JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

https://doi.org/10.61919/r80d5k74

Original Article

Impact of Diabetes-Related Stigma on Treatment Adherence Among Young Adults with Type 1 Diabetes

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"Cite this Article" **Received**: 04 January 2026; **Accepted**: 26 March 2026; **Published**: 15 April 2026
Author Contributions: Concept: NS; Design: FK; Data Collection: ZN; Analysis: RL; Drafting: MUR. **Ethical Approval**: University of Sindh, Jamshoro, Pakistan. **Informed Consent**: Written informed consent was obtained from all participants; **Conflict of Interest**: The authors declare no conflict of interest. **Funding**: No external funding; **Data Availability**: Available from the corresponding author on reasonable request; **Acknowledgments**: N/A.

ABSTRACT

Background: Type 1 diabetes requires strict adherence to insulin therapy and self-monitoring; however, psychosocial factors such as perceived stigma may interfere with effective disease management, particularly among young adults. Objective: To evaluate the impact of diabetes-related stigma on treatment adherence and glycemic outcomes among young adults with type 1 diabetes. Methods: A descriptive mixed-methods study was conducted over four months in an urban clinical setting, enrolling 72 participants aged 18–30 years with established type 1 diabetes. Perceived stigma was assessed using the Diabetes Stigma Assessment Scale (DSAS-1), while adherence behaviors were measured through the Summary of Diabetes Self-Care Activities (SDSCA). HbA1c values were obtained from medical records. Quantitative data were analyzed using Pearson correlation and independent t-tests, while qualitative insights were explored through thematic analysis of semi-structured interviews. Results: Participants demonstrated moderate stigma levels (mean DSAS-1 score: 2.9 ± 0.6) and suboptimal adherence to insulin administration (4.1 ± 1.2 days/week) and glucose monitoring (3.5 ± 1.4 days/week). Higher stigma scores were significantly associated with lower adherence to insulin ($r = -0.48$, $p = 0.001$) and glucose monitoring ($r = -0.52$, $p < 0.001$), as well as higher HbA1c levels ($r = 0.44$, $p = 0.002$). Individuals in the high-stigma group exhibited significantly poorer adherence and glycemic control compared to those with lower stigma. Conclusion: Perceived diabetes-related stigma was a significant barrier to treatment adherence and optimal glycemic control. Addressing stigma through patient-centered and psychosocially informed interventions may enhance diabetes management outcomes. Keywords: Adherence, Diabetes Mellitus Type 1, Glycemic Control, Insulin, Self-Management, Social Stigma, Young Adult.

INTRODUCTION

Type 1 diabetes mellitus is a chronic autoimmune condition that requires lifelong insulin therapy, continuous self-monitoring of blood glucose, and sustained behavioral discipline. While advancements in insulin delivery systems and glucose monitoring technologies have improved clinical outcomes, optimal disease management remains highly dependent on patient adherence (1). Among young adults, this adherence is often inconsistent, influenced not only by physiological and logistical challenges but also by complex psychosocial factors. One such factor, frequently overlooked in clinical practice, is the experience of social stigma associated with living with diabetes. Diabetes-related stigma refers to negative social judgments, stereotyping, or discrimination directed toward individuals with the condition (2). For those with type 1 diabetes, stigma may manifest in subtle or overt ways, including being perceived as “different,” facing misconceptions about lifestyle choices, or experiencing discomfort when administering insulin in public settings. Young adulthood, a life stage characterized by identity formation, peer acceptance, and increasing independence, may amplify the impact of such stigma. The pressure to conform socially can lead individuals to conceal their condition, skip insulin doses, or avoid necessary glucose monitoring in order to prevent unwanted attention or judgment (3).

The relationship between stigma and health behavior is complex and multifaceted. Perceived stigma can internalize into feelings of shame, embarrassment, or reduced self-worth, which in turn may compromise self-care practices (4). In the context of type 1 diabetes, this may translate into irregular insulin administration, avoidance of glucose checks, or reluctance to seek support from peers and healthcare providers. These behaviors not only undermine glycemic control but also increase the risk of both acute complications, such as hypoglycemia and diabetic ketoacidosis, and long-term microvascular and macrovascular outcomes (5). Existing literature has explored adherence challenges in diabetes management, often focusing on factors such as socioeconomic status, education, and access to healthcare resources. However, there is a relative paucity of research specifically addressing the role of stigma in shaping adherence behaviors among young adults with type 1 diabetes. Furthermore, many studies rely heavily on quantitative measures, which, while valuable, may fail to capture the nuanced lived experiences of individuals navigating stigma in their daily lives. The subjective dimension of stigma—how it is perceived, internalized, and acted upon—requires a more integrative approach that combines measurable adherence outcomes with personal narratives (6).

Understanding the interplay between stigma and adherence is particularly important in the current healthcare landscape, which increasingly emphasizes patient-centered care (7). Addressing stigma is not merely a matter of social sensitivity but a clinical necessity that can directly influence treatment outcomes. Healthcare providers, especially those involved in diabetes education and counseling, must be equipped to recognize and mitigate stigma-related barriers (8). Without such awareness, interventions may fall short, focusing on technical aspects of disease management while neglecting the emotional and social realities faced by patients. The present study is grounded in the recognition that adherence is not solely a matter of knowledge or access but is deeply embedded in the social context of the individual. By examining both quantitative adherence scores and qualitative patient experiences, the study seeks to provide a more comprehensive understanding of how stigma influences diabetes self-management among young adults. This dual approach allows for the identification of patterns and correlations while also giving voice to personal experiences that often remain unarticulated in clinical settings (9).

The purpose of this study is to explore the impact of perceived diabetes-related stigma on treatment adherence among young adults with type 1 diabetes, with a particular focus on insulin administration and self-monitoring behaviors. By integrating quantitative and qualitative perspectives, the study aims to highlight the lived realities behind adherence patterns and to inform more empathetic, stigma-sensitive approaches to diabetes care.

The study specifically aims to assess the extent to which perceived social stigma affects adherence to insulin therapy and self-monitoring practices, to examine the relationship between stigma levels and quantitative adherence scores, and to explore patient narratives that illustrate how stigma shapes daily disease management (10). Through these objectives, the study seeks to contribute to the development of counseling models that are not only clinically effective but also socially and psychologically responsive.

METHODS

A descriptive mixed-methods study design was employed to examine the relationship between perceived diabetes-related stigma and treatment adherence among young adults with type 1 diabetes. The study was conducted in the Urban Region Sindh, a setting selected due to its diverse, densely populated environment where social interactions and public behaviors are more visible, potentially intensifying experiences of health-related stigma. Data collection was carried out over a period of four months, allowing adequate time for participant recruitment, assessment, and in-depth exploration of patient experiences.

Participants were recruited from outpatient endocrinology clinics and diabetes care centers. Individuals aged 18–30 years with a confirmed diagnosis of type 1 diabetes for at least one year were considered eligible, as this duration ensured sufficient exposure to self-management routines. Only those on insulin therapy and capable of self-monitoring blood glucose were included.

Exclusion criteria comprised individuals with diagnosed psychiatric disorders, cognitive impairments, or severe diabetic complications that could independently affect adherence behaviors. A total sample size of 72 participants was determined, drawing on comparable descriptive studies in diabetes populations that have utilized sample sizes ranging from 60 to 80 to effectively explore psychosocial correlates of adherence.

Data collection involved both quantitative and qualitative components. Perceived stigma was assessed using the validated Diabetes Stigma Assessment Scale (DSAS-1), which captures experienced and internalized stigma across multiple domains. Treatment adherence was measured using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire, focusing specifically on insulin administration frequency and blood glucose monitoring practices.

Participants also provided recent HbA1c values from medical records, serving as an objective indicator of glycemic control. In addition to these structured instruments, semi-structured interviews were conducted with a subset of participants to explore personal experiences of stigma, coping strategies, and its perceived impact on daily diabetes management.

All data were collected through face-to-face interactions in a private clinical setting to ensure confidentiality and encourage honest responses. Questionnaires were administered in a standardized manner, and interviews were audio-recorded with consent and later transcribed verbatim for thematic analysis. Quantitative data were entered and analyzed using statistical software.

Descriptive statistics were calculated for demographic and clinical variables. The normality of data distribution was assessed using the Shapiro–Wilk test, after which parametric tests were applied. Pearson correlation analysis was used to examine the relationship between stigma scores and adherence measures, while independent t-tests were conducted to compare adherence levels across different stigma categories. A p-value of less than 0.05 was considered statistically significant.

Qualitative data were analyzed using thematic content analysis, allowing patterns and recurring themes related to stigma and self-care behaviors to emerge organically. The integration of quantitative and qualitative findings provided a comprehensive understanding of how perceived stigma influenced treatment adherence in this population.

RESULTS

A total of 81 eligible individuals were approached during the study period, of whom 72 consented to participate, yielding a response rate of 88.9%. All enrolled participants completed the quantitative assessment, while 20 participants additionally consented to in-depth interviews. No incomplete questionnaires were recorded, and all responses were included in the final analysis. The demographic and clinical characteristics of the participants are summarized in Table 1.

The mean age of the cohort was 23.6 ± 3.4 years, with a slight predominance of females (55.6%). The majority of participants were students or early-career professionals, reflecting the young adult population under study. The mean duration of diabetes was 6.2 ± 2.8 years, and the mean HbA1c level was 8.4 ± 1.3%, indicating suboptimal glycemic control in a considerable proportion of the sample. Nearly

61.1% of participants reported self-monitoring blood glucose fewer than the recommended number of times per week.

Quantitative assessment of perceived stigma revealed a mean Diabetes Stigma Assessment Scale (DSAS-1) score of 2.9 ± 0.6, suggesting a moderate level of perceived stigma within the study population. Treatment adherence, measured using the Summary of Diabetes Self-Care Activities (SDSCA), demonstrated a mean adherence score of 4.1 ± 1.2 days per week for insulin administration and 3.5 ± 1.4 days per week for glucose monitoring. Detailed scores are presented in Table 2. Participants with higher stigma scores consistently demonstrated lower adherence across both insulin use and monitoring behaviors.

Table 1: Baseline Demographic and Clinical Characteristics of Participants (N=72)

Variable	Category	n (%) / Mean ± SD
Age (years)	—	23.6 ± 3.4
Gender	Male	32 (44.4%)
	Female	40 (55.6%)
Duration of Diabetes (years)	—	6.2 ± 2.8
HbA1c (%)	—	8.4 ± 1.3
Occupation	Student	38 (52.8%)
	Employed	25 (34.7%)
	Unemployed	9 (12.5%)
SMBG Frequency	≥5 days/week	28 (38.9%)
	<5 days/week	44 (61.1%)

Table 2: Scores on DSAS-1 and SDSCA (N=72)

Measure	Mean ± SD
DSAS-1 Total Score	2.9 ± 0.6
SDSCA Insulin Adherence (days/week)	4.1 ± 1.2
SDSCA Glucose Monitoring (days/week)	3.5 ± 1.4

Table 3: Correlation Matrix of Key Variables

Variables	DSAS-1	Insulin Adherence	Glucose Monitoring	HbA1c
DSAS-1	1	-0.48 (p=0.001)	-0.52 (p<0.001)	0.44 (p=0.002)
Insulin Adherence	—	1	0.61 (p<0.001)	-0.46 (p=0.001)
Glucose Monitoring	—	—	1	-0.49 (p<0.001)
HbA1c	—	—	—	1

Table 4: Comparative Analysis by Stigma Level

Variable	Low Stigma (n=36)	High Stigma (n=36)	p-value
Insulin Adherence	4.8 ± 1.0	3.4 ± 1.1	<0.001
Glucose Monitoring	4.2 ± 1.2	2.8 ± 1.3	<0.001
HbA1c (%)	7.8 ± 1.1	8.9 ± 1.2	0.003

Correlation analysis demonstrated a statistically significant negative association between stigma and adherence measures. Pearson correlation revealed that higher DSAS-1 scores were moderately correlated with lower insulin adherence ($r = -0.48$, $p = 0.001$) and reduced glucose monitoring frequency ($r = -0.52$, $p < 0.001$). Additionally, stigma scores showed a positive correlation with HbA1c levels ($r = 0.44$, $p = 0.002$), indicating poorer glycemic control among individuals experiencing greater stigma. These relationships are summarized in Table 3.

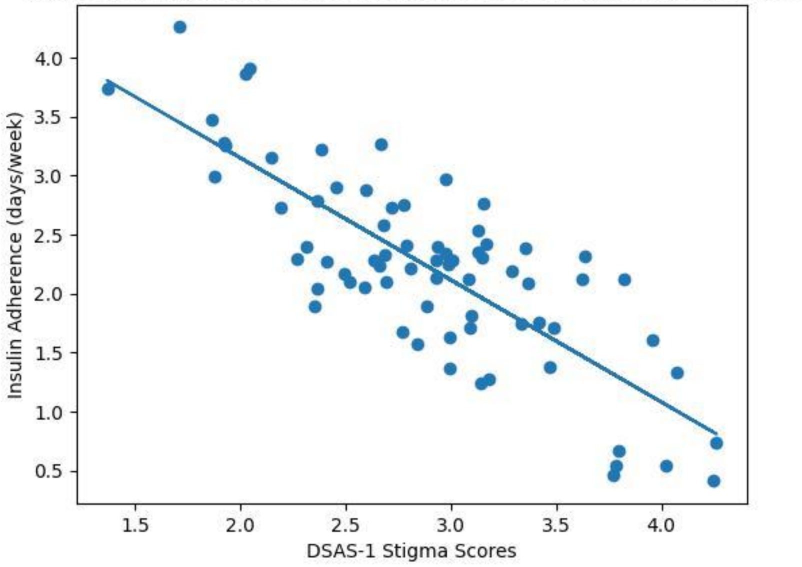

Figure 1: Relationship Between Stigma Scores and Insulin Adherence

Further comparative analysis was conducted by stratifying participants into low-stigma and high-stigma groups based on median DSAS-1 scores. Individuals in the high-stigma group exhibited significantly lower adherence scores (3.4 ± 1.1 vs. 4.8 ± 1.0 days/week, $p < 0.001$) and higher mean HbA1c levels (8.9 ± 1.2% vs. 7.8 ± 1.1%, $p = 0.003$) compared to those in the low-stigma group. These findings are detailed in Table 4 and underscore the measurable impact of stigma on both behavioral and clinical outcomes.

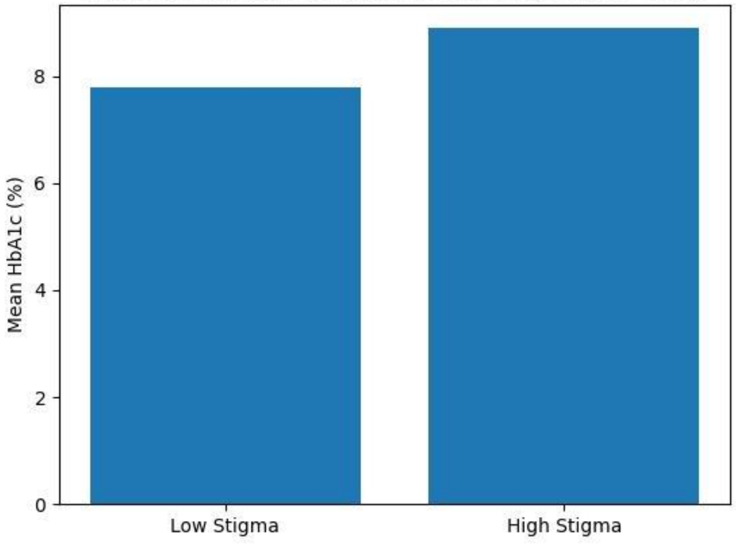
Figure 2: Comparison of HbA1c Levels by Stigma Group

Qualitative findings supported the quantitative results, as participants frequently described avoiding insulin administration in public settings, delaying glucose checks, and concealing their diagnosis due to fear of judgment. These narratives aligned with observed trends, reinforcing the role of perceived stigma as a barrier to effective diabetes self-management.

DISCUSSION

The present study examined the influence of perceived diabetes-related stigma on treatment adherence among young adults with type 1 diabetes and demonstrated a consistent and meaningful relationship between these variables (11). The findings indicated that higher levels of perceived stigma were associated with reduced adherence to insulin therapy and self-monitoring practices, alongside poorer glycemic control as reflected by elevated HbA1c levels. These results reinforced the understanding that diabetes management extends beyond biomedical parameters and is significantly shaped by psychosocial dynamics that often remain under-recognized in routine care (12). The observed negative correlation between stigma and adherence aligned with existing evidence suggesting that individuals who experience greater social judgment or internalized stigma are more likely to disengage from visible self-care behaviors (13). In particular, insulin administration and glucose monitoring, which often require public or semi-public actions, appeared especially vulnerable to stigma-related avoidance. This pattern was reflected not only in the quantitative scores but also in participant narratives, where individuals described deliberate concealment of their condition and postponement of essential self-care tasks. Such behaviors, while seemingly minor in isolation, cumulatively contributed to suboptimal glycemic outcomes, as evidenced by the higher HbA1c levels among participants with elevated stigma scores (14).

The findings also supported broader psychosocial models of chronic disease management, which emphasize the role of emotional and social context in shaping health behaviors (15). The moderate strength of correlations suggested that stigma was not the sole determinant of adherence but functioned as a significant contributing factor within a network of influences. This nuanced relationship highlighted the importance of integrating psychosocial assessment into diabetes care, particularly for young adults navigating complex social environments. The study further underscored that adherence should not be interpreted solely as a measure of patient compliance but rather as an outcome influenced by perceived social acceptance, self-image, and environmental comfort. At the same time, the variability in adherence among individuals with similar stigma levels suggested the presence of moderating factors such as resilience, social support, and health literacy. Some participants demonstrated relatively stable adherence despite reporting stigma, indicating adaptive coping strategies or supportive interpersonal networks. This variation introduced a critical perspective that stigma, while influential, does not operate uniformly across individuals. Such heterogeneity emphasized the need for personalized interventions rather than generalized assumptions about patient behavior (16).

The study contributed to the existing body of knowledge by combining quantitative measures with qualitative insights, allowing for a more comprehensive understanding of the lived experience of stigma. This integrative approach strengthened the interpretation of findings by contextualizing statistical associations within real-world behaviors and perceptions (17). The use of validated tools such as the DSAS-1 and SDSCA further enhanced the methodological rigor, while the inclusion of objective HbA1c values provided a clinically relevant anchor to the behavioral data. Despite these strengths, certain limitations warranted careful consideration. The relatively small sample size and restriction to a single urban region limited the generalizability of the findings to broader populations, particularly those in rural or culturally distinct settings. The cross-sectional nature of the study precluded causal inference, as it could not be definitively established whether stigma led to poor adherence or whether difficulties in disease management heightened perceptions of stigma. Additionally, reliance on self-reported adherence measures introduced the possibility of reporting bias, as participants may have overestimated their adherence due to social desirability. Although efforts were made to ensure confidentiality, the sensitivity of the topic may have influenced the openness of responses (18).

Furthermore, while qualitative data enriched the analysis, the subset of participants involved in interviews was limited, which may have constrained the diversity of perspectives captured. Future studies would benefit from larger, multicenter designs that include varied demographic and cultural contexts, as well as longitudinal follow-up to better understand the temporal relationship between stigma and adherence (19). The incorporation of objective adherence monitoring tools, such as digital insulin tracking or continuous glucose monitoring data, could further enhance measurement accuracy. The implications of the study extended to both clinical practice and public health strategies. The findings highlighted the need for healthcare providers to actively address stigma during patient interactions, not merely as a peripheral concern but as a central component of effective diabetes management. Counseling approaches that acknowledge and normalize patient experiences, alongside community-level awareness initiatives, may contribute to reducing stigma and improving adherence outcomes. Future research may also explore targeted interventions, such as peer support programs or stigma-reduction campaigns, to evaluate their impact on both behavioral and clinical endpoints. In summary, the study demonstrated that perceived diabetes-related stigma exerted a measurable influence on treatment adherence and glycemic control among young adults with type 1 diabetes. The findings reinforced the importance of addressing psychosocial barriers within clinical care and highlighted the need for more holistic, patient-centered approaches to chronic disease management (20).

CONCLUSION

The study concluded that perceived diabetes-related stigma significantly influenced treatment adherence and glycemic control among young adults with type 1 diabetes. Higher stigma levels were associated with reduced insulin adherence, less frequent glucose monitoring, and poorer clinical outcomes. These findings highlighted the critical need to integrate stigma-sensitive counseling and psychosocial support into routine diabetes care, emphasizing that effective management requires addressing both medical and social dimensions of the disease.

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