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Medication Adherence, Self-Care Management and Quality of Life among Young Adults with Type 1 Diabetes Mellitus

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ABSTRACT

The present study aimed to examine how medication adherence and self-care management predict the quality of life outcomes among young adults with type 1 diabetes mellitus. A quantitative, cross-sectional survey research design was employed. The sample size was N = 150 young adults, with n = 75 males, n = 75 females, with an age range of 18-30 years (M=24, SD=3.5) were engaged by using a non-probability purposive sampling technique. The participants demonstrated moderate levels of medication adherence (M=6.8, SD=1.2) and moderate to high levels of self-care management (M=68.4, SD=10.5), while their reported quality of life was at an average level (M=59.6, SD=8.9). Significant positive relationships were found among medication adherence with self-care management (r = .37**, p < .01) and quality of life (r = .41**, p < .01). Furthermore, self-care management emerged as the strongest predictor of quality of life (β = .48, p < .001), followed by medication adherence (β = .29, p < .01). The study reveals that focusing only on medication may be insufficient. Instead, the quality of life of young adults having T1DM can be improved significantly through comprehensive and integrated self-care management.

Introduction

Type 1 diabetes mellitus (T1DM) is a chronic autoimmune disease that demands continuous and multidimensional self-management such as insulin administration, blood glucose monitoring, diet regulation and physical exercise (Elsayed et al., 2023; Shiel et al., 2023a). Although diabetes treatments have significantly improved, young adults with T1DM still encounter distinct challenges during their transition to adulthood (Al-Worafi, 2023; de Beaufort et al., 2023; Mistry et al., 2022). Such as they often experience difficulty in maintaining adherence to the medication and effective self-care routines due to their increasing responsibilities of professional, academic, personal and social lives (Khadilkar & Oza, 2022; Vitale et al., 2024). However, the young adults with poor disease management

suffer psychological distress and poor metabolic control, which ultimately compromise their quality of life (Cengiz et al., 2024; van Duinkerken et al., 2020).

The adherence to medication and self-care are two key elements affecting the health outcomes of persons with T1DM (Xie et al., 2023). Medication adherence promotes successful glycemic control, but greater self-care behaviors, like as regular blood glucose testing, dietary adjustment, stress management and physical activity, make the foundation of daily disease management (Masadeh & Saleh, 2023; Sińska et al., 2022). Several studies have revealed the synergistic association between adherence, self-care activities and better biological and psychological results (Alzawahreh & Ozturk, 2024) . Despite the vital significance of this behavior, young adults usually show inconsistent engagement in adherence and self-care activities, leading to a decline in both physical health and quality of life (Montali et al., 2022; Vitale et al., 2024).

In diabetes research, the assessment of quality of life is considered a fundamental component in diabetes studies rather than relying solely on the conventional clinical indicator like HbA1c levels (Sarfo et al., 2023; Speight et al., 2023). Because it not only addresses physical health but also psychological, emotional and social well-being. The quality of life in individuals with T1DM can be greatly compromised by the cumulative effect of disease burden, intensive treatment, financial difficulties and perceived social stigma (Núñez-Baila et al., 2024) . Therefore, understanding how medication adherence and self-care management behaviors can help to shape the quality of life is essential for developing targeted interventions that promote the overall health and well-being of individuals suffering from T1DM (Aljawarneh et al., 2023; Fayyaz et al., 2024). So far, much of the research has been conducted in Western countries, with relatively few studies exploring how these relationships affect young adults with T1DM in South Asian countries such as Pakistan, where social, cultural and healthcare dynamics are very different. Because factors such as family support, health literacy, gender roles and availability of healthcare services may uniquely influence both disease management and quality of life outcomes. Therefore, region-specific research is greatly needed to guide the development of better culturally appropriate interventions (Khan et al., 2021; Tariq et al., 2022).

To address this gap, the present study aims to investigate medication adherence, self-care management and quality of life among young adults with T1DM in Lahore, Pakistan. Particularly, the objectives of the study are to; (i) evaluate the current levels of medication adherence, self-care behaviors and quality of life; (ii) explore the interrelationships among these variables; (iii) investigate the impact of medication adherence and self-care management on quality of life; and finally (iv) determine the potential gender differences. By conducting this research work within a South Asian urban context, this study allows a better understanding of T1DM management among young adults and offers insights for the development of culturally appropriate, comprehensive health care guidance aimed at improving both physical health and psychosocial well-being.

Methods

2.1 Study Design

In this study, a quantitative, cross-sectional survey research design was applied to examine the relationships among self-care management, medication adherence and quality of life in young adults with T1DM. This research design is well-suited for examining correlation and predictive relationships among the variables within a specific timeframe.

2.2 Participants

The sample consisted of N = 150 young adults, n = 75 males, n = 75 females aged between 18 to 30 years (Mean = 24, Standard Deviation = 3.5) diagnosed with T1DM. A purposive non-probability sampling approach was adopted for recruiting the participants from a range of private and public hospitals in Lahore, Pakistan.

2.3 Inclusion Criteria

The participants were included;,(i) diagnosed with T1DM for at least 1 year; (ii) aged between 18 and 30 years; (iii) have the ability to read and understand Urdu or English, and (iv) willing to participate and provide informed consent.

2.4 Exclusion Criteria

The patients were excluded, (i) having comorbid psychiatric conditions or severe physical illness; (ii) type 2 or gestational diabetes; (iii) hospital staff having T1DM were not included, and (iv) individuals with severe cognitive impairments that hinder their understanding or completion of the surveys.

2.5 Instruments

To gather data for the present study, a structured questionnaire was utilized, comprising both researcher-developed and standardized instruments. All scales were translated into Urdu through a standardized forward and backward translation procedure to ensure cultural and linguistic equivalence.

2.5.1 Demographic Information Sheet (DIS)

The DIS was compiled by the researcher to acquire the necessary background information from the respondents. The variables included in the DIS were gender, age, socioeconomic status, qualification and duration of diagnosis and type of medical healthcare facilities availed. This information helped to characterize the sample and control for demographic variables that might influence the results of the study.

2.5.2 Medication Adherence Rating Scale (MARS)

The MARS was used to evaluate the adherence of the participants to prescribed medication routines. The 10-item self-report instrument was designed by Thompson et al. specifically for individuals with chronic illnesses and to evaluate behaviors such as intentional non-adherence, forgetfulness, and beliefs regarding medication necessity and side effects. Each response is recorded as either “yes” or “No” and scored such that “No” responses are assigned 1 point and “Yes” responses 0 points, resulting in a cumulative score between 0 to 10. In this measure, greater adherence is represented by a higher score. The MARS has demonstrated acceptable psychometric properties, with internal consistency ranging from $\alpha = .75$ to .85 (Thompson et al., 2000). The scale was translated into Urdu to ensure compatibility with the targeted study population.

2.5.3 Self-Care Inventory-Revised (SCI-R)

The adherence to diabetes-specific self-care behaviors within the preceding month was assessed through the SCI-R scale. This scale includes 15 statements, with responses recorded on a “5-point Likert scale ranging from 1 (Never) to 5 (Always)”. It covers critical domains including insulin use, self-monitoring of blood glucose levels, dietary regulation, physical activity and responses to glycemic abnormalities. The overall score varies between 15 to 75, with greater values indicating stronger adherence to self-care practice. The SCI-R instrument has a satisfactory reliability score of .85 (Weinger et al., 2005). The instrument was translated into Urdu to ensure cultural and linguistic relevance for the target population.

2.5.4 Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-Q-SF)

The Q-LES-Q-SF was adopted to examine the perceived quality of life of the participants across different domains, such as physical health, work, social relationships, mood, leisure activities and household responsibilities. This scale comprises 16 items, where the first 14 contribute towards the total score and the final two evaluate the overall life satisfaction and medication satisfaction. The items are rated on a “5-point Likert scale ranging from 1 (very poor) to 5 (very good)”, resulting in a total score from 14 to 70 points. Life satisfaction and enjoyment increase as the score becomes higher. The Q-LES-Q-SF has shown excellent

reliability of .90 (Stevanovic, 2011) . The Urdu version used in this study was produced through rigorous translation to maintain conceptual accuracy and cultural sensitivity.

2.6 Procedure

The study received formal approval from the Head of the Applied Psychology Department and the Board of Studies (BOS) at Lahore College for Women University, Lahore, Pakistan. An authority letter confirmed the researcher's institutional affiliation and outlined the study's purpose as part of the MS in Health Psychology program. Necessary permissions were also secured from the administrative authorities of participating hospitals. Participants were approached in outpatient departments and diabetes clinics during routine follow-up visits. The purpose and scope of the research were clearly explained and participants were given an information sheet detailing their rights, including confidentiality, anonymity and the voluntary nature of participation. Written informed consent was obtained before administering the questionnaire. Data collection was conducted over three months, with each session lasting approximately 20-30 minutes. Questionnaires were completed individually by participants in a quiet setting within the clinic premises. Assistance was provided by the researcher in cases where clarification was needed. No monetary compensation was offered to participants, although verbal appreciation and feedback were provided upon request.

2.7 Data Analysis

The dataset was analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, e.g., means, SDs, and frequencies, were calculated to summarize the sample demographics and extent of adherence to prescribed medication, self-care management and quality of life. Furthermore, Pearson correlation coefficients were calculated to determine the association among medication adherence, self-care management and quality of life of the individuals. Multiple regression analysis was also conducted to evaluate the strongest predictors of quality of life. Gender differences were examined using independent sample t-tests. A significance level of $p < .05$ was maintained throughout all statistical tests.

Results

Table 1: *Demographic and social characteristics of individuals with type 1 diabetes.*

Characteristics	*n*	%
Gender		
Male	75	50
Female	75	50
Age Range		
18-24 years	82	54.7
25-30 years	68	45.3
Educational Level		
Secondary Education	42	28
Undergraduate Degree	93	62
Postgraduate Degree	15	10
Duration of Diabetes		
1-5 years	48	32
More than 5 years	102	68
Socioeconomic Status		
Low-Income	45	30
Middle-Income	83	55
High-Income	22	15
Type of Healthcare Facility		

Diabetes Specialty Clinic	108	72
General Healthcare Facility	42	28

Table 1 reports the socio-demographic characteristics of type 1 diabetes patients. The final sample comprised 150 young adults diagnosed with T1DM. Among all the participants, 75 (50%) were male and 75 (50%) were female, ensuring an equal gender distribution. The ages of participants ranged from 18 to 30 years, with a mean of approximately 24 years (SD=3.5). Regarding educational background, 62% of participants had completed undergraduate education, 28% had completed secondary education, and 10% had attained postgraduate degrees. The majority of participants (approximately 68%) reported living with T1DM for more than five years, while the remaining 32% had been diagnosed within the past one to five years. In terms of socioeconomic status, 55% of the sample came from middle-income families, 30% from low-income backgrounds and 15% from high-income families. Most of the participants (approximately 72%) were receiving regular follow-up care at diabetes special clinics, whereas the remaining 28% attended general healthcare facilities for their management.

Table 2: *Descriptive statistics and psychometric properties of scales*

Scales	*M*	*SD*	Range	Cronbach's α
Medication Adherence Scale	6.8	1.2	2-8	.69
Self-Care Management Scale	68.4	10.5	26-72	.76
Quality of Life Scale	59.6	8.9	32-63	.79

Table 2 presents both the descriptive statistics and psychometric properties for the scales employed in the present study. Descriptive statistics showed moderate adherence to medication (M = 6.8, SD = 1.2), moderate to high self-care practices (M = 68.4, SD = 10.5) and average quality of life scores (M = 59.6, SD = 8.9). The Cronbach's α value for Medication Adherence Scale was .69, Self-Care Management Scale was .76 and Quality of Life Scale was .79, which indicated the accurate internal consistency, suggesting it is a more reliable measure in this sample.

Table 3

Correlation among medication adherence, self-care management and quality of life among the subscales

Note. ***$p < .001$;

Table 3 shows that medication adherence has significant positive correlation with self-care

Variables	1	2	3
Medication Adherence	-		
Self-Care Management	.37**	-	
Quality of Life	.41**	.54***	-

management ($r = .37^{**}$, $p < .01$) and significant relationship with quality of life ($r = .41^{**}$, $p < .01$). Moreover, the results exposed that self-care management has significant positive relationship with quality of life ($r = .54^{***}$, $p < .001$).

Table 4

Multiple linear regressions showing the effect of medication adherence and self-care management on quality of life.

Variables	*B*	*SE*	*t*	*p*	95%CI
Constant	2.34	0.45	5.20	.000	[1.45, 3.23]

Medication Adherence	.42	.15	2.80	.004	[0.13, 0.71]
Self-Care Management	.65	.10	6.5	.000	[0.45, 0.85]

Note: "$p < .05$; **$p < .01$; ***$p < .001$; B = unstandardized coefficients; SE = standard error; CI= confidence interval".

Table 4 shows the impact of medication adherence and self-care management on quality of life among patients having T1DM. An R^2 value of .42 indicates that 42% of the variance in the dependent variable was explained by the predictors F (2, 147) = 27.43, $p < .001$. The results indicated that self-care management was a stronger predictor of quality of life (β = .48, $p < .001$) compared to medication adherence (β = .29, $p < .01$).

Summary of Findings

The following findings were obtained from the results: the study included 150 young adults with T1DM aged 18-30 from various hospitals in Lahore. Participants showed moderate medication adherence (M = 6.8), moderate to high self-care (M = 68.4) and average quality of life (M = 59.6). All three variables, self-care management, medication adherence and quality of life are significantly and positively correlated. Self-care management demonstrated the most predictive value for quality of life, followed by medication adherence. No gender differences were found in adherence, self-care and quality of life. The scales used were reliable, as confirmed by Cronbach's alpha values. The findings emphasize the importance of empowering young adults with T1DM through education and strategies that enhance both medication adherence and self-care practices to improve quality of life.

Discussion

This study investigated medication adherence, self-care management and quality of life among young adults with T1DM in Lahore, Pakistan, contributing important insights into a population often underrepresented in diabetes research. The participants exhibited moderate medication adherence, moderate to high levels of self-care management and an average quality of life. These findings align with previous literature, which often highlights the difficulties faced by young adults with T1DM in maintaining optimal adherence and self-management behaviors, especially during the transition to independent adulthood when academic, social and occupational pressure intensify (Gutierrez-Colina et al., 2020; Serrabulho et al., 2014; Shiel et al., 2023b) . However, the moderate adherence levels observed here contrast slightly with findings from Sawyer et al. (2022) in Western populations, where lower adherence rates were more commonly reported, suggesting that sociocultural and familial structures in South Asian contexts may play a protective role (Sawyer et al., 2022).

Importantly, significant positive correlations were found among self-care management, medication adherence, and quality of life. This is consistent with earlier studies demonstrating that higher adherence and involvement in self-care activities related to diabetes are associated with better health and psychosocial outcomes (Almeida et al., 2023; Fayyaz et al., 2024) . It emphasizes the interconnectedness of medical, behavioral and psychosocial aspects of diabetes management, indicating that interventions enhancing both adherence and comprehensive self-care practices can synergistically improve quality of life (Alzawahreh & Ozturk, 2024; Chantzaras & Yfantopoulos, 2022) . The study revealed that self-care management has the most significant predictive relationship with the quality of life, followed by medication adherence. These results align with the recent literature that non-pharmacological strategies such as physical exercise, dietary regulation, routine glucose monitoring and stress management greatly impact the daily functioning and life satisfaction of an individual beyond pharmacological interventions (Almeida et al., 2023; Fayyaz et al., 2024). This prioritization of self-care over medication-centered models reflects a paradigm shift in recent diabetes care frameworks. Which increasingly advocates for an overall patient-centered approach rather than only reliance on pharmacological adherence (Cleves-Valencia

et al., 2024; Zhang et al., 2024). Self-care management scores observed in this study were relatively higher compared to earlier studies, potentially reflecting growing diabetes awareness and educational efforts in urban Pakistani centers (Bombaci et al., 2024; Zulfiqar et al., 2023). While in high-income countries, technological interventions like continuous glucose monitors (CGMs) and mobile health applications have largely driven improvement in middle-income settings like Pakistan, other mechanisms, such as strong familial support and community-based health initiatives, may have fostered better engagement with self-care behaviors even with limited technological access. Nonetheless, the influence of emerging telehealth and mobile health solutions in urban environments cannot be ignored, as recent research suggests that early-stage adoption of mobile technologies is starting to impact diabetes management behaviors positively, even in resource-constrained areas (Ubaid Ur Rehman et al., 2020; Zhang et al., 2024). The quality of life scores reported in this study are consistent with those reported in prior research, suggesting that despite the medical advancement, they have improved physiological and survival outcomes, young adults with type one diabetes are facing psychosocial issues. Factors such as emotional distress associated with diabetes, financial challenges of ongoing treatment, fear of hypoglycemia, and experience of social stigma remain the key contributors to undermining the quality of life (Bronner et al., 2020; Monaghan et al., 2015). These challenges are further intensified during young adulthood. When individuals are striving for independence while coping with the ongoing demands of chronic illness, disease management. Another notable observation of the current study was the absence of gender differences in medication adherence, self-care management and quality of life. This diverges from earlier reports that suggested gender specific patterns, such as higher self-care among females but greater emotional distress. The absence of gender disparities in this study may reflect changing gender norms, improved equality in healthcare access and more uniformly delivered diabetes education in urban Pakistan. It also points toward the possible success of culturally sensitive interventions that have begun to bridge gender gaps previously observed in self-care practices and psychosocial outcomes (Castellano-Guerrero et al., 2020). This study provides several distinct insights into the existing literature. Such as in contrast to most of the T1DM studies carried out in Western contexts, this study presents data from the South Asian urban population, revealing the culturally and intuitively driven difference in diabetes-care practices (Virmani et al., 2021). Furthermore, by identifying the stronger influence of self-care management on quality of life, this research work supports a paradigm shift from the adherence dominance model towards a more inclusive lifestyle-centered diabetes management approach. Although this study did not directly examine the technology use, the relatively high self-care scores among participants suggest that even a minimal exposure to the telehealth or mobile diabetes education tools may already positively influence the management behaviors of young adults, which aligns with technological trends described in the recent literature. Finally, the lack of gender difference points out the importance of tailored education and support interventions that equally engage both males and females in effective diabetes management (Virmani et al., 2021).

Conclusion

This study explored the relationships among medication adherence, self-care management and quality of life in young adults with T1DM in Lahore, Pakistan. Findings revealed that while participants demonstrated moderate adherence to medication and moderate to high engagement in self-care behaviors, their overall quality of life remained at an average level. Significant positive correlations were observed among all three variables, with self-care management emerging as the strongest predictor of quality of life, followed by medication adherence. Furthermore, no significant gender differences were detected across adherence, self-care and quality of life, suggesting similar patterns across male and female participants. These results underline the critical importance of developing interventions that

simultaneously enhance medication adherence and strengthen self-care skills to overall improve the quality of life for young adults living with T1DM.

Limitations and Suggestions

Although this research work presents valuable findings but there are still a few limitations that should be acknowledged. Since the sample consisted of 150 individuals from particular hospitals in Lahore, Pakistan, the findings may restrict the generalizability to a more diverse population and healthcare systems. As the study employs the correctional approach, which limits its causal interpretation, it observes variables at a single point without temporal changes. Data collection relied on self-reported measures, which may be subject to limitations of recall inaccuracies or the inclination to respond in a socially acceptable manner. Moreover, the study addressed medication adherence and self-care management without considering other influential factors such as socioeconomic status, family dynamics and psychological well-being. Longitudinal studies are recommended for future research to monitor the quality of life and changes in self-care management and medication adherence over time. To increase the applicability of the results across more populations, subsequent research should involve larger and more diverse samples across different geographic and socioeconomic contexts. Furthermore, the addition of variables such as mental health, self-efficacy and social support systems could offer an in-depth insight into the variables impacting the quality of life of young adults having T1DM.

Implications

The results of this study carry meaningful implications for clinical practice, healthcare policy and diabetes education programs. The integrated education program designed by the healthcare provider should address not only medication adherence but also strengthen self-management skills encompassing dietary regulation, physical activity, stress management and psychological resilience. Psychological support services, including counseling and peer support groups, should be included in standard care to address emotional and motivational barriers to effective diabetes management. Policymakers and healthcare systems must prioritize the development of technology-driven interventions such as mobile applications and telehealth services to provide continuous support, monitoring and education for young adults with T1DM. Diabetes educators, nurses and allied health professionals should adopt individualized care models that are sensitive to the unique developmental challenges and lifestyle transitions faced by young adults, which may promote empowerment, self-efficacy and long-term success in disease management.

Declaration of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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