



Adoption of Hypertension Preventive Behaviors among Rural Residents of Qayenat



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ABSTRACT

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

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

Findings The mean score for adopting preventive behaviors for hypertension among the rural residents studied were 15.18 ± 1.21 out of 32, indicating an unfavorable level. Education level, the amount of physical activity per week, and the duration of hypertension were associated with adopting preventive behaviors for hypertension.

Conclusion The adoption of preventive behaviors for hypertension is lower among rural residents with lower education levels, less physical activity per week, and a longer duration of hypertension.

Keywords Hypertension; Education; Qayenat; Iran

CITATION LINKS

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Introduction

Hypertension is considered one of the major health and treatment problems worldwide. With significant progress made in controlling communicable diseases, the focus today has shifted more toward the control and treatment of non-communicable diseases [1]. It 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 140mmHg or higher, diastolic blood pressure of 90mmHg 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].

Azizi *et al.* 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 *et al.*, 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 with urban populations, whereas others 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 is higher among the urban population than among 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 *et al.* showed that mothers aged 20 to 49 years have 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 conducted to assess the extent to which preventive behaviors for hypertension are adopted and identify the factors influencing these behaviors among rural residents.

Instrument and Methods

The present descriptive-analytical, cross-sectional study was conducted on 300 rural residents of Qayenat County in 2024.

Sampling was conducted using 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 selected, 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], using 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 account expert statistical opinion and accounting for a potential 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 incomplete responses to the study questionnaires.

The data collection tools included a comprehensive questionnaire comprising two distinct sections.

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.

The second section was dedicated to evaluating the adoption of preventive behaviors for hypertension, utilizing the questionnaire developed by Ramezankhani *et al.* [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]. 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 for the entire questionnaire was 0.93, indicating excellent internal consistency.

The study was conducted after approval from the Vice-Chancellor for Research and Technology at Birjand University of Medical Sciences. 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. Questionnaires were completed using a self-report method, with participants explicitly instructed to answer all 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 23 software for analysis. Statistical analysis included multiple linear regression to identify predictors of preventive behaviors.

Findings

A total of 300 rural residents were examined (response rate: 100%). Among them, 61.3% (n=184) were female, 86% (n=258) were married, and 10.7% (n=32) had a past history of hypertension (Table 1). The mean age and BMI among the participating rural residents were 37.67 ± 14.33 years and $23.28 \pm 3.14 \text{ kg/m}^2$, respectively. Furthermore, the mean score for adopting preventive behaviors for hypertension among them was 15.18 ± 1.21 out of a possible 32, which was at an unfavorable level. 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 3.10. 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 2.03-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 13.46. Other demographic and background parameters assessed did not exhibit ically significant associations with the adoption of preventive behaviors for hypertension ($p > 0.05$; Table 2).

Table 1. Demographic and background characteristics of rural residents

Parameter	Category	Frequency (%)
Gender	Female	184 (61.3)
	Male	116 (38.7)
Marital status	Married	258 (86)
	Single	42 (14)
Number of children	1	46 (15.3)
	2	98 (32.7)
	≥3	156 (52)
Occupation	Homemaker	142 (47.3)
	Employee	42 (14)
	Farmer	28 (9.3)
	Others	88 (29.4)
Spouse's occupation	Homemaker	82 (27.3)
	Employee	40 (13.3)
	Farmer	58 (19.4)
	Others	120 (40)
Education level	Literacy and primary	86 (28.7)
	Secondary school	54 (18)
	High school and diploma	94 (31.3)
	Associate and bachelor's degree	52 (17.3)
	Master's degree and higher	14 (4.7)
Spouse's education level	Literacy and primary	82 (27.3)
	Secondary school	58 (19.3)
	High school and diploma	96 (32)
	Associate and bachelor's degree	52 (17.3)
	Master's degree and higher	12 (4)
Family economic status	Unfavorable	34 (11.3)
	Moderate	184 (61.3)
	Favorable	82 (27.4)
Weekly physical activity	Every day	30 (10)
	Most days	42 (14)
	Some days	132 (44)
	Rarely	74 (24.7)
	Never	22 (7.3)
Smoking	Yes	30 (10)
	No	270 (90)
Hookah use	Yes	36 (12)
	No	264 (88)
History of other diseases	Yes	266 (11.3)
	No	34 (88.7)
History of hypertension	Yes	32 (10.7)
	No	268 (89.3)
Duration of hypertension (month)	< 6	84 (28)
	≥6	216 (72)
Use of hypertension meds	Yes	28 (9.3)
	No	272 (90.7)
Family history of HTN	Yes	60 (20)
	No	240 (80)

Table 2. Factors influencing the adoption of preventive behaviors against hypertension in multiple linear regression

Predictor	Unstandardized coefficients		Standardized coefficients		p-Value	95% confidence interval for B		Collinearity statistics	
	B	Standard Error	Beta	T		Lower	Upper	Tolerance	Variance inflation factor
Construct	97.151	32.786		2.936	0.004	32.288	162.014		
Age	0.034	0.120	0.036	0.287	0.775	-0.203	162.014	0.250	3.995
Gender	-2.088	3.129	-0.074	-0.667	0.506	-8.277	0.272	0.317	3.154
Marital status	2.942	2.251	0.095	1.307	0.194	-1.512	0.102	0.737	1.358
BMI	0.157	0.087	0.15	1.804	0.073	-0.015	7.395	0.565	1.771
Number of children	-2.602	1.583	-0.139	-1.643	0.103	-5.734	0.33	0.545	1.836
Occupation	-0.015	0.473	-0.003	-0.031	0.975	-0.951		0.509	1.965
Spouse's occupation	0.222	0.546	0.035	0.407	0.685	-0.858	0.922	0.536	1.864
Education level	3.101	1.173	0.272	2.644	0.009	0.78	1.303	0.369	2.709
Spouse's education level	2.449	1.244	0.21	1.969	0.051	-0.012	5.421	0.344	0.907
Family economic status	1.462	1.411	0.072	1.036	0.302	-1.330	4.91	0.806	1.241
Weekly physical activity	2.033	0.979	-0.154	-2.077	0.04	-3.969	4.253	0.713	1.402
Smoking	0.695	4.339	1.011	0.160	0.873	-7.889	-0.097	0.858	1.165
Hookah use	4.788	3.089	0.113	1.55	0.124	-1.324	9.278	0.73	1.369
History of hypertension	2.145	5.609	0.048	0.382	0.703	-8.951	10.9	0.246	4.073
Duration of hypertension	-13.465	-2.135	-0.440	-6.305	0.001	17.690	13.241	0.801	1.249
History of antihypertensive medication use	-2.014	6.011	-0.043	-0.335	0.738	-13.905	-9.240	0.241	4.154
History of other diseases	1.527	3.16	0.035	0.483	0.63	-4.725	9.877	0.733	1.363
Family history of hypertension	1.76	1.991	0.061	0.884	0.378	-2.179	7.779	0.806	1.241

Discussion

The present study aimed to assess the adoption of preventive behaviors against hypertension and the factors influencing it among rural residents. The adoption of preventive behaviors for hypertension was unfavorable. This finding may be explained by unfavorable knowledge and attitudes toward hypertension, since knowledge and attitude are prerequisites for behavior change [15,16]. Consistent with this, Koohi & Khalili [17] also report a low level of preventive-behavior adoption. By contrast, Ramezankhani *et al.* found that mothers aged 20 to 49 years living in urban areas have an average level of adoption of preventive behaviors for hypertension [13]. Possible reasons for this discrepancy include differences between the present study and the aforementioned study in factors such as age, gender, and educational level of the participants. Another important reason could be differences in access to healthcare centers between urban and rural populations.

Education level was one of the factors affecting the adoption of preventive behaviors against hypertension. This may reflect that science and knowledge contribute to individuals' intellectual growth and excellence, and influence health-related behaviors. In addition, people with higher educational qualifications are likely to have more favorable knowledge and attitudes, and as a result, the adoption of preventive behaviors against hypertension is likely to be higher among them. Similarly, Babaei *et al.* [18], Rezaee Aderiani *et al.* [19], Sohng *et al.* [20], and Azadbakht *et al.* [21] report a significant relationship between education level and the adoption of preventive behaviors. In contrast, Panahi *et al.* [22] report no relationship between education level and the adoption of communicative behavior. Possible reasons for this discrepancy include differences between this study and the present study in terms of factors, such as the subject of the study, age, and gender of the participants.

Weekly physical activity was one of the factors affecting the adoption of preventive behaviors for hypertension.

Physical activity, like adopting preventive behaviors for hypertension, is itself a form of preventive behavior. Therefore, physical activity can be said to influence a parameter of its own kind. Moreover, several studies have shown that physical activity can have a substantial effect on lowering blood pressure in individuals [23, 24]. Consistent with this, the review by Rêgo *et al.* show that physical activity is an effective and complementary tool for managing hypertension [25].

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 constitutes an innovation of the present research. Limitations include self-reporting in questionnaire completion by rural residents, which may have led to inaccurate information. 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 urban areas. Additionally, because 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 extended to other parts of the country, including urban areas.

In general, the adoption of preventive behaviors against hypertension among the studied villagers was at an undesirable level. Also, education level, physical activity level per week, and duration of hypertension were effective factors on the adoption of preventive behaviors against 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.

Conclusion

The adoption of preventive behaviors for hypertension is lower among rural residents with lower education levels, less physical activity per week, and a longer duration of hypertension.

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Ethical Permissions: The ethical code for this study, according to the approval of the Ethics Committee at Birjand University of Medical Sciences, is IR.BUMS.REC.1402.537.

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