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Research Paper: The Effects of Illness Perception on Diet Adherence in Patients With Hypertension

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Background: The role of nutrition is undeniable in controlling hypertension; diet is among the most effective non-pharmaceutical methods. The current study aimed to determine the role of illness perception on diet adherence in patients with hypertension.

Materials & Methods: This cross-sectional study examined 268 patients with hypertension. The study sample was selected by convenience sampling method. The study tool consisted of the patients’ individual, social, and clinical factors, illness perception about hypertension, and adherence to the diet. The necessary data were analyzed using multiple logistic regression models.

Results: The Mean±SD score of illness perception was measured as 37.09±4.91 out of 56. Adherence to the recommended diet was relatively desirable in the majority of the examined patients (62%). Multiple logistic regression analysis data revealed no significant relationship between the scores of illness perception and dietary adherence (Adjusted OR=1.038, 95%CI: 0.974-1.105, P=0.250). The main predictor of dietary adherence was having hypertension dietary knowledge (OR=2.198, 95%CI: 1.198-4.035, P=0.011).

Conclusion: Our study data revealed that increasing awareness among patients with hypertension complications can improve self-care behaviors, including adherence to standard diets. Therefore, emphasis on increasing awareness among these patients and their continued follow-up seems necessary.

Keywords: Adherence, Diet, Hypertension, Perception

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1. Introduction

Hypertension is among the main risk factors of cardiovascular disease world-wide [1-3]. According to statistics in industrial countries, 25% of adults and 60% of individuals aged >60 years encounter hypertension [4, 5]. Studies in Iran also indicated a high prevalence of hypertension [5, 6]; about 50% of individuals aged over 55 years present hypertension in Iran [7].

Hypertension is a risk factor for cardiovascular diseases. It is a silent disease that may not manifest any symptoms but can lead to fatal complications if not properly treated. Thus, treatment adherence is a key factor in controlling hypertension [3, 6]. The World Health Organization defines adherence as an agreement between drug-related behaviors and compliance with dietary and lifestyle changes recommended by healthcare providers [8]. In developing countries, improving the control of hypertension over the past 50 years has led to a significant reduction in overall mortality. Additionally, evidence from a large clinical trial indicated a 40% reduction in stroke and at ≥25% reduction in myocardial infarction, along with treatment and hypertension control [9].

Moreover, the first-line treatment for hypertension is to make preventive lifestyle modifications and pharmacotherapy. Besides, poor hypertension control is attributed to inappropriate dietary regimens [10, 11]. Important changes that should be considered in lifestyle to help to decline blood pressure include adopting Dietary Approaches to Stop Hypertension (DASH); reducing sodium in dietary regime; weight loss in obese and overweight patients along with regular exercise; consuming enough fruits and vegetables, and reducing saturated fats intake [3, 12]. Among these characteristics, the role of nutrition in controlling this disease is undeniable. Furthermore, diet is among the most effective non-pharmaceutical methods in this respect [6, 13]. Dietary modifications that effectively decrease hypertension include reduced salt intake, increased potassium intake, moderated alcohol consumption, and a public healthy diet pattern [6].

However, previous studies suggested that most patients neglect nutritional instructions; only a small proportion of them have accepted the correct nutritional regimen as part of their treatment [3, 6, 8, 11, 12]. Based on the prior studies, various factors, such as demographic and socioeconomic characteristics and the illness perception of hypertension can affect the follow-up of patients [3, 8, 11, 12]. A major relevant factor is the role of illness perception and the relationship between illness perception and treatment adherence, i.e., supported in different studies [1]. Adherence to secondary prevention behaviors depends on the perception of patients about their conditions, the treatment, and the benefits of lifestyle reforms [7, 14-16]. Thus, health beliefs, such as understanding the seriousness of the disease, encountering complications, and the efficacy of treatment can predict better compliance in patients [14].

Given the importance of dietary adherence in controlling hypertension and the lack of knowledge in this regard, the present study aimed to determine the role of illness perception on adherence to diet in patients with hypertension.

2. Materials and Methods

This cross-sectional and descriptive-analytical study investigated the extent of diet adherence and the role of illness perception on it. The research population was patients with hypertension referring to a healthcare center in Rasht City, Iran, in 2018. The sample size was determined as 268 subjects with 95% confidence and an estimation error limit of 5% and proportion of dietary compliance equal to 0.225 [17]. The study samples were selected by convenience sampling method. The inclusion criteria of the study were the absence of mental illness, the occurrence of hypertension according to medical records, using antihypertensive drugs, being over 21 years old, and providing consent to participate in the study. The exclusion criteria were a history of chronic renal diseases and hemodialysis, and no consent to participate in the study.

The study tool consists of 3 parts, as follows: individual, social and clinical factors i.e., age, gender, marital status, educational level, occupational status, economic status, living location, a family history of hypertension, underlying disease, the number of patient’s household, the duration of hypertension disease, hypertension knowledge status, diet knowledge status, information source, and systolic and diastolic blood pressure; illness perception tools about hypertension disease; and adherence to the diet.

The Illness Perception Questionnaire (IPQ) (to measure hypertension) disease consisted of 14 items, in two domains, i.e., answered based on a 4-point Likert-type scale (totally agree, agree, disagree, totally disagree). The total score ranged from 14 to 56. The Persian version of the IPQ has been validated by Kamran. The relevant Cronbach alpha coefficient was computed as 0.833 [7].
The Perceived Dietary Adherence Questionnaire (PDAQ) contained 34 questions about the patient’s food basket, fat and salt intake, and the frequency of meal consumption of 30 main food items. The responses were classified in a 5-point Likert-type scale, ranging from never, 1-2 times in a month, 1 to 2 times in a month, 1-2 times in a week, and 3-4 times in a week, to daily consumption. The items were scored in a range of 0-100 according to the food type. For example, for white meat consumption, the daily intake was scored 50, the 3-4 times a week scored 100, 1-2 times a week scored 75, 1-2 times a month scored 25, and no use was scored 0. For egg consumption, daily consumption was scored 0, 3-4 times a week scored 50, 1-2 times a week scored 100, 1-2 times a month scored 75, and not use scored 25. Subsequently, the scores of all these sections were generally calculated. Next, the degree of adherence to the diet was categorized into 3 classes of undesirable adherence (total score: <1500), relative adherence (1500-2250), and desirable adherence (>2250). The reliability of the questionnaire was confirmed using the test-retest reliability method ($r=0.83$) [18, 19].

The obtained data were analyzed using SPSS. To describe the collected data, frequency, percentage, mean, Standard Deviation (SD), median, and range were used. To assess the normality distribution of quantitative characteristics, the Kolmogorov-Smirnov test was used. Except for hypertension disease duration, all variables presented a normal distribution. In the univariate analyses, to evaluate the association between qualitative individual, social, and clinical factors, and dietary adherence, a Chi-squared test was applied. Moreover, to evaluate the association between quantitative individual, social, and clinical factors, and dietary adherence, Analysis of Variance (ANOVA) was conducted. In the Multivariable Analysis of Variance (MANOVA), to determine the relationship between the examined patients’ illness perception and dietary adherence, for controlling individual, social, and clinical factors, a multiple logistic regression model was performed. All individual, social, and clinical factors with a significant level of 0.1 in the univariate analyses were entered in the MANOVA model. Additionally, to identify the most powerful predictors of dietary adherence, a stepwise odds ratio selection method was used. P<0.05 was considered significant.

3. Results

The Mean±SD age of the research participants was 58.9±10.32 years. Most of the study patients were female (59%) and living with their spouses (85%). The median of hypertension disease duration was equal to 60 months (1-480 months). The majority of the study patients reported a prior knowledge about hypertension disease (51.7%) and hypertension diet (64.3%); they referred to physicians and nurses as the source of information (63.4%). Table 1 presents the details of patients’ individual, social, and clinical characteristics.

The Mean±SD score of illness perception was measured to be 37.09±4.91 out of 56, i.e., on the scale of 0 to 100, the mean score equaled 55 (Table 2). The details of illness perception items indicated that the majority of respondents (96%) had a suitable attitude toward the restriction of salt in their dietary meals. However, the weakest attitude was toward the treatment of disease; 79% stated that hypertension is a curable disease and 97% agreed or quite agreed that the disease will be treated by pharmacotherapy or other therapeutic regimens.

Moreover, the obtained data revealed that dietary adherence was desirable in only 80 (38%) patients (Table 2). The dietary adherence-related data suggested that more than half of the examined patients reported having both low-fat and low-salt diets (52%); 71% had 3 meals per day; 40% had liquid meals at nights (soup & broth), and 45% added less than one teaspoon salt to the meal while cooking.

Respecting the univariate analyses results, except prior hypertension dietary knowledge (P=0.013), none of the other individual and clinical characteristics were significantly related to dietary adherence. Of patients who presented prior hypertension dietary knowledge, 45% had desirable dietary adherence; however, in patients without prior hypertension dietary knowledge, the frequency of diet adherence was calculated as 27%. The lowest dietary adherence concerned the consumption of wholemeal bread and the avoidance of high-fat yogurt and buttermilk. Moreover, 68% of the explored patients stated never to use wholemeal bread and 169 (67%) patients stated that they eat more than the daily recommended unit of high-fat yogurt and buttermilk.

In the univariate analysis, patients’ illness perception demonstrated a significant relationship with dietary adherence (P=0.029). The Mean±SD scores of illness perception in the patients with desirable and relatively desirable adherence were calculated as 37.9±4.95 and 36.3±5.22, respectively. However, in the multivariable analysis, multiple logistic regression results revealed that adjusting for patient’s prior hypertension dietary knowledge, there was no significant correlation between illness perception and dietary adherence (OR=1.04, 95%CI: 0.97-1.11, P=0.250). Only prior knowledge of patients about hypertension diet was associated with
### Table 1. The study patients’ individual, social, and clinical characteristics (n: 268)

| Characteristic                              | Mean±SD(Range) / No.(%) |
|---------------------------------------------|-------------------------|
| Age (y)                                     | 58.9 (10.32, 29-85)     |
| Gender                                      |                         |
| Male                                        | 110 (41)                |
| Female                                       | 155 (58)                |
| Marital status                              |                         |
| Married                                    | 227 (85)                |
| Widowed                                     | 37 (14)                 |
| Single                                      | 1 (0.4)                 |
| Divorced                                    | 2 (0.7)                 |
| Educational level                           |                         |
| Illiterate                                   | 99 (37)                 |
| Below diploma                               | 99 (37)                 |
| Diploma or above                            | 68 (26)                 |
| Occupational status                         |                         |
| Employed                                    | 68 (26)                 |
| Unemployed                                   | 199 (74)                |
| Income                                      |                         |
| ≤1 Million Toman                            | 87 (75)                 |
| >1 Million Toman                            | 29 (25)                 |
| Living place                                |                         |
| Urban                                       | 175 (65)                |
| Rural                                       | 93 (35)                 |
| Family history of heart disease             | 152 (57)                |
| Other underlying diseases                   | 193 (76)                |
| Number of household members                 | 3.3 (1.6)               |
| Duration of hypertension disease in a month, median (range) | 60 (1-480) |
| Having hypertension disease knowledge       |                         |
| Yes                                         | 136 (52)                |
| No                                          | 127 (48)                |
| Having hypertension dietary knowledge       |                         |
| Yes                                         | 171 (64)                |
| No                                          | 95 (36)                 |
| Information source                          |                         |
| Physician/Nurse                             | 113 (63)                |
| Family/Friends/Media                        | 67 (37)                 |
| Systolic blood pressure in mmHg             | 137.2 (21.6)            |
| Diastolic blood pressure in mmHg            | 69.6 (16.7)             |

SD: Standard Deviation; The difference from the total of 268 patients in each characteristic is due to missing data.
dietary adherence (OR=2.198, 95%CI: 1.198-4.035, P=0.011). The odds of having desirable dietary adherence was 2.198 times higher in patients with hypertension dietary knowledge than those without such an awareness (Table 3).

### 4. Discussion

Hypertension is highly prevalent around the world. The introduction of its serious complications on the body has made it a global health concern. Thus, the present study explored the relationship between illness perception and dietary adherence status in patients with hypertension.

The patient’s denying or adherence to hypertension treatment is a common phenomenon that reflects their informed choice based on their knowledge and understanding of the medical and therapeutic conditions. Therefore, there is a need to change the perception of hypertension as a disease process [20]. In our study, the dietary adherence status was undesirable in most examined patients. This finding was consistent with those of Khodadadi et al. who studied the progressive development of self-care awareness in patients with the acute coronary syndrome [21]. Moreover, our data were in line with those of Leong et al.’s study, titled “the follow-up of health recommendations after cardiac rehab after MI who had high levels of dietary compliance [22]. Van der Wal et al. (2010) reported a high level of dietary adherence in cardiac patients [23]; however, this finding was not consistent with those of their 2005 research, indicating that most explored patients manifested a low dietary adherence [24]. Differences in symptoms and their severity in patients with hypertension may cause differences in dietary adherence in observed studies.

In our study, the average score for the illness perception of hypertension was low; only 1.3% of the examined patients provided a good understanding of their illness. This finding was consistent with those of numerous studies that reported a low level of awareness in cardiac patients [24, 25]. According to Kamran et al., the knowl-

### Table 2. The study patients’ illness perception and dietary adherence description

| Characteristic | MeantSD (Range) /No. (%) |
|---------------|--------------------------|
| Illness perception | 37.09 (4.91, 23-51) |
| Dietary adherence |  |
| Undesirable adherence | 0 (0) |
| Relative adherence | 132 (62) |
| Desirable adherence | 80 (38) |
| Total | 2174 (167, 1625-2550) |

The difference from the total of 268 patients is due to missing data.

| Models | OR (95%CI) | P  |
|--------|------------|----|
| Model 1* | Illness perception | 1.038 (0.974-1.105) | 0.250 |
| | Dietary knowledge | 1.849 (0.942-3.629) | 0.074 |
| Model 2** | Dietary knowledge | 2.198 (1.198-4.035) | 0.011 |

OR: Odds Ratio; CI: Confidence Interval.
* Model was reported adjusted odds ratio and 95% confidence interval of having hypertension dietary adherence by patient’s illness perception, adjusting for patient’s dietary knowledge status.
** Model was reported the most powerful predictors of having hypertension dietary adherence in a backward stepwise likelihood ratio selection method.
edge and understanding of the disease can predict 47.2% of changes in sodium intake in the control group. There was also a significant correlation between the knowledge and understanding of the disease and sodium intake in patients with uncontrolled hypertension [8]. Considering that nutritional knowledge and illness perception may predict a high degree of sodium intake, it is critical to pay more attention to improving information and understanding of patients about hypertension, especially among those with uncontrolled hypertension [8].

Our study results indicated no significant relationship between the level of illness perception and the extent of dietary adherence. This finding was inconsistent with those of the study by Taheri et al., which found that those who had a better understanding of their illness were more likely to follow the regimen [1]. Chen et al. argued that illness perception was more consistent with treatment in patients [26]. Our findings suggested that increasing the perception of individuals at high risks of hypertension does not necessarily lead to improved preventive and self-care behaviors, including adherence to appropriate diets.

Another crucial finding was that, based on the multiple logistic regression model data, the level of dietary adherence was only related to dietary knowledge. Similarly, Moghadam et al. declared that increasing the level of awareness of cardiovascular risk factors leads to an improvement in daily functions for preventing CAD [27]. However, the results of the study of Mazloomi et al., contrary to our results, signified no correlation between awareness and self-care behaviors [28]. Nieuwenhuis et al. also documented no significant relationship between knowledge and dietary adherence [29]. Furthermore, another study revealed that only a few patients who had the required dietary knowledge complied with it [30]. Our study reminds us that increasing awareness among individuals at high risk of hypertension complications can improve self-care behaviors, including adherence to standard diets. The limitations of this research were to use the interview method; thus, the mental status of the patients under investigation during the interview as well as the willingness of patients to participate in the interview can affect the responses.

5. Conclusion

Based on the current research results, the role of awareness is essential to the adherence of patients to hypertension. Additionally, due to the lack of a continuous follow-up of these patients in society, despite the chronicity of the disease process, there is a need for planning to increase the level of awareness in this population. The increased awareness of patients can improve self-care in patients; thus, such measures reduce the complications of the disease.

Ethical Considerations

Compliance with ethical guidelines

The present study was approved by the Institutional Ethics Committee of Guilan University of Medical Sciences, Iran (Code: IR.GUMS.REC.1397.533).

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Authors’ contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflicts of interest.

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