

Original Research Article


Assessment of medication adherence in individuals with chronic diseases

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Abstract

Background and Aim: Chronic diseases require long-term drug use in terms of reducing morbidity and mortality. Adherence with medication treatment; It is the name given to all the decisions about prescribing the patient's drugs, starting, continuing and discontinuing the drugs, and applying the recommendations received in this process. The aim of this study is to assessment the medication adherence levels of individuals with chronic diseases.

Methods: The population of the study consisted of patients receiving treatment at Al-Nasiriyah Teaching Hospital in Dhi-Qar City, Iraq. Data were collected between December 2021 and May 2022. 208 patients were included in the study. Data were collected by face-to-face method using a socio-demographic questionnaire and General Medication Adherence Scale (GMAS).

Results: The cost sub-dimension scores of those under the age of 45 were lower, those who were married, those who were illiterate, those who were literate, and those who did not have a job had lower co-morbidity and drug burden, cost sub-dimension, and total GMAS scores compared to those who were unemployed ($p < 0.05$).

Conclusion: Education programs should be organized and awareness should be raised about drug use regularly by nurses for patients who use drugs regularly, before and after they start using the drug.

Key words

Chronic Disease, Medication Adherence, Patient Adherence, Nurse.

Introduction

Chronic diseases are mental or physical conditions that impair daily activities for patients and require ongoing medical care for a year or more include such health problems, Non – communicable disease (NCD), mental illnesses, HIV/AIDS, TB [1].

The primary source of mortality and economic hardship, chronic diseases increase the cost of healthcare globally. According to research, stroke and heart disease cost the United States an approximate 199 billion dollars annually in healthcare expenses. In addition, diabetes-related healthcare costs total \$237 billion [2].

In Iraq, a surge in the number of chronic diseases during the recent years and a rapid increase in the incidence of non-communicable ailments include cancer, diabetes, respiratory illness, and cardiovascular illness account for half of all deaths. Regardless of the gaps in medical care and the population's knowledge of non-communicable diseases, around one-third of these individuals pass away before reaching age 70 [3].

Management of chronic illness is frequently hampered by the occurrence of several health issues and social and psychological obstacles [4]. Adherence to medication is regarded as one of the most important factors of a treatment, as it is the cornerstone of every successful treatment [5]. Persistence, compliance, and adherence are commonly used interchangeably, but they all have distinct connotations in the context of organizational behavior. Compliance is the regularity and precision with which a drug regimen is adhered to. Persistence is the duration that a routine is maintained. Adherence is a combination of compliance and perseverance. Adherence, in general, is the outcome of a complicated interaction between an individual, the community and the environment [6]. Three fundamental components comprise the concept of drug adherence: initiation, implementation, and persistence [7].

Currently, nonadherence to medication is a widespread occurrence. Especially for chronic conditions with lengthy treatments, adherence is frequently subpar. Poor adherence to chronic disease treatment is a big problem all over the world. Inadequate adherence to long-term medicines jeopardizes treatment impact, making this a very important part of people's health [4].

Improving drug adherence is a public health issue that has the potential to minimize both economic and health consequences. Doctors, pharmacists, and nurses all have a significant role making sure that patients adhere to how they take their medicines. Adherence to medication can be improved by developing a personal relationship with a doctor or pharmacist [8]. Therefore, the aim of the study was assessment of medication adherence in individuals with chronic diseases and find out the relationship between patients' medication adherence and some of their sociodemographic characteristics.

Methodology

A descriptive-analytical study was conducted during the first week of December to May, from 01/12/2021 to 01/05/2022, to assess the medication adherence in individuals with chronic diseases and find out the relationship between the patients' medication adherence. The study was conducted in the city of Al-Nasiriyah / Dhi-Qar Health Directorate, and the hospital is located in the south of the city. The theoretical value of the study is 1.96 with a 95% confidence interval and a sampling error of 0.05. Based on the simple formula for random sampling with a 5% error margin and a confidence interval of 95%; When the research data were inserted into the equation, it was concluded that the number of samples that could represent the individuals of 450 people should be at least (208), according to the calculation results. Over-18-year-old male and female patients with a chronic condition diagnosed at least a year prior, with or without comorbidities, were invited to take part in the study. The data was gathered through the use of a questionnaire to determine the socio-

demographic characteristics of individuals and General medication adherence scale (GMAS).

Socio-demographic form: The first part contained questions concerning age, gender, marital status, education level, co-morbidity, occupation, and residence.

General medication adherence scale: The second part included the GMAS, an 11-item self-report adherence scale. The scale is sub-categorized into 3 subscales; these subcategories are patient behavioral mismatch (PBNA), additional disease and drug burden mismatch (ADPB), and cost-related non-adherence (CRNA). The scale has 11 multiple choice (MCQ) items and four possible choices for each item. One point is given for each item. Each area of the scale measures a certain size of mismatch. In addition, GMAS also measures overall adherence to drug therapy. Grading is done according to scoring criteria such as high fit, good fit, partial fit, low fit, and poor fit. The scale allows overall grading as well as grading in each area for the patient, which helps to understand individual adherence issues. The instrument was subjected to reliability analysis using Cronbach's alpha and the obtained value >0.5 was considered satisfactory. Note that the necessary permissions have been obtained from the researcher using the Arabic version. The General medication adherence Scale was developed and validated in Pakistan in Urdu and English [1, 9]. A nation that shares cultural similarities with Saudi Arabia. Validation of the Arabic version of the scale was previously conducted on patients in Saudi Arabia. [9]. The Arabic version of the GMAS was highly reliable. The value of this population was higher than what the GMAS said in English. Cronbach's α was 0.865, which was greater than 0.7 for all three structures with 11 components. All items were positively associated, with a minimum correlation coefficient value greater than 0.062, and the ICC was 0.862 (95% CI: 0.837-0.885). Cronbach's α values for all three constructs were 0.773, 0.723, and 0.641, respectively (Naqvi, et al. 2020) [10]. Based upon the score of the scale, the adherence

levels are categorized as high, 27–31 good, 25–27 partial, 15–24 low 9–14 and poor (≤ 10). The adherence may also be categorized as adherent (≥ 27) or non-adherent (≤ 26) (Naqvi, et. al. 2019), in the result of this study the sub-dimension scores of the patient's behavior scale were found to be 10.15 ± 4.57 , co-morbidity and drug burden 8.79 ± 2.73 , cost 4.13 ± 1.79 , and total scale score 23.07 ± 7.70 , respectively [9].

The Ethical Dimension

The Research Ethics Committee of the Scientific Research Committee granted ethical permission in the Dhi-Qar Health Department to conduct the research on 30/11/2021. Entering the hospital was quick and simple, while at the same time also facilitating the encounter with the patient and so also securing an agreement to take part in the interview. All study participants were verbally informed of the study's objectives and given the option to participate willingly. Additionally, each individual was promised of confidentiality.

Results

The demographic data are presented in **Table - 1**, this table shows that the majority of the patients' subgroups are: those with ages ranging ≥ 46 years (73.6%); female patients (57.2%); those that are married (74.5%); those that are illiterate (27.4%), those who are unemployed (54.8%); those living in urban area (78.8%); those who suffer from comorbidity (66.3%), those with hypertension (32.2%).

The mean of the scale and sub-dimensions found in the study were 10.15 in patient behavior, 8.79 in comorbidity and pill load, 4.13 in cost, and a total of 23.07 in drug compliance scale for chronic patients. It was seen that the skewness and flatness values related to the scale and sub-dimensions remained in the range of +2 to -2 (**Table - 2**).

To compare the mean scores of the medication adherence scale and its sub-dimensions for chronic patients according to the characteristics

of the participants, the independent t-test was used in the comparison of two independent groups, and the one-way analysis of variance (ANOVA) test was used in the comparison of more than two independent groups. As a result, it is seen that the average score of the cost

dimension, which is one of the sub-dimensions of the medication adherence scale for chronic patients according to age, shows a statistically significant difference ($p < 0.05$). Accordingly, the average cost score of those aged 46 and above was higher than those aged 45 and younger.

Table – 1: Descriptive statistics (frequency and percentage) for the demographic data of patients.

Demographic data	Sub-groups	Frequency (N=208)	Percentage (%)
Age / years	≤ 45	55	26.4
	≥ 46	153	73.6
Gender	Male	89	42.8
	Female	119	57.2
Marital Status	Married	155	74.5
	Unmarried	53	25.5
Educational Level	Illiterate	57	27.4
	Primary School	38	18.3
	Intermediate School	49	23.6
	Secondary School	47	22.6
	Bachelor's degree and above	17	8.2
Occupation	Employed	94	45.2
	Unemployed	114	54.8
Residence	Urban	164	78.8
	Rural	44	21.1
Comorbidity	Yes	138	66.3
	No	70	33.7
Chronic Disease	Hypertension	67	32.2
	Diabetes	48	23.1
	COPD	13	6.3
	Asthma	20	9.6
	Kidney disease	19	9.1
	Other	41	19.7

Table – 2: Distribution of the mean of the GMAS scale and its sub-dimensions.

Scale	Min	Max	\bar{X}	SS	Skew	Flatulence
Patient Behavior	0	15	10.15	4.57	-0.585	-1.010
Comorbidity And Pill Burden	0	12	8.79	2.73	0.945	0.203
Cost	0	6	4.13	1.79	-0.689	-0.468
Total Medication Adherence Scale For Chronic Patients	3	33	23.07	7.70	-0.843	-0.256

It is seen that the mean score of the medication adherence scale and its sub-dimensions for chronic patients according to gender and chronic disease of the participants did not show a statistically significant difference ($p > 0.05$).

It is seen that the mean score of comorbidity and pill load and cost dimensions of comorbidity and pill load and cost dimensions for chronic patients showed a statistically significant difference according to the participants' marital status

($p < 0.05$). Accordingly, it was seen that the mean score of comorbidity and pill load, cost, medication adherence for chronic patients of single patients was higher than that of married ones.

Table – 3: Assessment and mean of scores of patients' medication adherence.

	Patient Behavior X± SS	Co-morbidity And Pill Burden (X± SS)	Cost X± SS	Total X± SS
Gender				
Male	10.54±4.36	8.73±2.74	4.06±1.83	23.33±7.70
Female	9.86±4.72	8.83±2.74	4.18±1.76	22.87±7.72
Test value	t=1.065 p=0.288	t=- 0.265 p=0.792	t=-0.513 p=0,609	t= 0.418 p=0.676
Age				
≤ 45	9.98±4.49	8.65±2.75	3.98±1.77	23.33±7.70
≥ 46	10.21±4.85	9.16±2.72	4.55±1.78	23.35±7.76
Test value	t=-0.315 p=0.753	t=1.188 p=0.236	t=2.026 p=0.044*	t=0.700 p=0.485
Marital status				
Married	10.77±4.25	9.64±2.34	4.58±1.51	25.00±6.11
Unmarried	9.94±4.67	8.50±2.80	3.97±1.85	22.41±8.08
Test value	t=-1.152 p=0.250	t=-2.919 p=0.004*	t=-2.166 p=0.031*	t=-2.444 p=0.016*
Educational level				
Illiterate (1)	9.37±5.47	7.86±3.13	3.05±1.79	21.07±8.59
Primary (2)	9.74±4.42	8.74±2.71	3.68±1.60	21.79±8.67
Intermediate (3)	10.16±4.42	8.83±2.44	4.45±1.78	23.62±6.67
Secondary (4)	11.04±3.80	8.94±2.61	4.94±1.33	24.82±6.85
Bachelor's degree and above (5)	11.41±4.66	10.06±1.48	5.59±0.80	26.06±5.26
Test value	F=0.846 P=0,498	F=3.207 P=0.014*	F=14.297 P=0.000*	F=2.637 P=0.005*
Occupation				
Employed	10.21±4.74	9.30±2.92	5.04±1.37	24.55±9.03
Unemployed	10.10±4.39	8.37±2.41	3.38±1.75	21.85±8.55
Test value	t=0.182 p=0.856	t=2.515 p=0.013*	t=7.711 p=0.000*	t=2.621 p=0.009*
Residence				
Urban	10.82±4.20	9.26±2.38	4.41±1.57	24.48±6.48
Rural	7.66±5.09	7.05±3.26	3.09±2.15	17.80±9.47
Test value	t=3.782 p=0.000*	t=4.212 p=0.000*	t=3.795 p=0.000*	t=4.414 p=0.000*
Co-morbidity				
Yes	9.99±4.41	8.43±2.69	4.01±1.80	22.44±7.60
No	10.46±4.90	9.49±2.71	4.36±1.74	24.31±7.80
Test value	t=-0.691 p=0.490	t=-2.658 p=0.008*	t=-1.309 p=0.192	t=-1.652 p=0.000*

Chronic Disease				
Hypertension	10.16±4.68	8.72±2.44	4.12±1.79	23.00±7.93
Diabetes	9.52±4.65	8.44±3.05	3.67±1.88	21.63±8.26
COPD	11.77±3.85	9.54±2.82	4.38±1.39	25.69±5.66
Asthma	9.45±4.14	8.30±3.63	4.40±1.98	22.15±8.57
Kidney disease	10.68±4.50	8.89±3.13	4.11±1.97	23.68±8.45
Other	10.44±4.83	9.27±2.05	4.49±1.57	24.20±6.27
Test value	F=0.681 p=0.639	F=0.745 p=0.591	F=1.122 p=0.350	F=0.896 p=0.485

According to the education level of the participants, it is seen that the mean score of comorbidity and pill load and cost dimensions from the medication adherence scale and sub-dimensions for chronic patients showed a statistically significant difference ($p < 0.05$). The mean score of comorbidity and pill load, cost, drug adherence for chronic patients is higher than the other groups of the undergraduate and higher groups. According to the multiple comparison test showing the group that makes the difference, it is seen that the average score of comorbidity and pill load, cost, medication adherence for chronic patients is higher than illiterate participants, the cost score average of bachelor's degree and above participants is higher than the illiterate participants.

It is seen that the mean score of comorbidity and pill load and cost dimensions of the participants showed a statistically significant difference from the medication adherence scale and sub-dimensions for chronic patients according to the study situation ($p < 0.05$). Accordingly, it was seen that the mean score of comorbidity and pill load, cost, medication adherence for chronic patients was higher than those who did not work.

It is seen that the mean score of the medication adherence scale and sub-dimensions for chronic patients showed a statistically significant difference according to where the participants lived ($p < 0.05$). Accordingly, it was seen that the average score of sick behavior, comorbidity and pill load, cost, and medication adherence for chronic patients was higher than for those living in rural areas.

It is seen that the mean score of comorbidity and pill load size from the sub-dimensions of the medication adherence scale for chronic patients showed a statistically significant difference according to the comorbidity of the participants ($p < 0.05$). Accordingly, those who could not have comorbidity were found to be higher than those with mean comorbidity and pill load scores (**Table - 3**).

Discussion

There is a significant effect between age and adherence to medication for chronic patients ($p < 0.05$). This result is consistent with many previous studies [11, 12]. In the study conducted by Borataş (2017), it was stated that the adherence of patients with medication and age was the leading factor that made a difference, and that patients aged 61 years and older had higher medication adherence than other patients [13]. Who found that there is a significant relationship between age and adherence to medications for patients who have chronic diseases ($p < 0.05$). The reason for that is because. Because patients have a problem remembering to take medicine and its cost, as medicines in Iraq are usually not covered by insurance, in addition to their lack of knowledge about the diseases they suffer from. This makes it imperative to educate patients about their disease and the importance of adherence to medication. The results of our study show that younger patients were significantly associated with lower adherence to medication. This result is consistent with what was found by Lemay, et al. 2018; who found that older patients had greater adherence to medication. [14]. These results are supported by

reports among patients with different diseases .Older patients were more attentive to their treatment regimen because they were more aware of their own mortality compared to younger patients. In addition, this situation is thought to be due to the difficulty of accepting the chronic disease they have in young patients and the fact that they do not realize the importance of regular drug use [15].

There is no significant effect between gender and adherence to medication for patients with chronic diseases ($p > 0.05$). In the study of Demirbaş and Kutlu in which 275 adult patients evaluated drug adherence, no difference was found between gender and adherence. According to Prabahaar, et al. (2020) In the drug adherence study conducted with 208 adults in Saudi Arabia, no significant difference was found between gender and adherence [11, 16].

Similar to observations in studies among Middle Eastern patients, adherence was not associated with sex in the current study [17]. Meng, et al. (2022), in his study of 256 Chinese patients with chronic disease using the GMAS scale, stated that there was no difference between gender and adherence [18].

According to the marital status of the participants, the mean score of the Medication Adherence Scale and its sub-dimensions, comorbidities, pill burden and cost dimensions showed a statistically significant difference ($P < 0.05$). This result is consistent with the study of (Tümer, et al. 2016) [19]. They found in their study that the degrees of adherence with medications for married patients, who live with their spouses, and there was a statistically significant relationship between the marital status and the degree of adherence with the treatment scale as consistent with the study (Demirbaş and Kutlu 2020) who showed a significant effect between the social status and medication adherence for patients and it also this result consist (Huzur 2018) who found that married couples had a higher score on an assessment; Medication adherence and that there is a

significant effect between the social status and the degrees of medication adherence. The reason is due to the social support provided by the husband, which makes the patient more committed to medication in terms of reminding him to take the medication, and this may be financial, as it helps him provide treatment and get used to taking it. In addition to caring for patients by husbands [11, 20].

According to the educational level of the participants, there is a statistically significant difference in the mean score of the Medication Adherence Scale and its sub-dimensions, comorbidities, pill burden and cost dimensions ($p < 0.05$). This result is consistent with Tümer, et al. (2016) [19]. They found in their study that the degrees of adherence with medications for patients with higher educational degrees, and there was a statistically significant relationship between education and the degree of adherence with the treatment scale this result consist to Tuncay, et al. [21]. It was found that the level of education and adherence to medication also found a statistically significant difference between the level of education and adherence to medication, being educated has a higher average than patients with vocational education / high school graduates. It also seems to have. In the study of Karabulutlu, et al.; chronic care patients had their educational status examined, and as the educational level increased, the sub-dimensions and total scores for adherence to medication increased [22]. Meng et al. (2022), Demirbaş and Kutlu (2020) also stated that as the level of education increases, adherence to medication increases [11, 18].

In our study, it was observed that the GMAS sub-dimension and total scores were higher and more significant than those who did not work ($p < 0.05$). Similar positive associations have been found in some previous studies Meng et al. (2022), Demirbaş and Kutlu (2020) also stated that as the level of education increases, adherence to medication increases. In our study, it was observed that the GMAS sub-dimension

and total scores were higher and more significant than those who did not work ($p < 0.05$) [11, 18].

In our study, GMAS all sub-dimension and total scores were found to be higher and statistically significant in city residents compared to rural residents ($p < 0.05$). In the study of Demirbaş and Kutlu (2020), in which 275 patients evaluated drug adherence, the drug adherence scores of those living in the city were found to be higher and more significant than those living in the district and village [11]. In the study of Meng et al. (2022), no statistical significance was found in GMAS scores among those living in cities or villages. The living spaces where people live are important in terms of access to health, care and support services and medicine. Access to the city center of some villages and districts may be limited and restricted. Factors such as whether people have vehicles, weather conditions, and climatic events can also affect this transportation. We think that this difference in our study was affected by the factors mentioned above [18].

Co-morbid patients are more likely to take more than one drug per day. For this reason, they may sometimes have difficulties in controlling their drug adherence status. In our study, drug adherence status was found to be higher and significant in patients without co-morbid conditions compared to those with co-morbid conditions. This result is similar to what was found Meng, et al. (2022) [18].

Regular follow-up and training of patients with chronic diseases and those who need to use a large number of drugs, determining the factors that may cause non-adherence, will increase the level of treatment adherence and motivation. A limited number of patients were included in our study and no specific sampling method was used. It is thought that case-control studies should be conducted in order to emphasize the importance of education in larger patient groups.

Conclusion

As a result, it is seen that the average score of the cost dimension, which is one of the sub-dimensions of the medication adherence scale for chronic patients according to age, score of comorbidity and pill load, education level and cost dimensions of co-morbidity and pill load and cost dimensions for chronic patients, shows a statistically significant difference ($p < 0.05$).

Age, Marital Status, educational level, Occupation, Residence and Co-morbidity have All adherence factors have been identified and as a result these factors must be considered before therapeutic interventions that may be beneficial in improving patient comfort and increasing adherence to medication as well as expanding the role of social support for patients that may increase adherence to medication.

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