

## Determinants and Effects of Medication Beliefs in Chronic Illness

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### Abstract

### Original Research Article

In this study: Adherence to medications is a vital point in order to assure patients benefit maximally from their prescribed medications. However, many factors could influence the adherence behavior toward the prescribed medications. The current study sheds the light on how beliefs about medications and quality of life may impact adherence to medications in Jordanian population, with a highlight to the particular geriatric population. The current work is a cross sectional study. Adult patients with chronic diseases who were on multiple medications were invited to participate in this study. After consenting, the participants were asked to fill Medication Adherence report Scale-5, Beliefs about Medication Questionnaire and Quality Of Life Short Form-36 questionnaires. Questionnaires results analysis, correlation and student's t-test analyses were carried out using Statistical Package of Social Sciences software package. It is found that 57% of the recruited patients were reported to be adherent to their medications. The Beliefs about Medication Questionnaire reported scores of the necessity, concerns, overuse and harm items were 17.6, 20.1, 15.4 and 16.5 respectively (out of 25). Attitudinal analysis of the Beliefs about Medication Questionnaire scores revealed that 48.45% of the patients were ambivalent, 28.86% were accepting, 21.23 were skeptical and only 1.4% showed indifferent beliefs about their medications. Around half of the population reported high physical and mental quality of life. T-test analysis illustrated that there were a significant impact of both adherence and beliefs on the quality of life. Furthermore, beliefs about medications impacted the adherence rate. It is concluded that both adherence to medications and beliefs about medications affected the quality of life of the Jordanian patients. This suggests a cascade that starts with beliefs about medications, intermediated with adherence to medications and ends up with a good quality of life. Hence, a key factor to improve the patient's quality of life is by activating the pharmacist's "role" as an "educator"; stressing on the practice of patient education could potentially result in a better quality of life.

**Keywords:** Determinants, Chronic Illness, prescribed medications.

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## BACKGROUND

It is well known that the majority of the elderly population suffers from different and multiple chronic illnesses [1]. The presence of various chronic diseases in elderly patients, and the fact that these patients are involved in what is so called a "polypharmacy" may result in requiring a number of different medications which may influence their attitudes toward medications and subsequently their adherence practices and their quality of life (QOL) [2]. Adherence, compliance or concordance has been described by numerous researchers and various international health institutions as "the degree to which a patient abides by recommendations delivered to him/her by healthcare providers" [3]. According to the World Health Organization (WHO), Adherence is defined as "the extent to which a person's behavior in taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed

recommendations from a health care provider" [4]. Non-adherence to medical recommendations is a major problem in health care, since adherence to medical treatments regimens is essential to the success of the treatment [5]. Given the importance of adherence behaviors in the possible accomplishment of successful treatments, non-adherence to medical recommendations is an important problem to address, and the risk of non-adherence to treatment is costly and sometimes could potentially be lethal [6]. The problem of patient's poor adherence to treatment regimens is one of the main barriers in therapeutic management of chronic diseases for the health care providers [7]. As a result of non-adherence to the recommended treatment plan, more patients will not achieve the benefit from medical treatment, which consequently, results in inferior treatment outcomes, poorer QOL, and increased health care load [9]. The level of adherence was decreased markedly after the first six months of treatment among

patients suffering from chronic diseases while adherence rates are usually greater in patients with acute situations [10]. Ensuring patient's adherence of the recommended medication is a key dimension of successful management of chronic diseases because of the strong association between adherence, patient outcomes, and treatment budgets [11]. It has been a real interesting condition for numerous researchers in the medical field to measure the influence of multiple chronic diseases on attitude, beliefs, fears, behavior, and adherence of this group of patients [12]. Certainly, individual attitude toward diseases and medications may affect patient's adherence and practices. In fact, there exist a multi-factorial model including demographic, clinical, attitude/ behavioral, adherence practices and cultural factors that could in the long run impact therapeutic outcomes in patients suffering from chronic illness [13]. The psychological and mental situation and their influence on patient's practices have not been well studied, or intensively considered among chronically ill patients in the Arab world [14]. On the other hand, such factors have been of excessive attention in other geographic regions especially in Europe and USA. Another actual challenge was how to judge the attitude and how to measure adherence and is there really a difference in attitude and adherence practices among chronically ill patients according to the number or kind of chronic diseases [15]. Adherence could be measured by advanced and expensive procedures and could be measured simply and economically by narrative or self-reporting approaches that are used in various clinical settings with high accuracy and validity [16]. Nonetheless, each adherence measurement approach provides advantages and suffers from drawbacks; however, the estimate of the different approaches was generally proven to be more than fair. The other challenge facing researchers is how to measure the attitude or beliefs toward medications, and whether these beliefs are positive or negative, and how in the long term this is affected by number or kind of chronic diseases. Part of this challenge was resolved by development of a special tool to measure attitude/ belief in a narrative estimative way. This tool is called "Beliefs about Medications Questionnaire (BMQ)" [17]. This tool is broad in terms of measuring attitude. Therefore, it can assess the patient's attitude toward a particular medication and the attitude toward medications in general. It also can assess positive beliefs as measured by essential feelings and can also measure negative beliefs by measuring fears from medications. This can be achieved using a simple structure that can be utilized in any setting and is constructed to improve patient's practices, and consequently optimize the desired therapeutic results of a treatment plan [18]. Finding novel approaches to aid patients improve their adherence to existing medication treatments has enormous potential to improve health outcomes while potentially reduces the health care cost and can contribute to the further development of clinical interventions to improve adherence rates and

assist patients who have difficulty with engaging in adherent behaviors [19]. Improving quality of medication adherence could have positive effects on diseases management and patient's satisfaction toward care plan, and consequently improving QOL [20]. If patients are well educated about care regimen and the benefits of adherence, they will recognize the physical and psychological benefits from therapy, and this enhances adherence and persistence with the therapy regimen [21]. In addition, regularity of taking the prescribed drugs will prevent disorders that may occur in patients with poor adherence such as fatigue, anxiety, and unnecessary emergency visits [22]. Furthermore, reducing the fluctuation in the patient's physical and psychological status will reduce the burden of care upon caregivers or family members [23]. Improved awareness of adherence will guide health care providers to educate patients more about treatment regimen instead of manipulating drug dose or discontinuing useful drugs; consequently. This will enhance the treatment effectiveness, reduce health care cost, reduce patient suffering and improve QOL [24]. The present study was therefore carried out to assess attitude and beliefs toward medications and its correlation with adherence practices and to examine the relationship between attitudes and medication adherence practices in a multiple chronic disease scenario. An effort to extend this knowledge of the Jordanian population, this study will be carried out to explore the adherence level and correlate it with some of patients' demographic characteristics.

The findings of this study would support and guide the upgrading of future health care interventions to improve health outcomes for patients suffering from chronic diseases in Jordan. Also, the results of this study will address the area not covered enough previously and at least to narrow down the knowledge gap.

### **Aim of the Present Work**

The general objective of this study is to explore the effect of patient characteristics and health beliefs on their medication adherence, and consequently the quality of life.

## **METHODOLOGY**

### **Design**

The study was conducted using a quantitative cross sectional descriptive design to investigate adherence to chronic medications in different age populations of Jordanian patients, to address specific and general beliefs about medications by Jordanians and to examine QOL of Jordanian patients with chronic diseases. Cross-sectional studies aim to gather all data at a given point of time.

### **Settings**

Participants from King Hussein Medical Center in The Royal medical Services in

Amman/Jordan were recruited after obtaining permission from the ethical committee in the directorate of the royal medical services to perform the study.

### Instruments

To collect data for this study, a package which consisted of four parts was used. The first part was a demographic data sheet which was developed by the researcher to obtain background information of the participants, including: (age, gender, income level, educational level, diagnosis, duration of illness, number of medications, and type of medication). The second part included a self-reported questionnaire entitled the Medication Adherence Report Scale MARS-5. For the purpose of this study, the Arabic translated version of the MARS-5 was used. The third part included a self-report questionnaire entitled "Beliefs about Medicines Questionnaire (BMQ)".

### Inclusion Criteria

- Patients of age 20 years and above.
- Participants with a confirmed diagnosis of one chronic disease or more for at least six months.
- Participants who have been prescribed chronic medications for at least 6 months.
- Patients who were not seriously ill.
- Patients who concerned to participate in the study.

### Exclusion Criteria

- Patients less than 18 years of age
- Patients who were seriously ill and cannot respond.
- Patients who did not agree to participate in the study.

### Data Analysis Procedures

The Statistical Package for the Social Sciences (SPSS® version 22 from IBM, USA) was used to run descriptive and inferential statistics. Descriptive analysis was used to describe the continuous variables in terms of the mean, and standard deviations as well as the homogeneity. Several statistical testes were used: Pearson's correlation is the test statistics that measure the statistical relationship or association between two continuous variables. It gives information about the magnitude of the association, or correlation, as well as the direction of the relationship. The outcome is measured with a dichotomous variable (in which there are only two possible outcomes). The goal of logistic regression is to find the best fitting model to describe the relationship between the dichotomous characteristic of interest and a set of independent variables. Frequency analysis was used to represent the demographic data. Independent sample Student's t-test was conducted to evaluate the variables effect on the differences in means between variables. Furthermore, attitudinal analysis of BMQ results was conducted in which patients are categorized into four different groups based on their necessity/ concerns scores.

## RESULTS

### General Characteristics of the Study Sample

During the study period, a total of 485 consecutive patients were recruited. The median age of the participants was 57 (range 22- 82) years. More than one third of the participants (n 189: 38.9%) were geriatrics. More than half of the participants were males (246: 50.7%). The majority of participants (79%) had intermediate monthly income and 40% of participants had completed bachelor degree education. Furthermore, 22% of the participants had 2 or more medical conditions. Hypertension was the most common disease among the participants followed by diabetes. Participant demographic characteristics are summarized in Table-1.

**Table-1: Demographic characteristics of the participants**

<b>Gender</b>	
Male	246 (50.7% )
Female	239 ( 49.3 % )
Age median	57
Age range	22-82
<b>Educational level</b>	
Non-educated	16 (3.3%)
School level ( primary)	55 (11.3%)
School level ( secondary )	49 (10%)
High school	130 (26.8%)
Primary degree	194 (40%)
Post graduated	41 (8.5%)
<b>Income level</b>	
Low	57 (11.7%)
Intermediate	385 (79.4%)
High	41 (8.5%)
<b>Diseases</b>	
Hypertension	173 (42.3%)
Diabetes	156 (38.1%)
Cardiovascular	88 (21.0%)
Asthma	52 (12.7%)
Others	95 (23, 2%)
<b>Number of medications used</b>	
> 2	238(49.1%)
<2	247(50.9%)

### Reported Adherence of the Study Sample

The Cronbach's alpha of the five items of the MARS-5 questionnaire was 0.914 which indicated a satisfactory internal consistency between the items of MARS-5. Also a person correlation for the MARS-5 item was conducted as shown in Table-2.

**Table-2: Pearson's correlation between MARS**

	M1	M2	M3	M4	M5
M1	1				
M2	0.591	1			
M3	0.656	0.653	1		
M4	0.642	0.687	0.740	1	
M5	0.645	0.693	0.717	0.777	1

The cut off value of the standard population was determined as the median value of the aggregated scores of MARS-5 which was 18 in the current work. Hence any patient with score below 18 was considered non-adherent, while a patient scores higher than 18 was considered adherent in this study. Accordingly,

adherence rate in this study was 57% (n=277). Reported answers to MARS-5 are presented in Table-3. (26.1%) of the participants reported that they sometimes forgot to take their medications; and (19.1%) of the participants reported that they took less medications than prescribed.

**Table-3: Self-reported medication adherence behavior of study participants as determined by the MARS-5**

Item	Number of patients who answered yes
I forgot to take my medicine	127(26.1%)
I altered the dose of my medicine	102(21%)
I stopped taking my medicine for a while	105(26.6%)
I decided to miss out a dose of my medicine	96(19.7%)
I took less medicines than prescribed	93(19.1%)

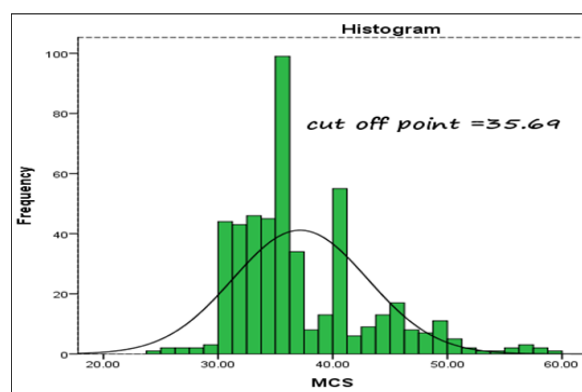
Logistic regression between the disease status (independent variable) and adherence to medication item (MARS-5 score; dependent variable) revealed no correlation between adherence and disease status in the studied population ( $p=0.22$ ).

Frequency analysis for adherence in different disease status is illustrated in Table-4.

**Table-4: Adherence frequency according to medical condition**

	Adherent	Non-adherent
Disease		
Hypertension(173)	80(46.2%)	93(53.8%)
Diabetes(156)	72(46.2%)	84(53.8%)
Cardiovascular(88)	45(51.1%)	48.9%)
Asthma(52)	23(44.2%)	29(55.8%)
Age		
Geriatric	91(48.2%)	98 (51.8%)
Non-geriatric	130(44%)	166(56%)
Gender		
Male	115(46.8%)	131(53.2%)
Female	106(44.4%)	133(55.6)

The cut off value for the SF-36 questionnaire in the current work was determined by calculating the median value of the sum scores of the standard population, which was lower than the US norms, for the MCS cut off point was 31.6 so according to this value 51.1% (n= 248) were considered high mental quality of life and 48.9%(n= 237) were considered to have low quality of life as shown in Figure-1.



**Fig-1: The frequency of the reported MCS scores. The cut off value determined as 35.69**

**Association between adherence and quality of life**

Pearson’s correlation ( $r$ ) was conducted to evaluate the association between adherence level and the quality of life scores, hence the  $r$  can take a range of values from +1 to -1. A value greater than 0 indicates a positive association, in this study the  $r$  value between adherence and physical component summary (PCS) and mental component summary (MCS) were 0.811 and 0.703 respectively, which illustrate a positive correlation i.e. ; as the value of adherence level increases, so does the value of quality of life scores.

**Table-5: Pearson’s correlation between adherence and quality of life**

	Adherence	PCS	MCS
Adherence	1		
PCS	0.811	1	
MCS	0.703	0.827	1

In addition, Student’s t-test was applied to investigate the mean differences between quality of life scores (MCS and PCS scores) with adherence scores as a dependent variable. The analysis revealed that there was significant difference. The results of the t-test of quality of life and adherence are shown in Table-6.

**Table-6: t-test for equality of means between QOL and adherence**

	T	df	Sig.(2-tailed)	Mean differences	Std. Error Differences	95% confidence interval	
						lower	Higher
PCS	-18.226	286.652	<0.05	-9.506	0.522	-10.532	-8.479
MCS	-16.327	268.517	<0.05	-7.321	0.448	-8.203	-6.438

**Association between quality of life and Beliefs about medications**

According to Pearson's correlation there is a positive correlation between both physical component

summary and mental component summary with the specific necessity, while a negative correlation between (PCS) and (MCS) with specific concerns , general overuse, and general harm Table-7.

**Table-7: Pearson's correlation between QOL subscales and BMQ subscales**

	PCS	MCS	NECISSITY	CONCERNS	HARM	OVERUSE
PCS Sig.(2-tailed) 0.00						
Pearson's correlation	1					
MCS Sig.(2-tailed) 0.00						
Pearson's correlation	0.827	1				
Necessity Sig.(2-tailed) 0.00						
Pearson's correlation	0.752	0.667	1			
Concerns Sig.(2-tailed) 0.00						
Pearson's correlation	-0.557	-0.520	-0.646	1		
Harm Sig.(2-tailed) 0.00						
Pearson's correlation	-0.507	-0.471	-0.563	0.663	1	
Overuse Sig.(2-tailed) 0.00						
Pearson's correlation	-0.502	-0.467	-0.600	0.646	0.811	1

**Association between adherence and Beliefs about medications**

Depending on results of Pearson's correlation between adherence rate and beliefs about medications subscales, there is a significant correlation between

patient's necessity upon their medications and their adherence attitude, while negative correlation between their concerns and adherence attitude endorse that patient's worries decrease their adherence (Table-8).

**Table-8: Pearson's correlation between adherence rate and BMQ subscales**

	Adherence	NECISSITY	CONCERNS	HARM	OVERUSE
Adherence Sig.(2-tailed) 0.00					
Pearson's correlation	1				
Necessity Sig.(2-tailed) 0.00					
Pearson's correlation	0.889	1			
Concerns Sig.(2-tailed) 0.00					
Pearson's correlation	-0.705	-0.646	1		
Harm Sig.(2-tailed) 0.00					
Pearson's correlation	-0.633	-0.563	0.663	1	
Overuse Sig.(2-tailed) 0.00					
Pearson's correlation	-0.621	-0.600	0.646	0.811	1

**DISCUSSION**

**Adherence Level**

In this study, adherence rate was calculated to be 57%, which concords with the universal findings of adherence (WHO), it is also concluded that neither the disease status, age, or gender had a significant effect on adherence behavior, furthermore, factors like

polypharmacy, sensitivity of adherence, duration of disease, educational level may also have influence on adherence to medication. The most common reasons were found to be forgetfulness (26.1%). The results of this study revealed low adherence to chronic medications. It seems that the Jordanian patients with chronic disease had a difficulty to follow the medication

regimen, which may extend to a long time. This was evident from the participants' answers to MARS-5 where 20% of the participants reports that they stopped, missed or altered in taking their medications.

### Beliefs and Its Impact on Medication Adherence

Reported fears of consequences related to taking medications regularly like, side effects, duration of the use and dependence to medications. Since (78.7%) of the patients had high fears and concerns scores about long-term side effects of taking medications chronically, it is mandatory for clinical pharmacists to be knowledgeable and fully aware of such fears and direct patients' education and intervention to minimize such concerns and consequently minimize non-adherence. It is also for immense importance that clinical pharmacists play their role in patient education as this is well known to improve the possible beliefs about medications in general, and consequently contributes to improve adherence to medications. For example, patients who take medications for chronic illness like hypertension or diabetes mellitus need to know that their medications are not addictive and that medications have an acceptable safety profile for long-term use. Therefore, assessment of medication beliefs may be important for success of medication improvement strategies. In addition, clinical pharmacists should expect to encounter many patients with multiple chronic diseases and multiple different medications. This should not confuse the patients or the clinical pharmacists. In terms of specific beliefs about medications patients expressed high level of concerns about the medications they use (mean score 20.1), this confirms the earlier discussed finding that patients in general are afraid of using their medications.

In terms of beliefs about medications in general, patients moderately responds that physicians use too much medications, and to lower extent medications in general can cause harm the their health status (mean scores 15.4 and 16.5 consequently), this indicates that patients are doubtful of using their medications to treat health conditions, causes of such a belief could be extracted from the frequency analysis of BMQ general in which high percentage of patients expressed that doctors place too much trust in medicines (64.9%), while ( 59.3%) expressed that if doctors had more time with patients, they would prescribe fewer medicines and ( 56.9%) reported that doctors use too many medicines. On the other hand only one third of patients reported that medications are harmful to health.

### Quality Of Life

In the present study; according to the MCS cut off point which was 31.6, around half of the patients expressed high level of both mental and physical quality of life (n 237 and 244 respectively). The PCS score was relatively lower compared to MCS. These findings were

consistent with the results from previous studies [26]. In general, our results demonstrated that all the demographic variables were not relevant to QOL as a simple ANOVA analysis revealed. The similarities and differences observed when compared to other studies can be attributed to factors including utilization of the study instrument, selection, definition and size of sample and the inherent cultural differences that exist between countries.

### Association between Adherence and QOL

In the present study; adherence to treatment has positive impacts on the mental and physical domain, as well as on the overall QOL score, i.e.; as the value of adherence level increases, so does the value of quality of life scores. These results are consistent with the results from a cross-sectional study performed in Palestine which showed that patients with a higher rate of medication adherence, evaluated by the Morisky Medication Adherence Scale (MMAS), presented high values on the quality of life index scale (EQ-5 d) compared to those with low or average adherence ( $p < 0.05$ ). The previous studies that referred to a relationship between quality of life and adherence to pharmacological treatment observed statistically significant associations, namely, there were greater increases in QOL when pharmacological treatment was adhered to.

### Association between Beliefs and QOL

In the present study, according to Pearson's correlation there is a positive correlation between both physical component summary and mental component summary with the specific necessity, while a negative correlation between (PCS) and (MCS) with specific concerns, general overuse, and general harm.

## CONCLUSION

As a conclusion, stronger positive attitude/belief in the necessity or of one's medications is significantly associated with high adherence and that assessment of medication attitude is important in understanding medication compliance/adherence among chronic medication users. At the same time, high fears and concerns are associated with high levels of non-adherence. It was clearly illustrated that adherence is affected by beliefs about medications, and quality of life is affected by adherence to medications. Hence, patient education about medications is recommended to improve adherence rates, and to configure positive beliefs about medications; this ultimately an improvement of quality of life in Jordanian patients.

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