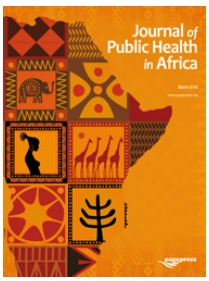

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Individual-related factors associated treatment adherence among hypertensive patients

Mohammed Malih Radhi,[1] Shatha Mahmood Niazy,[2] Sameeha Naser Abed[1]

[1]Community Health Nursing, Kut Technical Institute, Middle Technical University, Baghdad; [2]Department of Community, Medical-Technical Institute, Middle Technical University, Iraq University, Baghdad, Iraq

Correspondence: Sameeha Naser Abed, Department of Community Health Techniques, Kut Technical Institute, Middle Technical University, Baghdad, Iraq.
E-mail: sameeha.naser@mtu.edu.iq

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Abstract

Background: currently, some of the most prevalent illnesses are attributable to external sources, such as chronic disorders that threaten people's health. The goal of the study was to investigate the differences in individual characteristics associated with treatment adherence among hypertension patients.

Methods: in this descriptive cross-sectional study, 176 hypertensive patients who reviewed primary healthcare facilities in Babylon Province were included. Experts were used to ensure the study questionnaire's validity, and a pilot study was used to ensure its reliability. Using standardized questionnaire and interviewing methods, data were collected and analyzed.

Results: according to the study's findings, participants' average ages were 59 (10.86), 67% of them were over 60, 55.1% and 65.3% of them were men and married respectively, nearly half of them had moderate monthly income, the unemployed percentage was 61.9%, and 36.4% had completed their secondary education. Two-thirds, or 70.5%, of hypertension patients reported poor treatment adherence. Ages 30-59, male patients, married, high-income, and college-educated patients showed significantly better treatment compliance ($P<0.05$).

Conclusions: every individual characteristic for patients with high blood pressure is regarded as a predictor of therapy adherence. The current study is one of the few in Iraq to evaluate treatment adherence and look into the various elements that may influence it using the survey approach. Future research on the subject of antihypertensive treatment adherence in the hypertensive population in Iraq employing a representative sample, a qualitative methodology, and more factor exploration may offer additional insights.

Introduction

In many industrialized and developing nations, hypertension is a serious health issue. High blood pressure, often known as hypertension, is a disorder that affects the cardiovascular system[1]. The World Health Organization (WHO) defines it as "having a systolic blood pressure of at least 140 mm Hg and a diastolic blood pressure of at least 90 mm Hg"[2]. In addition to factors that may be changed; use of alcohol, salt intake increases, lack of exercise, overweight and obesity, older age, and family history are risk factors for developing hypertension[3]. Due to its high frequency of vascular disease, premature death, stroke, kidney disease, and retinopathy, hypertension is a significant public health issue worldwide [4]. It is the most important risk factor for cardiovascular disease, which kills more people than any other illness each year—about 12 million—in the world[5]. Preliminary screening in the older population makes it difficult for nurses to identify cases of hypertension due to the growing problem of hypertension around the world[6]. The prevalence of hypertension, an illness that

affects people all over the world, has been rising annually. The first line of defense in treating high blood pressure is adherence to treatment. Patients with hypertension have reported varying degrees of therapy adherence, from excellent to subpar. It has been discovered that a variety of factors influence drug adherence. The first step in considering future changes that tailor particular treatments to increase medicine adherence is to identify the elements that are associated to treatment adherence. Therefore, the purpose of this study was to investigate the differences in individual characteristics influencing treatment adherence among hypertension patients.

Methods

Study design: This study relied on the descriptive cross-sectional approach, as it is the most appropriate approach to achieve its objectives. This approach is concerned with determining the current situation of the problem, then describing, analyzing, and interpreting it using statistical analysis.

Study population: The research sample represents part or a limited number of the total patients with hypertension who attended primary health care centers in Babylon Province in the Middle of Iraq.

Study sample: A purposive sample of 10% depending on the statistics of the review for the three months prior to the sample collection period from each primary health care center was selected by using the non-probability sampling method.

Study tools: The scale of Hill-Bone Compliance, a self-report tool used to gauge medication adherence patterns among hypertensive patients, was used to gather field data [7]. It has 14 questions that indicate three behavioral dimensions of high blood pressure treatment adherence: salt consumption (2 questions), medication adherence (9 questions), and appointment keeping (3 questions). The age, gender, patient's marital status, occupation, income, and educational status are all examples of the elements that are specifically tied to each patient and their health. The scale of Hill-Bone Compliance was used to compare all these related patient differences.

After the study tool had been translated into Arabic, five faculty of nursing representatives evaluated the tool's face validity (three professors and two assistant professors). Ten percentage of a total of 17 patients' research samples were used to test the reliability of the study instrument. When one of the researchers meets with the participants, they introduce themselves to them and ask them to take part in the research by providing their feedback on the scale of Hill-Bone Compliance. After that, the researcher gave them an explanation of the study's goal and title before asking them to complete a study sheet during an interview to gauge its simplicity and understandability as well as the amount of time required to complete it. Each

form's expected completion time was 20 minutes. The pilot study's data were evaluated with no alterations made, hence it was eliminated from the sample. The Hill-Bone Compliance scale now has a Cronbach's alpha of 0.84, which indicates a good level of reliability. Actual data collecting occurred between August and September 2022, lasting roughly a month. To explain the study's goal and obtain oral agreement, the researchers spoke with each study participant individually. Patients who met the following criteria were interviewed (first, patients who were 18 years of age or older; second, patients who were previously diagnosed with hypertension for at least 6 months, and third; Voluntary participation). The study volunteers are not at risk when the research is being used.

Ethical consideration: The appropriate authorities granted official approval for the study to be conducted. Patients who took part in the trial provided oral consent. The participants' privacy and the confidentiality of the data collected were both guaranteed. Study participants are free to refuse or leave the study at any time and are not subject to any restrictions.

Statistical analysis: The IBM SPSS 20.0 program was used for all the analyses that follow. Numbers and percentages (No and%) were used to categorize the variables, while the mean and standard deviation were used to characterize the continuous variables (mean and SD). where the t test and ANOVA test were used to evaluate continuous variables. A two-tailed p-value of.05. was used to determine statistical significance.

Results

Participants' average ages was 59 (10.86), with the biggest percentage (67%) reported for people under the age of 60. In terms of gender, men made up more than half of the participants (55.1%) compared to women, 65.3% of people were married, which was the most common marital status. In terms of monthly income, the majority of participants 48.1% stated a modest level, 61.9% of people with employment status-related findings were unemployed and the greatest percentage of secondary school graduates in terms of education is 36.4% (table 1).

Table 1. Sociodemographic Characteristics SDVs

SDVs	**Classification**	**No. (%)**
Age (***M± SD=59±10.86***)	20-29	3 (1.7)
	30-39	11 (6.3)
	40-49	18 (10.2)
	50-59	26 (14.8)
	≥60	118 (67.0)
Gender	Male	97 (55.1)
	Female	79 (44.9)

Marital Status	Single	8 (4.5)
	Married	115 (65.3)
	Separated	13 (7.4)
	Divorced	16 (9.1)
	Widower	24 (13.6)
Income/Monthly	Poor	77 (43.8)
	Moderate	86 (48.9)
	High	13 (7.4)
Employment status	Employed	67 (38.1)
	Unemployed	109 (61.9)
Education Status	Illiterate	14 (8.0)
	Read and write	53 (30.1)
	Primary school	29 (16.5)
	Secondary school	64 (36.4)
	College	16 (9.1)

Based on the low overall mean and SD, which equal 22.7 (±12.343), the results showed that the treatment adherence of 70.5% of hypertension patients was poor (table 2).

Table 2. Hill-Bone Compliance Scale

Level of Adherence	**No. (%)**	**M (±SD)**
Low (*M=14-28*)	**124 (70.5)**	***22.7 (±12.343)***
Moderate (*M=28.1-42*)	**40 (22.7)**	
High (*M=42.1-56*)	**12 (6.8)**	
Total	**176 (100)**	

The treatment adherence among patients aged 20-29 are not differs from those who aged 30-39 ($p= .320$), 40-49 ($p= .775$), 50-59 ($p= .946$) and ≥60 ($p= .173$). The treatment adherence among patients aged 30-39 are not differs from those who aged 20-29 ($p= .320$), 40-49 ($p= .220$), 50-59 ($p= .093$); and differs from those who aged ≥60 ($p= .000$). The treatment adherence among patients aged 40-49 are not differs from those who aged 20-29 ($p= .775$), 30-39 ($p= .220$), 50-59 ($p= .655$); and differs from those who aged ≥60 ($p= .000$). The treatment adherence among patients aged 50-59 are not differs from those who aged 20-29 ($p= .946$), 30-39 ($p= .093$), 40-49 ($p= .655$); and differs from those who aged ≥60 ($p= .000$). The treatment adherence among

patients aged ≥60 are not differs from those who aged 20-29 (*p= .173*); and differs from those who aged 30-39 (*p= .000*), 40-49 (*p= .000*) and 50-59 (*p= .000*) (table 3).

Table 3. Comparison of the Hill-Bone Compliance Scale based on Age Groups

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
20-29	30-39	-.51948-	.52102	.320	-1.5479-	.5090
	40-49	-.14286-	.49884	.775	-1.1275-	.8418
	50-59	-.03297-	.48776	.946	-.9958-	.9298
	≥60	.63923	.46767	.173	-.2839-	1.5624
30-39	20-29	.51948	.52102	.320	-.5090-	1.5479
	40-49	.37662	.30614	.220	-.2277-	.9809
	50-59	.48651	.28772	.093	-.0814-	1.0545
	≥60	1.15871*	.25218	.000	.6609	1.6565
40-49	20-29	.14286	.49884	.775	-.8418-	1.1275
	30-39	-.37662-	.30614	.220	-.9809-	.2277
	50-59	.10989	.24528	.655	-.3743-	.5940
	≥60	.78208*	.20241	.000	.3825	1.1816
50-59	20-29	.03297	.48776	.946	-.9298-	.9958
	30-39	-.48651-	.28772	.093	-1.0545-	.0814
	40-49	-.10989-	.24528	.655	-.5940-	.3743
	≥60	.67219*	.17330	.000	.3301	1.0143
≥60	20-29	-.63923-	.46767	.173	-1.5624-	.2839
	30-39	-1.15871-*	.25218	.000	-1.6565-	-.6609-
	40-49	-.78208-*	.20241	.000	-1.1816-	-.3825-
	50-59	-.67219-*	.17330	.000	-1.0143-	-.3301-

The treatment adherence among patients who are male are statistically differs from those who are female (*t=2.705; p= .008*) (table 4).

Table 4. Comparison of the Hill-Bone Compliance Scale based on Gender

Treatment Adherence	Gender	M	SD	t-value	d.f	Sig.
	Male	1.78	.962	2.705	174	.008

	Female	1.43	.371			

Findings in table 5 indicate that the treatment adherence among patients who are single does not differ from those who are married (p= .906), separated (p=.126), divorced (p= .173), and widower (p= .141). The treatment adherence among patients who are married is not different from those who are single (p= .906); and differs from those who are separated (p= .013), divorced (p= .018), and widower (p= .004). The treatment adherence among patients who are separated is not different from those who are single (p= .126), divorced (p=.792), and widower (p=.802); and differs from those who are married (p= .013). The treatment adherence among patients who are divorced is not arguing from those who are single (p= .173), separated (p= .792), and widower (p= .970); and differs from those who are married (p= .018). The treatment adherence among patients who are widowers has not differed from those who are single (p= .141), separated (p= .802), and divorced (p= .970); and differs from those who are married (p= .004).

Table 5. Comparison of the Hill-Bone Compliance Scale based on Marital Status

(I) Marital Status	(J) Marital Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Single	Married	-.03672-	.31159	.906	-.6518-	.5783
	Separated	.58860	.38293	.126	-.1673-	1.3445
	Divorced	.50446	.36900	.173	-.2239-	1.2328
	Widower	.51488	.34789	.141	-.1718-	1.2016
Married	Single	.03672	.31159	.906	-.5783-	.6518
	Separated	.62532*	.24935	.013	.1331	1.1175
	Divorced	.54119*	.22738	.018	.0924	.9900
	Widower	.55160*	.19124	.004	.1741	.9291
Separated	Single	-.58860-	.38293	.126	-1.3445-	.1673
	Married	-.62532-*	.24935	.013	-1.1175-	-.1331-
	Divorced	-.08413-	.31819	.792	-.7122-	.5440
	Widower	-.07372-	.29346	.802	-.6530-	.5055
Divorced	Single	-.50446-	.36900	.173	-1.2328-	.2239
	Married	-.54119-*	.22738	.018	-.9900-	-.0924-
	Separated	.08413	.31819	.792	-.5440-	.7122
	Widower	.01042	.27503	.970	-.5325-	.5533

Widower	Single	-.51488-	.34789	.141	-1.2016-	.1718
	Married	-.55160-*	.19124	.004	-.9291-	-.1741-
	Separated	.07372	.29346	.802	-.5055-	.6530
	Divorced	-.01042-	.27503	.970	-.5533-	.5325

Findings in table 6 indicate that the treatment adherence among patients who are poor monthly income does not differ from those who are moderate-income (p= .257), and differs from those who are a high income (p= .000). The treatment adherence among patients who are moderate income does not differ from those who are poor income (p= .257), and differs from those who are a high income (p= .000). The treatment adherence among patients who are high income differs from those who are poor income (p= .000) and differs from those who are moderate-income (p= .000). From these results, we conclude that the higher the monthly income, the higher the treatment adherence.

Table 6. Comparison of the Hill-Bone Compliance Scale based on Income/Monthly

(I) Income/Monthly	(J) Income/Monthly	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Poor	Moderate	-.14551-	.12788	.257	-.3979-	.1069
	High	-1.37334-*	.24440	.000	-1.8557-	-.8909-
Moderate	Poor	.14551	.12788	.257	-.1069-	.3979
	High	-1.22783-*	.24255	.000	-1.7066-	-.7491-
High	Poor	1.37334*	.24440	.000	.8909	1.8557
	Moderate	1.22783*	.24255	.000	.7491	1.7066

The treatment adherence among patients who are employed are differs from those who are unemployed (*t=3.675; p= .001*) (table 7).

Table 7. Comparison of the Hill-Bone Compliance Scale based on Employment Status

Treatment Adherence	Occupation	M	SD	t-value	d.f	Sig.
	Employed	1.92	1.038	3.675	174	.001
	Unemployed	1.43	.713			

Findings in table 8 indicate that the treatment adherence among patients who are illiterate has not differed from those who are read and write (p= .339) and primary school (p= .055), and differs from those who are in secondary school (p= .000) and college (p= .000). The treatment adherence among patients who are read and write does not differ from those who are illiterate (p= .339); and differs from those who are primary school (p=.003), secondary school (p= .000) and college (p= .000). The treatment adherence among patients who are primary school does not differ from those who are illiterate (p= .055) and secondary school (p= .118); and differs from those who are read and write (p=.003) and college (p= .001). The treatment adherence among patients who are in secondary school does not differ from those who are in primary school (p= .118); and differs from those who are illiterate (p= .000) read and write (p=.000) and in college (p= .019). The treatment adherence among patients who are in college differs from those who are illiterate (p= .000), read and write (p= .000), in primary school (p= .001), and in secondary school (p= .019).

Table 8. Comparison of the Hill-Bone Compliance Scale based on Education Status

(I) Education Status	(J) Education Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Illiterate	Read and write	.16516	.17242	.339	-.1752-	.5055
	Primary school	-.40463-	.20985	.055	-.8189-	.0096
	Secondary school	-.70411-*	.17242	.000	-1.0445-	-.3638-
	College	-1.22062-*	.23473	.000	-1.6840-	-.7573-
Read and write	Illiterate	-.16516-	.17242	.339	-.5055-	.1752
	Primary school	-.56979-*	.19040	.003	-.9456-	-.1940-
	Secondary school	-.86927-*	.14813	.000	-1.1617-	-.5769-
	College	-1.38578-*	.21751	.000	-1.8151-	-.9564-
Primary school	Illiterate	.40463	.20985	.055	-.0096-	.8189
	Read and write	.56979*	.19040	.003	.1940	.9456
	Secondary school	-.29948-	.19040	.118	-.6753-	.0764
	College	-.81599-*	.24824	.001	-1.3060-	-.3260-
Secondary school	Illiterate	.70411*	.17242	.000	.3638	1.0445
	Read and write	.86927*	.14813	.000	.5769	1.1617
	Primary school	.29948	.19040	.118	-.0764-	.6753
	College	-.51651-*	.21751	.019	-.9459-	-.0872-
College	Illiterate	1.22062*	.23473	.000	.7573	1.6840

	Read and write	1.38578*	.21751	.000	.9564	1.8151
	Primary school	.81599*	.24824	.001	.3260	1.3060
	Secondary school	.51651*	.21751	.019	.0872	.9459

Discussion

The overall medication adherence among hypertension patients in the current study was poor because of significant influencing factors such as gender, age, income, marital status, and educational level of the patients. The significance of each of these several factors in determining treatment compliance. If the hypertensive patient has underlying contributory factors to elevated blood pressure, hypertension can occur at any age. However, age is the primary risk factor that results in essential hypertension[8]. Regarding age groups, there are statistically significant disparities in treatment adherence. The therapeutic commitment changes as people get older; it is the same for those in the 20–29 and 60–plus age groups, but it gets worse as people get older. Age affects how well a patient follows their treatment plan. The differences in adherence behaviors among hypertensive patients of different age groups were obvious, despite the fact that various studies have produced conflicting results about this factor's significance in regard to adherence to antihypertensive agents. There has been evidence of an inverse relationship between commitment behavior and age. Patients under 60 years old showed improved adherence to antihypertensive medication in an observational cross-sectional study of 1000 hypertension patients in Greece[9]. Another investigation into the use of antihypertensive drugs in Turkey among 750 hypertensive patients of various ages discovered a progressive decline in antihypertensive drug adherence with age[10].

The psychomotor talents deteriorate as we become older. Additionally, aging has an effect on a patient's health. For instance, certain health conditions, such as visual and impairments of cognitive (such as Alzheimer's disease or dementia), are more prevalent in older people[11]. Therefore, the decline in self-reliance caused by these problems was the explanation for why older people were taking less antihypertensive medications. Patients under 30 years old showed lower drug adherence than those between the ages of 30 and 50, who had the highest mean adherence rate[12]. In this particular cultural setting, family members are responsible for the elder relatives' daily medicine schedules.

The gender of the patient was used to predict some aspects of patient adherence behavior. According to the results of the current study, treatment compliance among patients who are male statistically differs from that of patients who are female; in terms of the statistical mean, male patients have better treatment compliance than those who are female. The demographic variations between men and women were a factor in the various studies' findings regarding

antihypertensive medication adherence[13,14]. An examination of the relationship between sociodemographic and cultural factors and antihypertensive medication adherence in a study done on 144 Chinese immigrants to the United States of America were studied (75 women and 69 men) revealed that men tended to report higher adherence than women while no significant differences were found[14]. A sample of 21 male and 49 female hypertension patients drawn from a larger randomized control study were used to explore the relationship between sociodemographic, cognitive characteristics, and clinical in the United States of America and antihypertensive agents adherence. The results showed that men with lower educational levels tended to consume drugs more religiously than women with higher educational levels[13].

Gender differences were a significant adherence factor in Taiwan (p 0.05), and males were more likely to take their antihypertensive medications as prescribed because women were less likely to do so. Additionally, compared to women, men demonstrated a strong predictor that related to their drug adherence: confidence in greater personal control and fewer symptoms[15]. Therefore, a comprehensive review of other factors that distinguish health behaviors between genders needs to be taken into account when examining disparities in medication adherence behavior between genders.

It was crucial to take marriage into account when analyzing patient adherence to antihypertensive treatment. his was due to the fact that it was regarded as a measurement of a network of social that worked as a motivating patient factor to control their illnesses[16]. In the current study, married couples fared better in terms of treatment adherence than single, divorced, separated, and widowed individuals, who displayed no difference between them. The treatment adherence process should take into account these categories. According to a study from Duke University Medical Center, being married was linked to a higher likelihood of taking hypertension medications consistently[17]. This study was comparable to one that was carried out in the United States of America on 1,326 individuals who had coronary artery disease and underwent cardiac catheterization. The multivariable variables revealed that being married influenced the study sample's higher adherence[18]. To build on the earlier findings, it was discovered that spouse assistance in medication adherence had given the patient useful support, such as a friendly reminder to take their pills. In the absence of spousal support, patients with chronic illnesses reported worsening health condition management and an increase in the consequences of this poor illness management, such as a higher prevalence of cardiac events in patients with heart failure[19],

For individuals with chronic illnesses as well as hypertension, economic status was related to medication adherence. The affordability of the drugs was a factor in this relationship. The cost of antihypertensive drugs ranges from reasonable to expensive[20]. The influence of patient

economic status on medication adherence extended beyond the ability to pay for medications; it also included ways to improve medication adherence through education or knowledge, as people with higher incomes typically had better education and, as a result, more in-depth knowledge of medication adherence[21]. According to the same logic as our findings, patients with higher income levels make better contributions to their own illness management, including medication adherence. Hypertensive patients with moderate to low incomes struggled to access healthcare services or afford therapy, which resulted in poor health management. Minorities who lived in neighborhoods without appropriate health support, as was the case for low-income groups, had issues with poor adherence due to their low socioeconomic level[22].

Patients who are employed (M=1.92) have greater treatment adherence than those who are jobless (M=1.43). Employment status was a predictor of treatment adherence. There were two sides to this. The first was having personal financial resources that allowed for access to medical care and treatments; the second was having the routine of a daily job that improved the patient's functional condition and cognitive and, as a result, made it easier to maintain a drug adherence schedule. Similar research involving two hundred forty-one older Korean hypertension patients found that being employed was associated with a better likelihood of antihypertensive medication adherence than patients who were retired or unemployed[13]. However, it was stated that employed patients' ability to control their illnesses and stick to their drug regimens was compromised by a hectic lifestyle that might make it difficult to do so. In 440 patients in an outpatient environment in Nigeria, a study that examined the effect of employment on illness management and medication adherence for malaria patients found a negative correlation between employment and medication adherence[24]. Similar findings were significantly explained by the necessity of taking time from work for the patient to obtain injections and participate in rehabilitation therapy while taking malaria drugs.

According to the findings of the current investigation, better education significantly improves treatment adherence. Lower levels of education are strongly associated with worse health outcomes, according to scholarly literature. Individual education levels significantly improved adherence to antihypertensive medication[19]. The Morisky Medication Adherence Scale was used in a study on 410 hypertension patients in Palestine to evaluate socio-demographic characteristics in connection to antihypertensive medication adherence. The level of education of the patient and medication adherence were shown to be significantly correlated in this study. The findings revealed a correlation between rising levels of education and rising MMAS scores. Through educational interventions, healthcare workers were able to improve patients' low health literacy regarding drugs[26]. Patients who received medication education of any kind reported greater medication adherence[27] and the education level played an important role in the

rehabilitation of chronic con[28], but in the absence of education about medication, the patient's education level was a significant predictor. In comparison to individuals who were uneducated, those who were educated may have an edge in seeking out further health information concerning their medical concerns. It was discovered that the absence of this component could have an impact on how less educated patients' health conditions were managed.

Conclusions

Every individual characteristic of patients with high blood pressure is regarded as a predictor of therapy adherence. The current study is one of the few in Iraq to evaluate treatment adherence and look into the various elements that may influence it using the survey approach. Future research on the subject of antihypertensive treatment adherence in the hypertensive population in Iraq employing a representative sample, a qualitative methodology, and more factor exploration may offer additional insights.

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