychological wellbeing, self-efficacy, and social support led to a rise in self-care by 0.238, 0.105, and 0.288 units, respectively. Based on the reported standard coefficients, self-efficacy had the most significant effect on self-care (Table 3).

The study found that psychological wellbeing has a greater impact on the autonomy (P<0.001) and self-acceptance (P<0.001) dimensions. Self-efficacy is more significant in the medical care dimension (P<0.001), while social support plays a more substantial role in the dimensions of friends' support (P<0.001) and family support (P<0.001). These results are shown in Table 4.

The results indicate that all dimensions of psychological wellbeing, except for positive relationships with others, are significantly related (P<0.05) to the dimensions of the other questionnaires (Table 5).

Since the variables of the questionnaire are hidden variables and regression analyses and correlation

Table 3: Effect of psychological wellbeing (PWB), self-efficacy (SE), and perceived social support (PSS) on self-care (SC) (n=300).

Variables		Coefficients	The standard deviation	Standard coefficients	t	P-value	R-square
Simple	**Constant**	2.776	4.306		0.645	0.52	0.42
	Psychological wellbeing	0.238	0.074	0.163	3.214	0.001	
	Self-efficacy	0.105	0.015	0.353	7.12	<0.001	
	Perceived social support	0.288	0.044	0.323	6.572	<0.001	
The dependent variable: Self-care							

Table 4: Effect of psychological wellbeing (PWB), self-efficacy (SE), and perceived social support (PSS) on self-care (SC) level using step-by-step simple regression analysis(n=300).

Subscales of questionnaires		Coefficients	The standard deviation	Standard coefficients	t	P-value	R-square
PWB (simple)	Constant	13.187	5.311	<0.001	2.483	0.014	0.27
	Self-acceptance	0.763	0.363	0.134	2.104	0.036	
	Positive relationships with others	-0.165	0.306	-0.028	-0.539	0.59	
	Autonomy	1.804	0.29	0.409	6.231	<0.001	
	Mastery of the environment	0.05	0.328	0.008	0.153	0.878	
	Objective life	0.385	0.277	0.078	1.39	0.165	
	Personal growth	-0.203	0.334	-0.036	-0.606	0.545	
PWB (step by step)	Constant	12.774	3.247	<0.001	3.934	<0.001	0.273
	Autonomy	1.85	0.265	0.419	6.986	<0.001	
	Self-acceptance	0.819	0.341	0.144	2.405	0.017	
SE (simple)	Constant	26.878	1.718	<0.001	15.645	<0.001	0.323
	Nutrition or diet	-0.146	0.086	-0.233	-1.694	0.091	
	Medication and foot check	0.21	0.202	0.103	1.043	0.298	
	Physical activity	0.299	0.209	0.162	1.43	0.154	
	Medical care	0.581	0.128	0.544	4.554	<0.001	
SE (Step by step)	Constant	27.893	1.45	<0.001	19.232	<0.001	0.343
	Medical care	0.597	0.051	0.56	11.654	<0.001	
PSS (Simple)	Constant	16.982	2.676	<0.001	6.346	<0.001	0.27
	Support from friends	0.548	0.129	0.241	4.241	<0.001	
	Family support	0.751	0.156	0.297	4.812	<0.001	
	Support others	0.179	0.114	0.098	1.561	0.12	
PSS (step by step)	Constant	16.809	2.68	<0.001	6.272	<0.001	0.275
	Family support	0.865	0.138	0.342	6.256	<0.001	
	Support from friends	0.605	0.124	0.266	4.858	<0.001	

The dependent variable: Self-care (SC)

coefficients do not consider the relationships of all variables simultaneously, it is better to use the structural equation model to investigate the effects of different variables on each other. The results of this model are well shown in the table and figure. In this model, the relationship between the variables has been investigated. Considering Figure 1 and Table 6 of coefficients, how the relationships between variables and their effects on each other are determined. The results show that psychological wellbeing (beta=0.270, P-value=0.005), self-efficacy (beta=0.416, P-value<0.001), and social support (beta=0.270, P-value<0.001) have a direct effect on self-care, as their values increase, self-care levels also increase. According to the reported coefficients and proposed structural equation modeling, the effect of psychological wellbeing on the extent of self-care

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Table 5: Correlation among self-care and psychological wellbeing (PWB), self-efficacy (SE), and perceived social support (PSS) dimensions (n=300).

		Diet	Insulin injection or antidiabetic pills	Sport	Blood sugar test	Foot care	Smoking	Self-care
Self-acceptance	Coefficient	0.24	0.17	0.377	0.192	0.234	-0.027	0.376
	P-value	<0.001	0.003	<0.001	0.001	<0.001	0.637	<0.001
Positive relationships with others	Coefficient	0.014	-0.016	0.024	0.097	-0.12	-0.067	-0.025
	P-value	0.816	0.786	0.686	0.096	0.039	0.249	0.67
Autonomy	Coefficient	0.394	0.362	0.406	0.141	0.328	0.001	0.498
	P-value	<0.001	<0.001	<0.001	0.015	<0.001	0.987	<0.001
Mastery of the environment	Coefficient	0.157	0.154	0.113	-0.003	0.14	0.011	0.176
	P-value	0.006	0.008	0.051	0.961	0.015	0.847	0.002
Objective life	Coefficient	0.262	0.134	0.195	0.178	0.131	0.014	0.275
	P-value	<0.001	0.02	0.001	0.002	0.023	0.814	<0.001
Personal growth	Coefficient	0.251	0.14	0.139	0.136	0.084	-0.056	0.221
	P-value	<0.001	0.016	0.016	0.018	0.144	0.333	<0.001
Psychological wellbeing	Coefficient	0.374	0.27	0.356	0.207	0.232	-0.033	0.434
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.574	<0.001
Nutrition or diet	Coefficient	0.538	0.308	0.283	0.322	0.152	0.114	0.47
	P-value	<0.001	<0.001	<0.001	<0.001	0.009	0.049	<0.001
Medication and leg check	Coefficient	0.47	0.443	0.341	0.21	0.269	0.125	0.512
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	<0.001
Physical activity	Coefficient	0.485	0.269	0.325	0.257	0.2	0.096	0.464
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.096	<0.001
Medical care	Coefficient	0.518	0.426	0.367	0.259	0.3	0.105	0.56
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.069	<0.001
Efficacy	Coefficient	0.544	0.371	0.337	0.296	0.226	0.117	0.526
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.044	<0.001
Support from friends	Coefficient	0.18	0.191	0.366	0.164	0.36	-0.058	0.407
	P-value	0.002	0.001	<0.001	0.004	<0.001	0.313	<0.001
Family support	Coefficient	0.204	0.393	0.331	0.092	0.428	0.018	0.452
	P-value	<0.001	<0.001	<0.001	0.112	<0.001	0.75	<0.001
Support others	Coefficient	0.257	0.227	0.318	0.217	0.222	-0.089	0.373
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.125	<0.001
Social support	Coefficient	0.269	0.325	0.417	0.203	0.401	-0.06	0.502
	P-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.301	<0.001

is mediated by the two variables of self-efficacy and social support. In other words, increasing psychological wellbeing increases self-efficacy (beta=0.53, P-value<0.001), and self-efficacy (beta=0.42, P-value<0.001) in turn increases the level of self-care. Additionally, increasing psychological well-being increases social

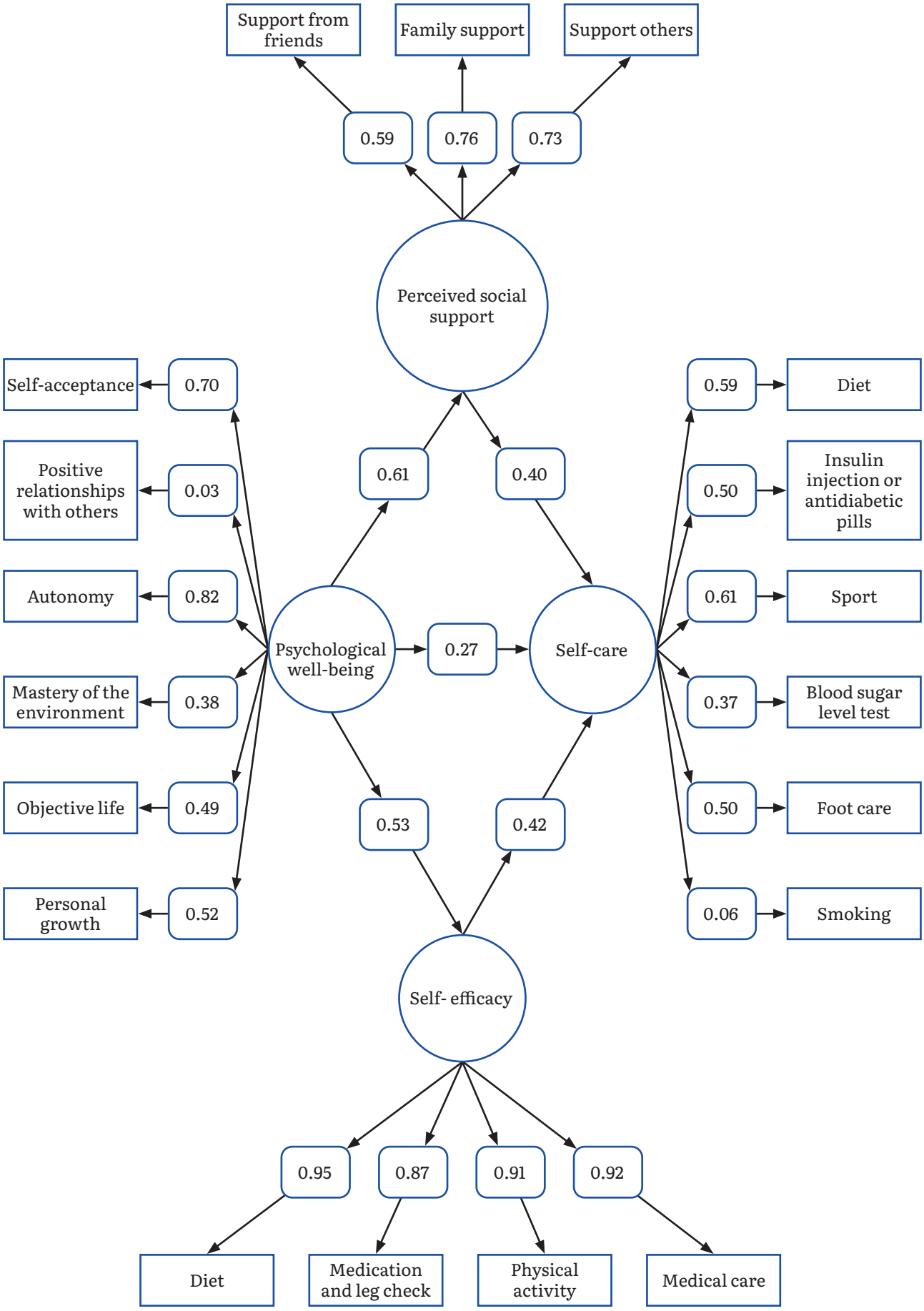

Figure 1: Structural equation model of the relationship between self-care, psychological well-being, perceived social support, and self-efficacy.

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Table 6: Correlation coefficient of structural equation model among self-care and psychological wellbeing (PWB), self-efficacy(SE), and perceived social support(PSS) dimensions (n=300).

	Coefficient	The standard deviation	Test statistics	P-value	95% confidence interval	
Self-care						
Psychological wellbeing	0.270	0.095	2.840	0.005	0.083	0.456
Self-Efficacy	0.416	0.072	5.760	<0.001	0.275	0.557
Social Support	0.401	0.089	4.480	<0.001	0.226	0.577
Social support						
Psychological wellbeing	0.614	0.055	11.240	<0.001	0.507	0.721
Self-efficacy						
Psychological wellbeing	0.531	0.050	10.540	<0.001	0.432	0.629
Self-care						
Diet	0.585	0.049	12.030	<0.001	0.490	0.680
Insulin injection or antidiabetic pills	0.499	0.051	9.860	<0.001	0.400	0.598
Sport	0.616	0.050	12.290	<0.001	0.517	0.714
Blood sugar test	0.370	0.057	6.460	<0.001	0.258	0.483
Foot care	0.502	0.057	8.800	<0.001	0.390	0.613
Smoking	0.060	0.064	0.940	0.347	-0.065	0.186
Social support						
Support from friends	0.587	0.048	12.350	<0.001	0.494	0.680
Family support	0.756	0.039	19.310	<0.001	0.679	0.832
Support others	0.734	0.040	18.220	<0.001	0.655	0.812
Self-efficacy						
Diet	0.954	0.009	105.420	<0.001	0.936	0.971
Medication and leg check	0.870	0.017	51.100	<0.001	0.837	0.903
Physical activity	0.910	0.013	71.670	<0.001	0.885	0.935
Medical care	0.922	0.012	76.950	<0.001	0.898	0.945
Psychological wellbeing						
Self-acceptance	0.697	0.039	17.900	<0.001	0.620	0.773
Positive relationships with others	0.031	0.064	0.490	0.623	-0.094	0.157
Autonomy	0.821	0.032	25.840	<0.001	0.759	0.883
Mastery of the environment	0.378	0.056	6.710	<0.001	0.267	0.488
Objective life	0.490	0.051	9.660	<0.001	0.390	0.589
Personal growth	0.517	0.049	10.530	<0.001	0.421	0.613

support (beta=0.61, P-value<0.001), and perceived social support (beta=0.41, P-value<0.001) also increases the level of self-care. Therefore, self-care is more affected by self-efficacy and social support. In other words, if the level of self-care is affected by psychological wellbeing, it is more due to the effect of psychological wellbeing on self-efficacy and social support (Table 6 and Figure 1).

Table 7: Goodness of fit indices of the structural equation model.

Index	RMSEA	AIC	BIC	CFI	TLI	SRMR	CD
Amount	0.098	28343.078	28572.506	0.84	0.82	0.07	0.88

The goodness-of-fit indices of the model indicated that the proposed model performed well, enabling it to effectively evaluate the relationships between the mentioned variables (Table 7).

Discussion

This study aimed to determine the relationship between psychological wellbeing, social support, and self-efficacy with self-care behaviors in patients with type 2 diabetes. The first part of the research findings was related to the demographic information of participants in the study. The findings of this study about the relationship between demographic variables and self-care variables showed that age, occupation, education level, and economic status are all related to self-care variables. The mean age of participants was 56.54 years. Older participants reported lower scores for self-care activities. In the Kong *et al.* [45] as well as in the Molalign Takele *et al.* [46] study, the results showed that participants in older age groups had higher self-care scores than lower age groups and reported higher self-care scores that did not match the findings from our study. However, Ilhan *et al.* showed that with increased age, there is a significant decrease in health literacy and self-care of people with diabetes [47]. This finding can be due to the fact that increasing age can cause a decrease in abilities such as self-care activities.

Another variable related to self-care was job status. In this study, employed people obtained higher self-care scores than non-working people. Whereas the results of the study by Kong *et al.* [45] and Lin *et al.* [48] showed that employed people had fewer general self-care behaviors than non-employed people, which did not confirm the results of the current study, because the employed individuals provided better self-care for themselves. Therefore, considering that job is one of the most important factors affecting self-care behaviors in patients with diabetes, health educators should first identify these factors to promote patients' self-care behaviors, and then, considering these factors, plan and establish educational interventions. On the other hand, the results of the present study showed that the level of education and economic status of individuals is directly related to self-care, so with the increase of education and economic status, self-care behaviors also increase, which is similar to the results of Robat Sarpooshi *et al.* [10], Tang *et al.* [49], which showed that patients with a university or higher education level have better self-care behaviors and status. It shows that education and its application are very important for diabetes management. Also, the results of the study by Chittooru *et al.* [50] showed that people with poorer socioeconomic status had fewer self-care activities and lower scores that were in line with the current study. This finding may be explained by the fact that patients with better incomes and economic status can easily access the healthy lifestyle recommended for diabetics, and easily pay for their medications and treatment [51].

Based on the results of simple and stepwise regression analysis, the variables of perceived social support, psychological wellbeing, and self-efficacy of all three variables have a significant relationship with self-care variables and have a positive effect, so that with increasing the amount of all three variables, the level of self-care activities will also increase, which will be studied respectively. For people living with a chronic disease such as diabetes, social relationships play an essential role in improving health, quality of life, and psychological wellbeing. One aspect of social relationships that is associated with health and wellbeing in people with diabetes is social support. Social support in diabetic patients is associated with better blood sugar control and improved self-care activities [52].

Self-care factors and social support have been found to positively correlate in this study. According to the Enggarwati *et al.* study, self-care activities and social support have a substantial link. This finding is consistent with this study. Furthermore, it said that the effect of social support on self-care differs greatly based on the kind of diabetes, the predominant ethnicity of the sample, and the kinds of social support activities that each person has attained. Families and loved ones can help individuals with type 2 diabetes in several significant ways. Among these, it is noteworthy that it helps patients recognize that their illness is incurable and can make them more conscious of how to manage their condition [53].

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Additionally, psychological health plays a positive role in shaping the social, mental, and physical aspects of human nature. When an individual's psychological wellbeing declines, they may encounter psychological issues like sadness, feelings of loneliness, and isolation, which lower their quality of life [14]. Therefore, maintaining psychological wellbeing in these patients is very important. The results of this study also indicate that psychological wellbeing improves self-care activities in patients with diabetes. In line with this study, the results of the study of Al-Ozairi *et al.* [54] and Schmitt *et al.* [55] showed that the high prevalence of depression symptoms in people with type 2 diabetes reduced the rate of self-care activity adherence, which is consistent with the results of the present study. Therefore, considering the effect of interventions related to psychological well-being in increasing self-care activities, psychological well-being training methods of diabetic patients can be used to improve health-related characteristics of patients with type 2 diabetes, reduce depression and anxiety, and increase self-care behaviors.

Good self-care skills and a positive state of wellbeing are prerequisites for managing diabetes. Moreover, a patient's wellbeing may be impacted by their views about their diabetes management efficacy. Self-efficacy influences how well a patient adapts to treatment, which influences the clinical result. When it comes to chronic diseases, a person's self-efficacy promotes adherence to prescribed treatment. It also shows whether or not a person can modify their behavior to improve their capacity for self-care [56].

In this study, the relationship between two variables of self-efficacy and self-care was proved, and it was found that self-efficacy is the strongest factor affecting self-care compared to the other two variables of social support and psychological wellbeing. In this regard, the results of the study by Juarez *et al.* showed that diabetes education and the self-efficacy of patients are associated with improved self-care activities. They also found that receiving diabetes education led to a greater likelihood of patients engaging in self-care activities, partly due to increased self-efficacy [57]. Kong *et al.*'s study shows a link between improved self-efficacy, lower HbA1C and fasting blood glucose levels, and better self-care among individuals with diabetes. While gaining knowledge and confidence in managing the disease is important, many diabetics still struggle to effectively implement self-care behaviors, especially in controlling blood glucose levels. Continuous monitoring and management of complications are crucial for diabetic patients, considering the chronic nature of diabetes. Tailored programs are needed to provide essential knowledge about diet, exercise, and medication for improving self-care practices and boosting self-efficacy through positive reinforcement in managing blood sugar goals and symptoms [45].

Type 2 diabetes, being a chronic condition, has the potential to lead to serious complications and profoundly impact the affected individual's quality of life [58].

The generalizability of our study may be limited due to certain limitations, including the use of self-reporting questionnaires and data collected from a single center.

Conclusions

Effective self-care can be influenced by a variety of factors such as psychological wellbeing, social support, and self-efficacy. However, our research demonstrated that self-efficacy and perceived social support emerged as the most influential predictors of self-care among individuals with type 2 diabetes. Those with type 2 diabetes need to prioritize their psychological wellbeing, social support, and self-efficacy due to their significant impact on self-care initiatives. Healthcare providers should concentrate on implementing strategies that promote self-care behaviors and reduce long-term complications, all while encouraging the overall wellness of individuals with diabetes. Furthermore, they must assist patients in recognizing the importance of psychological wellbeing, self-efficacy, and social support to encourage active participation in their self-care activities. Interventions concentrating on promoting psychological wellbeing, developing self-efficacy, and nurturing social support can lead to improved self-care practices. Tailored educational interventions should be regularly provided to identify obstacles in behavior and enhance self-care, considering each patient's specific needs.

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Conflict of interest

The authors declare no conflict of interest.

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