

Adherence to treatment in the elderly with chronic heart failure

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SOUHRN

Cíl: Cílem této studie bylo prozkoumat a zhodnotit adherenci k léčbě u seniorů s chronickým srdečním selháním a význam faktorů, které ji vysvětlují.

Metodika: Jedná se o průřezovou korelační a deskriptivní kvantitativní studii. Výzkumný vzorek tvořilo 127 seniorů s chronickým srdečním selháním, kteří splnili stanovená kritéria. K posouzení adherence k léčbě u seniorů s chronickým srdečním selháním byla použita česká verze upraveného standardizovaného dotazníku ACDI – Adherence pacientů s chronickým onemocněním. Sběr dat probíhal v letech 2023 až 2024 na kardiologickém oddělení vybraného zdravotnického zařízení se souhlasem jeho náměstkyně pro ošetrovatelskou péči.

Výsledky: Většina seniorů uvedla dobrou adherenci jak k medikaci (99,2 %), tak ke zdravému životnímu stylu (87,4 %). Mezi faktory ovlivňující adherenci k léčbě dosáhla nejvyšší prevalence odpovědnost, a to 97,6 %. Nejsilnějším faktorem souvisejícím s dodržováním medikace byla odpovědnost, zatímco faktorem nejvíce spojeným s dodržováním zdravého životního stylu byla motivace. Jedním z významných prediktivních faktorů adherence k léčbě je edukace o režimových opatřeních.

Závěr: Adherenci k léčbě lze posílit zvýšením motivace pacientů k dodržování léčebných opatření zaměřených na změnu rizikového chování, které negativně ovlivňuje progresi onemocnění. Důraz na edukaci pacientů může také vést ke zlepšení adherence k léčbě u seniorů s chronickým srdečním selháním.

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ABSTRACT

Objective: The objective of this study was to investigate and evaluate adherence to treatment in the elderly with chronic heart failure and the significance of factors explaining it.

Methods: This is cross-sectional correlational and descriptive quantitative study. The research sample consisted of 127 elderly people with chronic heart failure who met the specified criteria. To assess adherence to treatment in the elderly with chronic heart failure, the Czech version of the modified standardized questionnaire ACDI – Adherence of Patients with Chronic Disease Instrument was used. Data collection took place between 2023 and 2024 at the Cardiovascular Department of a selected healthcare facility with the consent of its deputy for nursing care.

Results: Most of the elderly indicated good adherence to both medication (99.2%) and a healthy lifestyle (87.4%). Among the factors affecting adherence to treatment, responsibility reached the highest prevalence, namely 97.6%. The strongest factor related to medication adherence was responsibility, while the factor most strongly linked to adherence to a healthy lifestyle was motivation. One of the significant predictive factors for treatment adherence is education about regimen measures.

Conclusion: Adherence to treatment could be strengthened by increasing patient motivation to follow therapeutic measures aimed at changing risk behaviours that negatively affect disease progression. Emphasizing patient education may also lead to improved adherence to treatment in the elderly with chronic heart failure.

Keywords:

ACDI questionnaire

Adherence to treatment

Factors affecting adherence

Chronic heart failure

The elderly

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Introduction

Heart failure is considered one of the epidemics of the 21st century in developed countries and represents a major public health challenge. Heart failure represents a complex multifactorial syndrome and is the most common cause of hospitalization in patients over 65 years old. It is primarily a disease of older age, with the average age of patients around 75 years.¹ Despite significant advancements in care achieved in recent decades, the prognosis for patients with this condition remains severe and unfavourable. Heart failure is one of the main causes of morbidity and mortality and is responsible for high healthcare costs in developed countries.² It leads to a shortening in life expectancy and a reduced quality of life. Given its complexity, the care provided to patients with heart failure should be organized, systematic, and multidisciplinary.¹

A significant medical and socioeconomic issue is the repeated rehospitalization of patients with this condition. These rehospitalizations are caused not only by the natural progression of the disease but also by poor patient education, inadequate adherence to treatment, and insufficient post-hospitalization management. More than half of rehospitalizations are due to modifiable factors, which could be prevented through appropriate care setting and organization. Epidemiological data indicate that after the first hospitalization, a quarter of patients is rehospitalized within one month, and half of patients within six months.³

Adherence is a complex, multifaceted concept that is a key in nursing practice, influencing patient care and behaviour throughout the healthcare system.⁴ Adherence to the treatment in chronic diseases affects their course significantly. It is crucial for stabilizing or potentially improving the disease, preventing its decompensation and progression, reducing rehospitalizations, lowering mortality, and improving the quality of life for patients. The World Health Organization (WHO) defines adherence to treatment as the extent to which a patient's behaviour (including medication use, diet adherence, and/or lifestyle modifications) aligns with the agreed-upon recommendations of a healthcare provider. Definition of WHO assumes the patient's active participation, cooperation, and perseverance in following the treatment regimen.⁵ Adherence to treatment is of clinical interest due to the widespread nature of non-adherence.⁶ Poor adherence can lead to adverse events such as severe relapses, symptom exacerbation, increased risk of dependency, toxicity, or resistance. Improving patient adherence can enhance the effectiveness of chronic disease treatment, increase patient safety, and reduce healthcare costs.⁷ There are numerous possible methods and interventions to improve patient adherence. Interventions aimed at improving adherence, or rather non-adherence, can be categorized into educational/cognitive, behavioural, psychosocial, financial, and medication-related interventions.⁸ Educational interventions play a significant role in adherence, as they improve adherence to the treatment plan, enhance treatment outcomes, and increase patient satisfaction.^{9,10} Adherence depends on developing a concordant relationship and should be measured using appropriate tools.^{7,11}

Adherence to treatment is a multifactorial behavioural process influenced by numerous interrelated factors.^{11,12} Factors affecting adherence to treatment can be categorized into several groups: patient-related factors, treatment-related factors, healthcare system factors, socioeconomic factors, and disease-related factors.^{6,13} One concept addressing adherence to treatment and its explanatory factors is the Theory of Adherence to Treatment in Patients with Chronic Disease.¹⁴ According to this theory, adherence in individuals with chronic disease is defined as an active, intentional, and responsible care process in which patients with chronic illnesses work collaboratively with healthcare professionals to maintain their health. Adherence involves taking prescribed medications and maintaining a healthy lifestyle, which includes proper nutrition, physical activity, abstaining from smoking, and moderate consumption of alcohol. According to Kyngäs' theory, explanatory factors linked to adherence to treatment in individuals with chronic illness include motivation, responsibility, results of care, cooperation, a sense of normality, support from next of kin, nurse support, physician support, and fear of complications.¹²

The objective of this research was to investigate and evaluate adherence to treatment in the elderly with chronic heart failure, including adherence to medication and adherence to a healthy lifestyle. Additionally, the study aimed to assess the significance of factors explaining adherence to treatment. The explanatory factors included patient motivation, fear of complications, support from next of kin, physicians, and nurses, responsibility, results of care, cooperation with healthcare professionals, and a sense of normality. For all the observed factors, the relationship with selected predictive factors was also examined, which included sociodemographic data (The Mini-Mental State Examination [MMSE], gender, age, education, marital status, cohabitation) and information specific to the disease (NYHA functional classification, number of hospitalizations, education).

Methodology

Design

A cross-sectional, correlational, and descriptive quantitative study was conducted using a questionnaire survey.

Sample

The research sample consisted of 127 elderly people with chronic heart failure who met the specified criteria (age 65 and older, diagnosis of chronic heart failure, knowledge of the Czech language, MMSE score of at least 24 points, consent to participate in the research). The most represented group in the research sample were the elderly with an MMSE cognitive function test score of 27 points ($N = 44$; 34.6%), with an average score of 26.9. Regarding the NYHA functional classification, all four classes were represented, with class III being the most common ($N = 60$; 47.2%), with an average value of 2.6. The sample had a higher representation of men ($N = 79$; 62.2%). The age of respondents ranged from 65 to 94 years, with a mean age of 75.0 years. The elderly divided into three categories corresponding to stages of old age were the

Table 1 – Sociodemographic characteristics and disease-specific information of the sample

Characteristic		N	%
MMSE	24	1	0.8
	25	13	10.2
	26	34	26.8
	27	44	34.6
	28	26	20.5
	29	8	6.3
	30	1	0.8
NYHA	Class I	5	3.9
	Class II	50	39.4
	Class III	60	47.2
	Class IV	12	9.4
Gender	Male	79	62.2
	Female	48	37.8
Age	65–74 years	60	47.2
	75–84 years	52	40.9
	85–94 years	15	11.8
Education	Primary school	11	8.7
	Secondary school without diploma	59	46.5
	Secondary school with diploma	39	30.7
	Higher vocational education	5	3.9
	University	13	10.2
Marital status	Single	9	7.1
	Married	64	50.4
	Widowed	37	29.1
	Divorced	17	13.4
Living situation	Alone	43	33.9
	In a shared household	84	66.1
Hospitalization	0	11	8.7
	1	52	40.9
	2	33	26.0
	3 or more	31	24.4
Education	Yes	96	75.6
	No	31	24.4

N – absolute frequency; % – relative frequency.

most represented age group being 65–74 years (N = 60; 47.2%). The largest proportion of the elderly had a secondary education without a high school diploma (N = 59; 46.5%). Most participants were married (N = 64; 50.4%) and lived in a household with others (N = 84; 66.1%). The number of hospitalizations related to heart issues in the past year ranged from 0 to 11, with an average of 2.0 hospitalizations. The largest portion of respondents had been hospitalized once in the past year (N = 52; 40.9%). Most the elderly reported being educated about regimen measures related to their heart condition by a physician

or nurse (N = 96; 75.6%). Sociodemographic characteristics and specific information related to the disease are provided in Table 1.

Data collection

To determine adherence to treatment and the significance of explanatory factors among in the elderly with chronic heart failure, the Czech version of the modified standardized ACDI (Adherence of Patients with Chronic Disease Instrument) questionnaire was used.¹⁵ This questionnaire was chosen primarily because it assesses not only adherence to treatment but also other aspects influencing adherence.¹⁶ The study also collected selected sociodemographic data of the elderly (MMSE, gender, age, marital status, cohabitation, education) and information specific to the disease (NYHA classification, number of hospitalizations, education). MMSE is the most commonly used method in cognitive impairment detection in both clinical and research fields. The maximum achievable MMSE score is 30 points, where values of 30–24 indicate a state without cognitive impairment.

The ACDI questionnaire is established on the theoretical model of adherence in patients with chronic disease of Kyn-gäs,¹⁴ which was originally developed and tested among adolescent patients with diabetes mellitus. This instrument demonstrates high validity and reliability.¹⁵ Originally created in Finnish, the ACDI questionnaire has been subsequently translated, tested, and successfully used in several studies in English, Japanese, German, Turkish, and Russian. The modified ACDI questionnaire contains 37 items assessing adherence to treatment, rated on a 5-point Likert scale (1 – strongly disagree; 2 – disagree; 3 – neither agree nor disagree; 4 – agree; 5 – strongly agree). The items are divided into 11 categories. These 11 categories are split into two endogenous mean sum variables: adherence to medication (two items) and adherence to a healthy lifestyle (four items). These two endogenous mean sum variables are explained by nine exogenous mean sum variables: cooperation (three items), responsibility (two items), motivation (two items), sense of normality (seven items), results of care (two items), support from next of kin (five items), support from physicians (four items), support from nurses (four items), and fear of complications (two items).^{16,17} For comparison with previous studies using the same tool,^{17,18} the average composite variables were categorized into two classes. Variables with values from 1 to 3.5 indicate a decreased level of adherence to treatment, while variables with values ranging from 3.51 to 5 represent a good level of adherence to treatment.

Data collection took place in 2023 and 2024 in the Cardiovascular Department of a selected university hospital in the Czech Republic, with the consent of the deputy head for nursing care. The elderly meeting the research criteria were given printed questionnaires during hospitalization or visits to the heart failure clinic. They were informed about how to complete the questionnaire, the voluntary nature of participation, anonymity, and confidentiality.

Translation and validation of the Czech version of the ACDI questionnaire

First, we obtained the author's official consent to use a modified version of the ACDI questionnaire for the

purposes of this research. A modified questionnaire for a group of patients with chronic heart disease was received from the authors in English and needed to be translated into Czech. The whole translation and validation process was carried out according to the methodological procedure according to Wild et al.¹⁹

The Czech version of the ACIDI questionnaire was tested for validity and reliability. Similar to previous studies,^{17,18} high reliability was found (Cronbach's alpha 0.83). To verify the validity of the Czech version of the ACIDI questionnaire, an exploratory factor analysis (EFA) was performed to test the connections between individual items. This analysis produced a factor solution with satisfactory statistical values (factor loadings 0.24–0.97, Cronbach's alpha values for individual factors 0.46–0.98) and its results were similar to the study with the modified English-language ACIDI questionnaire.¹⁷

Data analysis

Exploratory factor analysis (EFA) was conducted to verify the validity of the tool. Structural equation modelling (SEM) was used to determine the relationship between adherence to treatment and its explanatory factors. Model adequacy was evaluated using the CFI (Comparative Fit Index; a model with a CFI value ≥ 0.90 is considered a sufficiently good), RMSEA (Root Mean Square Error of Approximation; a model with a RMSEA value < 0.06 is considered a sufficiently good), and the Chi-square test. In order to find relationships between independent predictive factors (sociodemographic data and disease-specific information) and dependent factors explaining adherence to treatment contingency tables and the Chi-square test were first used. In the next phase, independent factors predicting adherence to treatment were identified using multivariate logistic regression (all statistically significant relationships from the univariate model were verified). OriginLab software was used for descriptive statistics and contingency tables. SEM was performed using SPSS Amos

26. Logistic regression and EFA were conducted using SPSS Statistics 29. Statistical tests were evaluated at a 5% significance level ($\alpha = 0.05$).

Results

Adherence to treatment in the elderly with chronic heart failure

The majority of the elderly reported good adherence to medication (99.2%) and to a healthy lifestyle (87.4%). Among the factors influencing adherence to treatment, responsibility had the highest prevalence at 97.6%; 94.5% of the elderly experienced good results of care and the same number received high support from next of kin. Slightly fewer respondents mentioned high levels of cooperation with healthcare professionals and high motivation for self-care (92.9%). Support from physicians and nurses was provided to 91.3% and 89.8% of the elderly, respectively. A sense of normality, indicating that the disease and its treatment did not limit their normal daily life, was felt by 69.3% of respondents. Fear of complications was mentioned by 46.5% of respondents. The prevalence of adherence and factors explaining adherence to treatment are shown in Table 2.

Relationships between adherence to treatment and explanatory factors

Initially, direct positive relationships between factors associated with adherence to medication and adherence to a healthy lifestyle was tested (Fig. 1). SEM excluded direct positive associations between sense of normality, fear of complications, results of care, cooperation, support from next of kin, physicians and nurses with adherence to medication, and a healthy lifestyle. Direct, positive associations were revealed between motivation and adherence to medication (standardized regression weight 0.18) and adherence to a healthy lifestyle (0.43), and between

Table 2 – Prevalence of good adherence to treatment and factors explaining adherence

Mean sum variables	Items	Good adherence (%) (n)	$\bar{x}$	Median	SD
Adherence to treatment					
Adherence to medication	1, 2	99.2 (126)	1.99	2	0.09
Adherence to healthy lifestyle	3–6	87.4 (111)	1.87	2	0.33
Factors explaining adherence to treatment					
Responsibility	10, 11	97.6 (124)	1.98	2	0.15
Results of care	21, 22	94.5 (120)	1.94	2	0.23
Support from next of kin	23–27	94.5 (120)	1.94	2	0.23
Cooperation	7–9	92.9 (118)	1.93	2	0.26
Motivation	12, 13	92.9 (118)	1.93	2	0.26
Support from physicians	28–31	91.3 (116)	1.91	2	0.28
Support from nurses	32–35	89.8 (114)	1.90	2	0.30
Sense of normality	14–20	69.3 (88)	1.69	2	0.46
Fear of complications	36, 37	46.5 (59)	1.46	1	0.50

n – frequency; $\bar{x}$ – mean values; SD – standard deviation.

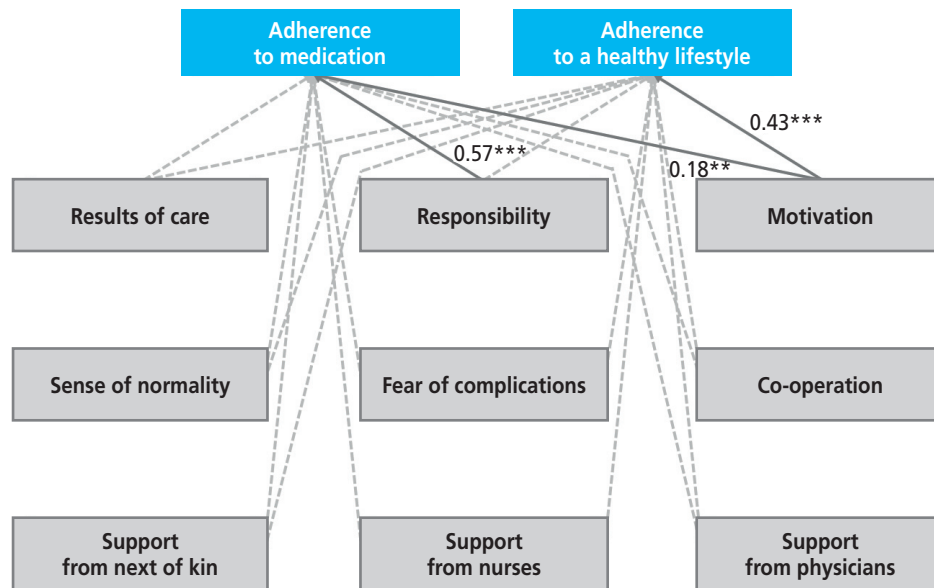


Fig. 1 – Hypothetical Theory of Adherence of People with Chronic Disease among the elderly with Chronic Heart Failure, direct connections. Standardized regression weights are presented, with significance levels indicated as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; p – statistical significance.

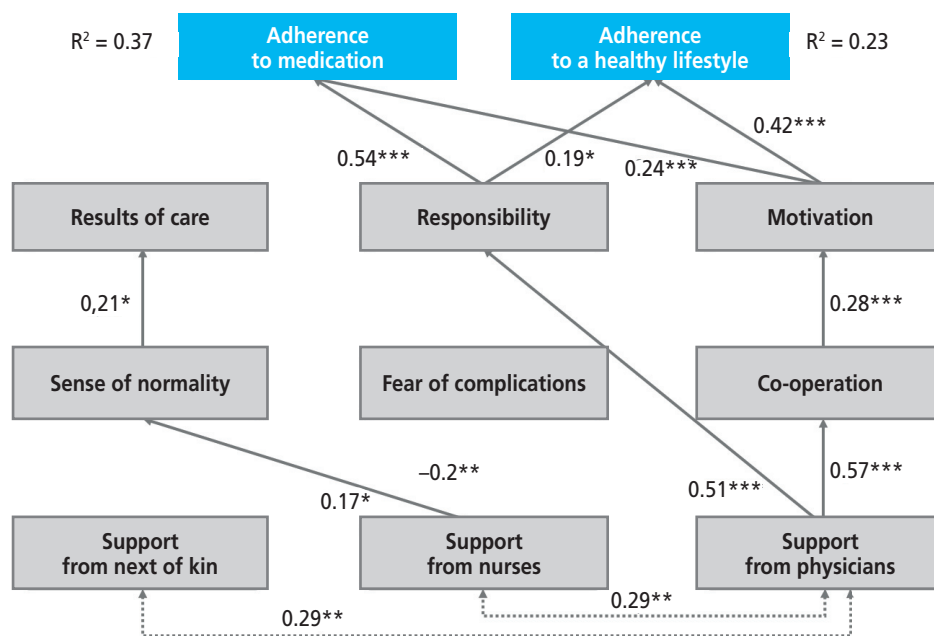


Fig. 2 – Hypothetical Theory of Adherence of People with Chronic Disease among the elderly with chronic heart failure, indirect connections. Standardized regression weights are presented, with significance levels indicated as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; p – statistical significance; R^2 – coefficient of determination.

responsibility and adherence to medication (0.57). However, given the model fit parameters (Chi-square [χ^2] = 196.9; degrees of freedom [df] = 37; χ^2/df ratio = 5.3; CFI = 0.38; and RMSEA = 0.19), it was evident that this model, based on the Theory of Adherence of People with Chronic Disease,¹⁴ was not suitable for the obtained data. Therefore, it was necessary to include indirect associations between individual explanatory factors in the model.

In the second phase, the indirect associations between factors and adherence to medication and a healthy lifestyle were tested (Fig. 2). In the proposed model in Figure 2, solid arrows represent the effect of one explanatory factor on the other, and dashed bidirectional arrows represent covariances between pairs of factors. This model demonstrated that support from physicians was correlated with support from both nurses and next of kin.

The model demonstrated statistically significant ($p < 0.05$) positive relationships between support from nurses and a sense of normality (standardized regression weight 0.17) and between a sense of normality and results of care (standardized regression weight 0.21). Further associations were found between support from doctors and cooperation (standardized regression weight 0.57), support from physicians and responsibility (standardized regression weight 0.51), and between cooperation and motivation (standardized regression weight 0.28). Motivation showed a positive association with adherence to medication and a healthy lifestyle (standardized regression weights 0.24 and 0.42, respectively). Responsibility revealed strong association with adherence to medication (standardized regression weight 0.54) and weaker association with adherence to a healthy lifestyle (standardized regression weight 0.19). This model was able to explain 37% of the variance in the factors linked to adherence to medication and 23% of the variance in the factors linked to adherence to a healthy lifestyle. The parameters used to assess the model's accuracy (Chi-square [χ^2] = 53.4; degrees of freedom [df] = 43; χ^2/df ratio = 1.24; CFI = 0.96; and RMSEA = 0.044) indicate that the model aligns well with the data.

Sociodemographic factors and disease-specific factors predicting adherence to treatment and its explanatory factors

The relationships between basic variables and factors explaining adherence to treatment in the elderly are shown in **Table 3**. A connection was found between education and fear of complications, with the educated elderly being approximately four times more likely to be aware of possible complications from non-compliance with regimen measures than the elderly who were not educated. The elderly with an MMSE score of 27–30 and NYHA functional classification I and II had approximately 2.5 and 3.2 times higher chances of living a normal life without limitations than the elderly with an MMSE score of 24–26 and NYHA classification III and IV. The elderly with one or more hospitalizations related to heart failure in the past year had about ten times more support from next of

kin than the elderly without hospitalization. The elderly who were married, widowed, or divorced had about 12.5 times more support from physicians than the elderly who were single.

Discussion

The goal of this study was to assess adherence to treatment among elderly patients with chronic heart failure, focusing on medication adherence and a healthy lifestyle. Additionally, the study aimed to identify the significance of factors explaining adherence to treatment. The relationships between these factors and selected predictive factors, including sociodemographic data and disease-specific information, were also examined.

This study is the first to present results using a self-assessment tool to examine factors explaining adherence and their predictive factors (both sociodemographic and disease-specific) in patients with chronic heart failure. A key finding of this investigation was a high level of adherence to treatment, with 99.2% of respondents reporting good adherence to medication. Previous studies utilizing the ACDI tool also found medication adherence rates exceeding 90%. For instance, a study by Kähkönen et al.¹⁷ investigating predictive factors of adherence to treatment in patients suffering from ischemic heart disease post-percutaneous coronary intervention reported a 95.2% adherence rate using the same modified standardized ACDI questionnaire designed for assessing adherence in patients with chronic heart disease.¹⁵ Medication adherence levels in heart failure patients depend on the definition and measurement method used.²⁰ For example, in a study of 124 respondents in Singapore with chronic heart failure and an average age of 69.1 years using the MARS-5 tool, 73.6% reported good medication adherence.²¹ Generally, adherence tends to decrease over the duration of living with the disease. Studies indicate that older age alone is not associated with reduced medication adherence in patients with chronic heart failure.²²

Regarding adherence to a healthy lifestyle, this study found that 87.4% of respondents reported good adher-

Table 3 – Multivariable logistic regression describing the relationships between primary variables and factors explaining adherence to treatment in the elderly with chronic heart failure

Predictive factors (Nagelkerke R ²)	Odds ratio (95% confidence interval)	<i>p</i>	χ^2	df	<i>p</i>
Fear of complications (0.100)			9.886	1	0.002
Education: yes	4.05 (1.59/10.30)	0.003			
Sense of normality (0.162)			15.492	4	<0.001
MMSE: 27–30	2.65 (1.18/5.95)	0.015			
NYHA: I a II	3.19 (1.33/7.65)	0.011			
Support from next of kin (0.144)			6.493	5	0.011
Hospitalization: 1 or more	10.50 (2.00/55.22)	0.005			
Support from physicians (0.159)			9.348	3	0.002
Marital status: married, widowed, divorced	12.69 (2.77/58.03)	0.001			

p-value – statistical significance; χ^2 – chi-square; df – degrees of freedom.

ence, comparable to the 89.9% reported in Kähkönen et al.¹⁷ The higher proportion of respondents with reduced adherence to a healthy lifestyle in this study might be attributed to decreased mobility due to advanced age and the presence of comorbidities, leading to inadequate physical activity. Another reason could be the reliance on meals provided by catering services that do not consider dietary restrictions for the disease, limiting the elderly control over their diet. Adherence to a sodium-restricted diet among older patients with heart failure varies from 13% to 75%, depending on data collection methods.²³

Among elderly patients with chronic heart failure, The Theory of Adherence of People with Chronic Disease explained 37% and 23% of the variance in adherence to medication and a healthy lifestyle, respectively. Based on the results of this study, the Theory of Adherence of People with Chronic Disease is an appropriate theoretical framework for planning and implementing nursing interventions for the elderly with chronic heart failure.

Although not all factors explaining adherence to treatment according to the Theory of Adherence of People with Chronic Disease had a direct effect on adherence to medication and healthy lifestyle, several statistically and clinically noteworthy findings emerged. The results showed that responsibility was the strongest factor associated with medication adherence, while motivation proved to be the strongest factor associated with adherence to a healthy lifestyle. These findings are in agreement with previous studies testing the Theory of Adherence of People with Chronic Disease. For example, a significant link between good patient motivation and good adherence was demonstrated in adolescents with diabetes mellitus,¹⁴ epilepsy,²⁴ and chronic illness in general.²⁵ Motivation was also a key factor for adult patients undergoing warfarin therapy,¹⁸ patients at risk of cardiovascular disease,²⁶ and patients with ischemic heart disease post-percutaneous coronary intervention.^{15,27} Similarly to previous studies, motivation appears to be a critical factor for adherence to a healthy lifestyle in the findings of this study. Motivation, a psychosocial factor influencing adherence to treatment, significantly impacts health behaviours and patients' approach to treatment. Therefore, the main challenge in caring for patients with cardiovascular disease is to initiate and maintain necessary changes of health behaviour, i.e. adequate and regular physical activity, abstinence from smoking and alcohol, and adherence to dietary restrictions. Healthcare providers should adopt a motivational approach built on mutual trust and partnership with patients, enhancing mutual communication.^{15,23}

Unlike adherence to a healthy lifestyle, the strongest factor associated with adherence to medication was responsibility. This study also observed relationships between responsibility and healthy lifestyle adherence, and between motivation and medication adherence. Both motivation (through the factor of cooperation) and responsibility are associated with physician support, which covaries with support from nurses and next of kin. These findings confirm the importance of social support for elderly patients with heart failure, known to positively influence adherence to treatment.^{28,29}

The results of this study indicated that education on lifestyle modifications related to heart disease predicted greater fear of complications among the elderly, reflecting an awareness of the risks associated with non-adherence to treatment regimens. Education for heart failure patients focusing on lifestyle modifications, self-care, and symptom management provides patients with information about the nature of the disease, the importance of treatment, self-monitoring, and the consequences of non-adherence. Awareness of the potential risks of inadequate adherence to heart failure treatment can lead to fear of complications among the elderly. The study by Kähkönen et al.²⁷ demonstrated that informational support was indirectly, but statistically significantly, related with adherence to both medication and a healthy lifestyle. In this study, informational support is understood as practical patient education, where patients receive basic and detailed information and recommendations regarding their illness, including feedback. These findings emphasize patient adherence to treatment as a multidimensional concept highlighting the active role and participation of a patient in his own care, which are currently a priority in nursing.¹⁶ To fully engage in self-care and make relevant decisions, patients should have enough knowledge and information about their disease and its treatment. This fact is supported by results from earlier studies indicating that knowledge and information are perceived as the most critical for engaging patients in treatment regimens. It is also essential to emphasize not only information provision but also improving competencies for collaboration between patients and professionals.^{12,16}

Another finding of this study was that the elderly with MMSE scores of 27-30 and NYHA functional classification I and II reported a greater sense of normality compared to those with lower MMSE scores and NYHA functional classification III and IV. Evidence suggests that cognitive function contributes independently to adherence in older adults with heart failure.³⁰ Patients with poor NYHA functional status typically have increased physical limitations, restricting their ability to perform daily activities. Although the elderly with NYHA functional classification III and IV experienced greater limitations in daily life, this study did not observe reduced adherence to treatment in these patients. However, some studies have shown that the severity of symptoms, reflected in worse NYHA functional class, is associated with poorer adherence to treatment.³¹

Furthermore, the study found that hospitalization related to chronic heart failure in the past year predicted better support from next of kin. A plausible explanation might be that hospitalization makes relatives perceive the disease as a severe condition, leading to increased support for the elderly with heart failure.

The final observed relationship between adherence predictors and explanatory factors was the association between marital status and physician support. The elderly who were married, widowed, or divorced had a higher likelihood of receiving strong support from a physician compared to those who were single. This finding aligns with the understanding that socioeconomic status is an important factor influencing adherence to treatment in older patients with heart failure.²³

It is worth noting that, unlike the study by Kähkönen et al.¹⁷ on predictors of adherence to treatment, this study did not find a relationship between motivation and any predictive factors. A possible explanation is that the sample of respondents showed high percentages of good adherence across most factors explaining adherence to treatment (except for the sense of normality and fear of complications), making it more challenging to identify predictors for these factors statistically.

Limitations of the study

Due to the fact that adherence is a multidimensional concept based on different definitions and there is no agreement upon generally accepted definition of adherence, and moreover the terminology has evolved over time, direct comparison with previously published studies is limited. In addition, a large proportion of adherence testing studies are focused only on medication adherence testing. Another limitation is the possible bias of the results due to the use of a self-assessment tool.

Conclusion

The results of this study align with the multifactorial concept of adherence to treatment, emphasizing the importance of assessing adherence not only to medications but also to a healthy lifestyle and all influencing aspects. One of the significant factors affecting adherence to treatment identified in this study is education. Therefore, it is crucial that education is tailored to the specific needs of the patient, considering their age, educational level, health literacy, and is based on professional knowledge. Most studies, including this one, agree that motivation is a key factor for adherence to treatment. Healthcare providers should thus focus on enhancing patient motivation through appropriate interventions, such as setting treatment plans, establishing, and monitoring individual goals, individual consultations, motivational interviews, counselling, or shared decision-making. This necessitates the development and strengthening of motivational skills among healthcare professionals.

In conclusion, the efficacy of multidimensional interventions to improve adherence not only in older patients with heart failure but also across various groups of patients with chronic illnesses needs further testing for a better understanding of this issue.

Conflict of interest

The authors declare that they have no competing interests.

Funding

None.

Ethical statement

The research protocol was approved by the institution where the study took place. Respondents were assured that all data collected would be anonymous and confidential.

Informed consent

Informed consent was obtained from all participants involved in the study.

Availability of data and materials

All data are available in the manuscript

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