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Self-Care Behaviors among Malaysian Heart Failure Patients in Government Hospital: Demographics Influence

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Abstract
Heart failure requires effective self-care to prevent complications, and understanding demographic influences supports tailored interventions. This study assessed self-care behaviors among HF patients and examined the impact of demographic variables. A cross-sectional study involving 159 patients receiving treatment for at least 6 months was selected through simple random sampling, and the SCHFI v7.2 was used, with analyses conducted using SPSS 27.0. Participants showed strong maintenance behaviors but moderate symptom management, with age the only significant predictor. HF patients perform well in maintenance tasks, but younger heart failure patients need targeted support to improve self-care.

Keywords: Heart failure, self-care, demographics, Malaysia, self-care behaviour

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1.0 Introduction

Heart failure (HF) is a chronic and progressive clinical syndrome in which the heart fails to supply adequate blood flow to meet the metabolic demands of the body, leading to impaired perfusion of vital organs. It commonly arises from underlying cardiovascular conditions, such as coronary artery disease, hypertension, and cardiomyopathies, and is characterized by symptoms including dyspnea, fatigue, exercise intolerance, and fluid retention (Savarese et al., 2022; Shahim et al., 2023). Globally, approximately 64 million individuals are affected by HF, with increasing prevalence due to population aging and improved survival following acute cardiac events, such as myocardial infarction (Khan et al., 2024; Shahim et al., 2023). The pathophysiology of HF involves complex mechanisms, including neurohormonal activation, increased afterload, and structural cardiac remodeling. Systemic hypertension is a primary contributor to heart failure with preserved ejection fraction (HFpEF), often resulting in left ventricular hypertrophy and diastolic dysfunction (Tan et al., 2022; Triposkiadis et al., 2022). Comorbidities such as diabetes mellitus and chronic kidney disease exacerbate functional decline and increase the risk of decompensation (Lee et al., 2023; Triposkiadis et al., 2022). For instance, diabetes predisposes patients to asymptomatic left ventricular dysfunction, which may progress to clinical HF if unmanaged (Triposkiadis et al., 2022). Optimal HF management involves pharmacological and non-pharmacological strategies. Standard pharmacotherapies, including diuretics, angiotensin-converting enzyme inhibitors, beta-blockers, and mineralocorticoid receptor antagonists, have been shown to improve symptoms and stabilize cardiac function (Lim et al., 2022; Song et al., 2023).

In Malaysia, the burden of HF continues to rise, with increasing admissions among both older and younger adults driven by high rates of hypertension, diabetes, and ischemic heart disease. This growing prevalence imposes substantial challenges on patients,

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caregivers, and healthcare systems, particularly in terms of long-term disease management and quality of life. Effective self-care is important in HF management, as it enables patients to maintain physiological stability, monitor symptoms, and take appropriate action during symptom exacerbations (Riegel et al., 2022). Evidence consistently shows that strong self-care behaviours reduce readmissions, improve survival, and enhance overall quality of life. Despite its importance, many HF patients struggle to perform adequate self-care due to factors such as lack of awareness, limited health literacy, cultural beliefs, and demographic variations. Demographic factors, including age, sex, marital status, employment, and living area, have been found to influence patients' readiness and ability to engage in self-care. For instance, older adults may exhibit higher self-care experience but poorer physical functioning, while marital support has been associated with better adherence and symptom monitoring. However, the influence of demographic characteristics on self-care in Malaysia's multicultural context remains underexplored.

Given the increasing prevalence of HF and the critical role of self-care in improving health outcomes, understanding how demographic determinants shape self-care behaviours is essential. Such insights can help clinicians design targeted, culturally sensitive, and patient-centred strategies to optimise HF management. Therefore, this study aims to examine the relationship between demographic characteristics and self-care behaviours among patients with heart failure in Malaysia.

2.0 Literature Review

2.1 Heart Failure and the Importance of Self-Care

Heart failure is a chronic, progressive condition requiring complex long-term management. Self-care is defined as a process involving maintenance, symptom monitoring, and management responses to prevent complications (Riegel et al., 2022). Adequate self-care improves clinical stability, quality of life, and reduces unplanned hospital visits. However, many HF patients worldwide demonstrate suboptimal self-care due to limited understanding of their condition, poor motivation, or psychosocial constraints (Jaarsma et al., 2020). Self-care behaviors are critical for long-term HF management. These encompass daily activities to maintain stability, monitor symptoms, and respond appropriately to early deterioration, including medication adherence, dietary modification, fluid management, physical activity, regular weight monitoring, symptom recognition, and timely help-seeking.

Effective self-care reduces hospitalizations, prevents symptom exacerbation, and improves functional outcomes. However, self-care practices vary widely and are influenced by demographic factors. Age affects physical capacity and cognitive function, while education level influences health literacy. Income and socioeconomic status shape access to care, medications, and dietary choices (Li et al., 2025) . Ethnicity and cultural norms affect treatment beliefs, dietary patterns, and family involvement. Social support further facilitates consistent self-care routines (Lim et al., 2022). Understanding these determinants is essential for designing tailored interventions and culturally sensitive HF management programs.

2.2 Demographic Determinants of Self-Care

Demographic characteristics play an important role in influencing patients' engagement in self-care. Age is a significant factor, as older adults often possess greater disease experience but may face challenges such as difficulty interpreting symptoms, cognitive decline, and multiple comorbidities. While some studies report that older individuals demonstrate better adherence to self-care recommendations, others highlight poorer performance, particularly in self-care maintenance (Lim et al., 2022). Sex has also shown mixed findings; although women generally engage more actively in health-seeking behaviours, evidence regarding sex differences in self-care among heart failure patients remains inconsistent (Koirala et al., 2020). Marital status contributes meaningfully to self-care, with married individuals often demonstrating better practices due to stronger social support, emotional stability, and shared responsibility in managing their illness.

Additionally, education and employment status are linked to higher health literacy, which enhances patients' capacity to understand and follow self-care recommendations. Residential location also matters, as individuals living in urban areas typically have better access to healthcare, health information, and support services than those in rural areas (Lim et al., 2022). However, in Malaysia, research exploring these demographic influences remains limited. Given the country's multiethnic and multicultural population, the demographic determinants of self-care may differ significantly from those in Western contexts, underscoring the need for locally contextualized evidence to guide heart failure management.

3.0 Methodology

A quantitative cross-sectional design was employed to assess self-care behaviors among patients with heart failure at a single point in time, which is suitable for examining the association between demographic factors and self-care. The study was conducted at a major cardiac referral center under the Ministry of Health Malaysia, specifically within the Cardiology Clinic of a public hospital. The target population consisted of adult patients diagnosed with heart failure who had been receiving treatment at the clinic for at least six months, and participants were selected using simple random sampling based on predetermined inclusion and exclusion criteria. The inclusion criteria were adults aged 18 years and above, diagnosed with heart failure and attending follow-up at the Cardiology Clinic, on maintenance treatment for at least six months, and able to read and understand English or Malay. Patients who were critically ill, did not provide informed consent, or had incomplete medical records were excluded from the study. The required sample size was calculated using the Raosoft sample size calculator, with a 5% margin of error, 95% confidence level, a population size of 270, and a response distribution of 50%, resulting in a target of 159 participants.

Data was collected using a self-administered questionnaire consisting of two sections. Section A captured demographic information, including gender, age, marital status, race, living area, employment status, occupation, and monthly income. Section B assessed self-care behaviors using the Self-Care Heart Failure Index (SCHFI) version 7.2, a validated tool based on the situation-specific theory of heart failure self-care. The SCHFI evaluates three domains: self-care maintenance, which includes routine behaviors such as medication adherence, diet control, and physical activity; self-care monitoring, which involves recognition and tracking of symptoms, including daily weight checks; and self-care management, which measures actions taken in response to symptoms, such as modifying diet or seeking medical advice. All items are rated on a 5-point Likert scale, and the instrument has demonstrated strong internal consistency, with a Cronbach's alpha of 0.91.

Data was collected using a self-administered questionnaire to assess self-care behaviors among patients with heart failure attending the Cardiology Clinic at the Public Hospital. Participants who met the inclusion and exclusion criteria were invited to join the study after obtaining ethical approval from the relevant committees. Eligible patients were approached during clinic visits and informed that completing the questionnaire would take approximately 15–20 minutes.

Data collection was conducted from March 1, 2025, to May 30, 2025. Participation was voluntary, and informed consent was obtained to ensure privacy and confidentiality. Participants were allowed to complete the questionnaire at their convenience within the clinic setting.

Data was analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 27.0. All collected data were checked for completeness, inconsistencies, and missing values before analysis. Descriptive statistics were used to summarize demographic characteristics and self-care variables. Appropriate statistical tests were applied to examine the relationships between demographic factors and self-care behaviors.

Ethical approval for this study was obtained from the Research Ethics Committee of Universiti Teknologi MARA (FERC/FSK/MR/2024/00367) and the Ministry of Health Malaysia through the Medical Research and Ethics Committee (MREC) (NMRR ID-25-00960-8NB [IIR]), and all procedures were conducted in accordance with the Declaration of Helsinki.

4.0 Findings

4.1 Demographic Characteristics of Participants

Table 4.1 presents the demographic profiles of the 159 respondents who participated in the study. Most participants were male, accounting for 104 (65.4%) of the sample, while females comprised 55 (34.6%). In terms of age, most respondents (101, 63.5%) were 35 years and older, followed by 32 (20.1%) aged 30 to 34 years, 17 (10.7%) aged 25 to 29 years, and 9 (5.7%) aged 18 to 24 years. More than half of the participants were married (50.34%), while 24 (15.1%) were single, 37 (23.3%) were divorced, and 18 (11.3%) fell under other or unreported marital status categories.

For the ethnicity, Chinese participants constituted the largest group (79, 49.7%), followed by Indians (37, 23.3%), Malays (26, 16.4%), and other ethnicities (17, 10.7%). Nearly half of the respondents (62, 39.0%) lived in suburban areas, while 45 (28.3%) resided in urban areas, and the remainder lived in small towns. Most participants were employed (103, 64.8%), followed by 33 (20.8%) who were self-employed, 12 (7.5%) who were unemployed, and 11 (6.9%) who were retirees. Regarding occupation, 89 (56%) were engaged in non-healthcare-related fields, while 70 (44%) were healthcare professionals. With respect to monthly income, most respondents (90, 56.6%) earned between RM1001 and RM1999.

4.1 Demographic characteristics of participants

Demographic Variable		Frequency (n)	Percentage %	Mean	SD
Gender	Female	55	34.6		
	Male	104	65.4		
Age	18-24 years	9	5.7		
	25-29 years	17	10.7		
	30-34 years	32	20.1	3.41	0.89
	35 years and above	101	63.5		
Marital Status	Single	24	15.1		
	Married	80	50.34		
	Divorced	37	23.3		
	Other/ Not reported	18	11.3		
Race	Malay	26	16.4		
	Chinese	79	49.7		
	Indian	37	23.3		
	Others	17	10.7		
Living Area	Urban area	45	28.3		
	Sub-urban	62	39.0		
	Small town	35	22.0		
	Others	17	10.7		
Employment Status	Employed	103	64.8		
	Self-employed	33	20.8		
	Unemployed	12	7.5		
	Retiree	11	6.9		
Occupation	Healthcare related	70	44.0		

	Non-healthcare related	89	56.0
Monthly Income	RM 1000 and below	34	21.4
	RM 1001- RM 1999	90	56.6
	RM2000-RM 4999	23	14.5
	RM5000 and above	12	7.5

4.2 Mean Scores of Self-Care Behaviors Across SCHFI Domains.

Patients demonstrated high adherence to daily maintenance activities. Regular weight monitoring was performed "often" by 56% and "always" by 13.2%, while ankle swelling checks were performed "often" by 50.3% and "always" by 17%. Physical activity was reported "often" by 34.6% and "always" by 26.4%. Low-salt dietary adherence was high, with 47.2% following recommendations "often" and 27.7% "always." Despite these behaviors, medication adherence was suboptimal, with 18.9% "always" forgetting to take medication and 46.5% "often" forgetting.

Self-care management behaviors were moderate. Most patients limited their salt intake and used medication reminders, yet only 27.7% adjusted their diuretics appropriately when symptoms occurred. Seeking professional advice was common, but some delays were observed. Confidence in symptom management was moderate, with 70% frequently attempting to relieve symptoms, yet only 27.7% consistently evaluated treatment effectiveness.

Table 4.2. Mean scores of self-care behaviors across SCHFI domains.

Variable	Never	Rarely	Sometimes	Often	Always
Maintenance	n (%)				
Weigh yourself?	1 (0.6)	1 (0.6)	47 (29.6)	89 (56.0)	21 (13.2)
Check your ankle for swelling	1 (0.6)	1 (0.6)	50 (31.4)	80 (50.3)	27 (17.0)
Try to avoid getting sick		7 (4.4)	36 (22.6)	59 (37.1)	57 (35.8)
Do some physical activity?		15 (9.4)	47 (29.6)	55 (34.6)	42 (26.4)
Keep doctors and nurse appointment	1 (0.6)	1 (0.6)	46 (28.9)	90(56.6)	21(13.2)
Eat low salt diet?		7(4.4)	32(20.8)	75(47.2)	44(27.7)
Exercise for 30 minutes?		8(5.0)	33(20.8)	74(46.5)	44(27.7)
Forget to take one of your medicines?		8(5.0)	47(29.6)	74(46.5)	30(18.9)
Management					
Ask for low-salt items?		10(6.3)	59(37.1)	57(35.8)	33(20.8)
Use a system to remember medicines?		8(5.0)	33(20.8)	74(46.5)	44(27.7)
Trouble breathing or ankle swelling?		8(5.0)	7(29.6)	74(46.5)	30(18.9)
Reduce the salt in your diet		1(0.6)	1(0.6)	49(30.8)	81(50.9)
Reduce your fluid intake		10(6.3)	43(27.0)	72(45.3)	34(21.4)
Take an extra water pill if you have ankle swelling/trouble breathing		15(9.4)	47(29.6)	53(33.3)	44(27.7)
Call a doctor or nurse for guidance	1 (0.6)	1(0.6)	46(28.9)	90(56.6)	21(13.2)
Confidence					
Keep yourself free of heart failure symptoms		8(5.0)	33(20.8)	74(46.5)	44(27.7)
Follow the treatment advice you have been given?		8(5.0)	47(29.6)	74(46.5)	30(18.9)
Do something that will relieve your symptoms?		10(6.3)	59(37.1)	57(35.8)	33(20.8)
Recognize changes in your health if they occur?		8(5.0)	47(29.6)	74(46.5)	30(18.9)
Evaluate how well a remedy works.		8(5.0)	33(20.8)	74(46.5)	44(27.7)

4.3 The Mean and Standard Deviation of Self-Care Behaviors Scores for Different Variables Among HF Patients.

Table 4.3 presents the means and standard deviations of self-care behaviors among patients with heart failure, based on 20 items across three domains: maintenance, management, and confidence. Patients achieved the highest mean score in the self-care maintenance domain, with an average of M = 3.87 (SD = 0.48) across eight items, indicating that routine health activities such as dietary control and exercise were performed more consistently than other self-care behaviors. The management domain, consisting of seven items, had a slightly lower mean score of M = 3.81 (SD = 0.48), suggesting that although patients generally responded to symptoms—such as contacting a healthcare provider or adjusting medications, these behaviors were less consistently performed than routine maintenance.

The confidence domain, which included five items assessing patients' belief in their ability to manage symptoms and evaluate treatment effectiveness, yielded the lowest mean score of M = 3.84 (SD = 0.58), indicating a moderate level of self-confidence in symptom management. The total combined mean score for all self-care behaviors was M = 11.53 (SD = 1.43), reflecting an overall good level of self-care among the sample, with some variability between individuals. These results underscore the importance of not only supporting patients in maintaining routine and management behaviors but also enhancing their confidence to ensure sustained, long-term self-care.

Table 4.3. The Mean and Standard Deviation of Self-Care Behaviors Scores for Different Variables Among HF Patients.

Variables	Number of Statements	Mean (SD)
Self-care behaviors		
Maintenance	8	**3.87 (0.48)**
Management	7	3.81 (0.48)
Confidence	5	3.84 (0.58)
Total Mean (SD)	**3.84 (0.47)**	

4.4 The Relationship Between Demographic Factors And Self-Care Behaviors.

Table 4.4 presents the relationship between sociodemographic variables and self-care behaviours. A Pearson correlation analysis showed a significant positive relationship between age and self-care behavior, $r = .28$, $p < .001$. This indicates that older participants reported higher levels of self-care behavior. A one-way ANOVA was conducted to examine differences in self-care behavior across marital status categories. The results showed no significant differences among single (M = 11.05, SD = 1.31), married (M = 11.70, SD = 1.38), divorced (M = 11.37, SD = 1.44), and other/not reported participants (M = 11.67, SD = 1.76), $p = .215$. with p value = 0.215. Similarly, there were no significant differences in self-care behavior based on living area, including urban (M = 11.35, SD = 1.50), suburban (M = 11.67, SD = 1.29), and small-town residents (M = 11.50, SD = 1.64) with p value = 0.493. Employment status also did not significantly influence self-care behavior. Mean scores were comparable among employed (M = 11.56, SD = 1.50), self-employed (M = 11.31, SD = 1.52), unemployed (M = 11.77, SD = 1.22), and retired participants (M = 11.79, SD = 0.46) with p value = 0.672). Besides, the occupational category (healthcare-related vs. non-healthcare-related) did not yield significant differences in either self-care behaviours (p = 0.691). Finally, monthly income was not significantly associated with self-care behavior. Participants earning RM1000 and below (M = 11.53, SD = 1.13) and those earning RM1001–1999 (M = 11.54, SD = 1.48) did not differ in their self-care behavior scores. Among all sociodemographic variables examined, age was the only variable that showed a significant association with self-care behavior, and the relationship was positive. All other variables demonstrated no statistically significant differences in self-care behavior.

Table 4.4 Relationship between demographic factors and self-care behaviors.

Sociodemographic Variables		Self-care behavior	p Value
Age		r 0.276	**P<0.001**
Marital Status			
Single	Mean (SD)	11.05 (1.31)	**0.215**[a]
Married	Mean (SD)	11.70 (1.38)	
Divorced	Mean (SD)	11.37 (1.44)	
Other/ Not reported	Mean (SD)	11.67 (1.76)	
Living Area			
Urban area	Mean (SD)	11.35 (1.50)	**0.493**[a]
Sub-urban	Mean (SD)	11.67 (1.29)	
Small town	Mean (SD)	11.50 (1.64)	
Employment Status			
Employed	Mean (SD)	11.56 (1.50)	**0.672**[a]
Self-employed	Mean (SD)	11.31 (1.52)	
Unemployed	Mean (SD)	11.77 (1.22)	
Retiree	Mean (SD)	11.79 (0.46)	
Occupation			
Healthcare related	Mean (SD)	11.49 (1.52)	**0.691**[a]
Non-healthcare related	Mean (SD)	11.58 (1.33)	
Monthly Income			**0.869**[a]
RM 1000 and below	Mean (SD)	11.53 (1.13)	
RM 1001- RM 1999	Mean (SD)	11.54 (1.48)	

*[a] *Independent t-test*

5.0 Discussion

The findings of this study suggest that demographic characteristics, particularly age, influence patients' engagement in self-care, reinforcing the need for patient-centred and contextually appropriate management strategies. Overall, patients demonstrated good adherence to self-care maintenance behaviours, while self-care management and confidence were only moderate. This pattern is consistent with the Situation-Specific Theory of Heart Failure Self-Care, which proposes that routine behaviours are easier to adopt than management behaviours requiring symptom interpretation, decision-making, and self-efficacy (Riegel et al., 2022). The strong performance in maintenance behaviours may reflect the structured follow-up and standardised education provided in Malaysian public cardiac clinics, where regular reinforcement by healthcare professionals supports routine practices such as dietary control, appointment attendance, and symptom monitoring. However, gaps in medication adherence and symptom-driven management indicate difficulties in autonomous decision-making during symptom exacerbation, a challenge similarly reported in previous studies (Jaarsma et al., 2020). Self-care confidence was only moderate, suggesting limitations in patients' perceived ability to independently manage worsening symptoms, which may delay timely responses and compromise long-term outcomes (Riegel et al., 2022). Among the demographic variables examined, age was the only factor significantly associated with self-care behaviour, with older patients demonstrating better self-care performance. This may be attributed to greater disease experience, stronger illness perception, and repeated exposure to self-care education. In contrast, younger patients may face competing life demands or perceive heart failure as less serious, contributing to lower engagement in self-care behaviours (Lim et al., 2022). Other demographic factors, including marital status, income, employment, and residential area, were not significantly associated with self-care behaviours, possibly reflecting equitable access to education and follow-up care within Malaysia's public healthcare system. Collectively, these findings suggest that demographic influences on self-care operate primarily through differences in self-care skills and confidence rather than demographic characteristics alone, underscoring the need for age-sensitive, skill-based interventions that strengthen symptom management and self-care confidence, particularly among younger heart failure patients.

6.0 Conclusion& Recommendations

6.1 Conclusion

Patients with HF in this study demonstrated good adherence to daily maintenance behaviors, moderate symptom management, and moderate confidence in managing their condition. Age significantly predicted self-care behaviors, highlighting the need for age-specific interventions. Medication adherence and active symptom management remain areas for improvement. Tailored, culturally sensitive, and patient-centered approaches are essential to optimize HF self-care and clinical outcomes.

6.2 Recommendations

Nurses should design self-care education tailored to patients' age, health literacy, and confidence levels. Strategies to improve medication adherence, including reminders, counseling, and family support, are crucial. Enhancing self-efficacy through skills training and symptom management reinforcement can improve outcomes. Integrating multidisciplinary care and technology-based tools may further support patient empowerment, early recognition of complications, and reduction of hospitalizations

6.3 Limitation

This study has several limitations. The cross-sectional design precludes causal inference, particularly regarding the relationship between age and self-care behaviours. As the study was conducted in a single cardiac referral centre, the findings may have limited generalisability to other clinical settings with different models of care. The use of self-administered questionnaires may also introduce recall and social desirability bias, potentially leading to overestimation of self-care practices. Furthermore, the analysis focused on demographic factors, while other important behavioural and psychological determinants of self-care were not examined. Future multi-centre longitudinal studies incorporating clinical, psychosocial, and behavioural variables are warranted to better inform targeted heart failure self-care interventions.

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Paper Contribution to the Related Field of Study

This study provides new evidence on how demographic characteristics influence self-care behaviours among heart failure patients in Malaysia, addressing a notable gap in the existing literature, which is largely dominated by Western populations. The findings offer context-specific insights that reflect Malaysia's multicultural environment, highlighting demographic groups that may require targeted education and support. This contribution strengthens the understanding of self-care determinants and supports clinicians and policymakers in developing more personalised, culturally appropriate strategies to enhance heart failure management. The study also

lays the groundwork for future research exploring tailored interventions and broader behavioural factors affecting self-care in diverse populations.

References

Jaarsma, T., Westland, H., Vellone, E., Freedland, K. E., Schröder, C., Trappenburg, J. C. A., Strömberg, A., & Riegel, B. (2020). Status of theory use in self-care research. International Journal of Environmental Research and Public Health, 17(24), 1–13. https://doi.org/10.3390/ijerph17249480

Khan, M. S., Shahid, I., Bennis, A., Rakisheva, A., Metra, M., & Butler, J. (2024). Global epidemiology of heart failure. Nature Reviews Cardiology, 21(10), 717–734. https://doi.org/10.1038/s41569-024-01046-6

Koirala, B., Dennison Himmelfarb, C. R., Budhathoki, C., & Davidson, P. M. (2020). Heart failure self-care, factors influencing self-care and the relationship with health-related quality of life: A cross-sectional observational study. Heliyon, 6(2). https://doi.org/10.1016/j.heliyon.2020.e03412

Lee, K. S., Park, D. I., Lee, J., Oh, O., Kim, N., & Nam, G. (2023). Relationship between comorbidity and health outcomes in patients with heart failure: a systematic review and meta-analysis. BMC Cardiovascular Disorders, 23(1), 1–16. https://doi.org/10.1186/s12872-023-03527-x

Li, F., Zhang, X. M., Chen, Y. H., Chen, J., Liu, S. Y. S. S., Liu, S. Y. S. S., Koontalay, A., Botti, M., Hutchinson, A., Habibzadeh, H., Bagherzadi, A., Didarloo, A., Khalkhali, H., Kiuchi, S., Tsukamoto, S., Sato, R., Hosono, K., Okuda, J., Natsumeda, M., … Le, A. (2025). Illness perceptions of people living with chronic heart failure and limited community disease management. International Journal of Nursing Studies, 23(1), 1–9. https://doi.org/10.1111/jocn.17335

Lim, Y. M. F., Ong, S. M., Koudstaal, S., Hwong, W. Y., Liew, H. B., Rajadurai, J., Grobbee, D. E., Asselbergs, F. W., Sivasampu, S., & Vaartjes, I. (2022). Trends for readmission and mortality after heart failure hospitalisation in Malaysia, 2007 to 2016. *Global Heart*, *17*(1), 20. https://doi.org/10.5334/gh.1108

Riegel, B., Dickson, V. V., & Vellone, E. (2022). The Situation-Specific Theory of Heart Failure Self-care: An Update on the Problem, Person, and Environmental Factors Influencing Heart Failure Self-care. The Journal of Cardiovascular Nursing, 37(6), 515–529. https://doi.org/10.1097/JCN.0000000000000919

Shahim, B., Kapelios, C. J., Savarese, G., & Lund, L. H. (2023). Global Public Health Burden of heart Failure: An updated review. Cardiac Failure Review, 9, e11. https://doi.org/10.15420/cfr.2023.05

Savarese, G., Becher, P. M., Lund, L. H., Seferovic, P., Rosano, G. M. C., & Coats, A. J. S. (2022). Global burden of heart failure: a comprehensive and updated review of epidemiology. Cardiovascular Research, 118(17), 3272–3287. https://doi.org/10.1093/cvr/cvac013

Song, H. J., Kim, H. Y., Park, S., & Lee, S. H. (2023). Factors influencing self-care behaviour in patients with heart failure: Grit as a behavioural support factor. International Journal of Nursing Practice, 30(2), e13151. https://doi.org/10.1111/ijn.13151

Triposkiadis, F., Xanthopoulos, A., Parissis, J., Butler, J., & Farmakis, D. (2022). Pathogenesis of chronic heart failure: cardiovascular aging, risk factors, comorbidities, and disease modifiers. Heart Failure Reviews, 27(1), 337–344. https://doi.org/10.1007/s10741-020-09987-z

Tan, P. P. S., Sandhu, R. S., Zain, S. M., Hall, D., Tan, N. C., Lim, H. M., Daud, F., & Pung, Y. F. (2022). Health motivations and perceived barriers are determinants of self-care behaviour for the prevention of hypertension in a Malaysian community. PLoS ONE, 17(12 December), 1–17. https://doi.org/10.1371/journal.pone.0278761

Wiśnicka, A., Lomper, K., & Uchmanowicz, I. (2022). Self-care and quality of life among men with chronic heart failure. Frontiers in Public Health, 10. https://doi.org/10.3389/fpubh.2022.942305