Adoption of Preventive Behaviors for Hypertension and Associated Factors Among Rural Residents of Qayenat

Abstract

Introduction: The limited number of studies specifically estimating the adoption of preventive behaviors for hypertension among adults highlights the need for further research. This study aims to address this gap by measuring the adoption of these behaviors and examining contributing factors specifically within a rural resident population.

Materials and Methods: In a descriptive-analytical cross-sectional study, 300 rural residents living in Qayenat County were selected in 2024 through multi-stage random sampling to participate in the research. The data collection tool included demographic and background characteristics and a valid and reliable questionnaire to measure the adoption of preventive behaviors for hypertension. Data were analyzed using SPSS version 23 and descriptive statistics and multiple linear regression.

Results: The results showed that the mean and standard deviation of the score for adopting preventive behaviors for hypertension among the rural residents studied was 15.188 ± 1.215 out of 32, which was at an unfavorable level. Education level, the amount of physical activity per week, and the duration of hypertension were effective factors in adopting preventive behaviors for hypertension.

Conclusion: The adoption of preventive behaviors for hypertension was lower among rural residents with lower education levels, less physical activity per week, and a longer duration of hypertension. Therefore, it is suggested that more attention be paid to the aforementioned rural residents in designing educational programs to promote the adoption of preventive behaviors for hypertension among rural residents.

Keywords: Hypertension, Rural Residents, Qayenat, Iran

Introduction

Hypertension is considered one of the major health and treatment problems worldwide. With the significant progress made in controlling communicable diseases, the focus today has shifted more towards the control and treatment of non-communicable diseases (1). Hypertension is a chronic condition in which the pressure of blood within the arteries is elevated. As a result of this increased pressure, the heart must work harder than normal to maintain blood circulation throughout the blood vessels. Blood pressure consists of two readings, systolic and diastolic, which correspond to the contraction and relaxation of the heart muscles between beats, respectively (2). High blood pressure is defined as systolic blood pressure of 140 mmHg or higher, diastolic blood pressure of 90 mmHg or higher, or both (3)

Hypertension is one of the most significant risk factors for cardiovascular diseases. Its most important characteristic is its asymptomatic nature, which has led to it being called “the silent killer.” Additionally, diagnosing hypertension does not require advanced medical equipment, and it can be effectively managed through lifestyle changes and pharmacological treatments (4). People with hypertension may experience a variety of symptoms, including headache, blurred vision, nausea, vomiting, seizures, heart failure, and oliguria (reduced urine output) (5).

More than 90% of hypertension cases are classified as primary (essential) hypertension, for which the exact cause is not fully understood. Nonetheless, both genetic and environmental factors are believed to play a role in its development. In contrast, secondary hypertension arises from identifiable conditions such as kidney and adrenal disorders, hormonal imbalances, and coarctation of the aorta, and can often be managed by treating the underlying cause (6). If left untreated, approximately 50% of people with hypertension will die from coronary artery disease and congestive heart failure, 33% from stroke, and 10–15% from kidney complications. Other organs, including the eyes and major blood vessels, may also be affected (2). Additionally, hypertension contributes to disability, increased mortality, and imposes significant economic burdens on society (7).

According to a study by Haqhdoost and colleagues, the prevalence of hypertension was reported to be 23% among individuals aged 30 to 55 years, and approximately 50% among those over 55 years of age. Similarly, Azizi and colleagues found that the prevalence of hypertension in Iran is 22%,

highlighting the high burden of this condition in the country (8). While the significance of hypertension as a chronic disease and a major contributor to mortality is well established in developed countries, its importance is less widely recognized in developing nations (9). In Iran, various studies have reported the prevalence of hypertension as 20.88% in Gonabad, 14% in Kermanshah, 20.82% in Tabriz, and 22% in Tehran (7). According to research by Vazifeh and colleagues, nearly 60% of people up to the age of 60 years have hypertension, and by the age of 70, approximately 65% of men and 75% of women are affected (10).

According to the National Survey of Risk Factors for Non-Communicable Diseases conducted in 2016, approximately 30% of Iran's population over the age of 30 suffers from hypertension, which equates to more than 15 million individuals. Notably, only 60% of affected individuals are aware of their condition, just half of those diagnosed receive treatment with medication, and blood pressure is adequately controlled in only 19% of patients (11).

Some studies have reported a lower prevalence of hypertension and awareness in rural communities compared to urban populations, whereas other studies have noted a higher prevalence of hypertension in rural areas than in urban settings. For instance, in a study conducted in a major Iranian city (Isfahan), the prevalence of hypertension was found to be higher among the urban population compared to their rural counterparts (12).

The rising prevalence of hypertension worldwide serves as a serious warning of the need for increased attention to this disease. Evidence suggests that, in recent years, hypertension has become the leading cause of mortality among non-communicable diseases globally. Furthermore, it is projected that by 2025, approximately 1.5 billion people worldwide will be affected by hypertension (2).

Regarding the adoption of preventive behaviors for hypertension, limited studies have been conducted in Iran. For example, the results of a study by Ramezankhani and colleagues showed that mothers aged 20 to 49 years had a moderate level of engagement in preventive behaviors for hypertension (13).

Given the limited number of studies assessing preventive behaviors for hypertension among the adult population (13), the recognized importance of compliance with blood pressure-related behaviors in preventing the complications associated with hypertension (14), and the need to specifically evaluate these behaviors among rural residents, the present study was designed and conducted. The primary objective was to assess the extent to which preventive behaviors for hypertension are adopted, as well as to identify the factors influencing these behaviors among rural residents.

Materials and Methods

The present study employed a descriptive-analytical, cross-sectional design. The study population comprised rural residents of Qayenat County in the year 2024. A total of 300 rural residents were included in the study.

Sampling was conducted through a multi-stage random sampling approach. Initially, a comprehensive list of all villages, their associated health houses, and the respective covered populations was compiled. Subsequently, three villages were randomly selected from this list. Within each selected village, families were randomly chosen, and from each family, one individual aged between 18 and 65 years was randomly recruited for participation.

The sample size was determined based on the prevalence of hypertension reported by Safari Moradabadi et al. (20%) (7), utilizing the Cochran sample size formula with a precision level (d) of 0.05. Accordingly, the minimum required sample size was calculated to be 246 participants. Taking into consideration expert statistical opinion and accounting for a possible 20% attrition rate, the final sample size was increased to 300 individuals.

Eligibility criteria for participation included willingness to take part in the study, current residence in a rural area, having a registered health record in the SIB system, and possessing at least basic literacy (reading and writing skills). Exclusion criteria encompassed unwillingness to continue participation at any stage of the research as well as incomplete responses to the study questionnaires.

Data collection instruments in the present study included a comprehensive questionnaire composed of two distinct sections:

a) Demographic and background information:

The first section was designed to gather detailed information on the participants' demographic and personal backgrounds. This section included items pertaining to age, gender, marital status, number

of children, occupation, spouse's occupation, level of education, spouse's education level, economic status, body mass index (BMI), the average amount of weekly physical activity, cigarette and hookah (waterpipe) smoking habits, history of comorbid diseases, family history of hypertension, duration of hypertension (if present), history of antihypertensive medication use, and whether the participant had relatives or acquaintances suffering from hypertension.

b) Assessment of preventive behaviors for hypertension:

The second section was dedicated to evaluating the adoption of preventive behaviors for hypertension, utilizing the questionnaire developed by Ramazankhani and colleagues (13). This validated instrument comprised 8 items specifically focused on preventive behaviors. Response options for each item were scored on a 4-point Likert scale (ranging from 1 to 4), resulting in a total score range between 8 and 32, with higher scores indicating greater engagement in preventive behaviors.

The validity of this questionnaire was established through rigorous face and content validity procedures, referencing relevant scientific literature and reputable sources. The questionnaire underwent expert review by a panel consisting of five faculty members: two specialists in health education and promotion, one epidemiologist, one internal cardiologist, and two researchers with experience in the field of hypertension prevention. Modifications were made to address identified ambiguities and errors, and the final version was confirmed as valid. Reliability was ensured through both test-retest methodology and measurement of internal consistency (Cronbach's alpha), with satisfactory results reported in the original development (13).

In the present study, the instrument was pilot-tested on a sample of 30 individuals to further assess its reliability in the current context. The Cronbach's alpha coefficient calculated for the entire questionnaire was 0.93, indicating excellent internal consistency.

With regard to ethical considerations, this study was conducted following approval from the Vice-Chancellor for Research and Technology at Birjand University of Medical Sciences and assignment of a research project number (Ethics code: IR.BUMS.REC.1402.537). All necessary permissions and coordination were obtained with the selected rural health centers (health houses) prior to data collection.

Before enrollment, the purpose and objectives of the study were fully explained to all prospective participants, and written informed consent was obtained from each individual. Participation in the study was entirely voluntary. Completion of the questionnaires was performed using the self-report method, whereby participants were explicitly instructed to respond to all questionnaire items honestly and based on their own experiences. Participants were also assured that the information provided would be kept strictly confidential and analyzed anonymously, with no identifiers or names attached.

Upon completion, the collected data were entered into SPSS software (version 23) for analysis. Statistical analysis included descriptive statistics as well as multiple linear regression to identify predictors of preventive behaviors. The threshold for statistical significance was set at $p < 0.05$.

Results:

In the present study, 300 rural residents were examined (response rate: 100%). Among them, 61.3% (n = 184) of the samples were female, 86% (n = 258) were married, and 10.7% (n = 32) had a past history of hypertension (Table 1). The mean and standard deviation of age and body mass index for the participating rural residents were 37.671 ± 14.333 years and 23.287 ± 3.145 kg/m^2, respectively. Furthermore, the mean and standard deviation of the score for adopting preventive behaviors for hypertension among them was 15.188 ± 1.215 out of a possible 32, which was at an unfavorable level.

Table 2 presents the results of the multiple linear regression analysis conducted to determine the factors influencing the adoption of preventive behaviors against hypertension among the surveyed rural residents. The findings revealed that education level, weekly physical activity, and duration of hypertension were significant predictors of preventive behavior adoption.

Specifically, a higher level of education emerged as a strong predictor; for each incremental increase in education level, the likelihood of adopting preventive behaviors against hypertension increased by a factor of 3.101. Similarly, weekly physical activity was positively associated with the adoption of preventive behaviors, such that each additional unit of weekly physical activity resulted in a 2.033-fold increase in the likelihood of engaging in such behaviors. In contrast, the duration of hypertension demonstrated a negative effect; for every additional unit of time living with hypertension, the likelihood of adopting preventive behaviors decreased by a factor of 13.465.

It is noteworthy that other demographic and background variables assessed in the study did not exhibit statistically significant associations with the adoption of preventive behaviors for hypertension ($P < 0.05$).

Table 1: Demographic and Background Characteristics of Rural Residents in the Study

Variable	Levels	Frequency	Percentage
Gender	Female	۱۸۴	۶۱/۳
	Male	۱۱۶	۳۸/۷
Marital Status	Married	۲۵۸	۸۶
	Single	۴۲	۱۴
Number of Children	One Child	۴۶	۱۵/۳
	Two Children	۹۸	۳۲/۷
	Three or More Children	۱۵۶	۵۲
Occupation	Homemaker	۱۴۲	۴۷/۳
	Employee	۴۲	۱۴
	Farmer	۲۸	۹/۳
	Other	۸۸	۲۹/۴
Spouse's Occupation	Homemaker	۸۲	۲۷/۳
	Employee	۴۰	۱۳/۳
	Farmer	۵۸	۱۹/۴
	Other	۱۲۰	۴۰
Education Level	Literacy and Primary	۸۶	۲۸/۷
	Cycle and Middle School	۵۴	۱۸
	Diploma And High School	۹۴	۳۱/۳
	Associate and Bachelor	۵۲	۱۷/۳
	Master's and Higher	۱۴	۴/۷
Spouse's Education Level	Literacy and Primary	۸۲	۲۷/۳
	Cycle and Middle School	۵۸	۱۹/۳
	Diploma And High School	۹۶	۳۲
	Associate and Bachelor	۵۲	۱۷/۳
	Master's and Higher	۱۲	۴
Family Economic Status	Unfavorable	۳۴	۱۱/۳
	Moderate	۱۸۴	۶۱/۳
	Favorable	۸۲	۲۷/۴
Weekly Physical Activity	Every Day	۳۰	۱۰
	Every Day	۴۲	۱۴
	Some Days	۱۳۲	۴۴
	Rarely	۷۴	۲۴/۷
	Never	۲۲	۷/۳
Smoking	Yes	۳۰	۱۰
	NO	۲۷۰	۹۰

Hookah Use	Yes	۳۶	۱۲
	NO	۲۶۴	۸۸
History of Other Diseases	Yes	۲۶۶	۱۱/۳
	NO	۳۴	۸۸/۷
History of Hypertension	YES	۳۲	۱۰/۷
	NO	۲۶۸	۸۹/۳
Duration of Hypertension	Less than 6 Months	۸۴	۲۸
	6Months or More	۲۱۶	۷۲
Use of Hypertension Meds	YES	۲۸	۹/۳
	NO	۲۷۲	۹۰/۷
Family History of HTN	YES	۶۰	۲۰
	NO	۲۴۰	۸۰

Table 2. Factors Influencing the Adoption of Preventive Behaviors Against Hypertension in Multiple Linear Regression

Discussion

Unstandardized coefficient			Standardized Ciefficient			95.0% Confidence Interval For B		Collinearity Statistics	
Model	B	Std Eror	Beta	T	Sig	Lower Bound	.Upper Bound	Tolerance	VIF
Variable	۹۷/۱۵۱	۳۲/۷۸۶		۲/۹۳۶	۰/۰۰۴	۳۲/۲۸۸	۱۶۲/۰۱۴		
Age	۰/۰۳۴	۰/۱۲۰	۰/۰۳۶	۰/۲۸۷	۰/۷۷۵	-۰/۲۰۳	۱۶۲/۰۱۴	۰/۲۵۰	۳/۹۹۵
Gender	-۲/۰۸۸	۳/۱۲۹	-۰/۰۷۴	-۰/۶۶۷	۰/۵۰۶	-۸/۲۷۷	۰/۲۷۲	۰/۳۱۷	۳/۱۵۴
Marital Status	۲/۹۴۲	۲/۲۵۱	۰/۰۹۵	۱/۳۰۷	۰/۱۹۴	-۱/۵۱۲	۰/۱۰۲	۰/۷۳۷	۱/۳۵۸
BMI	۰/۱۵۷	۰/۰۸۷	۰/۱۵	۱/۸۰۴	۰/۰۷۳	-۰/۰۱۵	۷/۳۹۵	۰/۵۶۵	۱/۷۷۱
Number of Children	-۲/۶۰۲	۱/۵۸۳	-۰/۱۳۹	-۱/۶۴۳	۰/۱۰۳	-۵/۷۳۴	۰/۳۳	۰/۵۴۵	۱/۸۳۶
							۰/۵۳۱		
Occupation	-۰/۰۱۵	۰/۴۷۳	-۰/۰۰۳	-۰/۰۳۱	۰/۹۷۵	-۰/۹۵۱		۰/۵۰۹	۱/۹۶۵
Spouse's Occupation	۰/۲۲۲	۰/۵۴۶	۰/۰۳۵	۰/۴۰۷	۰/۶۸۵	-۰/۸۵۸	۰/۹۲۲	۰/۵۳۶	۱/۸۶۴
Education Level	۳/۱۰۱	۱/۱۷۳	۰/۲۷۲	۲/۶۴۴	۰/۰۰۹	۰/۷۸	۱/۳۰۳	۰/۳۶۹	۲/۷۰۹
Spouse's Education Level	۲/۴۴۹	۱/۲۴۴	۰/۲۱	۱/۹۶۹	۰/۰۵۱	-۰/۰۱۲	۵/۴۲۱	۰/۳۴۴	۰/۹۰۷
Family Economic Status	462/1	411/1	072/0	036/1	302/0	330/1-	۴/۹۱	806/0	241/1
Weekly Physical Activity	033/2	979/0	154/0-	077/2-	04/0	969/3-	253/4	713/0	402/1
Smoking	695/0	339/4	011/0	160/0	873/0	889/7-	097/0-	858/0	165/1
Hookah Use	788/4	089/3	113/0	55/1	124/0	324/1-	278/9	73/0	369/1
History of Hypertension	145/2	609/5	048/0	382/0	703/0	951/8-	9/10	246/0	073/4
Duration of Hypertension	465/13-	135/2-	440/0-	305/6-	001/0	690/17-	241/13	801/0	249/1
History of antihypertensive medication use	014/2-	011/6	043/0-	335/0-	738/0	905/13-	240/9-	241/0	154/4
History of other diseases	527/1	16/3	035/0	483/0	63/0	725/4-	877/9	733/0	363/1
Family history of hypertension	76/1	991/1	061/0	884/0	378/0	179/2-	779/7	806/0	241/1

The present study aimed to assess the adoption of preventive behaviors against hypertension and the factors influencing it among rural residents. According to the results of the present study, the adoption of preventive behaviors for hypertension was at an undesirable level. In justification of this finding, it can be said that this low level of adoption of preventive behaviors is probably due to their unfavorable knowledge and attitude towards hypertension, because knowledge and attitude are prerequisites for behavior change (15, 16). In line with this finding, the study by Kouhi and Khalili (17) also reported a low level of adoption of behavior. In addition, this finding was in contrast to the results of the study by Ramazankhani et al., in which mothers aged 20 to 49 years living in the city had an average level of adoption of preventive behaviors for hypertension (13). Possible reasons for this discrepancy include the differences between the present study and the aforementioned study in terms of factors such as age, gender, and educational level of the participants. In addition, another

important reason could be the difference in the level of access to health-treatment centers between the urban and rural populations.
The results of the present study showed that the level of education was one of the factors affecting the adoption of preventive behaviors against hypertension. In justification of this finding, it may be argued that science and knowledge play a role in the intellectual growth and excellence of individuals. It also affects the way people behave, especially regarding health-related issues. Also, people with higher educational qualifications are likely to have more favorable knowledge and attitudes, and as a result, the levels of adopting preventive behaviors against hypertension are likely to be higher among them. Similar to this finding, in the studies of Babaei et al. (18), Rezaee Aderiani et al. (19), Sohng et al. (20), and Azadbakht et al. (21), there was a significant relationship between the level of education and the adoption of preventive behavior. Also, contrary to this finding, in the study of Panahi et al. (22) there was no relationship between the level of education and the adoption of communicative behavior. Possible reasons for this discrepancy include the difference between this study and the present study in terms of factors such as the subject of the study, age, and gender of the subjects studied.

The results of the present study showed that the amount of physical activity per week was one of the factors affecting the adoption of preventive behaviors for hypertension. In justification of this finding, it can be argued that physical activity, like adopting preventive behaviors for hypertension, is itself a type of preventive behavior. Therefore, it can be said that physical activity has an effect on a variable of its own kind. Also, various studies have shown that physical activity can have a major effect on reducing blood pressure in individuals (23, 24). Similar to this result, the results of a review study by Rego et al. showed that physical activity is an efficient and complementary tool for managing hypertension (25).

The results of this study indicated that the duration of hypertension was another significant factor influencing the adoption of preventive behaviors against hypertension. This may be explained by the argument that, as the duration of hypertension increases, individuals' motivation and willingness to adopt behaviors aimed at controlling and reducing high blood pressure may decrease.
To our knowledge, this study is the first to examine the adoption of preventive behaviors against hypertension and the related demographic and contextual factors among the Iranian population, which is considered an innovation of the present research. Limitations of this study include self-reporting in questionnaire completion by rural residents, which may have led to the provision of inaccurate information. Furthermore, other limitations include the small sample size, the limited number of studies on this topic-especially among rural residents—and the lack of access to rural residents who had traveled to the city. Additionally, as this study was conducted only among rural residents living in the villages of Qayenat city, the results cannot be generalized to rural residents in other regions of the country. Therefore, it is recommended that similar studies be conducted on a larger scale among rural populations in this city and extend to other parts of the country, including urban areas.

Conclusion:

In general, the results of the present study indicated that the adoption of preventive behaviors against hypertension among the studied villagers was at an undesirable level. Also, the variables of education level, physical activity level per week, and duration of hypertension were effective factors on the adoption of preventive behaviors against hypertension. The adoption of preventive behaviors against hypertension was lower among villagers with lower education level, less physical activity per week, and longer duration of hypertension. Therefore, it is suggested that more attention be paid to the aforementioned villagers in designing educational programs to promote the adoption of preventive behaviors against hypertension among the villagers.