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Investigating the relationship between social stigma and treatment adherence in type 2 diabetes patients at healthcare centers in Northwest Iran

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Abstract

Background The social stigma associated with type 2 diabetes is a significant global mental and social health issue that can hinder treatment adherence among patients. To address this concern, the present study aimed to examine the relationship between social stigma and treatment adherence levels in type 2 diabetes patients attending healthcare centers in northwest Iran.

Methods In this descriptive-correlation study, 432 patients with type 2 diabetes referred to Ardabil city health service centers were selected by simple random and multi-stage cluster method. The data collection tools included the personal-social profile form, type 2 diabetes stigma assessment scale (DSAS-2), and treatment adherence questionnaire. Data were analyzed using SPSS 26 software with descriptive statistics, independent t-tests, analysis of variance, a logistic linear regression model.

Results The results indicated that the average score for the total social stigma of type 2 diabetes among the studied samples was 59.27 ± 15.52. A high level of perceived social stigma was observed in 55.6% of the patients. The average score for treatment adherence was 97.46 ± 28.79, with an adherence situation at an average level (59.7%). An inverse relationship was identified between the social stigma of diabetes and adherence to treatment ($r = -0.29$, $p < 0.001$). Additionally, there was a significant relationship between the average score of social stigma of diabetes and variables such as gender and marital status, as well as between the average score of treatment adherence and the gender of patients. The stepwise multiple linear regression model revealed that 15.1% of the variance in treatment adherence could be explained by age, duration of the disease, and social stigma of diabetes.

Conclusion The study found that, more than half of the patients had social stigma and reported their adherence to treatment as moderate. Also, there was an inverse and significant correlation between social stigma and treatment adherence. Therefore, it is necessary to provide psychological counseling services to reduce social stigma and teach the importance of adherence to treatment in these patients.

Keywords Social stigma, Treatment adherence, Type 2 diabetes, Nursing

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Introduction

Type 2 diabetes is one of the most prevalent chronic diseases and a major health problem worldwide. According to the latest statistics reported by the World Health Organization (WHO), the global prevalence of diabetes ranges from 2 to 10%, with 90–95% of cases being type 2 diabetes [1]. In Iran, the prevalence of type 2 diabetes has steadily increased in recent years due to factors such as population growth, aging, urbanization, obesity, and sedentary lifestyles [2]. A 2022 report indicates a 15% prevalence of diabetes in some provinces of Iran, excluding Tehran [3]. In Ardabil province, the latest statistics show that 14.22% of individuals aged 25 years and older have diabetes [4]. The high prevalence of diabetes across various societies and cultures can result in significant physical, social, psychological, and economic harm to both individuals and communities [5]. Patients with type 2 diabetes encounter numerous challenges in their daily lives, including adhering to dietary guidelines, engaging in physical activity, undergoing regular foot and eye examinations, practicing self-care and self-monitoring, managing stress, coping with the fear of diabetes complications, and administering insulin injections [6–10]. These challenges can be mitigated through consistent and appropriate self-care behaviors, which are integral to effective diabetes management [11]. Because self-care can be done with a low cost while having a high effectiveness in patients' life, and it also increases their adherence to the treatment [12]. This is especially important in low-income countries that do not receive adequate medical care [13]. Given that patients with diabetes often do not adhere to self-care principles, one of the key aspects of diabetes control is ensuring patients' adherence with treatment recommendations [14]. The World Health Organization defines treatment adherence as the degree to which individuals follow prescribed behaviors, including medication intake, dietary modifications, and lifestyle changes, in alignment with healthcare providers' recommendations [15].

Poor treatment adherence among patients with diabetes is a global issue, with approximately 50% of patients not following their prescribed treatment. This non-adherence can lead to vascular complications, increased mortality, and higher healthcare costs [16]. Studies also indicate poor treatment adherence among patients with type 2 diabetes [16, 17]. Non-adherence to treatment regimens in diabetic patients can result in frequent hospitalizations, failure to achieve treatment benefits, high treatment costs, numerous doctor visits, insufficient blood sugar control, and increased mortality [18, 19]. Studies show that a higher level of social support is associated with improved diabetes self-management and adherence to treatment [20]. The International Diabetes Federation also confirms this finding [21].

The results of various studies indicate that diabetes patients face various psychosocial problems such as fear, shame, embarrassment, and social stigma, which may have an adverse effect on the management and treatment of the disease [22–24]. Consequently, recent studies have focused on social factors affecting adherence, including socialization, social communication, social actions, and social stigma [25, 26]. Stigma is defined as a negative attitude or belief about a mental, physical, or social characteristic of a person or, group that is linked to social disapproval [27]. Social stigma can occur in various contexts, including health-related situations, and manifest through different mechanisms, such as discriminatory attitudes of community members [28, 29]. The feeling of stigma can also directly impact the management of diabetes, leading individuals with the condition to avoid fully disclosing their illness to peers and healthcare professionals due to fear of judgment or blame [30]. Studies also indicate that patients with diabetes experience stigma, which can negatively impact self-care behaviors and adherence to doctors' recommendations [30–32].

In the review of the literature, no study was found that used a quantitative approach to evaluate the relationship between social stigma and adherence to treatment in type 2 diabetes patients. Because stigma affects a person's self-esteem and understanding of self-efficacy and causes negative feelings such as anxiety, isolation, shame, depression, dissatisfaction, hatred, fear, and non-compliance with treatment [17]. Additionally, the limited research conducted has primarily investigated diabetes-related stigma through in-depth interviews, focusing on self-care barriers associated with social stigma in diabetic patients [33, 34]. Therefore, the relationship between social stigma and adherence to treatment in these patients as a research gap needs more investigations. Given that societal attitudes toward type 2 diabetes in Iran are not well-understood and may involve a degree of trivialization or underestimation of the disease, it is crucial to explore the social stigma associated with type 2 diabetes in this context. Therefore, this study was conducted to determine the relationship between social stigma and treatment adherence in patients with type 2 diabetes.

Method

The current research is a descriptive-correlational study conducted between August and November 2021. The research population consisted of patients with type 2 diabetes who visited the healthcare centers in Ardabil, a large city in northwest of Iran.

Inclusion criteria

Participants had to be diagnosed with type 2 diabetes, be over 18 years of age, and provide written consent to participate in the study.

Exclusion criteria

Patients were excluded if they did not cooperate during the research process or failed to answer at least 5% of the questions in the questionnaires.

To determine the sample size, the formula $n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-B}\right)^2}{w^2} + 3$ was used. Considering the confidence limits of 99%, the test power of 80% and the correlation coefficient of these two variables (r=0.03) in the pilot study, a sample size of 390 people was obtained. To account for a 10% attrition rate, a total of 432 participants were targeted. The study employed a multi-stage cluster sampling method, encompassing a total of 50 health centers, including 33 healthcare centers in Ardabil city. Ardabil city was divided into four parts: North, South, East, and West. The number of health and healthcare centers in each district was determined, and one health center and one healthcare center were randomly selected from each district. From these centers, 108 type 2 diabetes patients were randomly selected in each district. To collect data, the patients' personal-social information form, the Type 2 Diabetes Stigma Assessment Scale (DSAS-2)[1], and the Treatment Adherence Questionnaire for Chronic Diseases were used.

Individual-social information form of patients

This form included variables such as age, gender, marital status, education level, employment status, income level, duration of type 2 diabetes, and family history of type 2 diabetes.

Type 2 diabetes stigma assessment scale (DSAS-2)

This scale was designed by Brown et al. (2016) to develop and validate a self-report measure of perceived stigma in adults with type 2 diabetes in Australia. The scale is a valid 19-item instrument encompassing three different dimensions: behavioral dimensions (6 items), blame and judgment (7 items), and self-stigma (6 items). Scoring is based on a 5-point Likert scale where 1 = completely disagree, 2 = disagree, 3 = not sure, 4 = agree, and 5 = completely agree. The minimum score is 19, and the maximum is 95, with higher scores indicating greater perceived stigma among patients [30]. The reliability of this scale was calculated in Brown's study [35].

In the present study, the reliability of the tool was assessed using Cronbach's alpha, yielding a coefficient of α = 0.86. After translating the Diabetes Stigma Assessment Scale into Persin (Farsi), the questions were back-translated into English by an expert. Face validity and content validity were evaluated by ten university faculty members, resulting in high scores for content validity ratio (CVR = 0.93) and content validity index (CVI = 97).

Treatment adherence questionnaire for chronic diseases

The Treatment Adherence Questionnaire for Chronic Diseases was designed and psychometrically evaluated by Seyed Fatemi et al. (2013) [36]. This questionnaire contains 40 questions across 7 domains:

1. Area of interest in treatment (9 questions).
2. Willingness to participate in treatment (7 questions).
3. Ability to adapt to treatment challenges (7 questions).
4. Integration of treatment inhibitors (5 questions).
5. Insistence on treatment (4 questions).
6. Commitment to treatment (5 questions).
7. Measures in the implementation of treatment (3 questions).

The measurement scale in this questionnaire is a 6-point Likert scale, ranging from "completely" with a score of 5 to "not at all" with a score of 0. Higher total scores or higher scores in each category indicate greater adherence of the respondent. Treatment adherence was interpreted based on the percentage of points obtained: very good (75–100%), good (50–74%), average (26–49%), and poor (≤ 25%). The reliability of the questionnaire was calculated in Seyyed Fatemi's study (α = 0.921) [36]. In the present study, the reliability of the instrument was assessed using Cronbach's alpha, yielding a coefficient of α = 0.82.

To conduct the present study, ethical approval was obtained from the research ethics committee of Ardabil University of Medical Sciences. The researcher then approached the Deputy Health Office of Ardabil City. A multi-stage sampling method was used to select the centers, and all patients with type 2 diabetes who met the inclusion criteria were invited to participate. The researcher guided the patients in a quiet environment within the urban health service centers, away from any noise. After explaining the research objectives, written consent was obtained from each participant.

The researcher then explained how to answer the questionnaire to the patients. If any patient did not understand a question, the researcher provided detailed explanations. Data analysis was performed using SPSS version 26 software. Descriptive statistics methods, including frequency distribution tables and numerical indices, were used to analyze the socio-demographic variables of the samples, as well as to evaluate treatment adherence and social stigma. The average score of social

[1] The Type 2 Diabetes Stigma Assessment Scale.

Table 1 Frequency distribution of individual social characteristics of the studied samples

Individual-Social Characteristics		*N* (%)
Gender	Male	207 (47.9%)
	Female	225 (52.1%)
Marital Status	Single	5 (1.2%)
	Married	394 (91.2%)
	Divorced	33 (7.6%)
Education Level	Illiterate	110 (25.5%)
	Literate	84 (19.4%)
	Below Diploma	144 (33.3%)
	Diploma and above	94 (21.8%)
Family History of Diabetes	Yes	278(64.4%)
	No	154(35.6%)
Income Level	Poor	194(44.9%)
	Moderate	191(44.2%)
	Good	47(10.9%)
Employment Status	Employed	236(54.6%)
	Unemployed	196(45.4%)
Presence of Comorbidities	Yes	235(54.4%)
	No	197(45.6%)
Age (years)		56.48 ± 11.3
Disease Duration (years)		8.27 ± 4.08

Table 2 Comparison of social stigma and its dimensions with the criterion value

Social Stigma and Its Dimensions	Mean ± SD	Criterion Value	*p*-value
Different Behavior	18.96 ± 5.30	18	0.001
Blame and Judgment	21.85 ± 5.85	20	0.001
Self-Stigma	18.47 ± 5.39	18	0.07
Social Stigma (total) (19–95)	59.27 ± 5.52	57	0.003

stigma questions and their components was compared with the criterion score.

The following formula was used to calculate the criterion score: the maximum score minus the minimum score divided by two, plus the minimum score [37]. Linear regression, t-tests, independent groups, and one-way analysis of variance were used to investigate the relationship between adherence to diet therapy and social stigma in type 2 diabetes patients in the studied sample.

Results

In this study, 432 patients with type 2 diabetes who were referred to health service centers were evaluated. The results showed that the average age of the patients was 56.48 ± 11.38 years and the duration of the disease was 8.27 ± 4.08 years. Also, 54.4% of the patients had comorbid diseases, and 64.4% of them had a family history of the disease. Other personal and social characteristics are shown in Table No. 1.

According to the results in Table 2, the results showed that the average score of social stigma (59.27 ± 15.52) was higher than the standard value (57), and this difference was statistically significant ($p < 0.003$).

Also, 55.6% of patients reported a high level of perceived social stigma.

According to the results in Table 3, The results showed that the mean score of treatment adherence (97.46 ± 28.79) was lower than the criterion value (100), and this difference was not statistically significant. Also, the average score of commitment to treatment and measures in Treatment Implementation is lower than the criterion value, and this difference was statistically significant ($p < 0.001$).

Also, the majority of patients (59.7%) exhibit moderate treatment adherence.

According to the results in Table 4, there was a statistically significant relationship between the average score of social stigmata of diabetes and both gender and marital status ($p < 0.03$). Additionally, there was a significant relationship between the average score of adherences to treatment and the gender of the patients ($p < 0.02$).

The result showed that there was an inverse and significant relationship between the average score of social stigma of diabetes and adherence to treatment (r = -0.29, $p < 0.001$), indicating that as the average score of social stigma increased, the degree of adherence to treatment among patients decreased. Also, there is a correlation between the set of variables predicting the social stigma of diabetes and its domains, age, duration of the disease, and the dependent variable of treatment adherence in patients.

According to the results in Table 5, there is a correlation between the set of variables predicting the social

Table 3 Comparison of treatment adherence and its dimensions with the criterion value

Treatment Adherence and Its Dimensions	Mean ± SD	Criterion Value	*p*-value
Attention in Treatment	22.77 ± 9.47	22.5	0.55
Willingness to Participate in Treatment	17.73 ± 7.07	17.5	0.49
Ability to Adapt Treatment to Life	17.47 ± 7.41	17.5	0.92
Integration of Treatment to Life	12.48 ± 5.18	12.5	0.94
Persistence in Treatment	9.91 ± 4.23	10	0.68
Commitment to Treatment	11.09 ± 3.38	12.5	0.001
Measures in Treatment Implementation	6.00 ± 3.13	7.5	0.001
Treatment Adherence (0-200)	97.46 ± 28.79	100	0.06

Table 4 Relationship between diabetes stigma, treatment adherence, and Individual-Social characteristics

Individual-Social Characteristics		Social Stigma	*p*-value	Treatment Adherence	*p*-value
Gender	Male	59.32 ± 15.93	0.03	95.95 ± 28.20	0.02
	Female	63.21 ± 15.09		99.10 ± 29.40	
Marital Status	Single	62.20 ± 10.06	0.03	82/40 ± 15/63	0.45
	Married	59.78 ± 15.44		97.45 ± 28.99	
	Divorced	52.73 ± 15.90		99.79 ± 27.75	
Education Level	Illiterate	56.17 ± 16.69	0.10	96.54 ± 28.79	0.78
	Literate	60.95 ± 13.77		100.35 ± 29.97	
	Below Diploma	60.22 ± 15.59		96.69 ± 28.75	
	Diploma and above	59/93 ± 15/19		97.14 ± 28.06	
Family History	Yes	58.41 ± 15.77	0.12	97.64 ± 28.36	0.86
	No	60.82 ± 14.97		97.13 ± 29.63	
Income Level	Poor	60.49 ± 16.71	0.29	98.21 ± 28.81	0.42
	Moderate	58.2 ± 14.91		97.97 ± 29.17	
	Good	59.30 ± 12.36		92.26 ± 27.18	
Employment Status	Employed	59.28 ± 14.68	0.98	97.72 ± 29.93	0.83
	Unemployed	59.26 ± 16.50		97.14 ± 27.43	
Presence of Comorbidities	Yes	58.54 ± 16.25	0.29	97.09 ± 29.10	0.77
	No	60.13 ± 14.59		97.90 ± 28.48	

Table 5 Predictors of treatment adherence and diabetes stigma

Predictor Factors	*r*	r^2	F	Non-Std Coefficient B	SE	Std Coefficient B	t	*P*
Social Stigma	-0.29	0.08	40.61	-0.54	0.08	-0.29	6.37	0. 001
Different Behavior	-0.28	0.08	37.08	-1.52	0.25	-0.28	6.09	0.001
Blame and Judgment	-0.28	0.08	37.66	-1.39	0.22	-0.28	6.13	0.001
Self-Stigma	-0.26	0.07	31.25	-1.39	0.24	-0.26	5.59	0.001
Age	-0.02	0.0004	0.2	0.05	0.12	0.02	0.45	0.001
Disease Duration	0.27	0.07	34.47	0.2	0.26	0.27	5.87	0.001

stigma of diabetes and its sub-components, age, duration of the disease, and the dependent variable of treatment adherence in patients. The adjusted coefficient of determination (r^2) of 0.151 indicates that 15.1% of the total changes in treatment adherence can be explained by age, duration of disease, and social stigma of diabetes. The β value for the age variable (0.05), duration of diabetes (0.20), and disease stigma variable (-0.54) showed the relative contribution of each variable in this prediction, with disease stigma having a greater impact than age and duration of the disease.

Discussion

The present study aimed to determine the relationship between social stigma and treatment adherence in type 2 diabetes patients referred to healthcare centers in the northwest of Iran. The results showed that the majority of patients experienced a high level of perceived social stigma. This finding suggests that the society in which these patients live, including family members, friends, and other community members does not view type 2 diabetes merely as a disease but holds other perceptions about this chronic condition.

This negative perception towards type 2 diabetes creates a negative attitude towards patients and reveals the stigma associated with the disease. This finding is consistent with the results of studies by Pedrero et al. (2021), Li et al. (2017), and Browne et al. (2016) [35, 38, 39]. The stigma is experienced in various settings, including healthcare, work, and family environments, likely due to a lack of adequate knowledge about the disease within society. Higher levels of stigma among patients can reduce their self-efficacy and self-esteem, leading to isolation and depression [39]. In contrast, studies by Lin et al. (2022), Akyirem et al. (2023), and Botchway et al. (2021) have shown that perceived stigma among patients with type 2 diabetes is moderate [21, 40, 41]. The likely reason for the discrepancy between these studies and the present one is the cultural differences in social contexts across societies. Social environments play a crucial role in shaping identities and behaviors [21].

Furthermore, the results indicated that the level of treatment adherence among the majority of patients in this study was moderate, which aligns with findings from studies by Khunti et al. (2019) and Liu et al. (2023) [42, 43]. The results of the present study are inconsistent with those of Sahoo et al. (2022), Nyirongo (2021), and Abebaw (2016) [44–46]. In these studies, the treatment adherence rate was low. Possible reasons for the discrepancy between these studies and the current study include perceived different needs of patients, the distance

to medical centers, economic challenges, and confusing instructions provided by health care providers.

The findings showed that there was an inverse and significant correlation between social stigma and adherence to treatment. In other words, an increase in the average score of perceived social stigma was associated with a decrease in the level of adherence to treatment. This can be explained by the fact that patients who have internalized social stigma experience a reduction in self-esteem and self-efficacy. This, in turn, leads to negative feelings such as anxiety, isolation, shame, depression, dissatisfaction with their condition, self-hatred, and fear of the disease. One of the consequences of these feelings is the refusal of treatment among patients [47], which is consistent with the findings of Lin et al. (2022) [40] and Seo (2021) [48].

The finding that women and unmarried individuals report higher levels of perceived social stigma may reflect deeper cultural attitudes that stigmatize women with chronic conditions and view illness as a potential barrier to marriage. These cultural pressures may reduce social support and intensify feelings of isolation, further complicating diabetes management. This can be attributed to the cultural conditions of the society and its negative attitude towards women suffering from diabetes. It seems that women are under more social pressure than men, resulting in a lack of social support [49]. This finding is consistent with the results of Gredig (2017) and Liu et al. (2017), which showed that the level of stigma perceived by women with diabetes was higher than that perceived by men [30, 50].

In line with the existing literature, unmarried patients may face additional societal scrutiny and reduced social support, which could diminish their motivation to adhere to treatment due to feelings of isolation or perceived lack of worthiness in social contexts. Due to their single status, they may experience blame and negative feelings towards their disease, leading to decreased self-esteem. They are more likely to be under social pressure from family, friends, and other community members, such as not being accepted for marriage due to their illness. The results of the present study showed that the rate of adherence to treatment in women with type 2 diabetes was higher than that of male patients, consistent with the study by Khanjani et al. [14]. This finding suggests that women feel more responsible for adhering to treatment and make greater efforts to prevent complications and negative consequences of type 2 diabetes.

Also, the results of the present study showed that the average score of commitment to treatment and measures in Treatment Implementation is lower than the criterion value, and this difference was statistically significant. This finding is consistent with the results of studies by Tanharo et al. (2018), Khiyali et al. (2021) [51, 52].

According to the other results of the present study, 15.1% of the total changes in treatment adherence could be explained by age and type 2 diabetes duration. The results of Khan et al.'s study (2022) showed a relationship between older age, single status, presence of comorbidities, and duration of type 2 diabetes with poor treatment adherence in patients with type 2 diabetes [53], which aligns with the findings of the present study. In explaining the results, it can be said that older people are more likely to understand the risk of diabetes, thus adhering better to treatment.

Additionally, as a person's age increases, there is a higher risk for the occurrence of diabetes complications. Therefore, to treat diabetes and prevent its complications, patients will need greater adherence to treatment.

Among the advantages of this study is that it is the first in Iran to investigate the relationship between social stigma and treatment adherence in type 2 diabetes patients. This research can serve as a foundation for future similar studies.

Limitations

Among the limitations of the present study, the use of a self-report questionnaire introduces the possibility of bias in the responses. Consequently, the collected information may not fully represent all the facts related to the phenomena under study. Additionally, the psychological state of the participants at the time of answering the questionnaire might have influenced their responses. Efforts were made to encourage accurate completion of the questionnaires by presenting them at an appropriate time and place, thereby aiming to collect valid information.

Conclusion

Our findings revealed a high level of perceived social stigma among the majority of participants, while treatment adherence levels were generally moderate. This suggests an inverse relationship, where increased social stigma was associated with decreased treatment adherence. Notably, females and unmarried patients reported experiencing greater social stigma compared to other groups. Interestingly, despite experiencing higher stigma, females also exhibited a higher rate of treatment adherence. This unexpected finding suggests that other factors beyond social stigma may also influence adherence behavior in patients with type 2 diabetes. Age, disease duration, and social stigma appear to be the most significant factors explaining variations in treatment adherence.

In light of the present study's findings, which highlight the significant negative association between social stigma and treatment adherence in patients with type 2 diabetes, there is a compelling need to prioritize interventions aimed at reducing social stigma and enhancing treatment

adherence in this population. This necessitates a multi-pronged approach involving healthcare professionals and policymakers.

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Author contributions
B. D. conceptualized the study; B. D. and M. S. supervision data collection; MA. M. Database search strategy; M.S. and MA. M. the data and drafted the first version of the manuscript; B. D. reviewed and edited the manuscript; all authors read the revised the manuscript and approved the final version.

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Data availability
The database generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participants
This study strictly followed the principles outlined in the Declaration of Helsinki. The present study was derived from a research project of Ardabil University of Medical Sciences with the code of ethics (IR.ARUMS.REC.1402.096). All participants provided written informed consent before the commencement of the study. The consent form gave the participants a clear understanding of the study's purpose and methods. Participants were also informed of the researchers' commitment to address any questions or concerns and the confidentiality of their information.

Consent for publication
Not applicable.

Competing interests
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