TURKISH REPUBLIC OF NORTH CYPRUS

NEAR EAST UNIVERSITY
HEALTH SCIENCES INSTITUTE

Illness Perception and Adherence to Medication in Cardiovascular Patients in Tertiary Hospital in North Cyprus.

Begard Agha

MASTER thesis

A THESIS SUBMITTED TO THE GRADUATE INSTITUTE OF HEALTH SCIENCES NEAR EAST UNIVERSITY

DEPARTMENT OF CLINICAL PHARMACY

Mentor

Assist. Prof. Dr. ABDIKARIM M. ABDI

Northern Cyprus, Nicosia
2019

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DEDICATION

I dedicate my dissertation work to my family and many friends and who support me every morning by words or even smile.

A special feeling of gratitude to my loving parents, who have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve.

My husband and brothers have never left my side and are very special also dedicate this dissertation to my many friends.

I dedicate this work and give special thanks to my best Teacher

Assist. Prof. Dr. Abdikarim M. Abdi

On a more personal note, I would like to dedicate this study to the individual who were kind enough to support me from the first day of my study, who didn't leave me alone in this life I mean **my husband.** I am truly thankful for having you in my life.

Approval

Thesis submitted to the Institute of Health Sciences of Near East University in partial fulfillment of the requirements for the degree of **Master of Science in Clinical Pharmacy.**

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ACKNOWLEDGMENTS

Millions of thanks to Almighty ALLAH- Who has blessed me with the knowledge and power to perform and complete not only project, but also other tasks and Who has always guided me in difficult times of which I have never imagined in my life.

First, I must express my very profound gratitude to my parents for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

I deeply acknowledge the valuable advices and the guidance provided by my advisor **Assis.Prof. Dr Abdikarim M. Abdi** regarding the project development, and I am very grateful to my teacher **Assoc. Prof. Bilgen Basgut** the head of Clinical Pharmacy Department at Near East University Cyprus for her encouragement throughout my university Career.

Special acknowledgement to my husband **Sanar Mohammad Saleh** for his major contribution in the completion of this project.

Also, I should thank specially my friend and colleague **Nevzat BIRAND** for his valuable efforts in collecting data and communication with hospital staff.

And many individual who helped me in the completion of my project, and all my family members and friends for their encouragement and prayer without which nothing would have been possible.

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Abstract

Introduction: Patients diagnosed with cardiovascular disease (CVD) are strongly recommended to adopt healthier behaviors and adhere to prescribed medication. Previous research on patients with a wide range of health conditions has explored the role of patients' illness perceptions in explaining coping and health outcomes. However, among coronary heart disease patients, this has not been well examined.

Aim: The purpose of this study was to explore coronary heart disease patients' illness perception beliefs and investigate whether these beliefs could predict adherence to healthy behaviors.

Method: A cross sectional descriptive face-to-face survey study was conducted involving patients enrolled in cardiology department of Near East University Hospital between November 2018 to January 2019 and fit inclusion criteria. Data of the study was collected using structured validated questionnaires tools that involve socio-demographical section, Brief Illness Perception Scale and Brief Morisky Adherence Scale.

Result: Of 126 CVD patients, 80 patients accepted and were eligible for the study. Of these 49 (61.2%) were male and 31 (38.8%) female patients. The mean ± SD age of the sampled group was 61.16 ± 12.60 with 15 (47.5%) being older than 65 years old. Almost 39% of the patients were identified as non-adherents. The data showed that there is a significant positive correlation between different sub-scales of illness perception scale ($p < 0.05$), while higher positive perception scores were identified in adherent patients and males.

Conclusion: According to the findings, it is crucial to strengthen patients' illness perceptions, with especial consideration to emotional responses beside personal and treatment control and disease understanding, as an important strategy in educational interventions in order to improve adherence.

Key Words: Cardiovascular, illness perception, medication adherence, pharmacy practice, Northern Cyprus.

STATEMENT (DECLARATION)

Hereby I declare that this thesis study is my own study, I had no unethical behavior in all stages from planning of the thesis until writing thereof, I obtained all the information in this thesis in academic and ethical rules, I provided reference to all of the information and comments which could not be obtained by this thesis study and took these references into the reference list and had no behavior of breeching patent rights and copyright infringement during the study and writing of this thesis.

Begard Agha

Contents

LIST OF ABBREVIATIONS

S. #	ABBREVATIONS	EXPLANATION
1	CP	Clinical Pharmacy
2	PC	Pharmaceutical Care
3	FDA	Food and Drug Administration
4	HTN	Hypertension
5	CVD	Cardiovascular Disease
6	SD	Standard Deviation
7	EMA	European Medicine Agency
8	IRB	Institutional Review Board
9	AACP	American Association of Colleges of Pharmacy
10	ACCP	the American College of clinical Pharmacy
11	ASHP	American Society of Health System Pharmacist
12	NEU	Near East University
13	WHO	World Health Organization
14	SPSS	Statistical Package for the Social Science
15	FUGAP	Federal Union of German Associations of Pharmacists
16	SHIP	Statutory Health Insurance Physicians

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1. Introduction:

The statistics showed that Cardiovascular Disease (CVD) as one of the most common cause of the death around the world. World and Health Organization mentioned that the percentage of death among cardiovascular patient varies from 25% to reach 45% (World Health Organization,2018).

This percentage decreased in the last decade since more advanced drugs and surgery successfully implanted in the treatment. Even the treatment of CVD showed a positive result, the patients are still under a high risk of more complications and hospitalization (World Health Organization,2018).

To reduce that risk of more cardiac complication events, the patients should be adhered to their drugs and stay away from smoking, follow a healthy diet which includes increasing in fruits and vegetables intake and decreasing fat foods. These recommendations include physical activity, keeping blood pressure under control and controlling body weight (Smith SC et al., 2011).

WHO in 2002 recommended to follow these instruction to avoid other CVD complications such as stroke diabetes mellitus (World Health Organization, 2003).

Understanding the disease and the importance of the treatment in addition to lifestyle medication have a significant effect in following WHO recommendations (Baroletti S &Dell'OrfanoH , 2010).

To conclude, this thesis project assesses the current available information regarding overview of CVD, treatment adherence, illness perception and relationship between illness perception and treatment adherence in patients with CVD.

In the second part of the thesis we describe the characteristics of CVD patients admitted to NEUH cardiology Clinic, beside their illness perception and adherence to drug therapy. We also test the hypothesis if there is any relationship between the illness perception domains and the patients adherence to their medications.

2. Background:

2.1Illness perception:

The literature showed that illness perceptions is one of the major effective factors that can affect the patient adherence since understanding the illness can help in adherence of the patient (Rajpura&Nayak, 2014).

The definition of illness perception is the patients' beliefs about their own 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 (Leventhal et al., 1997).

Treatment adherence can be conceptualized as coping strategy (problem-focused coping) of the individual to the CVD in this study. Patients might have their own 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 (Chen, Tsai, &Lee, 2009; Hsiao, Chang, & Chen, 2012).

Few studies in the literature studied the illness perception in CVD, and the major of theses studies was conducted in western and or developed countries such as USA or Taiwan (Chen, Tsai & Chou, 2011; Hsiao et al., 2012) (Kucukarslan, 2012; Ross, et al, 2004).

Till today, there is no study conducted in North Cyprus to assess the illness perception and adherence. Since NC are different from other countries in life style, culture, education system and health care system.

Since there is no study that examine the relationship between illness perception and adherence among CVD patient even the CVD is one of the most common disease in NC, the researcher conducted this study to assess the relationship between these two variables.

One of the expected achievements of this study is to provide a valuable recommendation for the health care provider to obtain their goals in patient adherence in CVD patients.

The causes of the disease from the patients view such as stress, smoking and genetic were presented as the underlying cause of the disease. The effect of the disease on the patients quality of life such as social or physical was presented as a consequences items (Petrie KJ and Weinman J,2012).

The nature of the disease if it is chronic or acute as patient thoughts was presented in the timeline.

Several studies mentioned that the illness perception of the different disease such as asthma or diabetes mellitus as a guideline to assess and enhance the patients adherence to the medication (Hale E et al, 2007).

Appropriate health beliefs, such as perceived seriousness of illness, vulnerability to complications and efficacy of treatment can predict better compliance among diabetic and hypertension patients. (Delamater AM et al 2001)

A study published in 2002, mentioned that the asthmatic patients who beliefs in the treatment recommendation had a better adherent to their medications (Hand CH & Adams M, 2002).

Moving to another disease, Kaptein AA, et al in 2010 found that the patients illness perception had a positive correlation with the medical adherence of the osteoarthritis patients (Kaptein AA, et al 2010).

In the literature, a study found that there is a significant but weak relationship illness perception and adherent to preventable behaviors. Therefore, the conclusion of the study was that there is no more addition can improve the patient adherence since only 2% of the of the adherence varience was because of illness perception (Byrne M et al., 2005).

The predictive value of illness perception in explainingthe adherence to secondary prevention behavior remainsunclear. This information could reflect patients' knowledgeof modifiable risk factors (such as smoking, lack ofexercise, obesity and consumption of fatty foods) andselected coping mechanisms, which have been identifiedas prerequisites for behavior changing interventions. (Mosleh et al.,2017)

2.1.1Illness perception measuring:

Illness perception refers to patient's integrative cognitive belief and emotional response about the CVD that affect patients' problem focused coping with CVD along the dimensions: identity, cause, timeline,consequences, cure/ control, concern, coherence and emotion.

Identity refers to the symptoms he/ she experiences or the label the individual associates with the CVD, cause refers to the belief about the etiology of the disease,timeline refers to the patients' belief about the duration of disease, consequences refers to belief about the impact of the disease on the patients' life, belief about the course of and time period of disease, cure/ control refers to belief about whether something can be done to recover from the disease and efficacy of the treatment, concern refers to something the patient thinks is a problem aroused from the disease

that needs attention, coherence refers to degree of understanding about the disease and emotion refers to feelings or response aroused in the patient by the disease.

Illness perception is measured by using the Extended Brief Illness Perception Questionnaire (EBIPQ) adapted from Broadbent, Petrie, Main, andWeinman (2006). Higher score from the tool indicates higher threatening illness perception about CVD.

2.2 Adherence:

The medication compliance and adherence were equitably but the uses is differs, WHO define the patient adherence to their medication as the degree that their action coincide with the recommendation of the health care providers (Beena Jimmy & Jimmy Jose, 2011).

In more details, the patient compliance is the action that meet the health care providers recommendations. the adherence scope the cooperation between the patients and healthcare providers by emerging their valuable opinions while the compliance is involving the patient acquiescence to the physician's authority (Beena Jimmy & Jimmy Jose, 2011).

2.2.1 Causes and identification of non-adherence

Several factors can affect positively or negatively the patient adherence. WHO defined that five sets of factors can affect the adherence (Sabaté E.2003).

2.2.2Social and economic factors

Different sub-factors belong to this factors and have an important affect in adherence level of the patients such as the cost of the medication, the culture of the patient, income, education, patients beliefs.

2.2.3Health care team and system-related factors

These factors related to the health care provider more than the patients such as the relationship between the patient and the health care giver.

In more details, the duration of consultation, the care giver knowledge, the ability to control chronic diseases, taking in consideration the patients feedback. All of these factors may affect the adherence.

2.2.4 Therapy-related factors

These factors are the most important factors that affect the patient adherence which include for example: the duration of the treatment, the doses, adverse effect of the drugs and regimen of the treatment in addition if any history of the treatment failure present.

For example as the frequency of the doses administration decrease the adherence significantly increase (Osterberg L, Blaschke T. 2005),(Claxton AJ, et al . 2001).

2.2.5 Patient-related factors

Several factors can affect the patient adherence specially if the patient are complaining from anxiety or afraid from any possible adverse reaction or insufficient awareness about the disease or the drug and inadequate monitoring or follow up.

2.2.6 Disease-related factors

Disease related factors have a significant effect in the adherence level which include; the severity of the disease and any kind of disability related to the disease, the type of the symptoms and disease condition and progression rate.

2.4 Adherence measurements

Deciding the way to promote the adherence can affected by several factors, before taking this decision the health care provider should take in consideration the hidden causes of low adherence and to which extent. Also the real behavior of the patients is an important factor.

Regardless the way to measure the adherence the patients should have a knowledge about the adherence measurement (Partridge AH. 2002)

One of the disadvantages of applying a questionnaire to measure the patients adherence is overestimating.

An electronic method to measure the adherence which is known as MEMS, is easy and simple to use, in consists of a bottle that can be filled of the oral drugs and measure the time and frequency of opening the bottle with time and date (Cramer JA. 1995).

Another issue is raised here, this tools measure the frequency, date and time of the opening the bottle not taking the drugs. In another language what if the patient opens the bottle and didn't administer the drug or taking the drug not from the same bottle or taking multiple dose of the same drug.

Furthermore, the cost of MEMS is not included in the health assurance, and special software should be used with special instructions, overall this method maybe not appropriated for low level of education patients or low income.

Nevertheless all this disadvantages, MEMS method considered as the most accurate and precise tool to measure the patients adherence to their medications (Osterberg L et al, 2005),(Partridge AH. 2002)

Several studies published measure the adherence of the cardiovascular patients, several factors are hidden that can affect the adherence level of the patients. The adherence of the patients can

measure the success of the treatment regimens (Khan et al., 2013) (Hsiao, et al, 2012) (Wang, et al, 2014).

2.4.1 Adherence enhancement

Documentation of the patients information and counseling can enhance significantly the adherence (Haynes RB et al. 2008).

Patients with chronic disease are more complaining of the hardness of medication adherence especially with intervention treatment since it is more complicated. Interventions are belong to four different categories (Haynes RB, et al. 2008),(Osterberg L,et al. 2005) , (Haynes RB, et al. 2008).

2.4.2 Educational interventions

Documentation of the patients information and educate them about their disease in addition to counseling have a vital importance in enhancing the adherence. These interventions are appropriate for the improvement of intentional non-adherence.

More understating of the disease and progress with complications in addition to the importance of the treatment will lead to enhance and achieve better adherence and following the treatment advices.

For example, clopidogrel an anti platelet drug, have been examined in patients with myocardial infarction, the result showed that the most common cause for non adherent and discontinuing was misunderstanding of the treatment duration (Decker C, et al 2008).

This information can affect the adherence of the patients and at the same time can not be written or delivered to the patients by the prescription.

Regarding the patient education and counseling, any abbreviation that unclear to the patient should not be used. Simple and easy language should be used with the patients specially regarding usage the inhalers which have specific instructors. Dosing and frequency intervals

should be cleared to the patients. All instructions and advices should be given in a clear language (Bissell P, May CR, Noyce PR. 2004).

2.4.3 Behavioral interventions

These interventions are more related to the patients behaviors such as forgetting the drugs. Several ways can improve the behaviors of the patients such as doses boxes, cards, alarms and involving family members in this intervention can enhance the non intentional adherence.

2.4.4 Monitoring interventions

Monitoring the effect of the drugs on the patients can improve the patients adherence such as monitoring the blood pressure in hypertensive patients.

Monitoring the adherence level of the patients can improve and promote it itself and enhancing the drugs administration behaviors. Hawthorne effect which known as the advantages of the monitoring on the outcomes (Partridge AH. 2004).

2.4.5 Pharmaceutical therapeutic interventions

These interventions are related to the drug administration and simply the instructions of administration of the drugs. For example, the whole drug should be administered in rare cases the tablet should be split. Believing in the importance of the treatment can decrease the percentage of the patients who split their tablets (Arnet I, et al 2010),(van Santen E, et al . 2002).

2.5Adherence and pharmaceutical care

Pharmaceutical care has a vital important role in enhancing the drug adherence in cardiovascular diseases. Different articles have been published mentioned that the pharmacists had an essential role in patient care and adherence.

Regarding the community pharmacists, the literature uncovered the importance role of the pharmacists' consultation which leads to more adherents to in the heart failure patients compared to patients that didn't have any pharmacists' consultations.

In 2003, a study took place have been compared between two groups, one had an intervention and one without any intervention. The result showed that patients with pharmacists care better adherence to their dugs (Bouvy ML, t al. 2003).

In 2006 a study was confirmed to compare between adherences of atorvastatin in uncontrolled cholesterol level patients used pharmaceutical care program to enhance the adherence. Electronically measured adherence was defined as the proportion of days with correct administration.

The findings showed that the pharmaceutical care program had a positive effect in patients using atorvastatin. Only 13% of the patients discontinue administering atorvastatin compared to non intervention group which 26% of the patients (Vrijens B, et al. 2006).

A randomized controlled trial was conducted to assess the effect of pharmaceutical care program in enhancing the drug adherence in patients with blood pressure and low-density lipoprotein cholesterol. The patients were enrolled into two phases run in and intervention phase.

Six months after conducting the study, the patients were enrolled in the continous pharmaceutical care program and measure the adherence.

The findings showed that there was a significant improvement in the adherence level of the patients with increasing more than 30% from the baseline (p=0.001), and this improvement leads to better outcome in both blood pressure and low-density lipoprotein cholesterol.

This can lead to conclude that the pharmaceutical care plan have a significant role in decreasing both blood pressure and in low-density lipoprotein cholesterol levels compared to group without any pharmaceutical care plan (Lee JK, Grace KA, Taylor AJ. 2006).

The adherence level of the depressed patient was assessed in 533 patients after 6 months using anti depressants. The results showed that 57.5% of the patients with pharmaceutical care plan had a good adherence, while only 46.2 had an adherence in the patients group without pharmaceutical care plan(p=0.03).

Also the pharmaceutical care plan showed that there is a statistically significant improvement in the anti depressing drugs usage (32.3% versus 10.9%, p=0.001)(Adler DA, et al. 2004).

MEMS system was used to measure the adherence of the patients using immunosuppressant after a liver transplant surgery. The adherence level considered as the number of the opening the bottle.
The findings showed that there is a 90% of the patients in the intervention groups adhered to their medication compared to only 81% in the control group(p=0.015) (Klein A, et al. 2009)

Self-reported non-adherence to newly prescribed medicines for chronic conditions was significantly lower in the intervention group (10/87, 11%) when compared to the control group (23/118, 19%; $p<0.05$) (Elliott RA, ct al. 2008).

A randomized, controlled trial from Hongkong showed an association between adherence of patients receiving poly pharmacy and mortality. Patients receiving five or more drugs for chronic disease and showing an adherence of less than 80% were included.

Throughout the study period of two years, patients allocated to the intervention group received a telephone call from a pharmacist at the midpoint between clinic visits (six to eight conversations lasting 10 to 15 minutes).

Telephone counseling improved adherence and reduced mortality by 41% which was mainly attributed to the decrease of cardiovascular events in the intervention group. The number needed to treat to prevent one death during two years accounted for 16 (Wu JYF, et al. 2006)

Different European countries have been successfully integrated pharmaceutical care plan as an essential plan in the treatment course. For example, Switzerland considered the pharmaceutical care plan which includes weekly dosing systems, poly medication checks as an vital part in the treatment after drug prescription.

Another example, in Germany the Federal Union of German Associations of Pharmacists (FUGAP) and the Associations of Statutory Health Insurance Physicians (ASHIP) both published the way to optimize the pharmaceutical care plan in 2011.

Through continuous care of multi morbid patients provided by both a physician and a pharmacist (medication management) it is aimed to enhance adherence and reduce costs. A shared reimbursement is intended.

In practice, the physicians sent the patients to the pharmacists to enhance the pharmaceutical care plan of the patients and individual care and drug interaction included (ABDA, KBV. 2011).

2.6 Previous Studies on adherence and illness perception in cardiovascular diseases patients

A study was conducted in 2011 by Chih-Yin Hsiao, the findings demonstrated that even the disease situation was sever and chronic but stable. the sampled patients faith in the treatment and ability to control the disease.

The enrolled sample was divided into three categories. The first group which contain % of the patients showed that they have low beliefs in the ability to control the disease with high emotional and illness consequences.

The second group of the patients has a higher belief in the ability to control and treat the disease but lower in the emotional and illness consequences compared to the first group.

Regarding the adherence, the first group has the best adherence while the second group gets the worst adherence score and the third group individuals were in between (Chih-Yin Hsiao et al., 2011).

In 2016, Mosleh et al., conducted a study among Jordanian patients to measure the illness perception and patient adherence, the findings showed that patients were highly coherence about their disease and belief that they can control it by the drugs treatment.

The data showed that the male patients had a lower consequences beliefs than female but are more in understanding the condition($p<0.001$). Also the result mentioned that a significant correlation was between the age and timeline and coherence ($p<0.010$).

Their findings also showed that perception in control, timeline and coherence (understaning the disease) can all affect the adherence (Mosleh et al., 2016).

Saarti S. et al., was conducting a study to evaluate patients adherence and perception and the relationship between both measurements.

The sampled patients were 117, around 30% of them had poor adherence level to the medications. MMAS-8 score was used.

The findings showed that patients with better adherence have a controlled hypertension 3.5 times better than poor adherent patients (P = 0.010).

Regarding the illness perceptions, the data showed that there is no significant difference in adherence level reading he perception even the mean of BIPQ where higher in non adherent patients (Saarti S. et al., 2015)

In 2015 a study was conducted to assess the adherence among CVD patient. MMAS during the initial clinic visit.

The finding showed that 26% of the patient gets less than 6 in the score while 51% of the sampled patients had a detected serum level of at least one drug (AmbarishPandey et al., 2015)

3. MATERIALS AND METHODS

3.1. Study Design

A cross sectional, descriptive, face-to-face, closed ended, questionnaire study.

3.2 Inclusion Criteria:

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 1 month prior to the study.

3.3 Exclusion criteria:

Patients were excluded if they were medically unstable, with any critical or acute episodes, and those with cognitive disabilities.

3.4 Sampling

All patients who entered cardiology department of Near East University Hospital between November 2018 to January 2019 and fits inclusion criteria.

3.5 Research Instruments

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

3.5.1Socio-Demographical Information Form

This section of the survey form was developed by the researcher and it gathers the information regarding the following variables: Gender, age, level of education, past medical history, days of admission, chief complain and admission in last 6 months.

3.5.2 Brief Illness Perception Questionnaire (IPQ)

Brief Illness Perception Questionnaire (BIPQ) was used to assess the patients awareness about their disease, this questionnaire composed of 8 items scored from zero to ten as a response scale and the last item which is 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 serious consequence can follow the disease. Referring to the item 2, higher response means the disease will last for more time.

Items three and four indicate that the disease able to be controlled or cured as the response increased. While the item 5 indicate contributing greater 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.

3.5.3Brief Morisky Medication Adherence Scale (MMAS)

Brief Morisky Medication Adherence Scale (BMMAS) was used to measure the patients adherence to their drugs. Which considered as one of the common scale used to measure patients adherence around the world. The questionnaire composed of 4 yes/no items. Yes =zero and no=1, the summation of the scale then referred to adherence if the patient get 4 and non adherent if less than 4. The internal consistency of the scale was measured using Cronbach alpha and found 0.7 which indicate a good and reliable scale.

3.6 Statistical Analysis

All statistical calculations and analysis were performed with Statistical Package for Social Sciences (SPSS) 20.0 software.

Frequency analysis was carried out to investigate the descriptive characteristics of 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, 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.

Independent samples Mann Whitney U test was applied for the comparison of 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 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.

Binary regression was performed to predict the factors that affect the adherence level.

Related analysis result of each statistical method is shown in their corresponding tables throughout the text. Level of significance was accepted to be 0.05 for the whole study.

3.7 Ethics approval:

Ethics approval for this study was obtained from the Institutional Review Board (IRB) of Near East University Hospital (Ref YDU/2018/62-655). Research was conducted in accordance with the Declaration of Helsinki. Prior to study verbal informed consent was obtained from the patients.

4. 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.

4.1. Patients Characteristics:

The patients who participated in the study involved 49 (61.2%) male and 31 (38.8%) female. The mean ± SD age of the sampled group was 61.16 ± 12.60 with 15 (47.5%) being older than 65 years old.

The education level of the sample was distributed, 46 patients (57.5%) had high school degree and 13 patients (16.3%) completed their university while only 3 patient (3.8 %), was capable only of reading and writing (Table 1).

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 were 5 with 1 drug per patient as the minimum drugs used and 19 drugs per patient as the maximum recorded.

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 last 6 months showed that 62.5% of the patients didn't 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 6 months for anemia, one (1.3%) for cancer and one (1.3%) for falling down (1.3%).

Table 1 Patient's demographic characteristics

	N (50)	%
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 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 2 Medical history of the participants

	N	%*
DM	22	27.5
Cholesterol	15	18.8
Depression	5	6.3
Cancer	8	10
Kidney disease	4	5
OP	1	1.3
Anemia	1	1.3

*The summation of percentage ≠ 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 ≠ 100, more than one disease is possible.

4.2. Patient's illness perception:

The p-value is less than the Shapiro-Wilk test level, then the null hypothesis is rejected and there is evidence that the data tested significantly deviate from a normal distribution and non-parametric tests were performed.

Table 5 shows patients responses to individual items and distribution of responses among demographic groups.

Table 4. Illness perception scores among the cardiovascular patients.

	Illness perception scores among the CHD patients					
	Median	**Min**	**Max**	**Mean**	**SD**	**Higher score indicate**
Consequences	5.00	0.00	10.00	4.70	3.72	Serious negative consequences
Timeline	10.00	0.00	10.00	7.96	3.76	Disease last for a longer time
Personal control	9.00	0.00	10.00	7.85	2.63	Ability to control their disease
Treatment control	9.00	2.00	8.00	8.04	2.30	Strong beliefs in prescribed treatment to control the disease
Identity	3.00	0.00	10.00	3.71	3.35	Contributing greater symptoms to the disease
Concern	5.00	0.00	10.00	4.74	3.73	Greater worries about health status
Coherence	10.00	0.00	10.00	8.11	2.64	Understand the course of their disease

Emotional representation	7.00	0.00	10.00	5.50	3.79	Greater stress about health

Table 5. Illness perception scores among the CVD patients

Illness perception scores among the CHD patients*								
	Consequences	**Timeline¥**	**Personal control**	**Treatment control**	**Identity ¥$**	**Concern**	**Coherence**	**Emotional**
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 $p<0.05$.

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.

4.2.2. Cognitive illness perceptions

Table 6. Correlation between perception subscales and Moriski scale for adherence.r (p-value)

	Consequences	**Timeline**	**Personal control**	**Treatment control**	**Identity**	**Concern**	**Coherence**	**Emotional**	**Moriski**
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)
Moriski									1

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

4.2.3. Causes of illness and Coherence of disease

Referring to the main causes of the disease as perceived by the patients, stress was identified by 37.5% of respondents, while only 20% perceived smoking as a main 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 6

4.3. 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 ± SD of age of the patients who were adherent was not significantly higher than the mean ± SD of non adherent patients (61.26 ±12.24) (61.58 ±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 went to school but knows 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 7. Adherent association 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%)	
6-10	18 (62.1%)	11 (37.9%)	>0.05
11-	2 (40.0%)	3(60.0%)	

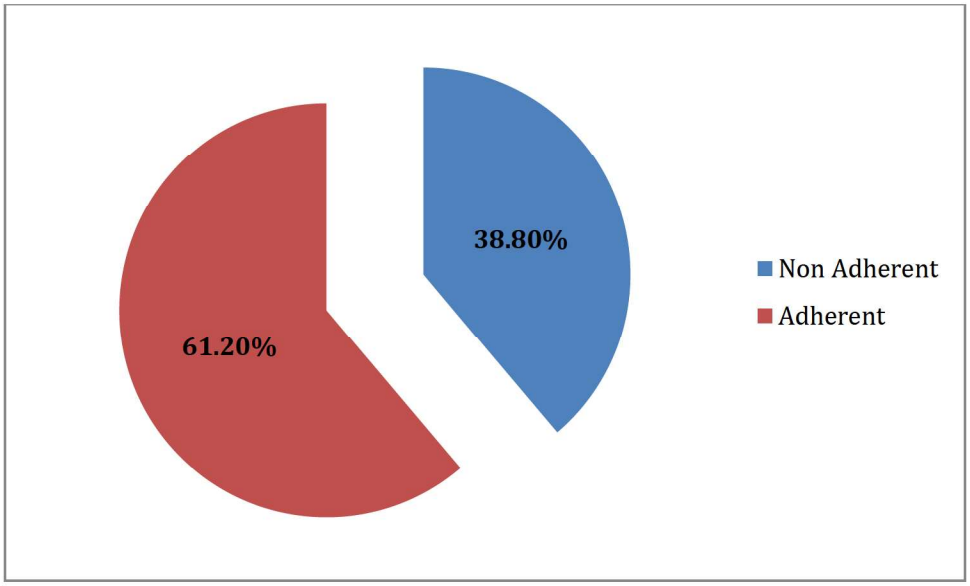

Figure 1. The percentage of adherence of the respondents

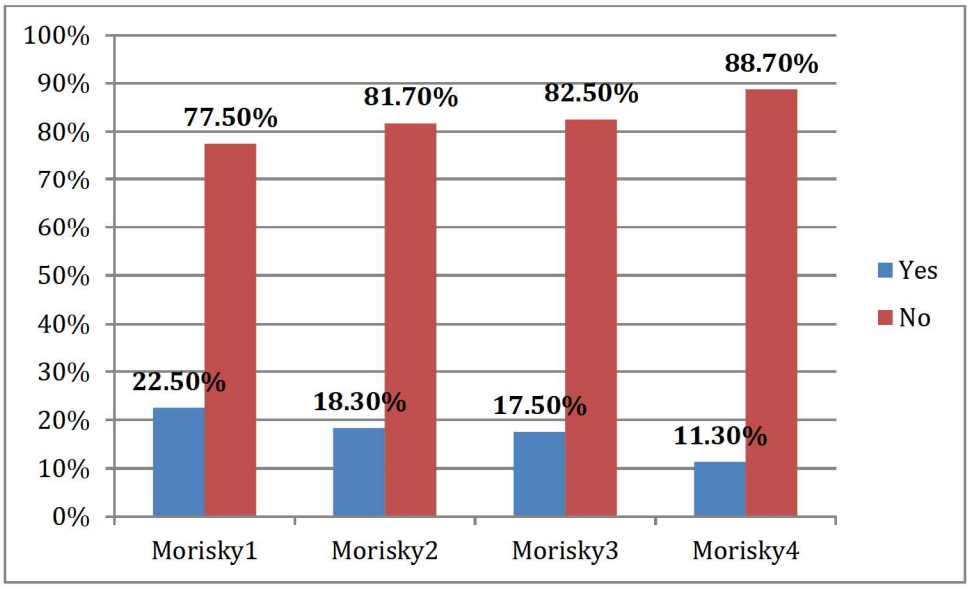

Figure 2. The Morisky items and patients responses

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).

Table 8 Regression to identify the factors that affect the adherence

	B	SE	p value
Consequences	-0.011	0.041	0.78
Timeline	-0.026	0.040	0.50
Personal control	-0.031	0.069	0.65
Treatment control	0.027	0.08	0.73
Identity	0.011	0.05	0.83
Concern	0.055	0.05	0.27
Coherence	0.066	0.04	0.12
Emotional	0.02	0.041	0.53

5. Discussion:

Cardiovascular diseases (CVDs) considered as the major cause for the death around the world, as 17.5 million death tolls were attributed to CVDs in 2012 (Mosleh S. &Almalik M. 2014). 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 important 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 (Acharya & Chalise, 2011; Chen et al., 2011).

The participants in this study had been diagnosed with IHD for less than 5 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 main comorbidity condition in patients with IHD.

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 was conducted in 2004 which showed that the hypertension disease can be controlled with drugs as it is a lifelong disease (Ross et al. 2004)

A study was conducted in 2013, the researcher mentioned that the treatment control ranked as a 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 finding in cardiovascular disease (Horne &Weinman, 1999), (Ahmad et al. 2013).

Significant non adherence (39%) was seen in the current study population, though this is much less than prevalence reported in earlier studies (Chen et al., 2011). 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 that reported 70% of the participants' as adherent to their medications of cardiovascular disease (Saarti, S et al, 2016).

Another study conducted in 2017 to measure the illness perception of the patients with heart failure, around half of the participated patients shown a positive perception of their illness. These findings were comparable to our findings in which a positive illness perception was also seen among study participants (Timmermans, I. et al,. 2017).

In our study, we used Brief Illness Perception Questionnaire (Brief IPQ), which is a continuous scale to measure the patients 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 (Lee WL et al., 2013), (Mosleh S. &Almalik M. 2014).

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 though patient educations and promote awareness of the consequences of non adherence in CVD.

5.1Strength and limitations:

This study is to our knowledge the first to evaluate cardiology patient's illness perception and adherence in North Cyprus.

Yet this study has few limitations. One of the limitations is that the study was conducted in a single centre, so the results may under the risk of bias and unable to generalize to population.

The sample size is considered as a main limitation of this study since the period of data collection was only two months.

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 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.

5.2 Conclusion:

According to the findings, it is crucial to strengthen patients' illness perceptions, with especial consideration to emotional responses beside personal and treatment control and disease understanding, as an important strategy in educational interventions in order to improve adherence.

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

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APPENDIX:

The survey used.

PATIENT PROFILE RECORDING				
Gender	☐woman		☐man	
Eğitim durumu	☐canreadandwrite	☐primaryschool	☐middleschool	
	☐highschool	☐university	☐postgraduatemaster/ doktora	
Birthday	…….			
Pastdiseasehistory	☐highcholestrol	☐ Diyabet	☐heartdisease	☐chf
	☐ Ülser	☐kidneydisease	☐liverdisease	☐canser
	☐Anemia	☐Depreesion	☐Mentaldisease	☐Osteoporoses
	☐other			
Clinicdepartment				
Total number of days in hospital				
Hospitalizationstory in thelast 6 months				

The Brief Illness Perception Questionnaire

For the following questions, please circle the number that best corresponds to your views:

How much does your illness affect your life?										
0 no affect at all	1	2	3	4	5	6	7	8	9	10 severely affects my life
How long do you think your illness will continue?										
0 a very short time	1	2	3	4	5	6	7	8	9	10 forever
How much control do you feel you have over your illness?										
0 absolutely no control	1	2	3	4	5	6	7	8	9	10 extreme amount of control
How much do you think your treatment can help your illness?										
0 not at all	1	2	3	4	5	6	7	8	9	10 extremely helpful
How much do you experience symptoms from your illness?										
0 no symptoms at all	1	2	3	4	5	6	7	8	9	10 many severe symptoms
How concerned are you about your illness?										
0 not at all concerned	1	2	3	4	5	6	7	8	9	10 extremely concerned
How well do you feel you understand your illness?										
0 don't understand at all	1	2	3	4	5	6	7	8	9	10 understand very clearly
How much does your illness affect you emotionally? (e.g. does it make you angry, scared, upset or depressed?										
0 not at all affected emotionally	1	2	3	4	5	6	7	8	9	10 extremely affected emotionally
Please list in rank-order the three most important factors that you believe caused <u>your illness</u>. *The most important causes for me:-*										
1. _____										
2. _____										
3. _____										

MORISKY scale of adherence

	MoriskyComplianceScale	yes	no
1.	**Do youforgettotakeyourmedicine?**	☐	☐
2.	**Do youforgettotakeyourmedicine on time?**	☐	☐
3.	**Do you stop takingmedicationwhenyoufeelgood?**	☐	☐
4.	**Ifyoufeelbadwhenyoutakethemedicine, willyou stop takingthemedicine?**	☐	☐

CURRICULUM VITAE

Name	Begard	Surname	Agha
Place of birth	Iraq	Date of birth	4-11-1989
Nationality	Iraq	Tel	00905338835111
Email	Begardagha89@gmail.com		

Education Level

	Name of the Institution where he/she was graduated	Graduation year
Postgraduate/ Specialization	_	_
Masters	NEU	2019
Undergraduate	Al-ahliya Amman University	2012
High school	Bery	2006

Job experience

Duty	Institution	Duration (Year-Year)
Clinical Pharmacists	Rizgary Hispital	2012-

Foreign Language	Reading Comprehension	Speaking	Writing
Arabic	Very good	Very good	Very good
English	Very good	Very good	Very good
Turkish	Good	Good	Good
Kurdish	Very good	Very good	Very good

Foreign Language Examination Grade								
YDS	ÜDS	IELTS	TOEFL IBT	TOEFL PBT	TOEFL CBT	FCE	CAE	CPE

	Math	Equally weighted	Non-math
ALES Grade			
Other grade			

Computer Knowledge

Program	Use proficiency
Microsoft office	Very good

ENCLOSURE: Other scientific activities (publication, congress proceedingsetc.)