

# **The Relationship Between Predictors of Hypertension Self-Care Behaviors Based on Protection Motivation theory and Demographic Variables, a cross sectional study, Omidieh Iran, 2022**

## **Abstract**

**Aims:** This study aims to investigate the relationship between demographic variables and self-care behaviors and their predictors based on the Protection Motivation theory in hypertensive patients

**Methodology:** This cross-sectional study was conducted on 397 patients with hypertension in Omidieh, Khuzestan Province, southern Iran, 2022. Data were collected using a demographic information form and a PMT based researcher-made questionnaire and analyzed using SPSS 27. Independent t-tests and ANOVA were used to compare variables at 0.05 significance level.

**Findings:** The results indicated that Self-care behavior was statistically significant among individuals with excellent economic status, while no statistically significant differences were observed across other demographic variables such as gender, marital status, occupation, and education level. A higher level of education level was associated with higher mean scores in self-care and self-efficacy variables ( $P < 0.05$ ). Men exhibited a higher perceived threat ( $P = 0.015$ ), and perceived rewards ( $P < 0.001$ ) than women. Marital status had no significant impact on the examined variables. Additionally, part-time employees reported significantly higher perceived rewards compared to other occupational groups ( $P = 0.006$ ). Economic status also significantly influenced self-care and self-efficacy variables, with individuals in better financial conditions having higher mean scores in these variables ( $P < 0.05$ ).

**Conclusion:** Educational level, sex, economic level, and job status can influence self-care behaviors in patients with hypertension. These findings can aid in designing educational interventions and health programs tailored to individuals' demographic characteristics.

**Keywords:** Hypertension, Self-care, Protection Motivation Model, Demographic Variables

## **Introduction**

Hypertension refers to a condition in which a person's blood pressure remains consistently above the normal range[1]. This condition can lead to vascular damage and harm vital organs such as the heart, brain, and kidneys, over time[2]. According to the World Health Organization's 2023 report, it is estimated that around 1.28 billion adults aged 30 to 79 are affected by hypertension, with two-thirds of them living in low- and middle-income countries. Despite its widespread prevalence, about 46% of those with hypertension are unaware of their condition, and less than half (42%) have been diagnosed and received adequate treatment[3]. A study conducted in Iran (2024) showed that the prevalence of high blood pressure is 21.44% among men and 33.53% among women[4].

Hypertension significantly increases the risk of developing cardiovascular diseases, stroke, and kidney failure[5]. One of the primary strategies for managing hypertension and maintaining blood pressure within a healthy range is self-care behaviors[6]. These behaviors include adherence to a proper diet, regular physical activity, weight management, compliance to prescribed medications, and reducing the intake of salt and fats[7].

Behavioral change models provide valuable frameworks for understanding the factors influencing self-care behaviors among patients. One of the key models in this field is the Protection Motivation Theory (PMT), introduced by Rogers in 1975[8]. This theory explains how individuals adopt protective behaviors in response to health threats and which factors influence their motivation to safeguard their health. PMT consists of five main components: Perceived threat which includes two subscales of perceived susceptibility (the likelihood of developing a disease or its complications) and perceived severity (the seriousness of the disease's consequences); Perceived rewards which refers to the potential benefits of engaging in unhealthy behaviors, such as the pleasure of consuming unhealthy foods or the time saved by avoiding physical activity; Perceived response efficacy which reflects an individual's belief in the effectiveness of a healthy behavior in reducing risk of disease; self-efficacy as the individual's belief in their ability to succeed in accomplishing preventive behaviors; response Costs which includes barriers such as financial costs, time, effort, and medication side effects that may prevent individuals from engaging in healthy behaviors; and finally protection

motivation which represents the individual's willingness and commitment to adopting healthy behaviors[9, 10].

On the other hand, understanding the relationship between demographic variables (such as age, gender, education level, and economic status) and predictors of self-care behaviors can facilitate the design of effective interventions for improving hypertension management[11]. While various studies have demonstrated that certain demographic factors (sex, education and income level, and marital status) directly influence patients' adherence to self-care behaviors[12-14]. The authors did not find any studies that examined the relationship of these demographic variables with constructs of behavior change models, particularly PMT. So, this study aimed to investigate the relationship between demographic variables and self-care behaviors and to identify their predictors based on the PMT in patients with hypertension.

### **Methodology**

This cross-sectional study was conducted among all patients with hypertension at eight urban and rural comprehensive health service centers in Omidieh, a city in Khuzestan Province, southern Iran, 2022. Participants were selected using stratified random sampling, ensuring an equal distribution of men and women in the study. The sample size of 420 was determined based on a study by Gheshlagh et al. [15] using IBM PASS 15 software, considering a significance level ( $\alpha = 0.05$ ), a margin of error ( $d = 0.05$ ), and a 10% non-response rate. In order to select and recruit the participants, from each comprehensive health center, an equal number of 25 men and women were randomly selected using the lists of patients in Iran's Integrated Health System (SIB).

Hypertensive patients who were equal or more than 30 years old, diagnosed with primary hypertension for at least six months, had no severe complications of hypertension, no history of chronic diseases or acute physical or mental illnesses were included in the study. Participants who did not fully respond to the questionnaire were excluded from the analysis.

The questionnaire used for data collection in this study consisted of three sections:

- a) Demographic information form (sex, age, education level, marital and job status).
- b) Protection Motivation Theory (PMT) Constructs: Perceived Severity (5 items, 5-point Likert scale: Very High / High / Moderate / Low / Very Low). Perceived Susceptibility (5 items, 5-point Likert scale: Very High / High / Moderate / Low / Very Low). Intrinsic and Extrinsic Rewards (14 items, 5-point Likert scale: Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree). Response Costs (11 items, 5-point Likert scale: Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree). Self-Efficacy (9 items, 5-point Likert scale: Very High / High / Moderate / Low / Very Low). Response Efficacy (9 items, 5-point Likert scale: Very High / High / Moderate / Low / Very Low). Face and Content Validity of the questionnaire was assessed and confirmed by a panel of 10 experts in health education and promotion, nutrition, and cardiology. Content validity ratios ( $CVR > 0.75$ ) and content validity indices ( $CVI > 0.79$ ) were obtained which were appropriate based on the Lawshe[16] and Waltz and Brussel's criteria[17]. The Cronbach's alpha values were within the constructions' permissible range of 0.7 to 0.90. In a pilot research with 30 participants and a two-week interval, the questionnaire's external reliability was evaluated using intra-class correlation (ICC), which revealed good reliability ( $ICC > 0.75$ ,  $P = 0.01$ ).
- c) The Self-Care Questionnaire for High Blood Pressure developed by Hahn et al. (2014), which includes 20 items rated on a 4-point scale (always - never)[18]. Ghaleenoe et al. (2019) assessed the reliability of the Persian version of this questionnaire, they discovered that eliminating a particular alcohol-related item led to a Cronbach's alpha of 0.86[15].

### **Data Collection Procedure:**

After receiving permission from the Shiraz University of Medical Sciences Ethics Committee (IR.SUMS.SCHEANUT.REC.1401.008), participants were informed about the goals of the study and signed a consent form. Then, they were given questionnaires to complete. The researcher stayed with the participants as they filled out the questionnaires, providing answers and clarifying any uncertainties. On average, it took a duration of 20 min to finish the surveys.

### **Data Analysis:**

The data were analyzed using SPSS24 software. The normal distribution of data was assessed and confirmed using the Kolmogorov-Smirnov test ( $p > 0.0$ ). Demographic information was reported using frequency distribution, mean and standard deviation. Independent t-tests and ANOVA were

used to examine differences in quantitative variables between different demographic subgroups. The significance level was set at  $< 0.05$

#### Ethical Considerations:

The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.SCHEANUT.REC.1401.008).

#### Findings:

Based on the sample size which was considered for this study, 420 questionnaires were administered to the participants and 397 people (198 women and 199 men) were completed the questionnaires (response rate = 94.5%). The respondents' mean age was 56.2 (9.26) years, ranging from 30 to 87 years. The frequency distribution of participants based on demographic variables are presented in table1.

Table 1: Frequency distribution of study participants based on demographic variables			
Variable		Women N(%)	Men N(%)
Marital Status	Married	148 (74.7)	163 (81.9)
	Single	9 (4.5)	19 (9.5)
	Divorced	7 (3.5)	5 (2.5)
	Widowed	34 (17.2)	6 (12.0)
Education	Illiterate	2 (1.0)	15 (7.5)
	Elementary	113 (57.1)	67 (32.7)
	Middle School	46 (23.2)	60 (30.2)
	High School Diploma	28 (14.1)	47 (23.6)
	University Degree	9 (4.5)	10 (5.0)
Occupation	Unemployed/Housewife	183 (92.4)	39 (19.6)
	Part-time Employed	11 (5.6)	64 (32.2)
	Full-time Employed	4 (2.0)	54 (27.1)
	Retired	0 (0.0)	40 (20.1)
Perceived Economic Status	Excellent	9 (4.5)	18 (9.0)
	Good	85 (42.9)	63 (31.7)
	medium	79 (39.9)	96 (48.2)
	Weak	25 (12.6)	22 (11.1)

Table2 Shows the differences of mean scales of PMT constructs between subgroups of education levels using one-way ANOVA. The results indicate that individuals with higher education levels, particularly university graduates, tend to have statistically significant higher mean scores in certain variables such as self-efficacy ( $P=0.033$ ), and response cost ( $P = 0.009$ ). While perceived threat ( $P = 0.052$ ) is close to statistical significance, other variables such as self-care behaviors, perceived reward and response efficacy do not show significant differences.

Table 2: Comparing the mean scales of self-care behaviors and PMT constructs in different education levels of participants						
Variable	Illiterate Mean ±SD	Elementary Mean ±SD	Secondary Mean ±SD	Diploma Mean ±SD	University Mean ±SD	P
Self-care behaviors	52.29 ±8.75	54.10 ±9.25	55.50 ±9.79	54.58 ±9.62	56.47 ±7.48	0.513
Perceived Threat	59.17 ±29.66	75.01 ±46.40	78.03 ±33.71	66.86 ±34.48	55.78 ±29.35	0.052
Response Cost	35.35 ±5.79	34.87 ±6.83	33.63 ±6.66	33.22 ±6.45	42.29 ±6.82	0.009
Perceived Reward	36.58 ±7.77	36.93 ±10.10	35.63 ±9.38	36.30 ±10.54	34.68 ±8.37	0.779
Response Efficacy	36.41 ±8.37	38.40 ±8.51	40.23 ±9.07	39.38 ±5.76	39.26 ±6.95	0.260
Self-efficacy	34.41 ±5.91	33.25 ±5.78	35.56 ±7.43	34.51 ±6.82	36.52 ±8.90	0.033

Table 3 presents the differences in the mean scales of self-care behaviors and PMT constructs based on sex (male and female) and marital status (married and single) using the independent t-test. The results indicate a significant difference between men and women in perceived threat (higher in men,  $P = 0.015$ ) and perceived reward (higher in men,  $P < 0.001$ ), while other variables did not show statistically significant differences. Regarding marital status, there were no significant statistical differences in the mean scales of the variables between married and single individuals.

Table 3: comparing mean scales of self-care behaviors and PMT constructs based on sex and marital status						
variable	Women Mean ±SD	Men Mean ±SD	P- value	Married Mean ±SD	Single Mean ±SD	P
Self-care behaviors	55.41 ±8.69	53.79 ±9.96	0.085	54.79 ±9.60	53.89 ±6.67	0.627
Perceived Threat	67.79 ±9.96	77.56 ±45.14	0.015	74.13 ±41.76	64.10 ±32.18	0.217
Response Cost	33.47 ±6.74	34.47 ±6.75	0.140	33.92 ±6.31	32.57 ±6.52	0.280
Perceived Reward	34.44 ±10.52	38.22 ±8.65	<0.001	36.38 ±9.85	34.82 ±7.40	0.414
Response Efficacy	39.19 ±8.93	38.87 ±7.35	0.699	39.51 ±8.52	38.67 ±6.70	0.613
Self-efficacy	34.68 ±5.56	33.94 ±7.62	0.277	34.52 ±7.00	34.46 ±4.94	0.962

Table 4 shows the differences in the mean scales of self-care behaviors and PMT constructs based on job status (homemaker/unemployed, part-time worker, full-time worker, and retired) using one-way ANOVA. The results indicate that perceived reward is significantly higher among the part-time worker group compared to other groups ( $P = 0.006$ ). However, no significant differences were observed across different employment groups for other variables, including self-care behaviors, perceived threat, response cost, response efficacy, and self-efficacy.

Table4 : comparing mean scales of self-care behaviors and PMT constructs based on Employment Status					
Variable	Homemaker/ unemployed Mean ±SD	Part-time employed Mean ±SD	Full-time employed Mean ±SD	Retired Mean ±SD	P
Self-care behaviors	54.36 ±9.30	54.33 ±9.34	55.72 ±10.13	54.75±8.51	0.857
Perceived Threat	73.76 ±44.40	80.59 ±34.44	65.35 ±30.85	63.45 ±33.47	0.117
Response Cost	33.88 ±7.03	33.54 ±6.31	33.87 ±7.55	35.20 ±5.03	0.721
Perceived Reward	34.84 ±9.83	39.61 ±9.95	37.44 ±9.56	36.93 ±8.21	0.006
Response Efficacy	38.99 ±9.04	38.98 ±8.34	40.20 ±5.24	37.70 ±5.99	0.602
Self-efficacy	33.98 ±5.92	34.90 ±5.95	34.74 ±9.94	34.43 ±6.61	0.851

Table 5 shows the differences in the mean scales of self-care behaviors and PMT constructs based on participants reported economic status (poor, moderate, good, and excellent) using one-way ANOVA. The results indicate that individuals with an excellent economic status have the highest self-care behaviors, and self-efficacy scores, with significant differences observed. Additionally, perceived threat is highest among individuals with a poor economic status, showing statistical significance. Response cost is also highest in the poor economic group, while perceived reward is at its peak in the excellent economic group. However, response efficacy does not show any significant differences across the different economic groups.

Table 5: Analysis of Protective Motivation Model Variables Based on Economic Status

Variable	Weak Mean $\pm$ SD	Moderate Mean $\pm$ SD	Good Mean $\pm$ SD	Excellent Mean $\pm$ SD	P
Self-Care	53.51 $\pm$ 9.81	54.68 $\pm$ 9.41	55.65 $\pm$ 8.78	49.84 $\pm$ 10.46	0.045
Perceived Threat	75.78 $\pm$ 31.59	71.73 $\pm$ 33.85	67.31 $\pm$ 33.95	105.07 $\pm$ 86.84	<0.001
Response Cost	38.21 $\pm$ 7.66	33.72 $\pm$ 6.05	32.47 $\pm$ 6.59	36.61 $\pm$ 7.04	<0.001
Perceived Reward	38.65 $\pm$ 7.98	35.98 $\pm$ 9.84	34.93 $\pm$ 9.62	43.03 $\pm$ 10.52	0.001
Response Efficacy	38.63 $\pm$ 5.79	39.27 $\pm$ 9.20	39.02 $\pm$ 7.37	37.92 $\pm$ 9.07	0.867
Self-Efficacy	32.95 $\pm$ 6.79	34.62 $\pm$ 5.88	35.03 $\pm$ 7.11	30.23 $\pm$ 7.56	0.004

## Discussion

In this study, the perspectives of 397 hypertensive patients were examined in 8 urban and rural comprehensive health service centers and 8 health posts in Omidiyeh city, with the aim of investigating the relationship between demographic variables and self-care behaviors in patients with hypertension, as well as assessing the impact of these variables on predicting the Protection Motivation Model.

The findings of this study regarding the variable of education indicate that two variables—response cost and self-efficacy—showed significant differences across different educational levels. Specifically, as individuals' educational level increased, their mean scores for self-efficacy and response cost also increased. However, no significant differences were observed in the other variables studied across educational levels. This finding may be explained by the fact that higher education equips individuals with more information and greater awareness about health, thereby enhancing their sense of efficacy. The significant differences in response cost and self-efficacy clearly demonstrate the positive impact of education on individuals' capacity to cope with health threats. Consistent with our study, the findings of Eylem et al. also indicated that self-efficacy levels increase with higher educational attainment[19]. In the study by Rahaei et al. it was found that there was no significant difference between different education levels in performing proactive self-care behaviors for cancer prevention [20]. The results of some studies were also inconsistent with our study. For example, in the study by Simbar et al. the findings showed that self-care among postmenopausal women was positively correlated with the educational level of both the women and their spouses[21]. In the study by Keshavarz et al. no significant difference was observed between literate and illiterate individuals in the variables of response cost and response efficacy [22]. These results can be considered in planning educational interventions, as patients with lower levels of education may need additional training to enhance their sense of self-efficacy.

There were significant differences between men and women in the variables of perceived threat and perceived reward, indicating that sex plays an important role in individuals' perception of threats and rewards. In our study, perceived threats, and perceived rewards in men was significantly more than women. These differences may be due to cultural, social, and even biological differences between men and women. While other variables, such as self-care behaviors and self-efficacy, did not show significant differences between genders, it appears that gender has a greater impact on certain psychological variables such as threat and reward. Consistent with our findings, the study by Qian et al. also found no difference in self-efficacy and self-care based on gender [23]. In the study by Yan and colleagues In regard to the intention to quit smoking, the results showed that men receive greater rewards from smoking compared to women[24]. However, contrary to our findings, in the study by Hu et al. it was women who adhered better to self-care behaviors[25]. Similarly, in the study by Eylem et al. on hemodialysis patients, the results indicated that male participants had higher self-efficacy compared to female participants [19]. In another study by Yan et al. on the intention to quit smoking, it was found that female participants had higher self-efficacy for quitting smoking than males and also perceived higher response costs [24]. Furthermore, in the study by Keshavarz et al. inconsistent with our results, no significant difference in perceived threat was observed between men and women, and response efficacy was reported to be higher in women than in men, whereas in the variable of response cost, consistent with our findings, no significant sex difference was observed [22].



The inconsistency in some findings may be due to the fact that the sample size in certain studies was not representative of the entire population, or differences in the research topics may have contributed to these discrepancies. Given that there are relatively few studies investigating the predictive role of demographic factors based on behavior change models, we were compelled to use articles with topics outside the domain of hypertension for comparison. Considering the influence of sex on the perception of certain constructs, it is recommended that healthcare providers take sex into account during their counseling on hypertension self-care and focus on aspects that are of greater importance to each sex.

In terms of marital status, our study found no significant differences between the studied variables and individuals' marital status. Consistent with our findings, Eylem et al. also reported that marital status had no effect on self-care or self-efficacy [19]. Similarly, in the study by Zare Sakhvidi et al. no significant differences were found in cancer preventive behaviors based on marital status [26]. In the study by Rahaei et al. on cancer preventive behaviors, the results also showed no significant differences in self-care behaviors between married and single individuals [27]. These findings may suggest that being married or single alone cannot account for differences in these variables. This may indicate that both married and single individuals act similarly in various aspects of motivation and self-care. However, given the complexities of social relationships and the different impacts that married life or single living may have on individuals, future studies should explore this issue more thoroughly and consider factors such as lifestyle and social support in this context.

Among different employment groups, our results showed that a significant difference existed only in the variable of perceived reward. Part-time employees perceived significantly greater rewards compared to other groups. Consistent with our findings, in the study by Eylem et al. employed individuals scored higher in self-care and self-efficacy [19]. Similarly, Simbar et al. reported that self-care among employed postmenopausal women was significantly higher than that of housewives, and women whose husbands were employed also scored higher than those whose husbands were unemployed [21]. In the study by Qian et al. unemployed cancer patients had lower self-efficacy scores compared to retired participants or those employed full-time [23]. However, in the study by Afshar et al. no significant difference in perceived threat was found between employed and unemployed individuals [27]. These findings may be valuable for those working in occupational health or workplace health promotion, as they can inform the planning of targeted interventions for individuals in different employment situations.

Economic status can be one of the most important factors influencing self-care behaviors and health-related motivations [28]. The results of the study showed that individuals with a good economic status had significantly higher levels of self-care and self-efficacy. Moreover, perceived threat and perceived rewards were significantly higher among those with excellent economic status compared to other economic levels. Conversely, response cost was significantly higher among individuals with poor economic status. Similarly, in the study by Eylem et al. individuals with higher income levels and access to health insurance reported higher self-care and self-efficacy scores [19]. The study by Simbar et al. also demonstrated a positive correlation between menopausal women's self-care and family income level [21]. In the study by Afshar et al. perceived severity scores were higher among individuals with poor economic status compared to those with better economic status [27]. However, in the study by Qian et al. no differences in self-efficacy for self-care were found based on insurance coverage and household income [23]. These findings may reflect fundamental differences in individuals' access to resources, information, and financial and social capabilities. Therefore, individuals with lower economic status may face greater challenges in adopting self-care behaviors. Overall, these results can inform health policy and strategies to support socioeconomically disadvantaged groups.

### **Limitations**

The sample was drawn from a single geographic region, which may restrict the diversity of the target population and limit the applicability of the findings to broader communities. Since cultural factors and health-related behaviors vary across different regions of the country, the findings of this study

cannot be generalized to all adults with hypertension in Iran. Therefore, similar studies should be conducted in other provinces, and the results should be compared. One of the strengths of this study is that it was conducted on a reasonably large sample of patients with hypertension. Additionally, a valid and reliable questionnaire was developed and validated during the study to assess the constructs of the Protection Motivation Model.

### **Conclusion**

demographic characteristics such as education level, gender, employment status, and economic status play a significant role in shaping self-care behaviors and protective motivation. These findings highlight the need for tailored health education programs and targeted interventions that consider individual and social determinants of health. By recognizing and addressing these differences, public health initiatives can be more effective in promoting sustainable health behaviors and improving overall community well-being. Future studies should employ longitudinal designs to examine long-term behavioral changes and protective motivation. Additionally, incorporating variables such as social support, healthcare accessibility, and cultural factors can provide a more comprehensive understanding of the determinants of health behaviors. Furthermore, sampling from diverse geographic and economic backgrounds would enhance the generalizability of the results and help identify varied behavioral patterns across different communities.