

Non-adherence to Oral Diabetes Medication: Investigating the Role of Socioeconomic Factors and Their Influence on Treatment Compliance

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Abstract

Objective: To investigate association between socioeconomic factors and non-adherence to oral diabetes medication among adult patients with diabetes.

Material and Methods: This was a hospital-based cross-sectional analytical study conducted from January to July 2023 in outpatient department of Bahawal Victoria hospital Bahawalpur. Sample size calculated at anticipated population proportion of 54.4%, level confidence 95% and margin of error 5% was 375. Ethical approval was taken from institutional ethical review committee. Non-probability consecutive sampling method was used to recruit participants. Structured questionnaire was used for data collection. Data was analyzed by SPSS version 22.0. Medication adherence was measured using Morisky 8-Item Medication Adherence Scale (MMAS-8). Self-reported reasons for non-adherence were noted. Chi square test was used to see any statistically significant difference between groups and p-value <0.05 was considered significant.

Results: Mean age of patients was 55±12.37 years. Majority of study subjects 33.9% were between 51-60 years, 56.3% were male, 68.5% participants were currently married, 33.6% patients were doing private job and 48.0% participants had monthly family income of ≤50,000. Family history of diabetes mellitus was positive in 67.7% patients. Age of patients was significantly associated with adherence to anti-diabetic medications (p=0.007). Family history of diabetes mellitus was also significantly associated with adherence to anti-diabetic medications (p<0.001). Most frequent reason for skipping medicine was away from home in 41.6% patients.

Conclusion: Study revealed high frequency of non-compliance with diabetic treatment and counseling about significance of adhering to prescribed treatments is necessary.

Keywords: Diabetes medication, Non-adherence, Socioeconomic factors

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Introduction

Diabetes is a significant global health challenge, characterized by chronic hyperglycemia

resulting from defects in insulin secretion, insulin action, or both. According to the International Diabetes Federation (IDF), approximately 463 million people worldwide were living with diabetes in 2019, and this number is projected to rise to 578 million by 2030. The disease not only poses severe health risks, including cardiovascular complications, neuropathy, and retinopathy but also imposes a substantial economic burden on healthcare systems and societies. Effective management of diabetes through medication adherence is critical to achieving optimal disease control and reducing the risk of complications.¹⁻³

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Adherence to diabetes medication is a cornerstone of successful diabetes management. Medication adherence refers to the extent to which patients take their prescribed medications as instructed by healthcare providers.⁴ Proper adherence to diabetes medications, such as oral hypoglycemic agents and insulin, can help regulate blood glucose levels, prevent acute hyperglycemia and hypoglycemia episodes, and improve overall health outcomes. Non-adherence to medication is associated with poorer glycemic control, increased hospitalizations, higher healthcare costs, and a higher risk of diabetes-related complications.^{5,6}

Non-adherence to diabetes medication remains a significant concern globally. Studies have reported varying rates of medication non-adherence, with some estimating rates as high as 50%.^{7,8} The reasons for non-adherence are complex and multifactorial, encompassing patient-related factors, healthcare system factors, and medication-related factors. Despite the well-documented adverse consequences of non-adherence, addressing this issue remains challenging. To develop effective interventions, it is crucial to identify the specific factors contributing to medication non-adherence among individuals with diabetes.⁹ While previous research has investigated various factors influencing medication adherence in diabetes, there is a significant gap in understanding the role of socioeconomic factors in contributing to non-adherence. Socioeconomic factors, including income, education, health insurance coverage, and social support, have been shown to influence health behaviors and healthcare access. However, their specific impact on medication adherence among individuals with diabetes has not been extensively explored. Addressing this gap will provide valuable insights into tailoring interventions to improve adherence in diverse populations.^{10,11}

Socioeconomic disparities have been well-documented in diabetes management, with individuals from lower socioeconomic backgrounds experiencing higher rates of complications and poorer health outcomes. Examining the relationship between socioeconomic factors and medication adherence is crucial to understanding how these disparities arise and persist. Identifying potential modifiable factors associated with adherence will aid in developing targeted strategies to bridge the gap and promote equitable diabetes care.^{12,13}

This research holds significant implications for diabetes management and healthcare policy. By gaining a comprehensive understanding of how socioeconomic factors influence medication adherence, healthcare providers and policymakers can design targeted interventions to improve adherence rates and ultimately enhance patient outcomes. Reducing non-adherence rates can lead to improved glycemic control, reduced healthcare costs, and a decrease in diabetes-related complications. Moreover, the findings of this study will contribute to the broader efforts to address health disparities and promote equitable access to diabetes care for all individuals, regardless of their socioeconomic background.

Materials and Method

This was a hospital-based cross-sectional analytical study conducted from January to July 2023 in outpatient department of Bahawal Victoria hospital Bahawalpur. The sample size calculated for the study at anticipated population proportion of 54.4% (Non adherence to anti-diabetic medication), level confidence 95% and margin of error 5% was 375. All participants were provided written informed consent before participation in the study and ethical approval was taken from institutional ethical review committee. The objectives and procedures of the study were briefed to the study subjects in their native language by the data collection team. Participation in the survey was voluntary, and participants were informed that refusal to participate would not affect the services provided to them. A non-probability consecutive sampling method was used to recruit eligible participants to the study. Adult with more equal to eighteen years of age with a confirmed physician diagnosis of type 2 diabetes mellitus and taking treatment during the study period were included in the study. Patients with mental impairment which may have limited their cognitive ability to participate in the study were excluded.

A structured questionnaire was used for data collection. Study subjects were interviewed through face-to-face interviews. During the data collection, random checks were carried out by the principal investigator to ensure the quality of data. All data were entered and analyzed by using a SPSS version 22.0. Medication adherence was measured using the Morisky 8-Item Medication Adherence Scale

(MMAS-8) questionnaire. Total scores on the MMAS-8 ranged between 0 and 8, with a score of more than 6 was labeled as adherence and <6 as non-adherence. The questionnaire contained information on socio-demographic characteristics (i.e., sex, age, marital status, monthly gross family income, and education), family history of diabetes and medication use. Self-reported reasons by the study subjects for non-adherence to anti-diabetic medication were also noted. Cross tabulation of socio-demographic variables and adherence to anti-diabetic medication was done and chi square test was used to see any statistically significant difference between the groups and p value less than 0.05 was taken as significant.

Results

This was a hospital-based cross-sectional analytical study conducted from January to July 2023 in outpatient department of Bahawal Victoria hospital Bahawalpur. The sample size calculated for the study

Table 1: Socio-demographic characteristics of study subjects

Variables		Frequency	Percentage
Age (Years)	≤30	23	6.1%
	31-40	51	13.6%
	41-50	83	22.1%
	51-60	127	33.9%
	≥ 61	91	24.3%
Gender	Male	211	53.3%
	Female	164	43.7%
Education	No formal education	65	17.3%
	Read and write	73	19.5%
	Upto Matric	87	23.2%
	Intermediate	109	29.1%
	Graduation and above	41	10.9%
Marital status	Single	07	01.9%
	Married	257	68.5%
	Divorced	93	24.8%
	Widowed	18	04.8%
Occupation	Government Employee	108	28.8%
	Private Job	126	33.6%
	Self employed	94	25.1%
	Retired	47	12.5%
Monthly Income	<50,000	180	48.0%
	50,000 - 1,00,000	123	32.8%
	>100.000	72	19.2%
Family H/o Diabetes	Yes	254	67.7%
	No	121	32.3%

Table-2: Socio-demographic characteristics of study subjects and adherence with medication

Variables	Adherence with anti-diabetic medication		p-value	
	Yes	No		
Age (Years)	≤30	17 (06.9%)	06 (04.6%)	0.007
	31-40	31 (12.6%)	20 (15.5%)	
	41-50	43 (17.5%)	40 (31.1%)	
	51-60	96 (39.0%)	31 (24.0%)	
	≥ 61	59 (24.0%)	32 (24.8%)	
Total	246 (100%)	129 (100%)		
Gender	Male	113 (45.9%)	98 (76.0%)	<0.001
	Female	133 (54.1%)	31 (24.0%)	
Total	246 (100%)	129 (100%)		
Education	No formal education	22 (08.9%)	43 (33.3%)	<0.001
	Read and write	44 (17.0%)	29 (22.5%)	
	Upto Matric	50 (20.3%)	37 (28.7%)	
	Intermediate	97 (39.4%)	12 (09.3%)	
	Graduation and above	33 (13.5%)	08 (06.2%)	
Total	246 (100%)	129 (100%)		
Marital status	Single	04 (01.6%)	03 (03.2%)	<0.001
	Married	189 (76.8%)	68 (52.7%)	
	Divorced	44 (17.9%)	49 (35.0%)	
	Widowed	09 (03.7%)	09 (07.0%)	
Total	246 (100%)	129 (100%)		
Occupation	Government Empl.	79 (32.1%)	29 (22.5%)	0.09
	Private Job	83 (33.7%)	43 (33.3%)	
	Self employed	53 (21.6%)	41 (31.8%)	
	Retired	31 (12.6%)	16 (12.4%)	
Total	246 (100%)	129 (100%)		
Monthly Income	<50,000	104 (42.3%)	76 (58.9%)	0.003
	50,000 - 1,00,000	94 (38.2%)	29 (22.5%)	
	>100.000	48 (19.5%)	24 (18.6%)	
Total	246 (100%)	129 (100%)		
Family H/o Diabetes	Yes	193 (78.5%)	61 (47.3%)	<0.001
	No	53 (21.5%)	68 (52.7%)	
Total	246 (100%)	129 (100%)		

at anticipated population proportion of 54.4% (Non adherence to anti-diabetic medication), level confidence 95% and margin of error 5% was 375. All participants were provided written informed consent before participation in the study and ethical approval was taken from institutional ethical review committee. The objectives and procedures of the study were briefed to the study subjects in their native language by the data collection team. Participation in the survey was voluntary, and participants were informed that refusal to participate would not affect the services provided to them. A non-probability

Table-3: Self-reported reasons for non-adherence to anti diabetic treatment regimen

Variables	Frequency	Percentage
Skip medicine when away from home	156	41.6%
Skip medicine when symptoms are controlled	53	14.1%
Skip medicine when not feeling well	36	09.6%
Forget to take medicine	26	06.9%
Lack of money	30	08.0%
Medicine are not effective	24	06.4%
Side effects of medicine	23	06.1%
Multiple medicines	22	05.9%
Fear of stigma	6	01.6%
Total	375	100%

consecutive sampling method was used to recruit eligible participants to the study. Adult with more equal to eighteen years of age with a confirmed physician diagnosis of type 2 diabetes mellitus and taking treatment during the study period were included in the study. Patients with mental impairment which may have limited their cognitive ability to participate in the study were excluded.

A structured questionnaire was used for data collection. Study subjects were interviewed through face-to-face interviews. During the data collection, random checks were carried out by the principal investigator to ensure the quality of data. All data were entered and analyzed by using a SPSS version 22.0. Medication adherence was measured using the Morisky 8-Item Medication Adherence Scale (MMAS-8) questionnaire. Total scores on the MMAS-8 ranged between 0 and 8, with a score of more than 6 was labeled as adherence and <6 as non-adherence. The questionnaire contained information on socio-demographic characteristics (i.e., sex, age, marital status, monthly gross family income, and education), family history of diabetes and medication use. Self-reported reasons by the study subjects for non-adherence to anti-diabetic medication were also noted. Cross tabulation of socio-demographic variables and adherence to anti-diabetic medication was done and chi square test was used to see any statistically significant difference between the groups and p value less than 0.05 was taken as significant.

Discussion

This study showed that there was high frequency of non-adherence to anti-diabetic medication that is 65.6% in comparison with adherence to anti-diabetic

medication. These results are consistent the findings of the study conducted by Aminde LN et al.¹⁴ in which more than half of our study participants were non-adherent to their diabetic medication.

The study findings revealed that low medication adherence was significantly higher among older age group people which is in contrast to study by Rana et.al.¹⁵ It may be due to fact that study was conducted in government sector tertiary care hospital and majority of study subjects were from low socioeconomic group and they are totally dependent on supply of medication from hospital. These findings are also in line with the results of studies that have reported that older patients were more compliant with diabetes medications.^{16,17}

Patients with family history of diabetes had higher frequency of low medication adherence in this study, which is consistent with the findings of a previous study conducted in Pakistan.¹⁸ A patient with a family history of diabetes are more knowledgeable about diabetes from their family members, receive more supportive behaviors resulting in increased motivation, and adherent to their diabetes medication which is in line with a previous study.²⁰

The study findings revealed that self-reported reasons for non-compliance of diabetes mellitus treatment include away from home, skip medicines when symptoms are controlled and when not feeling well, forgetfulness to take medication, medicines are not effective, lack of funds, side effects of medicines, taking multiple medicines and fear of stigma. These findings are consistent with the results of study conducted Boshe BD et al.²¹ in which the most frequent reason for non-adherence to anti-diabetic medication was skipping the medicines when away from home. The study might have sampling bias because the participants were not representative of the larger population of individuals with diabetes mellitus which limits the generalizability of the findings. The study employed cross-sectional design that cannot establish causal relationships between socioeconomic factors and medication non-adherence. Longitudinal or experimental designs would be more suitable for establishing causal links. The study focused solely on socioeconomic factors while other important determinants of medication non-adherence, such as cultural beliefs, health literacy, and patient-provider communication were not considered.

Longitudinal design to assess changes in medication

adherence and socioeconomic factors over time will be suitable for better understanding of causality. Collaboration with healthcare professionals to gain insights into the practical challenges patients face and potential strategies to enhance medication adherence will be helpful.

Conclusion

The study revealed high frequency of non-compliance with diabetic treatment regimens. It underscores the vital necessity of counseling patients about the critical significance of adhering to their prescribed treatments.

Conflict of Interest

None

Source of Funding

None

References

1. Cramer JA. A systematic review of adherence with medications for diabetes. *Diabetes Care*. 2004;27(5):1218-1224.
2. Choudhry NK, Shrank WH, Levin RL, et al. Measuring concurrent adherence to multiple related medications. *Am J Manag Care*. 2009; 15(7):457-464.
3. Krapek K, King K, Warren SS, et al. Medication adherence and associated hemoglobin A1c in type 2 diabetes. *Ann Pharmacother*. 2004;38(9):1357-1362.
4. Sokol MC, McGuigan KA, Verbrugge RR, Epstein RS. Impact of medication adherence on hospitalization risk and healthcare cost. *Med Care*. 2005;43(6):521-530.
5. Cramer JA. A systematic review of adherence with medications for diabetes. *Diabetes Care*. 2004;27(5):1218-1224.
6. Krapek K, King K, Warren SS, et al. Medication adherence and associated hemoglobin A1c in type 2 diabetes. *Ann Pharmacother*. 2004;38(9):1357-1362.
7. Choudhry NK, Shrank WH, Levin RL, et al. Measuring concurrent adherence to multiple related medications. *Am J Manag Care*. 2009;15(7):457-464.
8. Gonzalez JS, Peyrot M, McCarl LA, et al. Depression and diabetes treatment nonadherence: a meta-analysis. *Diabetes Care*. 2008;31(12):2398-2403.
9. Piette JD, Heisler M, Wagner TH. Cost-related medication underuse: do patients with chronic illnesses tell their doctors? *Arch Intern Med*. 2004;164(16):1749-1755.
10. Zullig LL, Gellad WF, Moaddeb J, et al. Improving diabetes medication adherence: successful, scalable interventions. *Patient Prefer Adherence*. 2015;9:139-149.
11. Schillinger D, Grumbach K, Piette J, et al. Association of health literacy with diabetes outcomes. *JAMA*. 2002;288(4):475-482.
12. Chatterji S, Lahiri K, Kim D, et al. Health care access and medical expenditures of immigrants and native-born individuals in the United States. *Am J Public Health*. 2007;97(5): 852-858.
13. Gonzalez JS, Safren SA, Delahanty LM, et al. Symptoms of depression prospectively predict poorer self-care in patients with Type 2 diabetes. *Diabet Med*. 2008;25(9):1102-1107.
14. Aminde LN, Tindong M, Ngwasiri CA, Aminde JA, Njim T, Fondong AA, Takah NF. Adherence to antidiabetic medication and factors associated with non-adherence among patients with type-2 diabetes mellitus in two regional hospitals in Cameroon. *BMC endocrine disorders*. 2019 Dec;19(1):1-9.
15. Rana MM, Islam MS, Akter J, Khatun S. Medication adherence to Type 2 diabetic patients hospitalized at a tertiary care hospital in Bangladesh: diabetic medication adherence. *J Health Sci*. 2019;9(3):159-167
16. Nagrebetsky A, Griffin S, Kinmonth AL, Sutton S, Craven A, Farmer A. Predictors of suboptimal glycaemic control in type 2 diabetes patients: the role of medication adherence and body mass index in the relationship between glycaemia and age. *Diabetes Res Clin Pract*. 2012;96(2):119-128.
17. Bezie Y, Molina M, Hernandez N, Batista R, Niang S, Huet D. Therapeutic compliance: a prospective analysis of various factors involved in the adherence rate in type 2 diabetes. *Diabetes & Metabolism*. 2006;32(6):611-616.
18. Riaz M, Basit A, Fawwad A, Yakoob Ahmedani M, Ali Rizvi Z. Factors associated with non-adherence to insulin in patients with type 1 diabetes. *Pak J Med Sci*. 2014;30(2):233.
19. Islam SMS, Uddin R, Zaman SB, et al. Healthcare seeking behavior and glycemic control in patients with type 2 diabetes attending a tertiary hospital. *Int J Diabetes in Dev Cries*. 2021;41(2):280-287.
20. Mayberry LS, Osborn CY. Family support, medication adherence, and glycemic control among adults with type 2 diabetes. *Diabetes Care*. 2012;35(6):1239-1245.
21. Boshe BD, Yimar GN, Dadhi AE, Bededa WK. The magnitude of non-adherence and contributing factors among adult outpatient with Diabetes Mellitus in Dilla University Referral Hospital, Gedio, Ethiopia. *PloS one*. 2021 Mar 4;16(3):e0247952.