

Original Article

The Relationship between Health Literacy and Medication Adherence in a Hypertensive Patient Population

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Abstract

Background: Medication adherence plays a key role in the management of chronic diseases. Low health literacy leads to failure in disease management and medication adherence.

Aims: The present study was carried out to investigate the relationship between health literacy and medication adherence in hypertensive patients.

Design: A descriptive, cross-sectional study design was used.

Setting: The population of this consisted of 101 hypertensive patients were referred to the Internal Diseases and Cardiology Outpatient Clinics of a hospital in Cyprus between June and August 2017.

Method: The 'Descriptive Information Form,' 'Commitment to Medical Treatment/Adherence Self-Efficacy Scale' and 'Adult Health Literacy Scale' were used as data collection tools. Percentages, the Mann-Whitney U test, Kruskal-Wallis H test and Spearman's rho correlation coefficient were used for statistical analyses of the data.

Results: The findings showed that the patients had low levels of medication adherence and health literacy. A moderate, significant, positive, linear relationship was found between the level of health literacy and medication adherence among hypertensive patients. The level of health literacy was found to be lower among patients with a low level of education, women, and hypertensive patients with disease duration of 5-9 years.

Conclusion: In conclusion, medication adherence among hypertensive patients can be elevated by increasing their level of health literacy. To ensure medication adherence, future studies should aim to develop, implement and evaluate interventions to increase the level of health literacy.

Key words: Hypertension, Health Literacy, Medication Adherence

Introduction

Medication adherence in hypertensive patients is a dynamic process that involves the use of medication at the prescribed frequency and dosage (Krzyszinski and Leeman, 2011). While the positive effects of medication adherence on the management of patients' health status and increasing their quality of life are well-known, previous studies reported moderate or low rates of medication adherence among hypertensive patients (Kang et al., 2015; Ferreira Maciel, Pimenta and Caldeira, 2016; Alsolami et al., 2015). Previous studies have demonstrated that factors, such as the disease itself, perceived health status, medication knowledge, patient-

nurse interaction, economic status and the level of health literacy, are associated with medication adherence (Kang et al., 2015; Fitzgerald et al., 2011; Zhang et al., 2014).

Acquiring health knowledge and understanding the recommendations of health professionals correctly require a high level of health literacy (Darvishpour, Omidi and Farmanbar, 2016). Health literacy (HL) is a combination of the required information, motivation and competence required to access, understand, evaluate and use health information to make health decisions or make judgments (Taş and Akış, 2016). Some studies underlined the importance of HL levels in the management of chronic diseases and

medication adherence (Zullig et al., 2014; Kang, 2015; Lee et al., 2017). Individuals with a low level of HL appear to be hospitalized more frequently, receive a lower level of protective healthcare services, and do not use their medication regularly, manage chronic diseases well or comprehend health messages, and are associated with increased mortality (Bauer, 2013, Federman, 2014; Berkman et al., 2011).

Hypertensive patients with a sufficient level of health literacy are more successful in controlling and treating their disease (Darvishpour, Omidi and Farmanbar, 2016). It is predicted that enhancing levels of HL will increase medication adherence.

This is because, patients who have a better understanding of their own health status and do not require help for medication management, can have increased levels of self-management and positive attitudes towards their disease, which in turn increase their medication adherence (Kang et al., 2015). Levels of HL among hypertensive patients are known to be inadequate (Wannasirikul et al., 2016). Due to low levels of health literacy, patients do not adhere to prescribed medications and cause an economic and social burden on society (Santiago and Melin, 2015).

Considering the key role of HL in hypertension control and the management of medication adherence, a demonstration of the level of HL in populations with different cultural and socioeconomic structures gains importance. In a review of international studies, a limited number of studies were found that investigated the association between medication adherence and HL in hypertensive patients (An and Park, 2016; Wannasirikul et al., 2016; Lee et al., 2017).

On the other hand, there was no previous study that evaluated the relationship between the medication adherence and HL of hypertensive patients in the Turkish population.

We believe that the results of the present study can contribute to the literature by highlighting the importance of health literacy to ensure blood pressure control and increase medication adherence among hypertensive patients.

Therefore, this study aims to investigate the relationship between medication adherence and HL in a Turkish hypertensive patient population and increase awareness of the effects of HL on patient outcomes.

Methods

This study was designed and conducted as a descriptive, cross-sectional study. The study population was selected from hypertensive patients who had been referred to the Internal Diseases and Cardiology Outpatient Clinics of a 157-bed state hospital located in Northern Cyprus. This study included patients aged 18 years and above, who had been diagnosed with hypertension at least six months previously, were using at least one medication prescribed by their physician and were able to read and understand the study instructions. The study population comprised individuals who were referred to the Internal Diseases and Cardiology Outpatient Clinics of a state hospital located in Northern Cyprus between 1 June and 30 August 2017, following a diagnosis of hypertension, for treatment or a check-up visit. A total of 101 hypertensive patients who met the study inclusion criteria made up the study sample. The investigator distributed the questionnaires to all patients, and the patients were asked to self-administer the questionnaire under the supervision of the investigator. All the questionnaires were completed within 10-15 minutes.

Data Collection Tools: The data collection tools used in this study comprised a Personal Information Form, which collected the descriptive data of the patients and was prepared according to a review of the literature (Mert et al., 2011; Gün et al., 2014; Darvishpour et al., 2016), a Commitment to Medical Treatment/Adherence Self-Efficacy Scale and an Adult Health Literacy Scale.

Personal Information Form: This form included questions relating to the descriptive characteristics of the patients (including, age, gender, marital status, level of education and level of income).

Adult Health Literacy Scale (AHLS): Sezer and Kadioglu developed the AHLS in 2014. The scale comprises 23 items, questioning the health knowledge and medication use, to determine the level of health literacy in adults. The reliability and validity of this scale have previously been demonstrated. Of all the questions, 13 questions are answered as yes/no, 4 questions requires filling in the blanks, 4 questions are multiple choice and three are 2 questions match-up questions. Scoring is done separately for each question type. Positive statements are given 1

point, and negative statements are given 0 points in the yes/no questions. For filling in the blanks questions, correct answers are given 1 point, and incorrect answers are given 0 points. For multiple-choice questions, participants who marked at least two correct answers are given 1 point, while participants who do not have any correct answer or mark an incorrect and a correct answer are given 0 point. For the match-up questions, at least two correct match-ups are given 1 point and the others are given 0 points. The total score that can be collected from the scale varies between 0-23. The level of health literacy increases by increasing total scores (Sezer & Kadioglu, 2014). The Cronbach's alpha coefficient of the Adult Health Literacy Scale was found to be 0.77 (Sezer & Kadioglu, 2014). In the present study, the Cronbach's alpha coefficient was estimated to be 0.73.

Commitment to Medical Treatment/Adherence Self-Efficacy Scale (MASES): In 2003, Ogedegbe et al., developed MASES in a hypertensive American patient population, and the validity and reliability of the Turkish version of the scale were performed by Gözümlü and Hacıhasanoğlu in 2009 (Gözümlü & Hacıhasanoğlu, 2009). MASES consists of 26 questions on factors that affect a patient's regular use of antihypertensive medications and evaluated the individual's level of self-efficacy on their contribution to each item. For example, individuals are asked to evaluate the following statement, "Are you sure you can always take your medicines when at work?" by selecting one of the following options "I am not sure at all," "I am rather sure," "I am very sure." In total, 26-78 points can be collected in the scale. Increased scores indicate a higher level of an individual's adherence to antihypertensive medications. The Turkish validity and reliability study of the Commitment to Medical Treatment/Adherence Self-Efficacy Scale reported a Cronbach's alpha value of 0.92 (Gözümlü & Hacıhasanoğlu, 2009). In the present study, the Cronbach's alpha value of the scale was estimated as 0.94.

Statistical Analysis: Study data were evaluated using the SPSS (20.0) for Windows Software Package Program. The One-Sample Kolmogorov-Smirnov test was used to check if the numerical data were normally distributed. Based on the results, non-parametric techniques were followed for data analyses. The Mann-Whitney U test was used for comparisons between two groups, and the Kruskal-Wallis H

test was used to compare more than three groups. When the results of Kruskal-Wallis H test were significant, the Mann-Whitney U Test was used to find the groups that caused the significant difference. Spearman's rho correlation coefficient was calculated to test the relationship between the MASES and AHLS scores. P-values lower than 0.05 were considered statistically significant.

Study Limitations: This study was conducted in a single center. Therefore, results of the study cannot be extrapolated to the overall population. We suggest that future studies in larger patient populations should investigate the reasons underlying the low levels of health literacy and medication adherence to provide new insights.

Ethical Aspects of the Study

Institutional Approval was obtained from the hospital where this study was conducted and Ethics Committee Approval was obtained from the Scientific Research and Publication Ethics Committee (Decision no: 2017/41-06) The written informed consent of the participating subjects was obtained on a voluntary basis as demonstrated by the Subject Informed Consent Form.

Results

When the descriptive characteristics of the patients were investigated, 69.3% were found to be at least 60 years old, 65.3% were women, 39.6% were literate, and 77.2% had balanced income and expenses. Of all the patients, 57.4% had experienced hypertension for at least 10 years (Table 2).

The mean MASES and AHLS scores of the patients were 46.30 ± 12.89 and 9.09 ± 3.85 , respectively (Table 1).

A moderate, significant, positive, linear relationship was found between the patients' MASES and AHLS scores ($r = .64$; $p = .000$). Based on this finding, the patients' Commitment to Medical Treatment/Adherence Self-Efficacy Scale scores increased proportionally to their adult health literacy scale scores (Table 3).

The mean MASES scores did not significantly differ between the analyzed age, gender, education status, level of income and disease duration categories ($P > .05$) (Table 2).

The mean AHLS scores of the patients did not significantly vary according to age or level of income ($P > .05$). On the other hand, the mean

AHLS score was significantly higher in men than women ($p < .05$). The mean AHLS score was significantly higher in patients who were at least university graduates, compared with the patients who were merely literate ($p < .05$).

The AHLS scores of the hypertensive patients also differed significantly, depending on disease duration. Hypertensive patients with a disease duration of 1-4 years had significantly higher AHLS scores compared with the patients with a disease duration of 5-9 years ($P < .05$).

Table 1: Distribution of the patients' mean AHLS and MASES scores

| Scales | Mean \pm SD | Min Score | Max Score |
|--------|-------------------|-----------|-----------|
| MASES | 46.30 \pm 12.89 | 26.00 | 78.00 |
| AHLS | 9.09 \pm 3.85 | 1.00 | 17.00 |

* Commitment to Medical Treatment/Adherence Self-Efficacy Scale ** Adult Health Literacy Scale

Table 2: The relation between MASES and AHLS scores of hypertensive patients

| Parameters | N | X | Ss | r_{rho} | P |
|------------|-----|-------|-------|------------|-------------|
| MASES* | | 46.30 | 12.89 | | |
| AHLS** | 101 | 9.09 | 3.85 | .64 | .000 |

* Commitment to Medical Treatment/Adherence Self-Efficacy Scale ** Adult Health Literacy Scale

Discussion

Low HL is known to increase the prevalence of hypertension (Shibuya et al., 2011). Findings in the present study showed that the level of HL is low among hypertensive patients. In a study performed by Warren-Findlow et al., only 28.4% of hypertensive patients were found to have an adequate level of HL (Warren-Findlow et al., 2014). In the study, which was performed on hypertensive American patients, the findings indicated a low level of HL in this patient group (McNaughton et al., 2014).

In another study performed in Iranian hypertensive patients, 41.8% of the patients were found to have an adequate level of HL (Darvishpour, Omidi and Farmanbar, 2016). Another study, conducted in Puerto Rico, reported that the level of HL was inadequate in 92% of the investigated patients (Santiago and Melin, 2015).

In the present study, the findings showed that the level of medication adherence was low among hypertensive patients. A study performed in

Brazil demonstrated that medication adherence was not sufficient in more than half of hypertensive patients (Daniel & Veiga, 2013). Another study, conducted in Britain, showed that 25% of the patients were non-compliant with their antihypertensive medication therapy (Tomaszewski et al., 2014). Various studies carried out in Nigeria reported medication non-adherence rates that vary between 24.7 to 66.7%. (Boima et al., 2015; Ezeala-Adikaibe et al., 2017).

It has been suggested that the differences between the study results originated from the differences in the socio-cultural structures of the individuals investigated and the differences in the measurement tools used in each study. We suggest that the reason underlying the low medication adherence of the hypertensive patients in the present study was their low level of HL.

Our results demonstrated that there was a moderate and significant association between HL and medication adherence in hypertensive

patients, and medication adherence increased with increasing levels of health literacy. Some of the previous studies that investigated the potential correlation between health literacy and medication adherence also reported that medication adherence was lower among individuals with a lower level of health literacy (Lee et al., 2017; Freedman et al., 2012). A study conducted with Japanese adult patients showed that low levels of health literacy and hypertension knowledge were associated with insufficient health status and low blood pressure levels (Shibuya et al., 2011).

Contrary to our findings, a study conducted in Thailand reported that health literacy did not have a direct effect on medication adherence in hypertensive patients (Wannasirikul et al., 2016). In another study, Mayo-Gamble and Mouton (2017) reported that individuals with a low level of health literacy more frequently forgot to take their medicines and used less medicine than prescribed. A study performed on American hypertensive patients did not show any association between health literacy and compliance with a specific diet (Hutchison et al., 2014).

In the present study, AHLS scores were found to be significantly higher among men than women ($p < .05$). Conversely, a study conducted by Shah et al., on 1014 patients with reference to different healthcare settings reported that the level of health literacy was higher among women than men (Shah et al., 2010). Similarly, a study performed by Clouston et al., in Britain also showed a higher level of health literacy among women (Clouston et al., 2017).

A systematic review performed by Ghisi et al., (2018) showed that HL was lower among men. Given that HL was lower among women in this study could be explained by the socio-cultural characteristics of the Turkish population. In the Turkish population, women participate in educational activities less frequently, due to their many household responsibilities, and this might have affected our results.

Educational status is an important factor associated with health literacy. As the level of education increases, individuals more easily comprehend health and disease-related information and apply them to their daily lives. In this study, we found out that the mean AHLS score was higher among patients who were at least university graduates, compared with those who were merely literate ($p < .05$).

Another study conducted with hypertensive patients also reported a higher level of health literacy in individuals with a high level of education (An and Park, 2016). A Chinese study showed that the level of knowledge regarding hypertension was lower among individuals with a low level of education (Li et al., 2013). In another study, made in Colombia, Shigaki et al., concluded that health literacy improved as the patients' levels of education increased (Shigaki et al., 2012)

Due to their persistent and incurable nature, chronic diseases may lead patients to develop negative opinions regarding their own health. Thus, over time, individuals may give up on efforts to gain health literacy. Hypertensive patients with a disease duration of 1-4 years had significantly higher AHLS scores compared with the patients who had a disease duration of 5-9 years ($P < .05$). According to another study conducted by Morris et al., health literacy is not associated with the duration of diabetes (Morris et al., 2013). Likewise, a study carried out by Cimen and Temel, did not demonstrate any association between the duration of chronic disease and levels of HL (Cimen and Temel, 2017). In their study, which included the elderly, Toci et al., showed that health literacy scores were inversely related to age and, as expected, the lowest scores were noted in the oldest age group (Toci et al., 2013). HL can be higher among individuals who had been recently diagnosed with HT, as these individuals are more eager to obtain information on their disease and more engaged in reading and researching their diagnosis.

Conclusion

The results of this study show that medication adherence in hypertensive patients increases with the increasing levels of HL. The level of health literacy is lower among individuals with low educational status, in women and the individuals with disease duration of 5-9 years.

Based on results of this study, nursing professionals are advised to consider HL in their interventions for increasing medication adherence. The findings also highlight the low level of health literacy among hypertensive patients and reveal the need to develop health policies on this matter. Thus, training programs for increasing the level of health literacy should target individuals with low educational status, women, and hypertensive patients with long disease duration. In conclusion, medication

management and blood pressure control in hypertensive patients require a multi-dimensional approach, including the improvement of medication adherence and the enhancement of health literacy.

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