

# Study of the Prevalence and Risk Factors of Treatment Non-compliance among Elderly Diabetic Patients in Majmaah, KSA

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## Abstract

**Introduction:** Medication noncompliance has a significant effect on morbidity, mortality, and ease of living in diabetic patients. Non-compliance may be associated with patient demographics, the complexity of the drug regimen, dosage frequency, adverse effects, or some combination of these. **Aim:** To study the prevalence of treatment non-compliance among elderly diabetic patients in Majmaah, KSA. **Method:** A cross-sectional questionnaire-based study among elderly patients registered with the primary health center in Majmaah, Saudi Arabia. **Results:** Patients with a neutral attitude towards the disease and some knowledge of diabetes were more likely to be non-compliant with their treatment than those who do not have any knowledge of diabetes or with a positive/negative attitude. **Conclusion:** A high prevalence of non-compliance is still a problem in the treatment of elderly diabetic patients, particularly those who had positive risk factors. Further studies are needed to reduce non-compliance through various ways and means.

**Keywords:** Non-compliance; Diabetes treatment; Risk factors; Elderly; Saudi Arabia

## Introduction

Diabetes is still considered a bane in older adults. Approximately 20% of individuals over 65 years of age have diabetes mellitus, and almost half of these individuals have been undiagnosed. [1] The management of diabetes over the years have been no different among older adults and the younger population, with some exception.

When diabetic patients do not follow the instructions to take medications regularly, they are then at risk against higher morbidity, mortality, and reduced quality of life progressively. An article online reported that this patient's behavior might be related to "patient demographics, the complexity of the drug regimen, dosage frequency, adverse effects, or some combination of these." [2] It is a widespread belief that elderly patients are less adherent to therapy because of declining cognitive function. Non-compliance is a significant barrier to treatment efficacy. Studies have also found that forgetfulness is one of the crucial causes of non-compliance. Other factors included a busy life, polypharmacy, and regimen complexity.

The outlook of the patient towards the disease is also an essential factor that can lead to non-compliance. Mostly, studies have shown that patients with a positive attitude and a supportive environment are good at following instructions than those living alone and being depressed. Diabetic patients with poor adherence to medications can develop many unfavorable consequences, notably decreased glycemic control. Non-compliance can lead to the rapid development of diabetes complications like

microvascular and macrovascular diseases and altered lipid metabolism. [3,4] Particularly true for elderly patients who have a long-standing history of diabetes and medication. Some of the many cohort studies showed that non-adherence to prescribed drugs (OHAs, antihypertensive and statins) has led to higher HbA1c, blood pressure, and LDL cholesterol levels among diabetic patients leading to an increased risk of morbidity and mortality. [5,6] In the year 2015, Saudi Arabia has reported 3.4 million cases of diabetes, considered a significant public health issue around the world due to its high prevalence. [7,8]

The incidence of diabetes mellitus among elderly residents of Saudi Arabia has increased to 27%. Studies have shown that in general elderly population are at higher risk for polypharmacy, functional disabilities, and common geriatric syndromes that include cognitive impairment and depression that can affect the treatment compliance. [9,10]

In 2003, the WHO emphasized that "increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments." [11] Other studies in patients with insulin-

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treated type 2 diabetes concluded that non-adherence is an independent risk factor for all-cause mortality.<sup>[12,13]</sup>

Studies on elderly diabetic patients in Saudi Arabia are focusing more on its prevalence and associated complications.<sup>[14-16]</sup> There is a scarcity of studies focusing on elderly diabetic patients and their treatment compliance. Most of the focus on scientific studies has been on control, treatment outcome, and self-adherence to the recommended lifestyles of diabetic patients in the gulf region.<sup>[17-20]</sup>

With this background, this study will attempt to determine the prevalence of treatment non-compliance and its associated risk factors among elderly diabetic patients in Majmaah, Saudi Arabia.

Broadly, the objective is to study the prevalence of treatment non-compliance among elderly diabetic patients in Majmaah, KSA. Further, this study would like to determine the frequency of non-compliance among elderly diabetic patients undergoing treatment. Also, to identify the possible risk factors associated with non-compliance and to give recommendations on improving the compliance for diabetic therapy in the elderly population.

### Research Methodology

The study design is cross-sectional to find out the prevalence and risk factors associated with non-compliance among elderly diabetic patients. We conducted this study among elderly diabetic patients attending the primary health centers in Majmaah city, KSA. We conducted this study among male and female elderly diabetic patients in Majmaah, KSA. Based on previous similar studies done on non-compliance among elderly patients, the prevalence (P) was 15%, and the formula for calculating sample size was:

$$n = Z^2P(1-P)/d^2$$

Where, n = sample size, Z = statistic for level of confidence, P = expected prevalence of proportion, d = 0.05

The calculated sample size was n = 196. We rounded off the sample size to 200 participants. A total of 161 participants (80% of the target number) out of 200 completed this study.

We included those patients who visited the clinic during the data collection period from two randomly selected primary health centers in Majmaah. We collected the data via a pretested, preformed interviewee based, the close-ended questionnaire from the study participants in a time-bound manner. We also recorded the latest HbA1C results of the participants in the survey. We entered all data through SPSS software and conducted a statistical analysis to find out the significance of the result. We considered a 95% degree of freedom with a p-value of <0.05 as statistically significant. The total duration, including data collection, took around six months for completion of the study.

### Ethical Considerations

We took prior consent for participation from elderly patients.

They had been briefed about the aim and objective of the study and the advantage to them as well as to the community due to their participation. All information had been kept purely confidential and only used for statistical analysis.

### Inclusion and exclusion criteria

All the elderly patients who are residing in Majmaah city. We excluded any study participants who voluntarily refused to participate in the study.

### Results

The total number of participants who completed the study were 161 (80.5%) out of the total 200 who were selected. The percentage of males was 56.5% and 43.5% were females [Figure 1]. All the patients included in the study were more than 55 years of age to fulfill the criteria of the elderly age group.

Table 1 shows the distribution of the participants according to the prevalence of non-compliance of treatment for diabetes mellitus. At least 60.2% of participants follow the doctor's instruction on taking medicines, and 79.5% renewed their prescriptions when their medications get over. Interestingly about 47.2% agreed that sometimes they take medications at wrong times, and 35.4% said they were irregular with their medicine intake.

Table 2 shows a comparison of gender with risk factors for non-compliance shows a significant association between the two variables. More female participants (66.2%) were having either none or lesser education, which reflected on their higher negative attitude towards the disease as compared to males. The knowledge of diabetes was also higher among males (60.2%) than females. Smokers among males (100%) were significantly higher, and who also tended to forget more (60%) about taking their medications than females (40%). More female participants (58.6%) experienced visiting the clinic, depressing some of the time due to the above factors.

Lack of access to the clinic (65.6%) and long waiting time (62.2%) were significantly more among females than males

Distribution of study participants

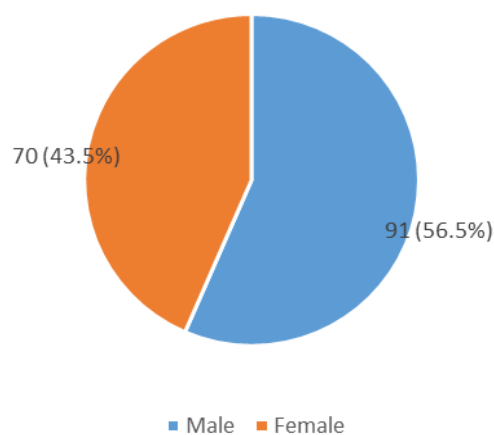


Figure 1: Distribution of study participants.

and even when in the clinic, the problems of communication with the doctor were more among females (70.8%) than males (29.2%).

Table 3 shows the comparison of the attitude of the patient towards the disease with the risk factors for non – compliance. Patients with neutral feelings about diabetes (71.2%) were more likely to be sometimes irregular with their medications. We also noted the irregularity among patients who would stop the treatment when they are feeling fine (72%). Most of the patients who had neutral feelings about diabetes said that they would stop treatment without advice (89.3%) or take medications only during a visit to the doctor sometimes (68.8%).

Table 4 shows the association between knowledge about diabetes among the participants and non – compliance of treatment. Significantly more patients without knowledge of diabetes were irregular with their treatment (48.7%) than those

who were aware of the disease. Also, 59.1% of participants with no knowledge of diabetes failed to go for follow up as compared to those who knew about it (13.6%). Patients without knowledge of diabetes (37.5%) and with some experience (50%) did not renew their prescriptions timely as compared to those who knew about diabetes (12.5%). The findings were statistically significant.

### Discussion

Many works of literature have shown similar findings regarding non – compliance among diabetic patients with known socio-demographic risk factors. Our study showed omission to take medications ranged between 45% to 58% contrary to other studies [21,22] that showed a much lower (25-30%) non – compliance of medication intake. Depression associated with non – compliance was also significantly present in our study, and a survey by Gonzalez et al. [23] supports our findings.

**Table 1: Prevalence of non-compliance among the study participants.**

S.no	Non – compliance variables	Yes (%)	No (%)	Sometimes (%)	Total (%)
1	Usually take incorrect dose of medicine	16 (9.9)	82 (50.9)	63 (39.1)	161 (100)
2	Taking medications at wrong times	8 (5)	77 (47.8)	76 (47.2)	161 (100)
3	Increase or decrease frequency of taking medicines	20 (12.4)	75 (46.6)	66 (41.0)	161 (100)
4	Stopping treatment on your own	23 (14.3)	88 (54.7)	50 (31.1)	161 (100)
5	Follow doctor’s instructions on taking medicines	97 (60.2)	28 (17.4)	36 (22.4)	161 (100)
6	Irregular with medicine intake	28 (17.4)	76 (47.2)	57 (35.4)	161 (100)
7	Renew prescription when medications get over	128 (79.5)	16 (9.9)	17 (10.6)	161 (100)

**Table 2: Association of gender and risk factors for non – compliance.**

S.no	Risk factors	Males (%)	Females (%)	Total	P-value	
1	Educational status	Not educated	23 (33.8)	45 (66.2)	68	.000
		School level	40 (69)	18 (31.0)	58	
		College & above	28 (80)	7 (20)	35	
2	Attitude towards disease	Positive	12 (63.2)	7 (36.8)	19	.082
		Negative	14 (40)	21 (60)	35	
		Neutral	65 (60.7)	42 (39.3)	107	
3	Knowledge of diabetes	Yes	68 (60.2)	45 (39.8)	113	0.356
		No	22 (47.8)	24 (52.2)	46	
		Somewhat	1 (50)	1 (50)	2	
4	Tobacco smoking	Yes	12 (100)	0 (0)	12	0.000
		No	58 (45.3)	70 (54.7)	128	
		Stopped smoking	21 (100)	0 (0)	21	
5	Forgetfulness	Yes	12 (60)	8 (40)	20	0.916
		No	34 (54.8)	28 (45.2)	62	
		Sometimes	45 (57.0)	34 (43.0)	79	
6	Medication side effects	Not present	58 (65.9)	30 (34.1)	88	0.015
		Sometimes	32 (47.1)	36 (52.9)	68	
		Always	1 (20)	4 (80.0)	5	
7	Lack of access to clinic	Easily accessible	80 (62.0)	49 (38.0)	129	0.005
		Difficult to access	11 (34.4)	21 (65.6)	32	
		Always	17 (37.8)	28 (62.2)	45	
8	Long waiting time at the clinic	Sometimes	42 (53.8)	36 (46.2)	78	0.000
		Never	32 (84.2)	6 (15.8)	38	
		Always	7 (29.2)	17 (70.8)	24	
9	Communication problem with doctors	Sometimes	27 (44.3)	34 (55.7)	61	0.000
		Never	57 (75.0)	19 (25.0)	76	
		Always	8 (44.4)	10 (55.6)	18	
10	Visit to clinic is depressing	Sometimes	24 (41.4)	34 (58.6)	58	0.002
		Never	59 (69.4)	26 (30.6)	85	
		Always	8 (44.4)	10 (55.6)	18	

**Table 3: Association of attitude towards the disease with non-compliance variables of treatment.**

		Attitudes towards the disease			Total	P-value	
		Feel negative (%)	Feel positive (%)	Neutral feeling (%)			
1	Increase or decrease in the frequency of taking medications	Yes	1 (5)		20	0.017	
		No	18 (24)	10 (13.3)	47 (62.7)		75
		Sometimes	16 (24)	3 (4.6)	47 (71.2)		66
2	Do you stop your treatment when you feel fine	Yes	7 (30)	1 (4.3)	15 (65.2)	23	0.024
		No	24 (27.2)	8 (9.1)	56 (63.6)	88	
		Sometimes	4 (8)	10 (20)	36 (72)	50	
3	Do you stop and start the treatment on your own	Yes	0 (0)	3 (10.7)	25 (89.3)	28	0.019
		No	23 (30.2)	8 (10.5)	45 (59.2)	76	
		Sometimes	12 (21.1)	8 (14)	37 (64.9)	57	
4	Do you take medicine only when visiting the doctor	Yes	1 (20)	1 (20)	3 (60)	5	0.010
		No	27 (29.3)	5 (5.4)	60 (65.2)	92	
		Sometimes	7 (10.9)	13 (20.3)	44 (68.8)	64	

**Table 4: Association of knowledge of diabetes with non – compliance variables of treatment.**

		Knowledge of diabetes			Total	P-value	
		Yes (%)	No (%)	Somewhat (%)			
1	Do you increase or decrease the frequency of taking medicines	Yes	9 (24.3)		37	0.002	
		No	4 (5.3)	19 (25.3)	42 (56)		75
		Sometimes	5 (8.5)	21 (36.0)	33 (56)		59
2	Do you regularly visit your clinic for follow up	Yes	8 (9.8)	21 (25.6)	53 (64.6)	82	0.002
		No	6 (13.6)	26 (59.1)	12 (27.3)	44	
		Sometimes	4 (11.4)	11 (31.4)	20 (57.1)	35	
3	Do you renew your prescription on time when the medicines get finished	Yes	13 (10.2)	40 (31.3)	75 (58.6)	128	0.009
		No	2 (12.5)	6 (37.5)	8 (50)	16	
		Sometimes	3 (17.7)	12 (70.6)	2 (11.8)	17	

Several studies found that patients with higher educational level might have higher compliance. [25] However, DiMatteo found that even highly educated patients may not understand their conditions or believe in the benefits of being compliant with their medication regimen. [26] A UK study group found that patients without formal educational qualifications had better compliance with cholesterol-lowering medication. [28] Our studies have shown that most of the uneducated participants with little or no knowledge of diabetes presented with non-compliance.

In our study, people with a positive attitude were more likely to be compliant with their treatment, while those who had a negative or neutral view would have higher risk factors for non – compliance. Other studies have shown that patient’s worries about the treatment, believing that the disease is uncontrollable and religious belief might add to the likelihood that they are not compliant to therapy. [28-31]

A healthy relationship depends on patients’ trust in prescribers and empathy from the prescribers. Studies have found that compliance occurs when doctors are emotionally supportive, giving reassurance or respect, and treating patients as an equal partner. [32-34] Similarly, our study showed a high presence of risk factors associated with compliance like communication problems with the doctors and long waiting times in the clinic, which could impact the medication compliance.

## Conclusion

The above evidence indicates that non-compliance is still

commonplace in healthcare, and no substantial change occurred despite a large number of studies attempting to address and highlight the problem. Also, too few studies done systematically to quantify the impact of non-compliance on the health of elderly diabetic patients. More surveys on factors influencing compliance are needed, particularly in Saudi Arabia, which would be helpful to fill in the knowledge gap and contribute to formulating strategies at the individual and community level for countering non-compliance.

## Recommendations

A felt need to provide comprehensive health education to the patients on the importance of knowing about the disease/ health disorder they have and also compliance with the treatment prescribed by the healthcare professionals to achieve the goal of a healthy body and mind. To make the patients aware of the risk factors associated with the non – compliance and to minimize it.

## Limitations

There are some limitations in our study, such as small sample size, memory recall bias of the participants, and omission of informative referential studies in other databases or other languages. Also, a more comprehensive statistical analysis would have given a better outcome of the study. Since we have initiated a baseline study to characterize the risk factors associated with non – compliance of treatment among elderly diabetic patients, it would be an encouragement for further detailed studies in this research area.



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## Competing Interests

The authors declare that they have no competing interests.

## References

1. <http://journal.diabetes.org/diabetesspectrum/99v12n2/pg70.htm>.
2. [https://www.medscape.com/viewarticle/465932\\_4](https://www.medscape.com/viewarticle/465932_4).
3. Standards of Medical Care in Diabetes--2013. American Diabetes Association. *Diabetes Care*. 2013;36:S11-66.
4. Cramer JA, Benedict A, Muszbek N, Keskinaslan A, Khan ZM. The significance of compliance and persistence in the treatment of diabetes, hypertension, and dyslipidemia: A review. *International Journal of Clinical Practice*. 2008;62:76-87.
5. Ho PM, Rumsfeld JS, Masoudi FA, McClure DL, Plomondon ME, Steiner JF, et al. Effect of medication nonadherence on hospitalization and mortality among patients with diabetes mellitus. *Arch Intern Med*. 2006;166:1836-1841.
6. Bailey CJ, Kodack M. Review patient adherence to medication requirements for therapy of type 2 diabetes. *Int J Clin Pract*. 2011;65:314-322.
7. Anokute CC. Epidemiologic studies of diabetes mellitus in Saudi Arabia-Part I--Screening of 3158 males in King Saud University. *JR Soc Health*. 1990;110:201-203.
8. The International Diabetes Federation (IDF) <https://idf.org/>.
9. [https://www.uptodate.com/contents/treatment-of-type-2-diabetes-mellitus-in-the-older-patient?source=search\\_result&search=geriatric%20diabetes%20in%20saudi%20arabia&selectedTitle=1~150#H27](https://www.uptodate.com/contents/treatment-of-type-2-diabetes-mellitus-in-the-older-patient?source=search_result&search=geriatric%20diabetes%20in%20saudi%20arabia&selectedTitle=1~150#H27). Accessed on 3.12.2019
10. Jin J, Sklar GE, Oh VM, Li SC. Factors affecting therapeutic compliance: A review from the patient's perspective. *Therapeutics and Clinical Risk Management*. 2008;4:269.
11. World Health Organization: Adherence to long-term therapies. Evidence for action. Geneva: World Health Organization, Geneva, 2003.
12. Currie CJ, Peyrot M, Morgan CL, Poole CD, Jenkins-Jones S, Rubin RR, et al. The impact of treatment noncompliance on mortality in people with type 2 diabetes. *Diabetes Care*. 2012;35:1279-1284.
13. Lerman I. Adherence to treatment: The key for avoiding long-term complications of diabetes. *Archives of medical research*. 2005;36:300-306.
14. Elhadd TA, Al-Amoudi AA, Alzahrani AS. Epidemiology, clinical and complications profile of diabetes in Saudi Arabia: a review. *Annals of Saudi Medicine*. 2007;27:241.
15. Al-Nozha MM, Al-Maatouq MA, Al-Mazrou YY, Al-Harhi SS. Diabetes mellitus in Saudi Arabia.
16. Alqurashi K, Aljabri K, Bokhari S. Prevalence of diabetes mellitus in a Saudi community. *Annals of Saudi Medicine*. 2011;31:19.
17. Al-Kaabi J, Al-Maskari F, Saadi H, Afandi B, Parkar H, Nagelkerke N. Assessment of dietary practice among diabetic patients in the United Arab Emirates. *Rev Diabet Stud*. 2008;5:110-115.
18. Al-Maskari F, El-Sadig M, Nagelkerke N. Assessment of the direct medical costs of diabetes mellitus and its complications in the United Arab Emirates. *BMC Public Health*. 2010;10:1.
19. Saadi H, Carruthers SG, Nagelkerke N, Al-Maskari F, Afandi B, Reed R, et al. Prevalence of diabetes mellitus and its complications in a population-based sample in Al Ain, United Arab Emirates. *Diabetes Research and Clinical Practice*. 2007;78:369-377.
20. Al-Elq AH. Current practice in the management of patients with type 2 diabetes mellitus in Saudi Arabia. *Saudi Medical Journal*. 2009;30:1551-1556.
21. Paes AH, Bakker A, Soe-Agnie CJ. Impact of dosage frequency on patient compliance. *Diabetes Care*. 1997;20:1512-1517.
22. Martin LR, Williams SL, Haskard KB, DiMatteo MR. The challenge of patient adherence. *Ther Clin Risk Manag*. 2005;1:189-199.
23. Gonzalez JS, Peyrot M, McCarl LA, Collins EM, Serpa L, Mimiaga MJ, et al. Depression and diabetes treatment nonadherence: a meta-analysis. *Diabetes Care*. 2008;31:2398-2403.
24. Ghods AJ, Nasrollahzadeh D. Noncompliance with immunosuppressive medications after renal transplantation. *Experimental and clinical transplantation: Official Journal of the Middle East Society for Organ Transplantation*. 2003;1:39-47.
25. Yavuz A, Tuncer M, Erdoğan O, Gürkan A, Cetinkaya R, Akbaş SH, et al. Is there any effect of compliance on clinical parameters of renal transplant recipients?. In: *Transplantation Proceedings* 2004;36:120-121.
26. DiMatteo MR. Patient adherence to pharmacotherapy: the importance of effective communication. *Formulary Cleveland, Ohio, USA*. 1995;30:596-598.
27. Senior V, Marteau TM, Weinman J. Self-reported adherence to cholesterol-lowering medication in patients with familial hypercholesterolemia: the role of illness perceptions. *Cardiovasc Drugs Ther*. 2004;18:475-481.
28. Bender BG, Bender SE. Patient-identified barriers to asthma treatment adherence: responses to interviews, focus groups, and questionnaires. *Immunol Allergy Clin N Am*. 2005;25:107-130.
29. Barnes L, Moss-Morris R, Kaufusi M. Illness beliefs and adherence in diabetes mellitus: a comparison between Tongan and European patients. *NZ Med J*. 2004;117:U743.
30. Gonzalez J, Williams JW, Noël PH, Lee S. Adherence to mental health treatment in a primary care clinic. *J Am Board Fam Pract*. 2005;18:87-96.
31. Spikmans FJ, Brug J, Doven MM, Kruijenga HM, Hofsteenge GH, Van Bokhorst-van der Schueren MA. Why do diabetic patients not attend appointments with their dietitian? *J Hum Nutr Diet*. 2003;16:151-158.
32. Moore PJ, Sickel AE, Malat J, Williams D, Jackson J, Adler NE. Psychosocial factors in medical and psychological treatment avoidance: the role of the doctor-patient relationship. *J Health Psychol*. 2004;9:421-433.
33. Lawson VL, Lyne PA, Harvey JN, Bundy CE. Understanding why people with type 1 diabetes do not attend for specialist advice: A qualitative analysis of the views of people with insulin-dependent diabetes who do not attend diabetes clinic. *J Health Psychol*. 2005;10:409-423.
34. Rubin RR. Adherence to pharmacologic therapy in patients with type 2 diabetes mellitus. *Am J Med*. 2005;118:27s-34s.