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Compliance to Medication Management and Mental Health Status of Elderly Hypertensive Patients: Basis of Educational Health Program

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Abstract: *Objective:* The study aimed to assess medication management compliance and mental health in elderly patients with hypertension. *Method:* The study evaluated medication compliance and mental health status of elderly hypertensive patients in China using simple random sampling. Data was collected using the Morisky Medication Compliance Questionnaire, Hospital Anxiety and Depression Scale, and a checklist. Ethical practices were strictly observed. *Results:* A study of 100 elderly hypertensive patients found poor drug management compliance, with female patients showing worse compliance. Female patients were more vulnerable to anxiety and depression. The study also found no significant association between gender, age, education level, marital status, living standards, and medication compliance. Barriers to medication management included food and daily necessities, lack of awareness about the importance of drug treatment, and basic family needs. The lowest-ranked barriers were lack of support from government health clinics, low income, and lack of family support. *Conclusion:* Based on the results, the study proposes an educational plan for elderly hypertensive patients and their families, to be evaluated and implemented by the hospital and township community service center. The plan aims to improve medication management and lifestyle modification compliance, encourage active participation, and provide access to medical and mental health clinics, support groups, and counseling services.

Keywords: Elderly patients with hypertension; Compliance with medication management; Mental health status; Health education program

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1. Introduction

High blood pressure has a very high prevalence as a chronic disease. Clinical treatment and care research for elderly patients with chronic hypertension are continuously emerging. Elderly high blood pressure has gradually become representative of chronic diseases. The harm of high blood pressure to the human body is also gradually being revealed. It is a systemic disease accompanied by functional or organic changes in the heart and vascular organs, which can cause stroke, heart disease, and hemangioma disease. It is an important risk factor for cardiovascular disease and death, characterized by high prevalence, high fatality, and high disability rates,

especially among the elderly [1].

Medication compliance refers to the consistency of the patient's medication behavior with the doctor's advice. From the perspective of medication treatment, medication adherence refers to the execution of the drug regimen [2]. The reasons affecting drug compliance are divided into several factors: drug side effects, patients' doubts about the efficacy of drugs [3], low curative effect, high cost, long-term pain [4], differences in education and occupation, loneliness, poor memory [5], economic factors, living responsibilities, and lack of family support [6], gender, doctor's consultation on lifestyle, patient's understanding of hypertension, and patient's understanding of hypertension management and lifestyle advice [7], and supportive interventions at the individual, family, and community levels [8]. After studies showing that medication nonadherence is very common, a 2003 statement from the World Health Organization suggested that improving medication adherence "may have a greater impact on people's health than improvements in any particular medical treatment" [9]. This suggests that improving patient medication adherence is still important at this stage. A study found that 62% of patients forget to take their medication and 37% use all their drugs within a year [10].

The World Health Organization (WHO) defines health as "not only the elimination of disease or weakness, but also the complete health of the body, spirit, and society." Therefore, the psychological condition of patients is also crucial. The WHO emphasizes the importance of addressing the psychological health of patients, as research shows a bidirectional relationship between mental health and hypertension. High blood pressure can lead to poorer quality of life, lower treatment compliance, and higher mortality rates. Additionally, individuals with high blood pressure are more likely to suffer from depression and anxiety, which can affect medication adherence. Ignoring these emotions may exacerbate drug non-compliance. Therefore, managing negative emotions is crucial for overall health.

The aging population in today's era does not necessarily improve people's quality of life. The elderly often experience declining quality of life due to physical and metabolic disorders. Hypertension, a chronic disease, can cause brain pathological disorders and increase the risk of mental illness. Additionally, the elderly may be lonelier. Hence, the primary objective of this study is to examine the management of medication adherence and mental health status in elderly hypertensive patients. The increasing number of elderly patients with hypertension necessitates attention to elderly hypertension, making it important to understand the medication compliance and mental health status of these patients. The ultimate goal is to achieve the stability of hypertension in the elderly and reduce mortality.

2. Methodology

2.1. Research design

This study used a quantitative, cross-sectional design to determine the compliance to medication management and mental health status of elderly hypertension patients in a hospital in Shandong. Quantitative research methods observe events affecting a sample population by collecting diverse numerical data and analyzing it to aggregate, compare, or show relationships among the data.

2.2. Participants/respondents

In this study, a combination of purposive and convenience sampling techniques was used to select 100 participants from Yantai Tonghua Hospital in China. Inclusion criteria: (1) age older than or equal to 60 years, (2) elderly people with self-care ability; (3) meeting the World Health Organization diagnostic criteria for hypertension: systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater

than or equal to 90 mmHg; (4) ability to understand and communicate; and (5) willingness to participate in the study.

The exclusion criteria are (1) patients with or suspected of cognitive impairment; (2) patients with hearing or visual impairment; (3) patients with serious complications, such as severe renal failure or malignancy; (4) patients participating in other studies.

2.3. Instrumentation

According to the purpose of this study, a survey questionnaire was used. There are four parts to the questionnaire.

2.3.1. General situation questionnaire

Eight items include gender, age, education, previous occupation, smoking status, alcohol consumption, number of children, and current living conditions, which are mainly used to collect patients' personal data.

2.3.2. Morsiky Medication Compliance Questionnaire (MMAS-8)

This includes eight items. The alternative answers to questions 1 to 7 are binary, namely "yes" and "no," with 1, 2, 3, 4, 6, and 7 answered "no" and "yes" scored as 0, with reverse scoring for item 5. The alternative answers are "never," "occasionally," "sometimes," "often," and "all the time," scored as 1, 0.75, 0.50, 0.25, and 0, respectively. When the full score of the scale is 8, a score of less than 6 indicates poor compliance, 6-8 indicates moderate compliance and 8 points indicates good compliance.

2.3.3. Hospital Anxiety and Depression Scale (HADS)

This includes fourteen items. According to the criteria, the scores for anxiety and depression are divided into 0–7 for asymptomatic; 8–10 for suspicious symptoms; and 11–21 for positive symptoms. Diagnosing depression requires summing the scores of all double-item questions for a total score. To diagnose anxiety, the scores of all single-item questions should be summed for a total score.

2.3.4. Barriers to full compliance

This part determines the barriers participants face in fully complying with their medication management.

2.4. Analysis and interpretation

For the processing and analysis of the statistical data, general information was summarized using descriptive statistics, such as frequency and percentage. For barriers, frequency and percentage with ranking were utilized, and for testing significant relationships, inferential analysis, specifically the Chi-squared test, was used.

3. Analysis and results

This chapter mainly introduces the data collected for the study, the interpretation, and analysis of medication management and mental health compliance needs in elderly patients with hypertension.

Table 1 shows the socio-demographic profile of 100 respondents in this study.

Table 1. The socio-demographic profile of the respondents (n = 100)

Variables	Frequency	%
Age		
60–64 years old	49	49
65–69 years old	11	11
70–74 years old	26	26
75–79 years old	11	11
> 80 years old	3	3
Gender		
Male	47	47
Female	53	53
Marital status		
Married / having children	95	95
Single / no children	5	5
Education level		
Primary school and below	40	40
Junior middle school	27	27
High school or a technical middle school	17	17
Junior college	14	14
Bachelor's degree or above	2	2
Living conditions		
Living alone	7	7
Living with spouse	71	71
Living with children	14	14
Living with caretaker	8	8

(1) Age: According to the survey, the majority of elderly patients were aged 60-64, with the number of elderly over 75 years gradually decreasing, and those over 80 accounting for only 3%. The survey indicates that, with the rapid development of society, the healthy life expectancy in China is 68.7 years. Among the 100 elderly hypertensive patients surveyed, those aged 60–74 years accounted for 86%.

(2) Gender: 53% were female and 47% were male. This result showed a relatively balanced male-to-female ratio, and all the elderly participants were very active in filling out the questionnaire and actively participating in the elderly patient program in the selected hospitals.

(3) Education level: Most (67%) of the elderly have only received secondary or below education, 33% have received higher education, and 40% have attended primary school or below, while only 2% have a bachelor's degree or above. This reflects the historical lack of education in China and the associated lack of knowledge.

(4) Living conditions: The data show that most people are married and live happy lives, with only a few elderly people without children or a spouse. According to the survey results, 15% of elderly people live alone, with nannies, or in nursing homes, not with their spouses or children. Generally, the medical

conditions of the elderly who do not rely on their families are worse than those with spouses and children, with decreased cognition of the disease, medication costs, and living standards.

Table 2. The level of compliance of participants in their medication management (n = 100)

Compliance score	Gender [*n* (%)]		Total [*n* (%)]
	Male	Female	
< 6 points (poor)	43 (48%)	47 (52%)	90 (90%)
6–8 points (moderate)	4 (40%)	6 (60%)	10 (10%)
≥ 8 points (good)	0 (0%)	0 (0%)	0 (0%)

As shown in **Table 2**, Out of 100 participants, 90 scored < 6 points, with 43 (48%) being male and 47 (52%) being female. Only 10 participants scored 6–8 points, and none scored over 8 points. This indicates that the elderly hypertensive patients investigated in the hospital had poor compliance with drug management, with female patients having worse compliance than their male counterparts. These findings are attributed to the barriers to compliance that they identified.

Table 3. The health status of participants classified by gender

Classification	Grade	Total	Gender			
			Male		Female	
			n	%	*n*	%
Anxiety	0–7 (none)	47	22	46.8	25	53.2
	8–10 (possible)	14	7	50.0	7	50.0
	11–21 (significant)	39	18	46.2	21	53.8
Depression	0–7 (none)	46	20	43.5	26	56.5
	8–10 (possible)	13	7	53.8	6	46.2
	11–21 (significant)	41	20	48.8	21	51.2

On the mental health status of elderly participants in terms of anxiety, 47% scored 0–7, indicating no signs of anxiety, while 39% scored between 11–21, indicating significant anxiety attacks. Comparing gender, 54% of female participants experienced more anxiety episodes than their male counterparts (46%), as shown in **Table 3**.

For depression, the results showed that 46% scored 0–7, indicating no signs of depression, while 41% scored between 11–21, suggesting some signs of depression. Comparing gender, 51% of female participants experienced some symptoms of depression (**Table 3**). These findings suggest that female elderly patients with hypertension are more vulnerable to anxiety and depression than male patients [11].

The findings varied from those of Silva *et al.* [12] and Mohamad *et al.* [13], who found that elderly individuals with chronic diseases, such as hypertension, often experience fear and sadness due to their incurable nature and lack of independence. Loneliness can also contribute to mental illness in these individuals.

As seen in **Table 4**, the results of the Chi-squared test showed no correlation between gender, age, education level, marital status, and living standard of children and the level of compliance with medication management in elderly hypertensive patients. Therefore, the null hypothesis is accepted. This indicates that the selected profile variables have no strong association with compliance, revealing that poor compliance can be attributed to personal reasons like forgetfulness, economic or financial constraints, and not prioritizing medication.

Table 4. The significant relationship between participants' profile and their compliance with medication management

Variable	χ^2 computed	χ^2 tabular value at 0.05	Interpretation	Decision
Gender	17.871	33.924	Not significant	Accept H_0
Age	93.385	113.145	Not significant	Accept H_0
Marital status	19.761	33.924	Not significant	Accept H_0
Education level	100.935	113.145	Not significant	Accept H_0
Living conditions	85.107	90.531	Not significant	Accept H_0

Table 5. Significant relationship between participants' demographic characteristics and their mental health status

Variable	χ^2 computed	χ^2 tabular value at 0.05	Interpretation	Decision
Gender	36.581	38.885	Not significant	Accept H_0
Age	102.963	113.145	Not significant	Accept H_0
Marital status	23.158	38.885	Not significant	Accept H_0
Education level	94.967	113.145	Not significant	Accept H_0
Living conditions	92.086	101.879	Not significant	Accept H_0

The results of the Chi-squared test (**Table 5**) revealed no correlation between gender, age, education, child marital status, and standard of living and the mental health status of elderly patients with hypertension. Thus, the null hypothesis is accepted. This suggests that these personal profiles have no direct influence on mental health status, whether participants are anxious or depressed about their health conditions.

Table 6. Barriers to medication management compliance

Variable	*n*	Rank
1. No money for medicine	31	7
2. Food and other daily necessities are top priorities	68	1
3. Low income	16	9
4. Forget to take medication on time	62	4
5. Lack of support from family members	13	10
6. Multiple drugs causing confusion	60	5
7. The basic family needs are more important than medical treatments	66	3
8. Lack of support from governmental health clinics	24	8
9. Lack of awareness of the importance of drug treatment for hypertension	67	2
10. Side effects of the drugs	54	6

Table 6 uses frequency analysis to identify barriers to compliance with medication management and ranks them from highest to lowest. The top barrier, according to participants, is "Food and other daily necessities are top priorities," followed by "Lack of awareness of the importance of drug treatment for hypertension" and "The basic family needs are more important than medical treatment."

According to the data, 68 elderly patients prioritized food and daily necessities over medication, 67 lacked awareness of the importance of drug treatment, and 66 believed that basic family needs were more important than medication. The lowest-ranked barriers were "Lack of support from governmental health clinics" (n = 24), "Low income" (n = 16), and "Lack of support from family members" (n = 13). This reveals that elderly patients with hypertension lack support from family members, are generally very old (most over 65 years old), and often lack money to buy medicine. Many are farmers living alone or without children. Participants perceived a lack of government support, despite the state providing basic medical insurance through Article 29 of the Law on the Protection of the Elderly, which mandates government subsidies for low-income and urban residents. Participants also cited low income as a reason for poor compliance, though the local governments are tasked with developing urban and rural community pension services according to the rights of the elderly in the People's Republic of China [2].

Table 7 shows the educational program designed for elderly hypertensive patients in Yantai Tonghua Hospital in Shandong, aiming to improve their compliance with medication management and mental health status.

Table 7. Educational program for elderly hypertensive patients

Key areas of activity	Objective	Activities	Personnel involved	Time frame	Budget (RMB)	Expected outcome
Hypertension in elderly						
(1) Basic information about hypertension (2) Signs and symptoms (3) Dietary restrictions (4) Physical activities (5) Medication management	(1) Provide basic information signs, and symptoms of hypertension (2) Acquire knowledge and understanding of diet/food specific for hypertension as well as dietary restriction (3) Improve medication management compliance (4) Understand the basic indications of drug therapy	(1) Explain the PowerPoint about the prevention and treatment of hypertension (2) Explain the diet and precautions about hypertension (3) Watch documentaries about high blood pressure (4) Role-playing	(1) Community nurses or in hospital nurses (2) Doctors in the community or hospital (3) Community staff (4) The patient himself and his family members	Once every month	500	100% lecture attendance and increased medication adherence by 90%
Mental status						
(1) Anxiety (2) Depression	(1) Acquire a basic understanding of mental health (2) Understand the early signs of anxiety and depression (3) Provide directories of hospitals/health centers and government agencies that provide free consultations and counseling (4) Encourage active participation in planning activities of daily living for a healthier lifestyle	(1) Explain the prevention and treatment of anxiety and depression in elderly patients with hypertension (2) Film showing (3) Create a senior citizen group chat or official platform for communication (4) Conduct aerobic exercises such as slow walking and Tai Chi after meals	(1) Community nurses or hospital nurses (2) Community staff (3) Patients and their family members	Once every month	500	90% of older people improve their mental health

4. Discussion

Data were processed using descriptive and inferential statistical methods. Ethical practices were strictly observed throughout the study.

Almost half of the participants were aged 60–64 years (49%), mostly married (95%), female (53%), and had children. Less than half (40%) had a primary level of education, and the majority (71%) were still living with their spouses.

A study of 100 participants found that 90% scored less than 6 points on medication compliance, with 48% being male and 52% female. Only 10% scored between 6–8 points, and none scored 8 points. This suggests poor drug management compliance among elderly patients with hypertension, with female patients showing worse compliance.

The study found that 47% of elderly participants had no signs of anxiety, while 39% experienced significant anxiety attacks. Female participants experienced more episodes of anxiety than male participants (46%). The majority of participants had no signs of depression (46%), with 41% experiencing some symptoms. These findings suggest that female elderly patients with hypertension are more vulnerable to anxiety and depression.

The chi-squared test revealed no significant association between gender, age, education level, marital status, living standard, and medication compliance in elderly hypertensive patients, confirming the null hypothesis and indicating no strong association between selected participant profile variables.

The chi-squared test also revealed no association between gender, age, education level, marital status, standard of living, and mental health status in elderly patients with hypertension, indicating that these factors do not directly influence their mental health status, thereby accepting the null hypothesis.

A frequency analysis identified barriers to medication management, ranking food and daily necessities as the top priority. Lack of awareness about the importance of drug treatment for hypertension was ranked second, and basic family needs were ranked third. The three lowest-ranked barriers to poor medication compliance were the lack of support from government health clinics, low income, and lack of support from family members.

The educational program for elderly hypertensive patients at Yantai Tonghua Hospital in Shandong is designed to improve their medication compliance and mental health status. It includes awareness and active family participation to improve support. The program features mixed lectures, community courses, mobile phone initiatives, and assessment surveys for content improvement. The goal is to provide a general overview and easy-to-understand materials.

5. Conclusions

Based on the study's findings, the following conclusions are drawn:

(1) Elderly patients with hypertension have relatively low medication compliance, which is lower among female patients than male patients.

(2) Female elderly patients with hypertension are more susceptible to anxiety and depression than male participants.

(3) No correlation was found between gender, age, education level, marital status, and living standard of children and the level of compliance to medication management in elderly hypertensive patients, thus accepting the null hypothesis.

(4) Personal profile variables such as gender, age, education level, marital status, and living standard do not directly influence participants' mental status, thus accepting the null hypothesis.

(5) The main barriers to medication management compliance in elderly patients with hypertension are the lack of awareness of the importance of hypertension medication and the belief that family expenses and daily necessities are the main priority.

(6) The educational plan for elderly hypertensive patients at Yantai Tonghua Hospital in Shandong is an interactive program for patients and families that promotes awareness and active family participation to improve compliance.

6. Recommendations

Based on the results and conclusions, the following recommended actions are hereby offered:

(1) To the nursing service department: The study proposes that the educational plan designed for elderly hypertensive patients and their families be presented to the hospital and the township community service center for evaluation and potential implementation.

(2) To nursing staff: Review the proposed educational plan as part of their discharge plan and health education for patients and their families to ensure higher compliance with medication management and lifestyle modifications.

(3) For patients and families: Encourage active participation in the educational planning process to ensure continuity of care, compliance with medication, and adherence to dietary and lifestyle changes.

(4) To the community township service center: Provide patients and families with directories of medical and mental health clinics, support groups, and contact numbers for consultations and counseling. Establish regular meetings for elderly patients with hypertension, allowing those with good treatment outcomes and compliance to share their experiences and promote joint-supervision.

(5) For future research: Use the data from this study as a reference for future research, including studies with different variables, research locales, and broader scopes to enhance the findings' generalizability.

7. Limitation

(1) Sample size limitations: Due to time constraints, the number of researchers, and the age of the study group, the sample size was small, with only 100 participants. This may limit the generalizability of the study results.

(2) Geographical restrictions: The study only selected elderly participants from nearby areas due to time and budget constraints. The applicability of the results to other regions needs further investigation.

(3) Subjectivity of responses: Respondents' responses are subjective and may change over time or due to interactions with others. Their personal or others' attitudes and experiences may influence their answers.

(4) Feedback deviation: Respondents' moods and blood pressure at the time of the survey may cause positive or negative biases, and some may have randomly filled out the questionnaire, impacting the accuracy of the results.

In conclusion, the limitations of this study mainly relate to the region, sample size, collection method, and respondent biases. These limitations may result in different outcomes compared to other studies. Future research should build on this study, expanding the number of researchers and scope to collect more data, making the study more comprehensive and providing more convincing results.

Disclosure statement

The authors declare no conflict of interest.

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