

The Effect of Rational Drug Usage on Disease Adaptation and Quality of Life in Geriatric Patients with Cardiac Insufficiency

Taner AKARSU^{1,a}, Çağdaş AKGÜLLÜ^{2,b}

¹Department of Health Care Services, Cerkes Vocational School, Cankırı Karatekin University, Cankırı, TURKEY

²Elderly Health and Care Interdisciplinary, Institute of Health Sciences, Aydın Adnan Menderes University, Aydın, TURKEY

ORCIDS: ^a0000-0002-1337-3178; ^b0000-0003-4978-1955

ABSTRACT

Objective: Due to chronic diseases which occur through advancing age, the number of medications used in geriatric patients increase in a dramatic fashion. This increment necessitates the rational usage of drugs within a proper program. Reasonable drug use can affect individuals' adaptation to diseases and their quality of life. This research was undertaken to explore the impact of rational drug use on disease adaptation and life quality in geriatric patients who suffer from cardiac insufficiency. **Method:** The study sample consisted of 322 people over the age of 65. The study was conducted between the time periods of 01.09.2020 and 01.09.2021 in the cardiology outpatient clinic of The Aydın State Hospital. Participants completed a patient information form, including the Rational Drug Use Scale (RDUS), the Adaptation to Chronic Illness Scale (ACIS), and the Elderly Quality of Life Scale (CASP-19). Statistical comparisons utilized t-tests, Mann-Whitney U tests, and ANOVA tests, while the Pearson correlation analysis was employed to assess the associations between scale scores. Significance was determined for conditions with p-values which were determined to be less than 0.05. **Results:** The study revealed a notable correlation between the patients' levels of rational drug use and their adaptation to the disease ($r=0.226$; $p<0.001$). Conversely, no significant relationship was observed between reasonable drug use and quality of life ($r=-0.039$; $p=0.486$). Nevertheless, upon examining the sub-dimensions of the Rational Drug Use Scale and the Elderly Quality of Life Scale (CASP-19), a weak but statistically significant relationship emerged between these sub-dimensions ($r=-0.191$; $p<0.001$). No significant difference was found between the polypharmacy and non-polypharmacy groups when comparing RDUS, ACIS, and CASP-19 scale scores and sub-dimension total scores ($p>0.05$). However, only in the group with polypharmacy; the total score of the physical adaptation sub-dimension of the ACIS was found to be significantly lower ($p=0.011$). **Conclusion:** The research findings indicate that rational drug use among geriatric individuals positively influenced their ability to adapt to the disease, albeit resulting in a comparatively modest impact on the sub-dimensions with regards to quality of life. Further studies are required in order to evaluate rational drug use and to investigate its effect on symptom control, patient satisfaction, and quality of life in patients with cardiac insufficiency.

Key words: Cardiac Insufficiency, Geriatrics, Quality of Life, Rational Drug Use.

Kalp Yetersizliği Olan Geriatrik Bireylerde Akılcı İlaç Kullanımının Hastalığa Uyum ve Yaşam Kalitesine Etkisi

öz

Amaç: İlerleyen yaşla birlikte ortaya çıkan kronik hastalıklar nedeniyle geriatrik hastalarda ilaç kullanım miktarı artmaktadır. Bu artış, ilaçların uygun bir program dâhilinde akılcı kullanımını gerektirmektedir. Akılcı ilaç kullanımı, bireylerin hastalıklara uyumunu ve yaşam kalitesini etkileyebilir. Bu araştırma, kalp yetmezliği olan geriatrik hastalarda akılcı ilaç kullanımının hastalığa uyum ve yaşam kalitesi üzerindeki etkisini araştırmak amacıyla yapılmıştır. **Yöntem:** Çalışmanın örneklemi 65 yaş üstü 322 kişiden oluşmaktadır. Çalışma 01.09.2020-01.09.2021 tarihleri arasında Aydın Devlet Hastanesi kardiyoloji polikliniğinde gerçekleştirilmiştir. Katılımcılar, Akılcı İlaç Kullanımı Ölçeği (AİKÖ), Kronik Hastalığa Uyum Ölçeği (KHUÖ) ve Yaşlılarda Yaşam Kalitesi Ölçeğini (CASP-19) içeren bir hasta bilgi formunu doldurdu. İstatistiksel karşılaştırmalarda t-testleri, Mann-Whitney U testleri ve ANOVA testleri kullanılırken, ölçek puanları arasındaki ilişkileri değerlendirmek için Pearson korelasyon analizi kullanılmıştır. Anlamlılık, p-değerleri 0.05'ten küçük olan koşullar için belirlenmiştir. **Bulgular:** Çalışma, hastaların akılcı ilaç kullanım düzeyleri ile hastalığa uyumları arasında kayda değer bir korelasyon olduğunu ortaya koymuştur ($r=0.226$; $p<0.001$). Buna karşılık, akılcı ilaç kullanımı ile yaşam kalitesi arasında anlamlı bir ilişki gözlenmemiştir ($r=-0.039$; $p=0.486$). Bununla birlikte, Akılcı İlaç Kullanımı Ölçeği'nin alt boyutları ile Yaşlılarda Yaşam Kalitesi Ölçeği (CASP-19) incelendiğinde, bu alt boyutlar arasında zayıf ancak istatistiksel olarak anlamlı bir ilişki ortaya çıkmıştır ($r=-0.191$; $p<0.001$). Polifarmasi olan ve olmayan gruplar arasında AİKÖ, KHUÖ ve CASP-19 ölçek puanları ve alt boyut toplam puanları karşılaştırıldığında anlamlı bir fark bulunmamıştır ($p>0.05$). Ancak, sadece polifarmasi olan grupta KHUÖ'nin fiziksel uyum alt boyutunun toplam puanı anlamlı derecede düşük bulunmuştur ($p=0.011$) **Sonuç:** Araştırma bulguları, geriatrik bireyler arasında akılcı ilaç kullanımının, yaşam kalitesinin alt boyutları üzerinde nispeten mütevazı bir etkiye neden olsada, hastalığa uyum sağlama becerilerini olumlu yönde etkilediğini göstermiştir. Kalp yetmezliği olan hastalarda akılcı ilaç kullanımını değerlendirmek ve semptom kontrolü, hasta memnuniyeti ve yaşam kalitesi üzerindeki etkisini araştırmak için daha fazla çalışmaya ihtiyaç vardır.

Anahtar kelimeler: Akılcı İlaç Kullanımı, Geriatri, Kalp Yetersizliği, Yaşam Kalitesi.

DOI: 10.53493/avryasyab.1435125 Received: 11.02.2024 Accepted: 08.05.2024

INTRODUCTION

The growth of the global population, the extension of life expectancy, the advancement of health services through technology, and social and environmental factors have collectively contributed to an increase in the prevalence of chronic diseases across a range of age groups, with a particularly notable impact on the elderly (Burch et al. 2014). While heart failure (HF) was previously considered an epidemic, it has become a chronic public health problem of increasing importance in countries with a high percentage of the elderly population (Groenewegen et al. 2020). Heart failure (HF) is a disease with a low quality of life indication due to the presence of comorbidities, the need for frequent hospitalization, and the accompanying complications (Hoekstra et al. 2011; Alkan and Nural 2017). It is a significant cause of mortality and morbidity in geriatrics (Savarese and Hund 2017).

As individuals age and the prevalence of chronic diseases increases, they are more likely to be treated by different specialties. During the treatment process, physicians often add another prescription to the previous drug treatment, resulting in multiple drug use. Multiple drug use (side effects, inappropriate prescribing), along with the inadequate use of existing therapies, hospitalisations, and increased costs, increases the burden of HF (Mastromarino et al. 2014).

The increased prevalence of polypharmacy has highlighted the necessity of employing drugs in a systematic, planned, and rational manner. To avoid the occurrence of adverse outcomes in the administration of pharmaceutical agents for chronic ailments, the rational execution of drug therapy from the stage of prescription to the conclusion of the treatment process must be conducted in an orderly and meticulous manner. Adherence to certain principles is conducive to the achievement of favourable outcomes in the adaptation to and management of the disease (Maxwell 2016).

Pharmacological treatment and the use of prescription drugs are essential indicators of quality of life (Olsson et al. 2011). Within the therapeutic process of chronic illnesses, the objective is to convey knowledge and experiences that assist elderly individuals in meeting the roles and responsibilities the treatment demands, promoting adaptation to the condition,

and enhancing the overall quality of life. Concurrently, the social and economic burden on individuals and communities will be reduced over time (Gyasi and Phillips 2019).

The objective of this study was to assess the impact of appropriate medication utilisation on disease adaptation and quality of life among elderly patients diagnosed with heart failure undergoing follow-up at the cardiology outpatient clinic.

MATERIAL AND METHOD

Population and Sample of the Study

The study population comprised patients aged 65 and above who had been diagnosed with heart failure and admitted to the cardiology outpatient clinic of Aydin State Hospital in 2019. The sample size was calculated using the formula $n = \frac{DEFF * Np(1-p)}{[d^2 / Z^2 * 1 - a/2 * (N-1) + p * (1-p)]}$. The calculation determined that a minimum of 308 patients should be included for a 95% confidence interval (OpenEpi 2013). For this study, a total of 322 elderly patients diagnosed with heart failure from the Cardiology outpatient clinic of Aydin State Hospital were enrolled.

Power Analysis

A power analysis was conducted using G-Power ver. 3.1.9.7 software (Faul et al., 2007). The effect size value (d) was determined to be 0.5, and the actual power was calculated to be 95.4% based on the sample numbers in the groups (Group 1; 214, Group 2; 108). Cohen (1988) stipulates that a scientific study should have at least 80% power. This criterion is met by the present study, which will be completed with an appropriate amount of power. The critical t value was 2.54, and the effect size was taken as 0.5. The two groups were as follows: Group 1: 5 or more drug users; Group 2: 1-4 drug users.

Data Collection Tools

The data collection process entailed the administration of a structured interview form and the administration of the Rational Use of Medication Scale, the Adaptation to Chronic Diseases Scale, and the Quality of Life in Older Persons Scale (CASP-19) questionnaires.

Scales

Rational Drug Use Scale (RDUS): The RDUS, formulated by Cakmak and Pakyuz in 2020, comprises a 36-item scale encompassing six sub-dimensions: behavioural beliefs, control beliefs, attitude, subjective norm, intention, and knowledge. The total score attainable on the scale is 72, utilising a 3-point Likert-type scale (0=never, 1=sometimes, 2=always). The scale's validity and reliability in Turkish were established through the calculation of a Cronbach's alpha coefficient of 0.85.

The Adaptation to Chronic Illness Scale (ACIS): The ACIS, devised by Atik and Karatepe in 2016, comprises 25 items. The total score derived from the scale is 125. The 5-point Likert scale, with values ranging from 1 (indicating a complete lack of agreement) to 5 (indicating total agreement), was employed. The scale's validity and reliability in Turkish were assessed using the Cronbach's alpha coefficient, which yielded a value of 0.88.

Quality of Life Scale in Older People: The CASP-19, initially developed by Hyde et al. (2003) to assess the quality of life in older individuals, was translated into Turkish by Turkoglu and Adibelli (2014). Six items with low factor loads were eliminated during the adaptation process, resulting in a reduction of the number of questions to 13. Higher scores on the 4-point Likert-type scale (ranging from 1=never to 4=always) are indicative of a higher quality of life for the respondent. The adapted scale exhibited a Cronbach's alpha of 0.91.

Patient Sample Collection

The research employed a descriptive and cross-sectional design, encompassing patients diagnosed with heart failure who presented to the cardiology outpatient clinic of Aydin State Hospital between 1 September 2020 and 1 September 2021. In order to be included in the study, participants were required to meet the following criteria: an age of over 65, a diagnosis of heart failure, good cognitive function, the ability to communicate verbally, and the absence of difficulty in understanding and speaking. The quantity of medication consumed by those who were not taking any medication and those with polypharmacy was recorded. Those who consented to participate were verbally informed, and their

consent was obtained through signed consent forms. The research was conducted using a face-to-face interview method, adhering to social distancing and hygiene guidelines, with each session lasting approximately 30 minutes.

Ethical Considerations

The research was approved by the Aydin Adnan Menderes University Faculty of Health Sciences Non-Invasive Clinical Trials Ethics Committee (decision date: 03/07/2020, document no: E.34909, protocol no: 2020/032). The study was approved by the Aydin Provincial Health Directorate (17 July 2020, Decision No: 00121153694). All participants provided informed consent prior to their involvement in the study. The research was conducted in accordance with the Declaration of Helsinki of 1964.

Data Analysis

Statistical analyses for the acquired data were conducted using SPSS version 26.0 (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp) software. The normal distribution conformity of variables was assessed through analytical methods employing Kolmogorov-Smirnov and Shapiro-Wilk tests. Descriptive analyses were expressed as mean \pm standard deviation for variables that exhibited a normal distribution (such as the overall mean and sub-dimension averages). Variables that did not follow a normal distribution were expressed as median (interquartile range) and minimum-maximum. Descriptive statistics were employed to present demographic characteristics, frequency, and percentage values. The t-test was employed for independent groups (non-polypharmacy vs. polypharmacy) when the data were normally distributed for continuous variables. Pearson's correlation test was employed to investigate the relationship between the scales and sub-dimensions of the scales. A p-value of less than 0.05 was deemed to be statistically significant.

RESULTS

The study included individuals aged 65 to 95 years (mean = 74.53, SD = 7.39). Of these, 63% (n=203) were male, and 37.0% (n=119) were female. The detailed demographic characteristics of the sample are presented in Table 1.

Table 1. General patient characteristics

Parameters		Frequency	%
Sex	Female	119	37.0
	Male	203	63.0
Education level	Literate	72	22.4
	Primary school	192	59.5
	Secondary school	24	7.5
	High school	17	5.3
	University	17	5.3
Marital status	Married	228	70.8
	Single	94	29.2
Economic status	Equivalent to income and expense	273	84.8
	Income-less than expenditure	49	15.2
Cohabitation status	Wife	229	71.1
	Children	48	14.9
	Relative	4	1.2
	*Other	41	12.8
Comorbidity status	Yes	310	96.2
	No	12	3.8

*People living alone or in a nursing home

Table 2. RDUS and ACIS scale correlation status

Scale and subdimension	RDUS							
	Statistical terms	Behavioral beliefs	Control beliefs	Attitude	Subjectif norm	Intention	Information	Total score
ACIS								
Physical adaptation	r	0.320**	0.642**	-0.669**	0.175**	-0.232**	-0.028	0.051
	p	<0.0001	<0.0001	<0.0001	0.002	<0.0001	0.616	0.361
Social adaptation	r	-0.027	0.440**	-0.126*	0.034	0.327**	-0.008	0.356**
	p	0.635	<0.0001	0.024	0.545	<0.0001	0.879	<0.0001

Pearson correlation analysis was conducted to examine the relationship between the RDUS, ACIS, and CASP-19 scales and their respective sub-dimensions. The findings of the study indicated that rational drug use in geriatric individuals with heart failure was a significant factor in adapting to the disease, with a limited impact on the quality of life.

A significant correlation was identified between the RDUS sub-dimensions and the ACIS sub-dimensions (Table 2).

A significant correlation was found between RDUS sub-dimensions and CASP-19 sub-dimensions (Table 3).

Non-polypharmacy and polypharmacy

The analysis of the medication use of the participants revealed that the median, minimum, and maximum medication use was 5, 0, and 15, respectively (IQR=3). The total scores of the related scales and sub-dimensions of these scales were compared between the group below (Group 2; n=214) and above (Group 1; n=108) the median value, with the number of drugs used as the criterion. Consequently, no significant difference was observed between the two groups in the total score of the RDUS ($p = 0.691$). When the total scores of the sub-dimensions of this scale were compared between the groups, no significant difference was found in any of the sub-dimensions, including behavioural beliefs ($p=0.275$), control beliefs ($p=0.246$), attitude ($p=0.296$), subjective norm ($p=0.351$), intention ($p=0.325$) and knowledge sub-dimension ($p=0.787$). No significant difference was observed when the total score of the ACIS was compared between the groups ($p=0.145$). However, when the total score of the physical adaptation sub-

Psychological adaptation	r	0.233**	0.655**	-0.427**	0.097	0	-0.059	0.294**
	p	<0.0001	<0.0001	<0.0001	0.081	0.997	0.288	<0.0001
Total score	r	0.256**	0.726**	-0.582**	0.149**	-0.039	-0.035	0.226**
	p	<0.0001	<0.0001	<0.0001	0.007	0.484	0.527	<0.0001

r; Pearson Correlation coefficient and $p < 0.05$ is statistically significant.

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

RDUS; Rational Drug Use Scale ACIS;Adaptation Chronic Illness Scale

Table 3. RDUS and CASP-19 scale correlation status

Scale and subdimension	Statistical terms	RDUS						
		Behavioral beliefs	Control beliefs	Attitude	Subjectif norm	Intention	Information	Total score
ACIS								
Control	r	0.079	0.324**	-0.213**	0.045	0.093	0.017	0.160**
	p	0.157	<0.0001	<0.0001	0.424	0.097	0.767	0.004
Autonomy	r	0.107	0.233**	-0.388**	0.165**	-0.155**	-0.02	-0.119*
	p	0.055	<0.0001	<0.0001	0.003	0.005	0.691	0.032
Pleasure	r	0.153**	0.134*	-0.384**	0.095	-0.187**	-0.03	-0.191**
	p	0.006	0.016	<0.0001	0.087	<0.0001	0.641	<0.0001
Self realization	r	0.188**	0.243**	-0.383**	0.072	-0.207**	0.01	-0.099
	p	<0.0001	<0.0001	<0.0001	0.201	<0.0001	0.852	0.076
Total score	r	0.151**	0.303**	-0.400**	0.111*	-0.103	-0	-0.039
	p	0.007	<0.0001	<0.0001	0.047	0.064	0.946	0.486

r; Pearson Correlation coefficient and $p < 0.05$ is statistically significant.

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

dimension of this scale was compared between the groups, it was found that Group 1 had significantly lower scores (38.5±6.6 vs. 42.1±4.8; $p=0.011$, Table 4). Nevertheless, no significant difference was observed between the groups in the other sub-dimensions of the ACIS, namely social adjustment ($p=0.351$) and psychological adjustment ($p=0.619$). The total score on the CASP-19 was found to be statistically indistinguishable between the groups ($p = 0.727$). Furthermore, the CASP-19 was not significantly different from the other scores, and

no significant difference was found between the groups in the sub-dimensions (control $p=0.205$, autonomy $p=0.238$, pleasure $p=0.725$, self-actualization $p=0.795$).

In the present study, a comparison was made between the scale and sub-dimensions of polypharmacy and non-polypharmacy. It was observed that there was a significant difference only in the physical adaptation sub-dimension of the ACIS.

Table 4. The Comparison of the ACIS Sub-dimensions Between Polypharmacy and Non-polypharmacy

Drug usage characteristics	n	Physical adaptation	
		$\bar{x} \pm sd$	Statistics
4 and ↓ taking medication	214	42.1±4.8	t=2.563
5 and ↑ taking medication	108	38.5±6.6	p=0.011

DISCUSSION

Pharmacotherapy represents a pivotal element of heart failure (HF) treatment. The judicious utilisation of drugs within a defined plan and programme can influence the adaptation to the disease and the quality of life in elderly individuals. Consequently, we deemed it necessary to conduct a study investigating the impact of rational drug use on geriatric patients diagnosed with HF in terms of disease adaptation and quality of life. The aim of this study was to contribute to the existing literature on the effect of rational drug use on adherence and quality of life in the geriatric population with heart failure in Turkey, where there are currently few studies examining this topic. In the elderly, particularly those with chronic conditions such as heart failure, challenges related to the adaptation to treatment regimens and the irrational use of medications are frequently encountered.

The number of medications used increases with age. It is therefore essential to implement intervention methods focusing on rational geriatric pharmacotherapy in elderly individuals in order to reduce the unnecessary drug burden, adverse drug effects, medical costs, and rates of geriatric morbidity and mortality (Kitaw and Haile 2023). A study carried out in Germany among individuals with chronic illnesses revealed that 40.9% of the patients did not adhere to their medication regimen (Jüngst et al. 2019). The complexity and multiplicity of factors influencing non-compliance with drugs among elderly patients highlight the necessity of implementing a structured programme of drug use (MSD 2021).

A study conducted on patients with geriatric heart failure found that the patients did not take many of the medications as prescribed (Ewen et al. 2015). Adherence to rational principles is essential for the use of drugs, which is an essential stage in

chronic diseases. This will inevitably affect compliance with the disease, especially drug therapy. It has been emphasised that rational drug use will improve drug compliance and increase quality of life (Shrestha and Prajapati 2019). In another study, the importance of developing strategies for multiple drug use at both the admission and discharge stages of heart failure treatment was emphasised (Unlu et al. 2020).

In chronic conditions that directly impact one's quality of life, establishing a positive and sustainable connection between the disease and overall well-being is crucial for elderly individuals aspiring to lead a better life. It has been emphasised that the evaluation of the quality of life in elderly individuals with HF in clinical studies is essential in terms of guiding disease management (Butrous and Hummel 2016). Consequently, in the assessment of medication compliance and quality of life in HF, it was demonstrated that adherence to drug treatment had a minimal positive effect on quality of life (Silavanich et al. 2018). One study revealed that one of the most significant predictive factors for compliance with medication therapy was the patient's own administration of medications outside of the physician's supervision. Furthermore, the study highlighted the influence of demographic status and socioeconomic conditions on the adaptation to the disease (Ragbaoui et al. 2017).

The present study revealed a significant difference in the physical sub-dimension of adaptation to the disease in individuals with polypharmacy and increased drug intake. Polypharmacy is often considered indicative of suboptimal prescribing of medication and is associated with negative outcomes. It is especially common in cardiovascular diseases (Appleton et al., 2014). Elderly patients with heart failure frequently have comorbidities that necessitate additional specific treatment, which in turn increases the number of

medications. Polypharmacy is a significant yet underestimated problem in the treatment of heart failure patients. However, it has a profound impact on the treatment of heart failure. The presence of polypharmacy can often lead to inappropriate drug prescription, poor compliance with pharmacological treatments and disease, interactions between two drugs, and side effects (Mastromarino et al. 2014).

The direct correlation between polypharmacy and cardiovascular diseases and heart failure results in elderly individuals experiencing difficulties in performing their daily activities and meeting their basic physiological needs in the physical sub-dimension of adaptation to the disease, while simultaneously affecting their adaptation to the disease. Consequently, our study aligns with the findings obtained from the literature. This compliance may be associated with the effects of the problems caused by the presence of polypharmacy, especially on chronic diseases.

CONCLUSION

The objective of our investigation was to assess the impact of rational drug utilisation on adherence and quality of life in elderly individuals with heart failure. The findings of this study indicate that the rational use of drugs is an effective approach to managing chronic diseases, although it has only a limited impact on quality of life. To ascertain the sub-dimension's influence, it would be beneficial to employ the scale on larger cohorts within other patient groups, which would enhance the insights gained from future studies. To assist elderly individuals with heart failure in improving their conditions and attaining their individual quality of life goals, it is essential to provide them with comprehensive support, encompassing physical, social, and psychological aspects. This support should facilitate their ability to meet expectations from drug therapy and to adapt to the challenges of chronic disease. When patients are not permitted to participate in the decision-making process during the treatment phase, their preconceptions and attitudes towards the treatment methods may impede and restrict their disease adaptation. Interfering with these negative perceptions and maintaining the rational application of drug therapy with proper planning can contribute to an enhanced quality of life for the elderly. In conclusion, to

investigate the effects of prudent drug utilisation on disease adherence and quality of life in elderly heart failure patients, we propose and emphasise the necessity for a scale designed to assess rational drug use in specific medical conditions. Furthermore, we recommend that further comprehensive studies be conducted in this area.

AUTHOR CONTRIBUTION

Idea/Concept: ÇA; Design: ÇA; Data Collection and/or Processing: TA; Analysis and/or Interpretation: ÇA,TA; Writing the Article: ÇA, TA.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FINANCIAL DISCLOSURE

The authors received no financial support for this research.

ACKNOWLEDGEMENTS

All authors are grateful to all the participants for their valuable contributions to this study.

ETHICAL STATEMENT

Ethical approval from Aydin Adnan Menderes University Faculty of Health Sciences Ethics Committee (Decision Date: 03.07.2020, Document no: E.34909, Protocol no: 2020/032) and institutional permission from the place where the study was obtained (Date: 17.07.2020 Decision No: 00121153694.) Informed consent was obtained from the patients.

REFERENCES

- Alkan S, Nural N. (2017). Can be prevented re-hospitalizations in heart failure? *Turkish J Card Nur*, 8(16):28-34. doi:10.5543/khd.2017.25238
- Appleton, SC, Abel GA, Payne RA. (2014). Cardiovascular polypharmacy is not associated with unplanned hospitalisation: evidence from a retrospective cohort study. *BMC Family Practice*, 15(1):1-8. <https://link.springer.com/article/10.1186/1471-2296-15-58> (accessed October 14, 2023).
- Atik D, Karatepe H. (2016). Scale development study: adaptation to chronic illness. *Acta Medica Mediterranea*, 32(1):135-142. doi:10.19193/0393-6384_2016_1_21
- Burch, JB, Augustine AD, Frieden LA, Hadley E, Howcroft TK,

- Johnson R, Khalsa PS, Kohanski RA, Li XL, Macchiarini F, Niederehe G, Oh YS, Pawlyk AC, Rodriguez H, Rowland JH, Shen GL, Sierra F, Wise BC. (2014). Advances in geroscience: impact on healthspan and chronic disease. *J Gerontol A Biol Sci Med Sci*, 69(1):1-3. doi:10.1093/gerona/glu041
- Butrous H, Hummel SL. (2016). Heart failure in older adults. *Canadian J Cardiol*, 32(9):1140-1147. doi:10.1016/j.cjca.2016.05.005
- Cakmak V, Pakyuz SC. (2020). A methodological study: development of the rational drug use scale. *Journal of Anatolia Nursing and Health Sciences*, 23(4): 498-507. doi: 10.17049/ataunihem.595394
- Ewen S, Baumgarten T, Ewen VR, Mahfoud F, Mammen NG, Schulz M, Böhm M, Laufs U. (2015). Analyses of drugs stored at home by elderly patients with chronic heart failure. *Clinical Research in Cardiology*, 104(4):320-327. doi:10.1007/s00392-014-0783-2
- Faul F, Erdfelder E, Lang AG, Buchner A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2):175-191. doi:10.3758/bf03193146
- Groenewegen A, Rutten FH, Mosterd A, Hoes AW. (2020). Epidemiology of heart failure. *Eur J Heart Fail*, 22(8):1342-1356. doi:10.1002/ehfj.1858
- Gyasi RM, Phillips DR. (2019). Aging and the rising burden of noncommunicable diseases in Sub-Saharan Africa and other low- and middle-income countries: a call for holistic action. *The Gerontologist*, 60(5): 806-811. doi:10.1093/geront/gnz102
- Hoekstra H, Leegte IL, Van Veldhuisen DJ, Sanderman R, Jaarsma T. (2011). Quality of life is impaired similarly in heart failure patients with preserved and reduced ejection fraction. *Eur J Heart Fail*, 13(9):1013-1018. doi:10.1093/eurjhf/hfr072.
- Hyde M, Wiggins RD, Higgs P, Blane DB. (2003). A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging & Mental Health*, 7(3):186-94. doi:10.1080/1360786031000101157
- Jüngst C, Graber S, Simons S, Wedemeyer H, Lammert F. (2019). Medication adherence among patients with chronic diseases: a survey-based study in pharmacies. *QJM*, 112(7):505-512. doi:10.1093/qjmed/hcz058.
- Kitaw TA, Haile RN. (2023). Prevalence of polypharmacy among older adults in Ethiopia: a systematic review and meta-analysis. *Meta-Analysis Scientific Report*, 13(1):17641. doi:10.1038/s41598-023-45095-2.
- Mastromarino V, Casenghi M, Testa M, Gabriele E, Coluccia R, Rubattu S, Volpe M. (2014). Polypharmacy in heart failure patients. *Curr Heart Fail Rep*, 11(2):212-219. doi:10.1007/s11897-014-0186-8
- Maxwell SRJ. (2016). Rational prescribing: the principles of drug selection. *Clin Med (Lond)*, 16(5):459-464. doi: 10.7861/clinmedicine.16-5-459
- MSD Manual Professional Version (MSD) (2021). Overview of drug therapy in older adults. <https://www.msmanuals.com/professiona/geriatrics> (accessed September 11, 2023).
- Olsson IN, Runnamo R, Engfeldt P. (2011). Medication quality and quality of life in the elderly, a cohort study. *Health Qual Life Outcomes*, 9(95):1-9. doi: 10.1186/1477-7525-9-95
- Open Source Epidemiologic Statistics for Public Health (2013). Sample size for a proportion or descriptive study. <http://www.openepi.com/SampleSize/SSPropor.htm> (accessed December 17, 2023).
- Ragbaoui Y, Nouamou I, El Hammiri A, Habbal R. (2017). Predictive factors of medication adherence in patients with chronic heart failure: Morocco's experience. *Pan Afr Med J*, 26(115):1-4. doi:10.11604/pamj.2017.26.115.11471
- Savarese G, Hund LH. (2017). Global public health burden of heart failure. *Card Fail Rev*, 3(1):7-11. doi:10.15420/cfr.2016:25:2
- Shrestha R, Prajapati S. (2019). Assessment of prescription pattern and prescription error in outpatient department at tertiary care district hospital, central Nepal. *J Pharm Policy Pract*, 16(12):1-9. doi:10.1186/s40545-019-0177-y
- Silavanich V, Nathisuwan S, Phrommintikul A, Permsuwan U. (2018). Relationship of medication adherence and quality of life among heart failure patients. *Heart&Lung*, 48(2):105-110. doi:10.1016/j.hrtlng.2018.09.009
- Turkoglu N, Adibelli D. (2014). Adaptation of quality of life scale in older people (CASP-19) to Turkish society. *The Journal of Academic Geriatrics*, 6:98-105.
- https://toad.halileksi.net/wp-content/uploads/2022/07/yasliarda-yasam-kalitesi-olcegi-casp-19-toad_0.pdf (accessed November 15, 2023).
- Unlu O, Levitan, EB, Reshetnyak E, Hayek JK, Diaz I, Archambault A, Chen L, Hanlon JT, Maurer MS, Safford MM, Lachs MS, Goyal P. (2020). Polypharmacy in older adults hospitalized for heart failure. *Circ Heart Fail*, 13(11):1-22. doi:10.1016/CIRCHEARTFAILURE.120.006977