



Illness Perception and Adherence to Medication in Cardiovascular Patients at a Tertiary Hospital in Northern Cyprus

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Authors' contributions

This work was carried out in collaboration among all authors. Authors BA and AMA were responsible for design and implementation of the study. Authors BA and AMA finalized study designed and coordinated implementation. Authors BA and NB collected data, authors BA and BBB carried data interpretation and creation of the manuscript, author BBB reviewed and improved manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background and Aims: The Patients diagnosed with cardiovascular disease are strongly recommended to adopt healthier behaviors and adhere to prescribed medication. The role of patients' illness perceptions in patient care and impact on health outcomes was studied previously in a wide range of health conditions. However, among patients with cardiovascular diseases, this has not been well examined. Purpose of this study was to assess treatment adherence, illness perception, and relationship between illness perception and treatment adherence in patients with cardiovascular disease.

Study Design: A cross-sectional descriptive study.

Place and Duration of Study: The study was conducted from November 2018 to January 2019 to

all patients who admitted to the cardiology department of Near East University Hospital in North Cyprus.

Methodology: A survey form of three sections were used to gathered data; a socio-demographic section, Brief Illness Perception Scale, and Brief Morisky Adherence Scale. Data were analyzed using Statistical Package for Social Science (SPSS) for window version 20.0 software. P-value less than 0.05 were statistically significant.

Results: The patients who participated in the study involved 49 (61.2%) male and 31 (38.8%) female. The mean \pm SD age of the sampled group was 61.16 ± 12.60 , with 15 (47.5%) being older than 65 years old. The Median (Max-Min) of the total Illness Perception Questionnaire positive perceptions shows significantly higher scores in males compared to female's illness perception 52.0 (73.0 – 20.0) Vs. 41.0 (74.0 – 18.0), $z=-2.297$; $p < 0.05$, respectively. Also, university graduate patients had significantly higher positive perception scores compared to patients who graduated from only high schools or less 57.0 (71.0-40.0) Vs. 45.0 (74.0-20.0) and 43.0(68.0-18.0) $df=2$; $p=0.013$, respectively.

Conclusion: There is a significant positive correlation between different subscales of perception scale, while higher positive perception scores were identified in adherent patients and males. It is crucial to strengthen patients' illness perceptions, with especial consideration to emotional responses besides personal, treatment control, and disease understanding. We recommend an educational intervention in order to improve adherence.

Keywords: Cardiovascular medicine; illness perception; medication adherence; North Cyprus.

1. INTRODUCTION

Cardiovascular Disease (CVD) as one of the most common causes of death around the world. World and Health Organization mentioned that the percentage of death among cardiovascular patients varies from 25% to reach 45% [1].

To reduce the risk of more cardiac complication events, the patients should adhere to their drugs and stay away from smoking, follow a healthy diet, which includes increasing fruits and vegetable intake and decreasing fat foods. These recommendations include physical activity, keeping blood pressure under control, and controlling body weight [2].

Illness perceptions are among parameters that may significantly affect patient adherence since understanding the illness can help in adherence of the patient [3].

The definition of illness perception is the patients' beliefs about their disease. To simplify more this definition, the cognitive of the patients, which consists of five factors; identity, cause, consequences, and controlling the disease in addition to the emotional regarding the disease, more details about each factor will be discussed later [4].

Treatment adherence can be described as the coping strategy (problem-focused coping) of the individual to the CVD in this study. Patients might have their view about CVD, which influences their decisions to regulate the treatment

adherence behaviors and thereby making the illness perception an essential factor influencing treatment adherence [5].

The predictive value of illness perception in explaining the adherence to secondary prevention behavior remains unclear. This information could reflect patients' knowledge of modifiable risk factors (such as smoking, lack of exercise, obesity and consumption of fatty foods) and selected coping mechanisms, which have been identified as prerequisites for behavior-changing interventions [6].

Several studies mentioned that the illness perception of the different diseases such as asthma or diabetes mellitus as a guideline to assess and enhance the patient's adherence to the medication [7].

Adherence to medication in CVD constitutes a primary factor of treatment success as suboptimal use leads to decreased treatment efficacy and increased direct and indirect costs, mortality, and morbidity [8].

Few studies in the literature studied the illness perception in CVD, and the major of these studies was conducted in western and or developed countries such as the USA or Taiwan [5,9,10].

There is no study conducted in North Cyprus (NC) to assess the illness perception and medication use behavior in patients with cardiovascular diseases. The purpose of this

study is to examine the relationship between illness perception and adherence among patients with CVD, one of the leading causes of mortality and morbidity worldwide and as well in North Cyprus. Clarification of this may improve the understanding of how disease control can be achieved and possible future interventions to optimize medication use in this unique patient population.

2. MATERIALS AND METHODS

2.1 Subjects and Setting

A cross-sectional, descriptive study was carried in a cardiology department from November 1, 2018 to December 30, 2018, at Near East University hospital (NEUH), North Cyprus.

All in-patients admitted to the cardiology department were screened for eligibility to be included in the study sample.

Inclusion criteria involved adult patients with a diagnosis of cardiovascular diseases confirmed by a cardiovascular physician and having been prescribed at least one drug for their disease for at least one month before the study. Patients were excluded if they were medically unstable, with any critical or acute episodes, and those with cognitive disabilities.

2.2 Data Collection and Study Tools

Data of the study were collected with a survey form that consists of the socio-demographical section, Brief Illness Perception Scale, and Brief Morisky Adherence Scale.

The researcher developed a socio-demographic information gathering form to collect information regarding the following variables: Gender, age, level of education, past medical history, days of admission, chief complain, and admission in last six months.

The Brief Illness Perception Questionnaire (BIPQ) was used to assess patient's awareness about their disease, this questionnaire composed of 8 items scored from zero to ten as a response scale and the last item was an open-ended question.

In details, the first five items measure the patients' cognitive illness. These items include consequences, timeline, personal control, treatment control, and identity.

The higher response to the consequences indicates that more severe consequences can follow the disease. Referring to item 2, higher response means the disease will last for more time.

Items three and four indicate that the disease can be controlled or cured as the response increased. While the item 5 indicate contributing more significant symptoms to CVD.

Item 6 and item 8 together indicate that the patients are more stress and worried about their disease, both together referred to emotional response.

Item 7 was referred to the understating of the disease, and item 9 was measuring the most common cause of the disease.

The total illness perception score was calculated by reverse score for consequences, timeline, identity, symptoms, and emotional response, and then adding this to the score of other items. The maximum total score is 80, and the minimum total score is 0. A higher score reflects a more positive view of the illness, whereas a lower score reflects threatening illness perception.

The Brief Morisky Medication Adherence Scale (BMMAS) was also used to measure patient's adherence to their drugs. The BMMAS is one of the standard scales used to measure patient's adherence in literature. The questionnaire is composed of 4 yes/no items. Yes=zero and no=1, the summation of the scale then is referred to as adherent if the patient gets four and nonadherent if less than 4. The internal consistency of the scale was measured using Cronbach alpha and found 0.7, which indicates a good and reliable scale.

2.3 Statistical Analysis

All statistical calculations and analyses were performed with Statistical Package for Social Sciences (SPSS) 20.0 software. Frequency analysis was carried out to investigate the descriptive characteristics of the study sample.

For the continuous data such as Brief Illness Perception Questionnaire (IPQ), Brief Morisky Medication Adherence Scale (MMAS) scores, descriptive statistics such as arithmetic mean, standard deviation, median, minimum and maximum values were calculated.

To determine the statistical hypothesis testing methods, the distribution characteristics of the scale scores were investigated in terms of normality. For this purpose, the Kolmogorov-Smirnov test of normality, Shapiro-Wilk test of normality, Q-Q plots, skewness, and kurtosis values were all analyzed in each demographic characteristic.

Using all gathered information, non-parametric hypothesis tests were performed throughout the whole data analysis phase.

Mann Whitney U test was applied for the comparison of the Brief Illness Perception Questionnaire (IPQ) Brief Morisky Medication Adherence Scale (MMAS) score between two categorical variables. Kruskal Wallis test was applied for more than two variables group such as age groups or education levels to understand the significant associations of the Brief Illness Perception Questionnaire (IPQ) and Brief Morisky Medication Adherence Scale (MMAS) scores. This was due to the dependent variable having more than two independent categories.

Pearson correlation was performed to measure the level of correlation between illness perception subscales and Morisky scale. To assess the association between adherence level and demographic characteristics of the patients, Pearson Chi-square was performed. Detailed analysis result of each statistical method is shown in their corresponding tables throughout the text. Level of significance was accepted for p -value < 0.05 for the whole study.

3. RESULTS AND DISCUSSION

3.1 Results

A total of 126 patients were admitted to the cardiology clinic between 1-11-2018 till 30-12-2018. Of these 121 patients matched the inclusion criteria and were invited to participate while 4 were excluded due to not being medically stable and one patient due to not being able to communicate. At the end 80 patients accepted to participate and were surveyed in the study.

3.1.1 Socio-demographic characteristics

More than half of patients were male 49 (61.2%), and 31 (38.8%) patients were female. The mean \pm SD age was 61.16 ± 12.60 , with 15

(47.5%) patients being older than 65 years old. Regarding the patient's education level, 46 (57.5%) patients had a high school degree, and 13 (16.3%) patients completed their university while only three patients (3.8%), was capable only of reading and writing (Table 1).

3.1.2 Medical history of the participants

The mean Creatinine Clearance (Cr.Cl) of the sampled group was 67.7 ml/min with SD = 31.20, the median (Min-Max) of the Cr.Cl = 73.9(0.8-143.5). The median of the drugs used for the patients was 5 with one drug per patient as the minimum drugs used and 19 drugs per patient as the maximum recorded.

Table 1. Patient's demographic characteristics

| | N (80) | % |
|------------------------------|--------|------|
| Gender | | |
| Male | 49 | 61.2 |
| Female | 31 | 38.8 |
| Education | | |
| Reading and Writing | 3 | 3.8 |
| Elementary and middle school | 18 | 22 |
| High school | 46 | 57.5 |
| University | 13 | 16.3 |
| Age groups | | |
| 23-50 | 13 | 16.3 |
| 51-65 | 34 | 42.5 |
| 66< | 33 | 41.3 |

The mean total cholesterol of the patients was 119.86 mg/dl with SD = 106.6, the median and max of the total cholesterol = 134.5 and 415, respectively. The blood pressure mean of the patients was 128.7 mmHg and 73.8 mmHg for systolic and diastolic, respectively. The highest blood measure recorded was 200 mmHg for systolic and 100 for diastolic mmHg.

The past medical history for the last six months showed that 62.5% of the patients did not come to hospital, while 7.5% of the patients entered the hospital for blood pressure follow-up. Only a patient (1.3%) was hospitalized during the previous six months for anemia, one (1.3%) for cancer, and one (1.3%) for falling (1.3%).

The sampled patient medical history shows the distribution of following comorbidities; Diabetes mellitus (27.5%), cholesterol 18.8%, cancer, depression were 6.3%, where anemia and

osteoporosis get 1.3% for each (Table 2). Table 3 shows the distribution of cardiovascular diseases among sampled patients.

Table 2. Medical history of the participants

| | N | %* |
|-------------------|----|------|
| Diabetes Mellitus | 22 | 27.5 |
| Cholesterol | 15 | 18.8 |
| Depression | 5 | 6.3 |
| Cancer | 8 | 10 |
| Kidney disease | 4 | 5 |
| Osteoporosis | 1 | 1.3 |
| Anemia | 1 | 1.3 |

*The summation of percentage \neq 100. More than one disease is possible

Table 3. Cardiovascular diseases among the sample

| | N | %# |
|------------------------|----|------|
| Ischemic heart disease | 51 | 63.7 |
| HT | 50 | 62.5 |
| Atrial Fibrillation | 16 | 20 |
| Heart Failure | 11 | 13.7 |

Summation \neq 100, more than one disease is possible

3.1.3 Patient's illness perception

Table 4 shows patients' responses to individual items and distribution of responses among demographic groups.

The Median (Max - Min) of the total IPQ positive perceptions shows significantly higher scores in males compared to females illness perception 52.0 (73.0 - 20.0) Vs. 41.0 (74.0 - 18.0), $z=-2.297$; $p < 0.05$, respectively. Also university graduate patients had significantly higher positive perception scores compared to patients who graduated from only high schools or less 57.0 (71.0-40.0) Vs. 45.0 (74.0-20.0) and 43.0(68.0-18.0) $df=2$; $p=0.013$, respectively.

3.1.4 Causes of illness and coherence of disease

Referring to the leading causes of the disease as perceived by the patients, stress was identified by 37.5% of respondents, while only 20% perceived smoking as a leading cause of their illness. Genetic and nutrition or diet were the most common causes of illness as perceived by (77.5%) and (57.5%) of the patients, respectively. The data showed that there is a significant positive correlation between different

subscales of perception scale ($p < 0.05$) (Table 5).

3.1.5 Adherence scale

Regarding the Morisky scale, the data showed that only 49 (61.3%) patients were identified as being adherents, and 31 patients (38.7%) were considered non-adherents.

The mean \pm SD of age of the patients who were adherent was not significantly higher than the mean \pm SD of non-adherent patients (61.26 \pm 12.24) (61.58 \pm 12.95) ($p > 0.05$), respectively.

More male patients (31, 63.3%) were identified as adherent than females patients (18, 58.1%). The highest number of adherent patients finished their high school (25, 54.3%), while only two patient who finished his middle school (2.0%) were adherent while one patient who did not go to school but knew how to read and write was identified as non-adherent (2.0%). Yet, no association between adherent level and education level groups was found statistically ($p > 0.05$) (Table 6).

The data showed that the median (Max-Min) of the IPQ positive perception scores was higher in adherent patients compared to non-adherents 52.0 (73.0-20.0) Vs. 43.0(74.0-18.0) respectively but didn't reach to a significant level ($z=-1.858$; $p = 0.06$).

3.2 Discussion

Cardiovascular diseases (CVDs) considered as the primary cause of death around the world, as 17.5 million death tolls were attributed to CVDs in 2012 [6]. CVDs were the predominant cause of non-communicable diseases in Cyprus, accounting for 50% of all deaths in North Cyprus in 2017.

According to the study findings, it is to strengthen patients' illness perceptions, especially personal control and disease understanding, as an essential strategy in educational interventions in order to increase adherence to treatment. 61% of the studied population was identified as adherent to their medications.

More than half of the study participants were males (61.2%) similar to studies conducted in Nepal and Taiwan, were 57% and 60.3% of the patients were males respectively, as this is attributable to the fact that the prevalence of ischemic heart diseases is more common among men than women [11].

Table 4. Illness perception scores among demographic groups in the CVD patients

| Illness perception scores among the CHD patients* | | | | | | | | |
|---|--------------|-----------|------------------|-------------------|------------|---------|-----------|-----------|
| | Consequences | Timeline‡ | Personal control | Treatment control | Identity‡§ | Concern | Coherence | Emotional |
| Median scores | 5(0-10) | 10 (0-10) | 9 (0-10) | 9(2-8) | 3(0-10) | 5(0-10) | 10(0-10) | 7(0-10) |
| Gender# | | | | | | | | |
| Male | 4 (0-10) | 10(0-10) | 10(0-10) | 9 (2-10) | 2(0-10) | 3(0-10) | 10(0-10) | 5(0-10) |
| Female | 5(0-10) | 9(0-10) | 8(3-10) | 8(3-10) | 6 (0-10) | 7(0-10) | 10(3-10) | 8(0-10) |
| Education Ω | | | | | | | | |
| Before High school | 5(0-10) | 10(0-10) | 9(5-10) | 9(4-10) | 5(0-10) | 6(0-10) | 10(3-10) | 7(0-10) |
| High school | 5(0-10) | 10(0-10) | 8(0-10) | 8.5(2-10) | 4(0-10) | 5(0-10) | 10(0-10) | 7(0-10) |
| University | 2(0-8) | 9(0-10) | 10(0-10) | 10(5-10) | 0(0-5) | 0(0-10) | 10(3-10) | 4(0-10) |

* All the data presented as Median (Min-Max).

Mann-Whitney U test was performed.

Ω Kruskal Wallis test was performed.

‡There is a statistically significant difference in median scores between gender $p < 0.05$.

§ There is a statistically significant difference in median between high school and before the high school $p < 0.05$

Table 5. Correlation between perception subscales and Morisky scale for adherence

| | Consequences | Timeline | Personal control | Treatment control | Identity | Concern | Coherence | Emotional | Morisky |
|-------------------|--------------|------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| Consequences | 1 | 0.066 (0.562) | 0.287 (0.010) | 0.312 (0.005) | 0.559* (0.00) | 0.407 (0.00) | 0.047 (0.68) | 0.190 (0.09) | 0.073 (0.52) |
| Timeline | | 1 | -0.029 (0.796) | 0.116 (0.14) | 0.09 (0.42) | 0.340* (0.00) | -0.053 (0.64) | 0.269 (0.01) | 0.007 (0.94) |
| Personal control | | | 1 | 0.721* (0.00) | 0.289* (0.00) | 0.318* (0.00) | 0.195 (0.08) | 0.135 (0.23) | 0.071 (0.53) |
| Treatment control | | | | 1 | 0.337* (0.00) | 0.37* (0.00) | 0.169 (0.14) | 0.134 (0.23) | 0.099 (0.38) |
| Identity | | | | | 1 | 0.534* (0.00) | 0.160 (0.16) | 0.295* (0.00) | 0.153 (0.174) |
| Concern | | | | | | 1 | 0.051 (0.65) | 0.623* (0.00) | 0.223* (0.04) |
| Coherence | | | | | | | 1 | -0.016 (0.89) | 0.177 (0.12) |
| Emotional | | | | | | | | 1 | 0.176 (0.12) |
| Morisky | | | | | | | | | 1 |

r; correlation coefficient. * Significant correlation at level of significant 0.05

Table 6. Association of adherence with demographic data

| | Adherent N (%) | Non adherent N (%) | p value |
|-------------------|-----------------------|---------------------------|----------------|
| Gender | | | |
| Male | 31(63.3) | 18(36.7) | >0.05 |
| Female | 18(58.1) | 13(41.9) | |
| Age | | | |
| <65 | 26 (61.9) | 16 (38.1) | >0.05 |
| ≥65 | 9(52.9) | 8(47.1) | |
| Medication | | | |
| 1-5 | 17 (37.0%) | 29 (63.0%) | >0.05 |
| 6-10 | 18 (62.1%) | 11 (37.9%) | |
| 11- | 2 (40.0%) | 3(60.0%) | |

The participants in this study had been diagnosed with IHD for less than five years and the majority of them had hypertension. These findings are similar to those of the previous study conducted in Malaysia, which reported that hypertension was the primary comorbidity condition in patients with IHD [12].

Results from previous studies are controversial regarding non-adherence in males compared to females. In the current study, more proportion of males were adherent though the difference was not statistically significant (36.7% males vs. 41.9% females; $P > 0.05$). Also, males had significantly higher positive illness perceptions score compare to female patients ($P < 0.5$). This finding was consistent in other studies.

In our study, patients perceive cardiovascular disease as a lifelong disease that drugs can help in controlling it. This finding was similar to the finding of a study that was conducted in 2004, which showed that hypertension disease could be controlled with drugs as it is a lifelong disease [10].

A study was conducted in 2013; the researcher mentioned that the treatment control ranked as the highest score of BIPQ, while another study was conducted in 1999 showed that the patients with chronic disease belief that the treatment can control the disease when they are chronic. Both findings were similar to our findings in cardiovascular disease [13,14].

Significant nonadherence (39%) was seen in the current study population, though this is much less than the prevalence reported in earlier studies [15]. In our sample, approximately 61.3% of the patients considered as an adherent to the drugs they used. These findings were similar to the findings that Saarti, et al. study findings in 2015 reported 70% of the participants as

adherent to their medications of cardiovascular disease [16].

A study was conducted in 2017 to measure the illness perception of the patients with heart failure. Around half of the participated patients show a positive perception of their illness. These findings were comparable to illness perceptions reported among participants in the current study [17].

In our study, we used the Brief Illness Perception Questionnaire (Brief IPQ), which is a continuous scale to measure the patient's knowledge about their condition, while previously Revised Illness Perception Questionnaire (IPQ_R) was used which consists of 80 items. However, both scales were established and validated to use in cardiovascular disease patients [6,18].

More educational interventions or programs should be established to improve patient adherence and awareness for CVD.

Pharmacists should work on assessing and improving patient adherence through patient educations and promote awareness of the consequences of non-adherence in CVD [19,20].

To our knowledge, this study is the first to evaluate cardiology patient's illness perception and adherence in North Cyprus. Nevertheless, this study has a few limitations. One of the main limitations is that the study was conducted in a single Centre, so the results may not be to generalize to the population. The sample size is considered as a main limitation of this study since the period of data collection was only two months. Also, due to the small sample size, assumptions to carry a valid binary regression to predict the factors that affect adherence were not met.

Only inpatients were included in the study; the data may not be applicable to the indigent care population who visited outpatients' clinics.

However, most of the participants were uncomplicated, and the result may only reflect the illness perceptions and drug adherence in a relatively healthier cardiovascular population. Compared with previous community studies, patients had higher drug adherence in this study, possibly as a result of the sampling.

Finally, another limitation of this study is that it used a self-report questionnaire to assess adherence; this method has the disadvantages of recall bias and eliciting only socially acceptable responses, and hence, it may overestimate the level of adherence.

4. CONCLUSION

According to our findings, it is crucial to strengthen patients' illness perceptions, with special consideration to emotional responses besides personal and treatment control and disease understanding. Educational interventions are necessary as an important strategy in order to improve adherence.

Since most of the cardiovascular patients admitted so far had a moderate level of education and are geriatrics mostly, special educations programs should be established to encourage positive perceptions, which lead to better adherence to their medicine.

CONSENT AND ETHICAL APPROVAL

Confidentiality was assured during the study along patient's privacy, a letter of ethical approval for this study was obtained from the Institutional Review Board (IRB) of Near East University Hospital (Ref YDU/2018/62-655) prior to study. Only Initials were used during the study and other information of address and occupation were not recorded during the interview. Research was conducted in accordance with the Declaration of Helsinki. Prior to study verbal informed consent was obtained from the patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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