



Assessment of Medication Adherence among Non-communicable Chronic Disease Patients in Quetta, Pakistan: Predictors of Medication Adherence

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: The aim of this study was to assess the level of medication adherence among patients with different non-communicable chronic diseases in Quetta, Pakistan. Moreover this study has also evaluated the factors affecting medication adherence.

Methodology: A cross-sectional study was conducted in patients with different non-communicable chronic diseases, by visiting outpatient departments in public/private hospitals and clinics in Quetta, Pakistan. The Morisky Medication Adherence Scale (Urdu version) was used to collect the data. Descriptive statistics were used to present the demographic and disease-related information. Inferential statistics were used to evaluate the relationship among study variables. All analyses were performed using SPSS 20.0.

Results: A total of 505 patients with different non-communicable chronic diseases were enrolled for the present study. The mean age of the patients was 44.9 years, and the majority, 304 (60.2%), were females. Most patients in this study had exhibited poor medication adherence (61.0%) while only a few (11.1%) were adherent to their medication and some (27.9%) had shown moderate

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adherence to medication. In addition, patient's age, gender, ethnic group, disease type, forgetfulness, patient's satisfaction level, motivation level, number of medicines prescribed and frequency of medicine used were identified as significant influential factors for drug adherence.

Conclusion: The study concluded that the level of medication adherence among patients with non-communicable chronic diseases was very poor and predictors were also identified. Efforts should be made to overcome the factors associated with non-adherence so that the level of adherence is improved to achieve better therapeutic outcomes.

Keywords: Non-adherence; non communicable diseases; chronic diseases; predictors of adherence; multiple daily dosing; forgetfulness; Pakistan.

1. INTRODUCTION

There has been advanced and sophisticated development of drugs and treatment methods aimed at achieving therapeutic goals in cases of both acute and chronic diseases. Despite this advanced development, there has still been some failure to achieve therapeutic goals. The failure to achieve goals is partially attributed to the non-adherence of patients to prescribed medicines [1,2].

Adherence is the term used to describe the measurement of the extent to which a patient takes his or her medicines as prescribed by a health-care provider. Patient concordance is involved in adherence, whereby patients willingly and actively participate in therapeutic decision-making and the development of recommendations regarding lifestyle changes, diet changes, exercise, rest, nutrient supplements, home medicine monitoring, self-assessment and appointments etc. [1,3,4].

Even if the patient has agreed with the recommendations for treatment with the health-care provider, they may not follow the recommendations [1]. This deviation of the patient from treatment is known as non-adherence, which can be intentional or unintentional [5]. So assessment of adherence is very important, and nowadays it is of great concern to clinicians, health-care providers and stakeholders, because poor adherence or non-adherence could lead to worsening of conditions, thereby increasing the mortality and morbidity rate and also leading to increased health-care costs [6,7]. There could be a number of reasons for this non-adherence, including perception of the need for treatment, apprehension about potential Adverse Drug Reaction (unwanted effects of the Drug), forgetfulness [7-9], the complexity of the regimen [10-12], the cost of medicine [5,9], circumstances beyond control [13] and carelessness [4,13]. An extensive literature review has revealed adherence as one

of the important factors affecting treatment, and has also unveiled the importance of adherence in chronic diseases, because in cases of chronic diseases medicines are prescribed for longer time periods. There is strong evidence that patients with chronic diseases adhere worse than patients with acute illness because patients with chronic diseases such as diabetes, hypertension, asthma etc. have difficulty in following their regimen [14]. Due to the impact of non-adherence on the development of complications, increased mortality, morbidity and increased health cost burden, nowadays adherence is the main concern for clinicians, policymakers, stakeholders and health-care providers. But unfortunately not much work has been reported in Pakistan regarding adherence to medication. There have been a few studies, but none have concerned multiple chronic diseases. And other than one or two studies that have evaluated adherence to hypertensive medicines, no study to my knowledge has been reported about adherence to chronic disease medicines and factors affecting it in the population of Quetta.

The current study has been developed to fill this gap, and it is one that is very important to fill. So the current study aimed to assess or measure adherence among non-communicable chronic disease patients and also to identify the factors that could affect adherence. The current study aims to measure the level of adherence among non-communicable chronic disease patients in Quetta, Pakistan, and also to assess the factors affecting adherence.

2. METHODOLOGY

2.1 Study Design, Setting and Sample

A cross-sectional study consisting of a self-administered questionnaire was conducted among outpatients by visiting various public/private hospitals and GP clinics in different areas of the capital city of Balochistan, i.e. Quetta.

The study was conducted on 505 non-communicable chronic disease patients. Outpatients able to speak and understand Urdu (Pakistan's national language), patients aged 18 years and above and those who were willing to participate in the study were included, while patients younger than 18 years of age, those unable to speak or understand Urdu, a hospitalized patient, Afghan refugees and those who refused to participate were not included in the study.

2.2 Ethical Approval

The study was approved by the ethical committee of the Faculty of Pharmacy, University of Baluchistan, Quetta (Permit # FOP/PP-RO1/14) as per the guidelines of the National Bioethical Committee of Pakistan (www.pmrc.org.pk/erc_guidelines). Written consent was obtained from the participants.

2.3 Data Collection

The data for study was collected by using the Morisky Medication Adherence Scale (MMAS-8). The tool used has already been validated and tested for reliability, and has internal consistency (Cronbach's alpha reliability) of 0.83 [15].

The tool consists of 8 questions, and scoring was done according to an already developed method, in which the total score is 8. For questions 1–4 there was a score of 0 for every yes and 1 for every no, while for question 5 there was 1 for yes and 0 for no, and the remaining questions followed the same pattern as for 1–4. Those who scored 8 were considered to have good adherence while patients with scores >6 and <8 were considered to have moderate or medium adherence, and those who scored < 6 had poor adherence [15].

Some demographic patient details and disease-related information were also included in the study, which was approved by experts from the faculty. The results of a pilot study were not included in the study.

2.4 Statistical Analysis

Descriptive statistics were carried out for the demographic details and disease-related information. Continuous data was expressed as mean and standard deviation while categorical data was expressed as frequency and percentage.

For estimation of the difference and/or relationship among study variables inferential

statistics were used. The data was computed by SPSS 20.

3. RESULTS

The current study was conducted on non-communicable chronic disease patients from Quetta, Pakistan, in order to evaluate medication adherence. The study has concluded that most of the study subjects were exhibiting poor medication adherence (69%), and only 11.1% of the population were exhibiting good medication adherence.

The demographic details of the study subjects are tabulated in Table 1, which shows the high proportion of females (60.2%). The mean age of the study subjects was 44.9, and most of the study population were Pakhtoon (26.1%).

3.1 Disease and Therapy Characteristics

The diseases that were mainly considered in this study were diabetes, hypertension, heart diseases and asthma while some other non-communicable chronic diseases were also considered. The disease and therapy information is presented in Table 2.

The proportion of diseases was: diabetes 45.1%, hypertension 26.5%, heart diseases 7.3%, asthma 6.3%, and other non-communicable chronic diseases 14.7%.

Among the study population, 72.1% did not have any co-morbid condition while the remaining 27.9% were suffering with co-morbidity. Most were using one medicine (28.9%), while there was also a high proportion of patients who were using two medicines (27.3%). The most common frequency of medicine use per day was twice daily (40.4%) and they visited the clinic or health-care professionals when they were in need of it (69.9%). Most of the study population (80.7%) were satisfied with their current treatment.

3.2 Medication Adherence

Adherence was measured by using the Morisky Medication Adherence Scale (MMAS-8). According to that scale, a score <6 is considered as poor adherence, while >6 or <8 is considered moderate and good adherence is a score of 8. Among the 505 patients, 11.1% had good adherence while 27.9% had moderate adherence and 61.0% exhibited poor adherence. Most of the population had poor adherence. The

adherence found in the population is presented in Table 3.

Table 1. Demographic characteristics of study subjects

Category	Frequency N=505	Percentage
Age (44.9±13.5) years		
<24	24	4.8
25-36	128	25.3
37-48	158	31.3
49-60	136	26.9
>60	59	11.7
Gender		
Male	201	39.8
Female	304	60.2
Marital status		
Married	437	86.5
Unmarried	68	13.5
Ethnicity		
Urdu	60	11.9
Pakhtoon	132	26.1
Punjabi	131	25.9
Baloch	127	25.1
Persian	14	2.8
Others	41	8.1
Education		
No Education	203	40.2
Only Religious	38	7.5
Primary	50	9.9
Metric	62	12.3
Intermediate	37	7.3
Graduate	48	9.5
Postgraduate	67	13.3
Income		
<8000	80	15.8
8000-15000	75	14.9
15001-25000	102	20.2
>25000	207	41.0
not disclosed	41	8.1
Locality		
Rural	444	87.9
Urban	61	12.1

Multiple factors significantly affected medication adherence: age group, gender, ethnic group, disease, number of medicines and frequency of use, along with frequency of visits, satisfaction, forgetfulness and adverse effect appearance. By applying multiple regression it has been evaluated that among these factors the biggest influence is that of forgetfulness of the patient. And after forgetfulness, the most statistically significant predictor of adherence is adverse effect appearance. The results of the multiple regression are shown in Table 4.

Table 2. Disease related information

Disease characteristics	Frequency N=505	Percentage
Diseases		
Diabetes	228	45.1
Heart disease	37	7.3
Hypertension	134	26.5
Asthma	32	6.3
Others	74	14.7
Presence of Co morbidity		
Yes	137	27.9
No	368	72.1
Disease duration (years)		
<0.5	27	5.3
0.5-1	25	5.0
>1-2	123	24.4
>2	330	65.3
Current treatment duration		
<1 month	16	3.2
1-3 months	36	7.1
3-6 months	48	9.5
>6 months	405	80.2
Number of medicines used		
None	9	1.8
One	146	28.9
Two	138	27.3
Three	98	19.4
Four	35	6.9
>four	79	15.6
Frequency of medicine use		
When needed	65	12.9
Once daily	126	25.0
Twice daily	204	40.4
Thrice daily	110	21.8
Frequency of visits		
When needed	353	69.9
Once in month	99	19.6
Twice in month	29	5.7
Others	24	4.8
Satisfaction with current treatment		
Yes	442	87.5
No	53	12.5

4. DISCUSSION

Medication adherence is crucial in cases of chronic disease and its absence leads to increased rates of mortality, morbidity, hospital readmissions, adverse outcomes and health-care cost [7]. This study has shown that the chronic disease population mostly has poor adherence, which is supported by other studies conducted in other parts of the world [12,15-17] and similarly by two different studies conducted in Pakistan by Saleem et al. [4,13].

Two studies conducted in Pakistan by Almas, Hameed et al. [18] and Hashmi et al. [19] have shown high adherence to antihypertensive medicines. Some studies conducted in other parts of the world have also shown a high proportion of good adherence [20-22], higher than that which my study has evaluated. This could be because they have only worked on one disease, i.e. hypertension, while in my study I have chosen more than one chronic disease and the difference may be due to the setting and sample of the study.

Table 3. Morisky medication adherence scale score

	Adherence	
	Frequency	Percentage
N=505		
Poor adherence	308	61.0
Moderate adherence	141	27.9
Good adherence	56	11.1

Poor adherence= score <6; Moderate adherence= score 6-<8; Good adherence= score=8

Table 4. Multiple regression outcomes

Variables	Beta	Significance
Age group	.071	.033
Gender	-.045	.164
Ethnic group	-.026	.408
Disease	.029	.404
Number of medicines	.065	.080
Frequency of use	.041	.289
Frequency of visit	-.011	.750
Forgetfulness	.509	.000
Adverse effect appearance	.395	.000

Various predictors of medication adherence were also identified, including demographic characteristics: patient's age, gender, ethnicity, disease characteristics, type of disease, number of medicines, frequency of medicines, frequency of visits to health-care professionals, satisfaction with treatment and forgetfulness.

The current study has evaluated demographic characteristics as predictors of medication adherence. Studies conducted in other parts of the world also report that age is a significant factor [15,23-30] and this is also supported by a local study conducted in Pakistan [19,22,27]. Age may affect adherence because advancing age increases the chances of forgetfulness, which will reduce patient adherence to medication.

But some studies have not found any significant relationship between adherence and age [21,31-33]. The reason for this controversy could be the difference in the setting and sample of study.

The current study has found patient gender to be a significant predictor of medication adherence, which was also reported by Khalil and Elzubier in Saudi Arabia [22]. This study found that males were more adherent than females. Some other studies also came to the same conclusion [23,34]. But some studies have not found any association between adherence and gender [21], while one study says that females are more adherent than males [15,30]. This might be due to the fact that no gender discrimination was found. Pakistan is a developing country, and in developing countries gender discrimination exists [35,36], which could be the reason for the non-adherence or poor adherence in females.

Ethnic group is also one of the factors affecting adherence. No other study has been conducted in this area, so the results of this study cannot be compared. Among studies conducted in other parts of the world, a few say that there is a significant relationship between ethnic group and adherence [23,30], while others do not support this [25,27]. But these studies were conducted in other communities, and the ethnic group also varies so cannot be used for comparison.

Disease type is also among the significant predictors of medication adherence. In the case of cardiovascular diseases, approximately 50% of patients were adherent to medicines prescribed [37], but if we then look at the case of hypertension the adherence rate is 57% [18]. According to a study conducted in Australia, in the case of asthma the adherence found was 43% [38]. In the case of diabetes, the adherence reported according to one study is 60% [39]. This means the adherence varies with the disease type, which is also concluded by the current study.

Motivation is very important for achieving adherence. In the case of chronic diseases this is usually low because of prolonged disease duration, but it is very important to ensure a person adheres to the treatment plan. It is assumed that in clinical sessions patients receive motivation. Thus this could affect adherence, which is also one of the findings of this study. This is also supported by a study conducted in the UAE [39].

The current study has evaluated forgetfulness as the strongest predictor of medication adherence. It is also documented by other studies as a manipulating factor [8,20,22,40-43].

The current study has also suggested that a patient's satisfaction with a therapy or treatment affects adherence to the therapy and medication in terms of agreeableness, which is also supported by another study [44].

Some therapy-related factors were also found to affect adherence, including: adverse effect experience, number of medicines prescribed and frequency of medicines used.

Our study has shown that adverse effects impact on adherence. Other studies agree with this [15,45,46], while in a study conducted by Youssef and Moubarak they did not find any relation between adverse or side effects and adherence [20]. The reason for this contrast could be the area where the study was conducted and perhaps the study population.

This study has concluded that the number of medicines used significantly affects adherence. Other studies conducted in other parts of the world came to the same conclusion [12,19]. Some other studies, such as those by Cholowski [31] and Briesacher [47], also found a relationship between the number of medicines prescribed and adherence.

Taking multiple daily doses of a medicine is a crucial factor affecting medication-taking behaviour. This crucial factor has also been found by this study to significantly affect adherence. Other studies also found it to be significant [48-53].

Thus the frequency of medicine use also has an effect on medication adherence because patients may get irritated due to frequent taking of medicine and start avoiding medicine administration.

The present study has not found any effect of marital status, income, presence of co-morbidity, duration of disease or duration of treatment on adherence. The reason could be the setting in which study had been carried out there people concern to medication, disease and treatment does not change by marital status and number of diseases even. And income was not found to be an influential factor possibly because the majority of the study population belonged to high-income families.

The current study is the only study in its setting that has been conducted on the adherence level in non-communicable chronic diseases. In addition, this study has also evaluated the predictors of adherence. The strength of this study has been further increased by the scale used to measure adherence, i.e. MMAS-8, which is a validated and reliable scale for adherence measurement. The work of the current study should be continued to evaluate the nature of the relationship between various factors and adherence.

5. CONCLUSION

The study concluded that the level of medication adherence among patients with non-communicable chronic diseases was very poor and predictors were also identified. Efforts should be made to overcome the factors associated with non-adherence so that the level of adherence is improved to achieve better therapeutic outcomes.

CONSENT

Written consent was obtained from patients prior to their participation.

ETHICAL APPROVAL

An approval from Departmental Research Ethics Committee was obtained.

DISCLAIMER

Some part of this manuscript was presented and published in the conference ISPOR Conference as poster presentation, conference name VALUE IN HEALTH.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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