Arrival Date: 31.07.2023 | Published Date: 25.10.2023 | Vol: 8, Issue: 4 | pp: 890-898 | Doi Number: http://doi.org/10.5281/zenodo.10045331

MEDICATION COMPLIANCE IN PATIENTS WITH HEART FAILURE: A QUALITATIVE STUDY

KALP YETERSİZLİĞİ HASTALARINDA İLAÇ UYUMU: NİTEL ARAŞTIRMA

Filiz ÖZEL ÇAKIR [1], Gökşen POLAT [2], Fisun ŞENUZUN AYKAR [3]

[1] Kastamonu University, Faculty of Health Science, Kastamonu, Türkiye
[2] Izmir Tınaztepe University, Health Services Vocational High School, Izmir, Türkiye
[3] Izmir Tınaztepe University, Faculty of Health Science, Izmir, Türkiye

ABSTRACT

Objective: The aim of this study was to overcome and explain the drug experiences, barriers, facilitators, and fears of heart failure patients with the Roy Adaptation Model in order to understand the basis of drug non-compliance.

Methods: The study was carried out in a phenomenological design. There are 14 semi-structured open-ended main questions. Coding qualitative data, creating themes, interpreting, and reporting were carried out by examining the texts. SPSS 25 was used for the analysis of socio-demographic characteristics and the program Nvivo 10 was used for the analysis of qualitative data.

Results: Themes were created according to the Roy Adaptation Model, and patients' views on drugs (positive and negative) were examined in terms of physiological domain, role function domain, self-concept domain, interdependence domain, and adjustment status (positive and negative).

Conclusion: There may be many physiological and psychological processes which affect the drug compliance of patients, but nursing interventions to increase compliance should be applied by investigating the factors affecting compliance. The Roy Adaptation Model can help increase drug compliance and improve the quality of life of heart failure patients.

Keywords: Compliance, Heart Failure, Nursing.

ÖZET

Amaç: Bu çalışmanın amacı, ilaç uyumsuzluğunun temelini anlamak için kalp yetersizliği hastalarının ilaç deneyimlerini, engellerini, kolaylaştırıcılarını ve korkularını Roy Adaptasyon Modeli ile aşmak ve açıklamaktır.

Gereç ve Yöntem: Çalışma fenomenolojik bir tasarımda gerçekleştirilmiştir. Yarı yapılandırılmış 14 açık uçlu ana soru bulunmaktadır. Nitel verilerin kodlanması, temaların oluşturulması, yorumlanması ve raporlanması metinler incelenerek gerçekleştirilmiştir. Sosyo-demografik özelliklerin analizi için SPSS 25, nitel verilerin analizi için ise Nvivo 10 programı kullanılmıştır.

Bulgular: Roy Uyum Modeli'ne göre temalar oluşturulmuş ve hastaların ilaçlara ilişkin görüşleri (olumlu ve olumsuz) fizyolojik alan, rol işlev alanı, benlik kavramı alanı, karşılıklı bağımlılık alanı ve uyum durumu (olumlu ve olumsuz) açısından incelenmiştir.

Sonuç: Hastaların ilaç uyumunu etkileyen birçok fizyolojik ve psikolojik süreç olabilir ancak uyumu artırmaya yönelik hemşirelik girişimleri, uyumu etkileyen faktörler araştırılarak uygulanmalıdır. Roy Adaptasyon Modeli, kalp yetersizliği hastalarının ilaç uyumunu artırmaya ve yaşam kalitesini iyileştirmeye yardımcı olabilir.

Anahtar Kelimeler: Kalp Yetersizliği, Uyum, Hemşirelik.

Sorumlu Yazar / Corresponding Author: : Filiz ÖZEL ÇAKIR, Assistant Professor, Kastamonu University, Faculty of Health Science, Kastamonu, Turkey ***E-mail:*** filiz.ozel@kastamonu.edu.tr

Bu makaleye atıf yapmak için / Cite this article: Özel Çakır F, Polat G, Şenuzun Aykar F. (2023). Medication Compliance in Patients with Heart Failure: A Qualitative Study. *Gevher Nesibe Journal of Medical & Health Sciences,* 8(4), 890-898. http://doi.org/10.5281/zenodo.10045331

INTRODUCTION

Heart failure (HF) is the condition when is the heart is not an able to pump enough blood and oxygen to meet the metabolic needs of other organs. HF affects approximately 64 million patients in the world. Comorbidity and risk factors also increase with aging, and the incidence is increasing with the increase of the survival rate after myocardial infarction (Castiglione et al., 2022). HF compliance with medication by patients in the use of more than one commonly available drug is insufficient. Lack of compliance to medication and exacerbation of HF, a decrease in physical function and hospitalizations are a common cause of mortality. HF initiatives that will improve compliance with medication in patients to prevent these risks are very important. Medication compliance and initiatives that should be implemented to improve compliance should be monitored with regular visits (Siddiqui et al., 2022). Incompatibility can happen at any stage of drug use, and this should be determined. There are three distinct phases in drug use. These stages are initiation, administration, and discontinuation of the drug. Initiation determines taken when the first dose of the drug is started; administration shows to what extent patients are using the prescribed medication, and discontinuation signifies the last doses taken, that is, the end of the treatment. Persistence is the time between starting the drug and stopping it (Pederson et al., 2022). Drug compliance should be evaluated in every phase of the process in assessing compliance to medication. As a nurse, it is necessary to benefit from evidence-based theories in order to make an accurate assessment in this direction. The concept of cohesion is the focus of the Roy Adaptation Model (RAM) (Dixon, 1999). According to the model, the human being, interacting with the environment to changing environmental stimuli in physiological, psychological and social areas, is a system that tries to adapt. Three stimuli that affect the harmony of the individual in the model are defined. Focal stimuli are the basic stimuli that cause the individual's response. Contextual stimuli result positively or negatively from the effect of focal stimulus that is not the direct cause of the behavior, in short, all factors of the individual's internal or external environment. Residual stimulus is environmental factors which are or are not effects of the current situation. These factors can be past beliefs, behaviors, and experiences. The reaction to these stimuli can influence the treatment of the current situation. The areas of harmony defined in this model are the physiological adjustment domain, the self-concept adjustment domain, the role function adjustment domain, and the interdependence adjustment domain. The physiological adjustment domain concerns all physiological needs such as oxygenation, nutrition, activity-rest, excretion and protection. The self-concept adjustment domain includes an individual's perceptions, feelings, experiences, thoughts, ideas, behaviors, moral values, and individual standards. The role function adjustment domain is the role of the individual in his behavior and relationships. The interdependence adjustment domain is behavior with the purpose of protecting the integrity of individual in relationships (Yıldız & Karagözoğlu, 2022). RAM consists of six steps in the nursing process: evaluation of behavior, evaluation of stimuli, nursing diagnosis, goal setting, intervention, and evaluation (Dixon, 1999). The purpose of this study was to determine and explain the drug experiences, barriers, facilitators, and fears of HF patients with the RAM in order to understand the basis of the drug problem and non-compliance in the light of this information.

MATERIALS AND METHODS

Design

The study was conducted according to the pattern of the qualitative research method of case science (phenomenology). A descriptive qualitative approach was determined in the study, which was conducted to determine the experiences, obstacles, and fears of drug compliance in HF patients.

Participants

The research was a multi-center study and was conducted hospitals. Patients who were hospitalized or admitted to outpatient clinics of these hospitals were included in the study. The criteria for inclusion in the study were using more than one heart medication, having been diagnosed with HF at least six months previously, and volunteering to participate in the study. Research data collection was continued until saturation was reached and in this way, 16 patients were included in the study.

Ethics

The permission of the ethics committee was obtained from the Izmir Tınaztepe University Health Sciences Scientific Research and Publication Board on 02.12.2021 with decision No. 35. In addition, written and oral permission was obtained from the individuals participating in the research.

Data Collection

Data collection began in February 2022. In the collection of research data, a semi-structured interview form was created by the researchers by scanning the literature and was evaluated by an expert with regard to content and scope, and an Individual Introduction Form containing socio-demographic characteristics (11 questions) were used. In the second part, there were 14 semi-structured open-ended main questions (Almasloukh & Stewart, 2021; Avcı et al., 2020; Dixon, 1999; Hood et al., 2018; Mansouri et al., 2019; Roy, 1997; Roy & Andrews, 2008; Shariatpanahi et al., 2019; Zhao et al., 2022). These questions are presented in Table 1.

Table 1. Semi-Structured Main Interview Questions

1. Are you adjusting to your heart medication? What are the conditions that prevent you from complying with your medications?
2. If you have a problem with your heart medications, how do you deal with the problem?
3. Have you ever not used your medicine as recommended by your doctor? What is your reason for not using it?
4. What are the factors/conditions that affect your compliance with your heart medications?
5. What are your expectations from your heart medications?
6. What are the conditions that make it difficult for you to use your heart medication? Where do you get support in these situations?
7. What are the problems you face with the heart medications you use? Have you experienced a problem before?
8. Do you have any fears about your medication while taking heart medication? What are your fears?
9. What are your suggestions to increase compliance with heart medications?
10. What do you do to comply with your medications?
11. What has changed in your life due to the drugs you use?
12. What are the burdens of heart medication on you?
13. Do the drugs you use affect your roles (such as the role of mother, father, child, student or employee)? What are the roles that you think were influenced?
14. Do you have any comments or suggestions you would like to add?

The interviews were conducted over Zoom and recorded on a voice recorder. Before data collection, the participants were informed about the research. The interview duration varied from a minimum of 11 minutes to a maximum of 23 minutes. The data collection process took six months. In the study, the data were collected in an empty room, taking care of the privacy of the participants. After the interviews, the data were converted into Microsoft Word format, and the analysis of the research was carried out. The reporting of the research was carried out within three months of the collection of the data.

Data Analysis

After the qualitative interviews were completed, the audio recordings were listened to and the preliminary data were transferred to the computer and converted into a Microsoft Word document. When the interviews that were converted into Word texts, the participants were listed by the numbers 1-16 (such as P-2). Thematic analysis specifically considered HF patients' medication experiences with RAM, barriers, facilitators and fears. SPSS 25 was used for the analysis of socio-demographic characteristics and the program Nvivo 10 was used for the analysis of qualitative data. In the analysis process; preliminary data were read, qualitative data were coded and themes were reached. Finally, data interpretation and reporting procedures were performed.

RESULTS

The mean age of the 16 patients participating in the study was 62.9. Nine of the patients were women, ten lived with their spouses, only eight had received training concerning their medications, eight people had been diagnosed with HF 1-3 years previously, and the total number of drugs used was three on average. The opinions of the patients are given below (Figure 1).

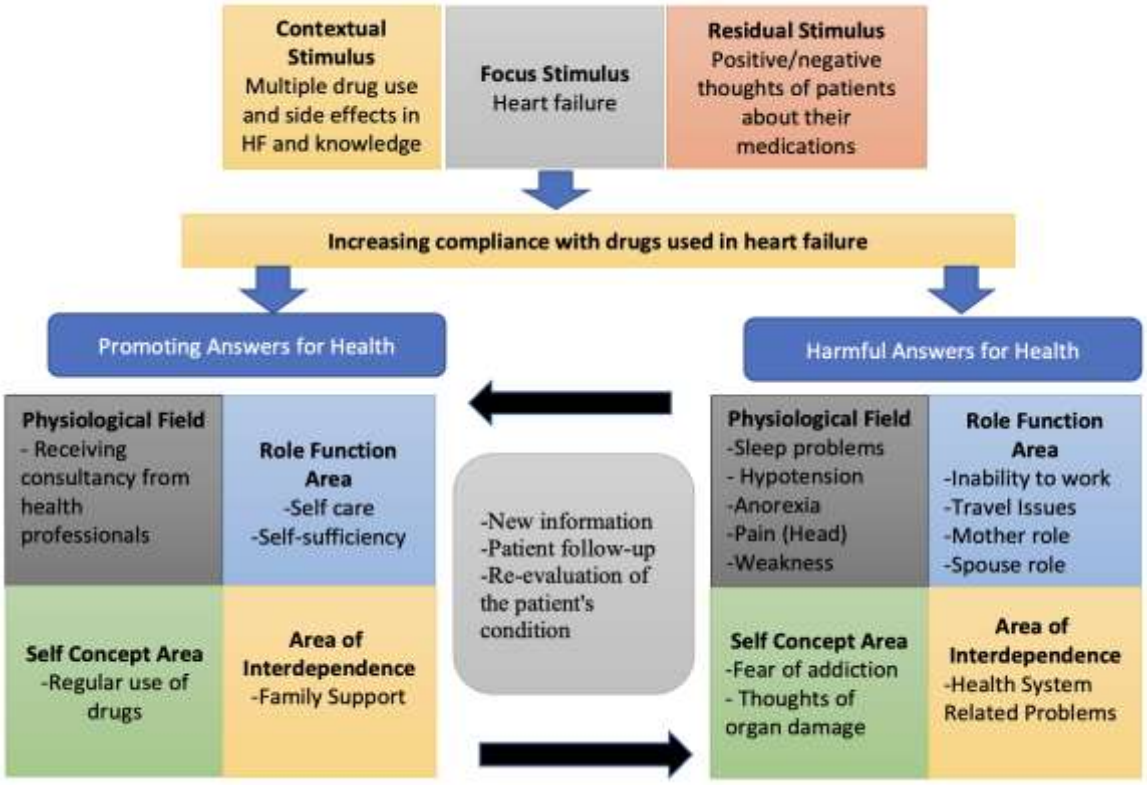

Figure 1. Heart Failure According to the Roy Adaptation Model

Thoughts about medicines

Positive Thoughts

- I am very satisfied with my medicines (*P-1*).
- A little more relief of my pain and illness with drugs (*P-2*).
- To heal (*P-5*).
- Doesn't affect daily living, like eating and sleeping (*P-9*).
- To reduce palpitations (*P-13*).
- Helps my symptoms to pass, and improves my health (*P-16*).

Negative Thoughts

- Can have side effects (*P-2*).
- Medicines make my feet very swollen *(P-3).*
- Makes my throat itch so that I can't speak *(P-8).*
- A great economic burden *(P-8).*

Physiological

-I've changed my heart medicine a lot. This has worn me out before, now my heart is fainting. When I start walking, fatigue begins *(P-2).*

-I don't sleep, it restricts my sleep *(P-12).*

-Gives a lot of sleep, my blood pressure is dropping, and I lose sense of time *(P-16).*

-Weakness comes when I take my medicine. I go to the doctor and say it made me fatigued *(P-3).*

- It happened before, and I changed my medicine. The drugs made my dizzy. The doctor changed my medicine and the problem was solved *(P-2).*
- There is a medicine for the urinary tract once in a while, if I take it, I cannot reach the toilet in time. My throat itches and I can't speak *(P-8).*
- It's affecting my sleep patterns. It makes my sleep irregular. The doctor said take it on an empty stomach in the morning, I have to take it before the meal *(P-10).*
- It gave me loss of appetite, dizziness, headache, and a drop in blood pressure *(P-11).*

Role and function

- I have shortness of breath, calcification in my legs, rheumatism, my heart is finished. I can't work. I have to work. When I have fatigue, I take a break for a day. There is swelling in my internal organs, I cannot bend. I don't take my medication then *(P-8).*
-When you travel to a place it's hard, I take a box with me and I pıt the other boxes in a suitcase *(P-13).*
- I can't do housework. I'm just filling my stomach *(P-6).*
- I feel upset about not being able to fulfill my role as a mother *(P-2).*
- I have trouble in the role of motherhood. I can't cook *(P-6).*
- My role as a grandmother is affected, and I have to look from my seat compared to the past *(P-12).*
- It's affecting the time of my work life. It's affecting my personal life *(P-15).*
-I haven't been going anywhere for 6-7 years because I can't use it when I'm travelling.
-Sweat flushes affect my social life *(P-1).*
-It affects me a bit compared to the past. It affects me sexually *(P-11).*
-I use all of my medicine regularly. I take it the way I'm told. I just go to one hospital once a month *(P-10).*

Self-concept

- I always open my eyes with them. I take them regularly *(P-6).*
- I'm in harmony with my pills *(P-7).*
- I strictly follow the use of my medicines. Before eating, I take my medicines. If I do not have my medicines with me, I cannot live *(P-6).*
- I comply with my medication. Nothing stops me. If I cannot get the medicine from the pharmacy, I get the equivalent *(P-7).*
- I'm afraid it would have a side effect *(P-2).*
- I'm afraid of damaging another organ *(P-3).*
- I was forced to be dependent on drugs *(P-5).*
- It affected my psychology. Fear; fear that something will happen to me *(P-12).*

Mutual commitment

- Patients get support from their daughters and their families *(P-2).*
- When the pharmaceutical ends I'll go to the doctor, but I can't get an appointment *(P-5).*

Compliance status

<u>Positive</u>

- I haven't had a problem so far *(P-1).*
-I haven't had a problem so far. Before, I had problems but I changed the medication. I had dizzy spells. The doctor changed my medicine and it cleared up *(P-7).*
- When I have a problem I go to the hospital *(P-10).*
-I consult my doctor *(P-4).*
- I put my medicine box on my table when I eat in the evening, I arrange my medicine box in the evening, and when I leave in the morning, I put my medicine box next to my keys and my phone. Even if I'm going to have breakfast outside, I do this so that I don't forget *(P-14).*
- I have no fear relating to drugs because I've been fighting with drugs for 25 years *(P-6).*
- I keep my medicine close at my bedside *(P-16).*
- I've got my health back *(P-15).*
- I set the alarm, for each drug *(P-13).*

<u>Negative</u>

- I can't breathe, I can't lose weight, I can't leave the house. I'm running out of medicine, I'll go to the doctor, but I can't get an appointment *(P-5).*
-It takes responsibility, but I won't miss a day so I don't have a problem. I had a really bad time when I skipped a few days *(P-9).*
- It's brought a psychological burden. The burden of having to use drugs *(P-12).*
-I had anxieties and fears. I came to psychiatry. Will there be any problems in my kidneys, how much effect will it have? *(P-9).*
-I usually use it. If I'm busy with my work, it may be delayed *(P-15).*
- I might forget. That's why I leave boxes in the car. I may forget when I start work *(P-14).*

DISCUSSION

The results of this research are discussed with RAM, one of the most used theories (Roy, 2019). HF is a chronic disease that affects individuals' quality of life. Having a chronic or severe illness can be seen as a warning (Whittemore & Sister Callista, 2022), and an important goal of nurses is to improve the quality of life of patients during chronic illness (Roy, 2019; Almasloukh & Stewart Fahs, 2021). The model of adaptation to the chronic illness is a theory that describes how people react to chronic illness, and is based on RAM (Shariatpanahi et al., 2019). And also the concept of quality of life is taken up from the perspective of RAM (Roy, 2019). Compliance with a chronic illness is defined as encompassing internal and external processes that affect reactions, and behaviors (Roy, 1997). The aim of living with a chronic illness is to become aware of the realities imposed by the disease and to restructure the self and the environment (Shariatpanahi et al., 2019). Behaviors or self-management actively participating in health promotion activities is an important variable in adapting to a chronic illness, which is affected by individual differences (focal, contextual and residual stimuli), individual perceptions, and health status. Active participation in self-management contributes to later physiological and psychosocial adaptation (Whittemore & Sister Callista, 2022). A person who is an integrated system can cope with the changing world (Shariatpanahi et al., 2019; Roy, 2008).

RAM (2009) consists of four fields: (a) physiological-physical, (b) self-concept/group identity, (c) role function, and (d) mutual commitment (Roy, 2019; Whittemore & Sister Callista, 2022; Almasloukh & Stewart Fahs, 2021). In the physiological domain, there are five basic physiological needs (activity and rest, nutrition, elimination, oxygenation and protection) and four regulatory processes (senses, fluids-electrolytes and basic acid balance, neurological function and endocrine function). Self-concept, perception, and the understanding of the reaction of the inner shaped by others, is itself a series of emotions and beliefs. For this field, the physical self is located between the components (such as body image and physical sensation) and personal self (self-consistency, self-ideals, and moral-ethical-spiritual self). Role function is a role-related behavior aimed at ensuring social integrity. A role is a set of expectations about how a person functions in society in their relationships with others. The field of interdependent relationships includes behaviors related to the mutual commitment of individuals. This area is focused on interactions related to love, respect, and giving and taking value. The basic need in this field is relational integrity (Shariatpanahi et al., 2019; Roy, 2008). Here, the purpose of nursing is to make easier this process which is achieved by encouraging conformity in each of the four fields which can be adapted (Pollock, 1993). As for medication compliance, HF self-care behaviors are an important component.

In HF, compliance to treatment is a multidimensional phenomenon that has been affected by the interaction of various factors (Shah et al., 2015). Medication compliance is an important variable factor in reducing poor health outcomes, recurrent situations and cost stemming from acute exacerbations in patients with HF (Shah et al., 2015; Jovicic et al., 2006). Medication compliance is the eventual result of a nested complex of many factors. In drug compliance; many factors such as lack of support, financial situation, absence of symptoms, cognitive decline, side effects, depression, short attention span, insufficient knowledge about medication, multiple drug use, difficulty in swallowing large pills, and frequent urination with diuretics contribute to drug non-compliance (Shah et al., 2015). In a study with chronic patients, Al-Noumani et al. (2022) found that 23.6% of the participants had HF, and that 19.5% of the patients had low compliance, 45% had moderate compliance, and 35.5% had high compliance. In a study to determine the compliance to drug treatment of patients being treated in hospital for cardiovascular disease, Avcı et al. (2020) found that half of patients showed low compliance to drug treatment, and the majority of them did not know the effects and side effects of the drugs they were using. Zhao et al. (2022) showed that most of the participants in their study with HF showed adaptation to severe illness. In the same research, unbalanced diet, inappropriate activities, unrestricted fluid intake, excessive sodium intake, fear of the future, negative emotions, weak spiritual direction, forcing to quit a job, not fulfill social roles, interpersonal alienation and less communication with friends or family were identified as themes. In another qualitative study to gain insight into the decision-making processes and experiences of older patients with HF by exploring different aspects of choosing whether or not to take prescribed medications in the community setting, Meraz et al. (2020) found that participants did not consider taking a medication differently than prescribed as non-adherence and viewed it as a necessary aspect of maintaining a level of personal health, which could also be viewed as self-care.

In our research, despite answers of fatigue and insomnia among the physiological field themes harming health, compliance could be achieved by consulting health professionals on these issues. As for the self-concept area, despite patients' fear and drug side effects, compliance was achieved with regular use of drugs. The patients stated that they could not work in the field of role function, they could not do housework, their travels were affected and their motherhood roles were affected, and they stated that they adapted by developing self-care and self-efficacy in order to cope with this influence. Finally, in the field of interdependence, they stated that they experienced some problems related to the health system and that they received family support. In the literature, it is stated that the factors which affect compliance to medication in HF are many-sided, and that it is not possible for a one-way intervention to improve it (Shah et al., 2015). Celano et al. (2020) in their qualitative study, they investigated psychological experiences related to HF and perceived relationships between positive psychological structures and adherence to physical activity, diet, and medication recommendations. In this study, participants stated that they mostly experienced gratitude, acceptance, connectedness, and faith in the HF environment. On the other hand, it has been determined that pride, determination and hope play the most frequent role in adherence to health behavior. Kamath et al. (2020) in their qualitative study to investigate the facilitators perceived by South Asian CHF patients regarding personal care and medication taking, the facilitators were internal (patient characteristics - situational awareness, self-efficacy, gratitude, flexibility, spiritual appeal and support-seeking behavior) and external (environment). - financial security and caregiver support, accompanying children, ease of access to healthcare, trust in provider/hospital, supportive environment, and recognition of the importance of information). Wang et al. (2020) reported positive adaptation as a result of theory-based interventions in patients with HF, and this is shows that RAM is an effective guide to developing a framework implemented for nursing practice for patients.

Based on the results of this study, the causes of drug non-compliance in heart failure patients are understood. Nursing care was supported by the use of the RAM model in the management of non-compliance. Nursing care for heart failure patients can be arranged for these results.

CONCLUSION

Heart failure is a clinical syndrome that is caused by left or global ventricular dysfunction, and is usually characterized by symptoms of congestion, fatigue, and dyspnea. Therapeutic approaches aim to treat the underlying cause (mostly unknown) and resolve the symptoms (Rossignol et al., 2019). Multi-drug combination therapy is an essential part of treatment in HF. Many drugs including angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, beta-blockers, mineralocorticoid receptor antagonists, and isosorbide dinitrate and hydralazine combinations are now available for the treatment of patients with HF (Marti et al., 2019). Generally prescribing more than one drug to patients causes adverse health outcomes and costly care, reducing compliance with treatment (Hood et al., 2018). Other factors include not only the use of large numbers of drugs, but also the complexity of drug regimens, inadequate care by healthcare providers, lack of health insurance or lack of transportation (Silavanich et al., 2019). Similarly, the World Health Organization (WHO) developed a treatment compliance model to be able to deal in depth with the factors that caused the mismatch, and grouped them under five dimensions. These were socio-economic factors, healthcare environment and system-related factors, condition-related factors, treatment-related factors, and patient-related factors. Studies examining compliance in the HF population show that these factors are intertwined. Health literacy, level of education, social support networks, distance to health facilities, drug costs, and cultural beliefs and family functions can be examined under the heading of socioeconomic factors (Leventhal et al., 2005). In our study, it was emphasized that the distance to health institutions, drug prices, and family roles were among the problems. Nursing intervention based on nursing theory may help patients to adapt to their illness and to the improvement of their quality of life. RAM can be used as a standard application to increase adaptation to the disease and to improve the quality of life (Mansouri et al., 2019). RAM can be used as a standard application to increase adaptation, and can help to improve the quality of life at a time of illness.

Strengths and Limitations
A limitation of this study is that it was carried out only with patients who applied to the X and Y research hospitals. Strong aspects of the research are that it is a qualitative study and that it examines the topic in depth.

Acknowledgement
We thank the patients and the managers of the hospitals concerned.

Author Contributions
Plan, design: FÖÇ,FŞA; **Material, methods and data collection:** FÖÇ, GP, FŞA; **Data analysis and comments:** FÖÇ, GP; **Writing and corrections:** FÖÇ, GP, FŞA.

Conflict of interest
The authors state that there was no conflict of interest concerning this article.

Funding
None.

REFERENCES

Almasloukh, KB, Stewart Fahs P. (2021). Quality of Life Through the Prism of the Roy Adaptation Model. Nurs Sci Q., 34(1), 67-73.

Al-Noumani, H, Al-Harrasi M, Jose J, Al-Naamani, Z, Panchatcharam SM. (2022). Medication Adherence and Patients' Characteristics in Chronic Diseases: A National Multi-Center Study. Clin Nurs Res., 31(3), 426-434.

Avcı, A, Gün, M, Erdoğan, S. (2020). Evaluation of Adherence to Drug Treatment and Affecting Factors of Inpatients Treated for Cardiovascular Disease. Turk J Cardiovasc Nurs., 11(26), 132-139.

Castiglione, V, Aimo, A, Vergaro, G, Saccaro, L, Passino, C, Emdin, M. (2022). Biomarkers for the diagnosis and management of heart failure. Heart Failure Reviews 27(2), 625-643.

Celano, CM, Beale, EE, Freedman, ME, Mastromauro, CA, Feig, EH, Park, ER, Huffman, JC. (2020). Positive psychological constructs and health behavior adherence in heart failure: A qualitative research study. Nurs Health Sci., 22(3), 620-628.

Dixon, EL (1999). Community health nursing practice and the Roy adaptation model. Public Health Nurs., 16(4), 290-300.

Hood, SR, Giazzon, AJ, Seamon, G, Lane, KA, Wang, J, Eckert, GJ, Tu, W, Murray, MD. (2018). Association Between Medication Adherence and the Outcomes of Heart Failure. Pharmacotherapy, 38(5), 539-545.

Jovicic, A, Holroyd-Leduc, JM, Straus, SE. (2006). Effects of self-management intervention on health outcomes of patients with heart failure: a systematic review of randomized controlled trials. BMC Cardiovasc Disord., 6, 43.

Kamath, DY, Bhuvana, KB, Dhiraj, RS, Xavier, D, Varghese, K, Salazar, LJ, Granger, CB, Pais, P, Granger, BB. (2020). Patient and caregiver reported facilitators of self-care among patients with chronic heart failure: report from a formative qualitative study. Wellcome Open Res., 5, 10.

Leventhal, MJ, Riegel, B, Carlson, B, De Geest, S. (2005). Negotiating Compliance in Heart Failure: Remaining Issues and Questions. Eur J Cardiovasc Nurs., 4 (4), 298–307.

Mansouri, A, Baraz, S, Elahi, N, Malehi, AS, Saberipour B. (2019). The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: A clinical trial study. Jpn J Nurs Sci., 16(4), 459-467.

Marti, CN, Fonarow, GC, Anker, SD, Yancy, C, Vaduganathan, M, Greene, SJ,…Butler, J. (2019). Medication dosing for heart failure with reduced ejection fraction-opportunities and challenges. Eur J Heart Fail., 21(3), 286-296.

Meraz, R. (2020). Medication Nonadherence or Self-care? Understanding the Medication Decision-Making Process and Experiences of Older Adults With Heart Failure. J Cardiovasc Nurs., 35(1), 26-34.

Pedersen, E, Primicerio, R, Halvorsen, KH, Eggen AE, Garcia, BH, Schirmer, H, Waaseth, M. (2022). Medication adherence among persons with coronary heart disease and associations with blood pressure and low-density-lipoprotein-cholesterol. Eur J Clin Pharmacol., 78(5), 857–867.

Pollock, SE. (1993). Adaptation to chronic illness: a program of research for testing nursing theory. Nurs Sci Q., 6(2), 86-92.

Rossignol, P, Hernandez, AF, Solomon, SD, Zannad, F. (2019). Heart failure drug treatment. Lancet, 393 (10175), 1034-1044.

Roy, C. (1997). Future of the Roy model: challenge to redefine adaptation. Nurs Sci Q., 10(1), 42-48.
Roy, C. (2019). Nursing Knowledge in the 21st Century: Domain-Derived and Basic Science Practice-Shaped. ANS Adv Nurs Sci., 42(1), 28-42.
Roy, C, Andrews, HA. (2008). The Roy Adaptation Model. United States, Pearson.
Shah, D, Simms, K, Barksdale D, Wu, J. (2015). Improving medication adherence of patients with chronic heart failure: challenges and solutions. Research Reports in Clinical Cardiology, 6, 87–95.
Shariatpanahi, S, Ashghali Farahani, M, Rafii, F, Rassouli, M, Kavousi, A. (2019). Designing and Testing a Treatment Adherence Model Based on the Roy Adaptation Model in Patients with Heart Failure: Protocol for a Mixed Methods Study. JMIR Res Protoc., 8 (7), e13317.
Siddiqui, M, Ripplinger, C, Chalchal, H, Murty D. (2022). Managing patients with heart failure: contemporary real-world experience. BMC Res Notes., 15(1), 41.
Silavanich, V, Nathisuwan, S, Phrommintikul, A, Permsuwan, U. (2019). Relationship of medication adherence and quality of life among heart failure patients. Heart Lung, 48(2), 105-110.
Wang, X, Tang, L, Howell, D, Zhang, Q, Qiu, R, Zhang, H, Ye, Z. (2020). Theory-guided interventions for Chinese patients to adapt to heart failure: A quasi-experimental study. Int J Nurs Sci., 7(4), 391-400.
Whittemore, R, Sister Callista, Roy. (2002). Adapting to diabetes mellitus: a theory synthesis. Nurs Sci Q., 15(4), 311-317.
Yıldız, E, Karagözoğlu, S. (2022) Nursing Care Process According to the Roy Adaptation Model of an Individual with Weight Gain After Bariatric Surgery. Journal of Health Sciences Institute, 7 (2), 132-138.
Zhao, Q, Zhang, J, Ye, Y, Chen, C, Fan, X. (2022). Experiences of Disease Adaptation in Patients with Heart Failure: A Qualitative Study. Clin Nurs Res., 31(7), 1287-1295.