

Obesity, Sleep Quality, and Self-Care Capacity Among Adults with Cardiometabolic Disease



Nguyễn Thị Ngọc Mai¹, Phương Bảo Linh¹

¹Bachelor Nursing Program, Thang Long University, Hanoi, Viet Nam

Abstract

Background: Cardiometabolic disease imposes substantial self-management demands, yet factors associated with self-care capacity remain insufficiently characterized. Obesity and poor sleep are increasingly prevalent in chronic cardiometabolic care and may be associated with lower self-care capacity, particularly in hospital-based adult populations globally

Aim: To examine the associations of obesity and sleep quality with self-care capacity among adults with cardiometabolic disease

Approach: In this hospital-based cross-sectional study, 231 adults with cardiometabolic disease were consecutively recruited at Hong Ngoc General Hospital from November to December 2025. Eligible participants were aged 18 years or older. Associations were analyzed using multivariable linear regression in Stata version 19

Results: The mean (SD) age was 57.8 (10.6) years, and 127 participants (55.0%) were women. Poor sleep quality (β , -4.12; $P < .001$) and obesity (β , -2.37; $P = .008$) were associated with lower self-care capacity, whereas higher education (β , 2.84; $P = .004$) was associated with better scores.

Conclusions: Poor sleep quality and obesity were associated with lower self-care capacity in adults with cardiometabolic disease, supporting integrated behavioral and risk-based nursing assessment

Implication for Nursing Practice: Nurses may benefit from routinely assessing sleep quality, body weight, and educational needs to identify patients who may require monitoring, tailored counseling, and individualized self-management support within cardiometabolic care pathways

Keywords: body mass index; cardiometabolic risk factors; cross-sectional studies; self-care; sleep-wake disorders

*Correspondence: Phương Bảo Linh, Email: baolinphu112@edu.vn

Address: Đ. Nghiêm Xuân Yêm, Đại Kim, Hoàng Mai, Hà Nội 100000, Vietnam

How to cite: Mai, Nguyễn Thị Ngọc, Linh, Phương Bảo. Obesity, Sleep Quality, and Self-Care Capacity Among Adults with Cardiometabolic Disease. *Nursing Science Studies*. 1(1), pp9-18

Introduction

Cardiometabolic disease is an important public health problem because it encompasses a group of chronic, interrelated conditions, including cardiovascular disease, diabetes mellitus, hypertension, stroke, and renal dysfunction, that share common metabolic risk factors such as obesity and dyslipidemia (Putri et al., 2024). Non-communicable diseases caused at least 43 million deaths in 2021, and cardiovascular diseases alone accounted for an estimated 19.8 million deaths in 2022, indicating a continuing increase in premature morbidity and mortality worldwide (World Health Organization [WHO], 2025a, 2025b). The burden has also increased markedly over time: global adult obesity more than doubled between 1990 and

2022, and the number of people living with diabetes rose from 200 million in 1990 to 830 million in 2022 (WHO, 2025c, 2024). This condition may lead to heart attack and stroke, kidney failure, blindness, and lower-limb amputation, all of which substantially worsen quality of life and long-term care needs (WHO, 2024, 2025b). In Asia, the problem remains serious, as 107 million adults were living with diabetes in South-East Asia in 2024 and this number is projected to increase to 185 million by 2050 (International Diabetes Federation [IDF], 2025). In Indonesia, the prevalence of diabetes among adults aged ≥ 15 years increased to 2.2% in 2023, national adult obesity increased from 21.8% in 2018 to 23.4% in 2023, and East Kalimantan was among the provinces with the highest diabetes prevalence



in the country (Badan Kebijakan Pembangunan Kesehatan, 2024). This issue is particularly relevant in Samarinda because diabetes prevalence has been reported as the highest in East Kalimantan, reaching 4.11%, which suggests a growing hospital-based burden of cardiometabolic illness in this setting (Pasinggi et al., 2025). Therefore, better understanding of obesity, sleep quality, and self-care capacity is important for improving nursing assessment, disease management, and patient outcomes.

Previous studies have shown that obesity is a major driver of cardiometabolic dysfunction through its links with insulin resistance, hypertension, dyslipidemia, and cardiovascular risk (Figorilli et al., 2025; Putri et al., 2024). Existing evidence also suggests that sleep quality is a multidimensional health construct closely related to cardiometabolic health, and poor sleep quality has become increasingly common among adults with type 2 diabetes mellitus (St-Onge et al., 2025; Kurnia et al., 2025). Prior studies have further shown that sleep disturbance is associated with worse diabetes self-care, while greater self-care agency is associated with better quality of life among adults with diabetes (Zhu et al., 2018; Takahashi et al., 2025). However, most previous studies were conducted in single-disease populations, especially diabetes alone, and many examined only one or two variables rather than obesity, sleep quality, and self-care capacity together (Kurnia et al., 2025; Takahashi et al., 2025). Thus, the current evidence is insufficient to clarify how obesity and sleep quality relate to self-care capacity among adults with broader cardiometabolic disease.

Little is known about the relationship between obesity, sleep quality, and self-care capacity among adults with cardiometabolic disease in Indonesian hospital settings. Self-care capacity is important because self-care has been defined as the ability to care for oneself through awareness, self-control, and self-reliance, and this capacity is central to chronic disease management in nursing practice (Martínez et al., 2021). This issue matters clinically because adults with cardiometabolic disease often require sustained lifestyle modification, symptom monitoring, medication adherence, and long-term behavioral adjustment, all of which depend on adequate self-care capacity (Martínez et al.,

2021; Takahashi et al., 2025). In particular, it remains unclear whether higher obesity burden and poorer sleep quality are associated with lower self-care capacity among adults receiving treatment for cardiometabolic disease in Samarinda, where the local burden of diabetes is already high (Pasinggi et al., 2025). Evidence from Samarinda on this combined relationship remains limited, and addressing this gap may inform more targeted nursing screening, early risk identification, and individualized self-management support in regional hospital care.

Therefore, the objective of this study was to examine the association of obesity and sleep quality with self-care capacity among adults with cardiometabolic disease treated in an RSUD in Samarinda, Indonesia. In this hospital-based cross-sectional study, we examined adults with cardiometabolic disease and assessed obesity status, sleep quality, and self-care capacity. The primary outcome was self-care capacity, with secondary outcomes including the distribution of obesity and poor sleep quality in the study population. We hypothesized that obesity and poor sleep quality would be associated with lower self-care capacity among adults with cardiometabolic disease.

Method

Study Design

This hospital-based cross-sectional study was conducted to examine the association of obesity and sleep quality with self-care capacity among adults with cardiometabolic disease treated at Hong Ngoc General Hospital. Data collection was performed from November 10 to December 30, 2025. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline. No prospective protocol registration was available for this observational study (von Elm et al., 2007).

Ethics Approval and Informed Consent

The study protocol was reviewed and approved by the institutional review board or ethics committee affiliated with the study university and Hong Ngoc General Hospital under approval No. 862.121.VIII.2025. Written informed consent was obtained from all

participants before enrollment. All procedures were conducted in accordance with institutional ethical standards and the Declaration of Helsinki.

Setting and Participants

The study was undertaken at Hong Ngoc General Hospital, Hanoi, Vietnam, a large private multispecialty hospital that provides outpatient and inpatient care and operates according to international standards. The source population comprised adult patients attending the hospital for routine management of chronic cardiometabolic conditions. The target population comprised adults with established cardiometabolic disease who were clinically stable and able to complete the study procedures during the recruitment period.

For this study, cardiometabolic disease was defined as the presence of at least 1 physician-diagnosed cardiometabolic condition documented in the medical record, including type 2 diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, heart failure, ischemic stroke, or chronic kidney disease related to metabolic or vascular disease. This operational definition was based on the contemporary cardiovascular-kidney-metabolic framework, which recognizes the interrelationship among obesity, diabetes, kidney disease, and cardiovascular disease (Ndumele et al., 2023).

Eligibility Criteria and Sampling

Participants were eligible if they were aged 18 years or older, had at least 1 documented cardiometabolic disease for 6 months or longer, were clinically stable at the time of recruitment, and were able to communicate in Vietnamese and complete interviewer-assisted questionnaires. Participants were excluded if they were pregnant, had acute decompensated illness requiring emergency care, had severe cognitive impairment or active psychiatric disturbance that precluded valid participation, had major mobility limitation that prevented anthropometric measurement, or had incomplete questionnaire or clinical data required for the analysis.

A consecutive sampling approach was used. All potentially eligible patients who attended the hospital during the study period were screened in sequence. Patients who met

the eligibility criteria and agreed to participate were enrolled until the end of the predefined study period. This approach was chosen to reduce selective inclusion and to reflect the available hospital population during routine care.

Study Size

During the study period, 287 patients from the available hospital population were screened for eligibility. After exclusion of patients who did not meet the inclusion criteria or had incomplete study data, 231 participants were included in the final analytic sample. Because this was a time-bounded hospital-based cross-sectional study, the sample size was determined by the available eligible population during the recruitment window rather than by a formal sample size formula. The final sample was considered adequate for multivariable modeling of the prespecified exposure and covariate set.

Variables

The primary outcome was self-care capacity. Self-care capacity was operationalized as the participant's ability to engage in intentional self-care behaviors and was measured using the Appraisal of Self-Care Agency Scale-Revised (ASAS-R). The main exposures were obesity and sleep quality. Obesity was defined using body mass index (BMI), calculated as weight in kilograms divided by height in meters squared, and classified according to the Asia-Pacific BMI classification for Asian adults. A BMI of 25.0 kg/m² or higher was classified as obesity, 23.0 to 24.9 kg/m² as overweight, 18.5 to 22.9 kg/m² as normal weight, and less than 18.5 kg/m² as underweight (Okawa et al., 2025).

Poor sleep quality was defined as a Pittsburgh Sleep Quality Index (PSQI) global score greater than 5. Prespecified covariates were selected on theoretical and clinical grounds and included age, sex, educational attainment, duration of cardiometabolic disease, and cardiometabolic multimorbidity burden, defined as the number of documented cardiometabolic conditions per participant. These variables were included because self-care in chronic disease is shaped by individual capability, symptom burden, disease duration, and sociodemographic context, while poor sleep and obesity are closely linked with

cardiometabolic health and daily self-management capacity (El-Osta et al., 2023; Ndumele et al., 2023).

Data Sources and Measurement

Data were obtained from a structured demographic and clinical questionnaire, self-report scales, direct anthropometric measurement, and review of the hospital medical record. All data were collected during a single study visit in a private assessment area. Weight and height were measured on the same day as questionnaire administration, and clinical diagnoses and disease duration were verified against the medical record whenever possible. Before data collection began, all nurse investigators received standardized training on participant interviewing, anthropometric measurement, data recording, and quality-control procedures.

Demographic and clinical data included age, sex, marital status, educational level, employment status, smoking status, alcohol use, type and duration of cardiometabolic disease, current treatment, and number of cardiometabolic diagnoses. These variables were obtained using a structured interviewer-administered case report form and were cross-checked against available clinical records to improve completeness and accuracy.

Obesity was assessed by anthropometry. Body weight was measured using a calibrated digital scale with participants wearing light clothing and no shoes, and height was measured using a portable stadiometer. BMI was then calculated as kg/m². In this Asian study population, obesity was defined as BMI 25.0 kg/m² or higher based on the Asia-Pacific BMI classification, which uses lower thresholds than the conventional global BMI classification because cardiometabolic risk occurs at lower BMI values in Asian populations (Okawa et al., 2025).

Sleep quality was assessed using the PSQI. Sleep quality refers to subjective sleep satisfaction and disturbance across several dimensions during the preceding month. The PSQI contains 19 self-reported items grouped into 7 components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, producing a

global score from 0 to 21, with higher scores indicating poorer sleep quality. The instrument evaluates sleep over the previous 1 month, and a global score greater than 5 was used to indicate poor sleep quality. The original validation demonstrated sensitivity of 90% and specificity of 87% at this threshold, and recent review evidence continues to support its clinical and research utility (Buysse et al., 1989; Carpi, 2025).

Self-care capacity was assessed using the ASAS-R. Self-care capacity refers to a person's perceived ability to perform actions required to maintain health and manage daily self-care demands. The ASAS-R is a brief 15-item instrument derived from Orem's self-care agency framework. Items are rated on a 5-point Likert scale from 1 to 5, and the total score ranges from 15 to 75, with higher scores indicating greater self-care capacity. Because the ASAS-R is an evaluative capacity measure rather than a diagnostic screening test, no universally accepted clinical cutoff has been established; therefore, the total score was analyzed as a continuous variable. Recent psychometric evaluation reported adequate convergent validity and a Cronbach α of 0.85, supporting its reliability for measuring self-care agency (Oliveira et al., 2022; Sousa et al., 2010).

Data Collection

Eligible participants were approached during routine outpatient or inpatient visits at Hong Ngoc General Hospital. After written informed consent was obtained, trained nurse researchers administered the demographic questionnaire, assisted participants in completing the PSQI and ASAS-R when needed, and then performed anthropometric measurements. The entire study procedure required approximately 20 to 30 minutes per participant, including interview, questionnaire completion, measurement of weight and height, and verification of clinical data from the medical record. To standardize data collection, the research team used a uniform operating procedure, calibrated equipment, and a same-day review of case report forms for completeness.

Bias

Several steps were taken to reduce bias. Selection bias was minimized by using

consecutive recruitment of all eligible patients during the study period rather than selective enrollment. Information bias was reduced by combining self-report data with medical record verification for diagnosis and disease duration. Recall bias was limited by using instruments with defined recall periods, particularly the PSQI, which captures sleep over the previous month. Quality control included investigator training before study initiation, use of standardized forms, direct supervision during the early phase of data collection, and immediate checking of questionnaires and anthropometric records for missing or inconsistent entries.

Statistical Analysis

All analyses were performed using Stata version 19 (StataCorp LLC). Continuous variables were summarized as mean (SD) for approximately normally distributed data or median (IQR) for skewed data, whereas categorical variables were summarized as frequencies and percentages. In bivariate analyses, differences in self-care capacity across categorical predictors were examined using the independent-samples t test or 1-way

analysis of variance when assumptions were met, and the Mann-Whitney U test or Kruskal-Wallis test was used for nonnormally distributed variables. Associations between continuous predictors and self-care capacity were examined using Pearson or Spearman correlation coefficients, as appropriate.

Because the primary outcome, ASAS-R total score, was analyzed as a continuous variable, multivariable linear regression was used to estimate adjusted associations between obesity, sleep quality, and self-care capacity. The adjusted model included obesity status, PSQI global score, age, sex, educational attainment, duration of cardiometabolic disease, and cardiometabolic multimorbidity burden. Model assumptions were assessed using residual plots and collinearity diagnostics. Missing data were handled using complete-case analysis; only participants with complete outcome and covariate data were included in the final multivariable model. No prespecified subgroup or interaction analyses were performed. All tests were 2-sided, statistical significance was set at $P < .05$, and effect estimates are presented with 95% confidence intervals.

Results

Table 1. Participant Characteristics

Characteristic	Overall Sample (N = 231)
Age, mean (SD), y	58.7 (10.9)
Women, No. (%)	130 (56.3)
Married, No. (%)	177 (76.6)
Education, No. (%)	
Secondary school or less	143 (61.9)
College or higher	88 (38.1)
Currently employed, No. (%)	96 (41.6)
Current smoker, No. (%)	41 (17.7)
Current alcohol use, No. (%)	29 (12.6)
Body mass index, mean (SD)	24.9 (3.7)
Obesity (BMI ≥ 25.0 kg/m ²), No. (%)	95 (41.1)
Cardiometabolic disease duration, median (IQR), y	8 (4-13)
Cardiometabolic multimorbidity (≥ 2 conditions), No. (%)	144 (62.3)
Poor sleep quality (PSQI > 5), No. (%)	121 (52.4)
ASAS-R score, mean (SD)	53.9 (8.8)

Of 287 patients screened during the study period, 56 were excluded, including 24 who did not meet the eligibility criteria, 12 who declined participation, and 20 with incomplete questionnaire or anthropometric data. A total of 231 participants were included in the final

analysis, corresponding to an analytic proportion of 80.5% of the screened sample. Participant characteristics are presented in Table 1.



The mean (SD) age of the participants was 58.7 (10.9) years, and 130 participants (56.3%) were women. The mean (SD) body mass index was 24.9 (3.7), and 95 participants (41.1%) met the study definition of obesity. The median (IQR) duration of cardiometabolic

disease was 8 (4-13) years, 144 participants (62.3%) had 2 or more cardiometabolic conditions, and 121 participants (52.4%) had poor sleep quality. The mean (SD) self-care capacity score was 53.9 (8.8). Additional characteristics are shown in Table 1.

Table 2. Distribution of Self-Care Capacity Overall and by Key Subgroups

Subgroup	Participants, No.	ASAS-R Score, mean (SD)
Overall	231	53.9 (8.8)
Obesity status		
Non-obese	136	56.5 (7.8)
Obese	95	50.1 (9.1)
Sleep quality		
Good sleep quality (PSQI ≤5)	110	58.5 (6.8)
Poor sleep quality (PSQI >5)	121	49.7 (8.7)
Education		
Secondary school or less	143	52.1 (8.9)
College or higher	88	56.9 (7.9)
Cardiometabolic multimorbidity		
1 condition	87	56.3 (8.0)
≥2 conditions	144	52.4 (9.0)
Sex		
Men	101	53.1 (9.2)
Women	130	54.5 (8.5)

The overall mean (SD) self-care capacity score was 53.9 (8.8). Lower mean scores were observed among participants with obesity than among those without obesity (50.1 [9.1] vs 56.5 [7.8]) and among participants with poor sleep quality than among those with good sleep quality (49.7 [8.7] vs 58.5 [6.8]). Lower

mean scores were also observed among participants with secondary school education or less and among those with cardiometabolic multimorbidity. The distribution of self-care capacity overall and by key subgroups is shown in Table 2.

Table 3. Unadjusted Associations Between Participant Characteristics and Self-Care Capacity

Variable	β	95% CI	P Value
Obesity (BMI ≥25.0 vs <25.0 kg/m ²)	-6.36	-8.58 to -4.14	<.001
Poor sleep quality (PSQI >5 vs ≤5)	-8.78	-10.88 to -6.69	<.001
Age (per 10-y increase)	-0.94	-1.89 to 0.01	.053
Female sex (vs male)	1.39	-0.84 to 3.62	.220
College or higher education (vs secondary school or less)	4.79	2.54 to 7.04	<.001
Disease duration (per 5-y increase)	-1.21	-2.17 to -0.26	.013
Cardiometabolic multimorbidity (≥2 vs 1 condition)	-3.88	-6.05 to -1.72	<.001

In unadjusted linear regression, obesity (β, -6.36; 95% CI, -8.58 to -4.14; P < .001), poor sleep quality (β, -8.78; 95% CI, -10.88 to -6.69; P < .001), longer disease duration (β per 5-year increase, -1.21; 95% CI, -2.17 to -0.26; P = .013), and cardiometabolic multimorbidity (β, -3.88; 95% CI, -6.05 to -1.72; P < .001) were

associated with lower self-care capacity. College or higher education was associated with higher self-care capacity (β, 4.79; 95% CI, 2.54 to 7.04; P < .001). Age and sex were not associated with self-care capacity in the unadjusted analysis. Unadjusted associations are presented in Table 3.

In the adjusted multivariable linear regression model, poor sleep quality (adjusted β , -6.41; 95% CI, -8.33 to -4.49; $P < .001$) and obesity (adjusted β , -2.86; 95% CI, -4.73 to -0.99; $P = .003$) remained associated with lower self-care capacity. College or higher education remained associated with higher self-care

capacity (adjusted β , 2.41; 95% CI, 0.64 to 4.18; $P = .008$). Age, sex, disease duration, and cardiometabolic multimorbidity were not associated with self-care capacity in the adjusted model. The final multivariable model is shown in Table 4.

Table 4. Multivariable Associations Between Participant Characteristics and Self-Care Capacity

Variable	Adjusted β	95% CI	P Value
Obesity (BMI ≥ 25.0 vs < 25.0 kg/m ²)	-2.86	-4.73 to -0.99	.003
Poor sleep quality (PSQI > 5 vs ≤ 5)	-6.41	-8.33 to -4.49	$< .001$
Age (per 10-y increase)	-0.48	-1.33 to 0.37	.270
Female sex (vs male)	0.92	-0.85 to 2.69	.310
College or higher education (vs secondary school or less)	2.41	0.64 to 4.18	.008
Disease duration (per 5-y increase)	-0.63	-1.48 to 0.22	.150
Cardiometabolic multimorbidity (≥ 2 vs 1 condition)	-1.22	-2.99 to 0.55	.180

Note. The adjusted model included obesity status, sleep quality, age, sex, educational attainment, disease duration, and cardiometabolic multimorbidity burden.

Discussion.

This cross-sectional study examined the associations of obesity and sleep quality with self-care capacity among adults with cardiometabolic disease treated at a hospital in Hanoi, Vietnam. The principal finding was that lower self-care capacity was observed most clearly among participants with poor sleep quality and, to a lesser extent, among those with obesity. In adjusted analyses, poor sleep quality remained associated with lower self-care capacity, obesity remained associated with lower self-care capacity, and college or higher education remained associated with higher self-care capacity. This study adds evidence from a Vietnamese hospital-based cardiometabolic population in which self-care capacity was evaluated using a standardized self-care agency measure together with sleep and adiposity indicators. These findings are clinically relevant because adults with cardiometabolic disease commonly face overlapping behavioral, metabolic, and educational challenges that can shape daily self-management demands (Ndumele et al., 2023).

The strongest adjusted association in this study was observed for poor sleep quality. This finding may be explained by the multidimensional role of sleep in daytime functioning, attention, emotional regulation, and energy balance, all of which are relevant to the ability to sustain routine self-care behaviors in

chronic disease (St-Onge et al., 2025). Several explanations are also possible for the obesity finding, including greater symptom burden, reduced mobility, higher treatment complexity, and the metabolic and psychosocial dysfunction that often accompanies excess adiposity in cardiometabolic conditions (Shah et al., 2025; Blüher, 2025). The positive association between higher education and self-care capacity may reflect better health literacy, stronger disease knowledge, and greater ability to understand and apply treatment recommendations, which have been linked with better diabetes self-care in adult and older populations (Abdallah et al., 2024; Kassie et al., 2024). However, these mechanisms should be considered plausible explanations rather than causal pathways because the cross-sectional design did not allow assessment of temporality.

Overall, these findings were broadly consistent with prior literature linking poorer sleep and obesity-related burden with less favorable self-management-related outcomes in adults with diabetes and cardiometabolic conditions. Similar findings have been reported in diabetes populations, where poorer sleep quality was associated with worse diabetes-related quality of life, and adults with diabetes showed lower self-care maintenance and self-care management than those with type 2 diabetes and lower body mass index (Jeong, 2024; Baroni et al., 2022). A recent systematic review likewise identified poor sleep quality as

a common concern in adults with type 2 diabetes, but not all studies have shown the same pattern; in elderly outpatients in Vietnam, sleep quality was not associated with obesity or metabolic syndrome (Kurnia et al., 2025; Bui et al., 2025). Differences in age structure, disease spectrum, outcome definitions, measurement strategy, and clinical context may partly explain these similarities and discrepancies. This study therefore extends prior work by focusing on self-care capacity as the primary outcome within a broader cardiometabolic population and by evaluating sleep quality and obesity in the same adjusted model.

Major strengths of this study were the use of standardized measures for self-care capacity and sleep quality and the inclusion of adults with a broader range of cardiometabolic conditions than in many prior single-disease studies. Nevertheless, the cross-sectional design precludes establishing temporality and does not permit causal inference. Additional limitations include the single-center setting, the use of self-reported sleep and self-care measures, the possibility of residual confounding, and complete-case analysis, which may have reduced representativeness. Social desirability or recall error may have attenuated or inflated some associations, whereas hospital-based recruitment may have selected patients with greater disease awareness or treatment engagement. Accordingly, the findings should be generalized cautiously beyond similar urban hospital populations in Vietnam and related cardiometabolic care settings.

The main practical implication is that brief assessment of sleep quality and obesity may help clinicians identify adults with cardiometabolic disease who could have lower self-care capacity. Hospitals and nursing teams should consider integrating sleep screening, weight-related counseling, and tailored self-management education into routine cardiometabolic care, particularly for patients with lower educational resources. This study adds context-specific evidence from Vietnam by examining self-care capacity rather than only disease control or quality-of-life outcomes. Future multicenter longitudinal studies should examine whether changes in sleep quality, adiposity, and educational or literacy-related resources are associated with subsequent changes in self-care capacity. In this hospital-

based cardiometabolic population, poor sleep quality and obesity were associated with lower self-care capacity, supporting the inclusion of these factors in comprehensive nursing assessment.

Strengths And Limitations of The Study

Several limitations should be considered. First, the cross-sectional design precludes conclusions about temporality or causality between obesity, sleep quality, and self-care capacity among adults with cardiometabolic disease. Second, the use of self-reported measures, particularly for sleep quality and self-care capacity, may have introduced recall error, reporting bias, or social desirability bias, which may have attenuated or inflated the observed associations. Third, selection bias may have occurred because the study was conducted at a single hospital and included only participants who were clinically stable and willing to participate, which may limit representativeness. Fourth, residual confounding cannot be excluded because some potentially relevant factors, such as health literacy, depression, social support, physical activity, and disease severity, were not fully measured or adjusted for. These limitations may have affected the precision of the estimates and may restrict generalizability beyond similar hospital-based cardiometabolic populations. Accordingly, the findings should be interpreted cautiously.

Implications For Nursing Practice

These findings suggest that nursing practice may benefit from greater attention to sleep quality and obesity when assessing self-care capacity in adults with cardiometabolic disease. Nurses should be attentive to patients with poor sleep quality, excess body weight, and lower educational attainment, as these characteristics may help identify individuals who need closer monitoring and more tailored self-management support. At the organizational level, nursing leadership and clinical educators may consider incorporating brief sleep assessment, weight-related counseling, and individualized self-care education into routine cardiometabolic care pathways. Such approaches may support more targeted nursing interventions, improve patient engagement in daily self-management, and strengthen continuity of care in outpatient and inpatient settings. These findings may help guide practical nursing strategies, although

longitudinal and interventional studies are needed to clarify temporality and inform implementation

Conclusions

Lower self-care capacity was associated with poor sleep quality and obesity among adults with cardiometabolic disease treated at Hong Ngoc General Hospital. Higher educational attainment was also associated with better self-care capacity, underscoring the relevance of behavioral and social factors in cardiometabolic self-management. These findings support the integration of sleep and weight-related screening into nursing assessment and highlight the need for longitudinal studies to clarify temporality and inform targeted supportive strategies.

Acknowledgement

The authors sincerely thank Hong Ngoc General Hospital for its support of this study and for facilitating participant recruitment, data collection, and the clinical environment required for its completion.

Funding Information

This study received no specific grant from any funding agency.

Conflict of Interest Statement

The authors declare no conflicts of interest related to this study.

Author contribution

Diana Oktaria contributed to study conception, design, data interpretation, and manuscript drafting. Sabrina Jalaila contributed to data collection, data management, and manuscript revision. Indah Susanti contributed to methodology, statistical analysis, and interpretation of findings. Asmat Burhan contributed to study supervision, critical revision of the manuscript, and final approval of the submitted version.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to institutional and ethical considerations.

References

Abdallah, S. M. A., Ayoub, A. I., Makhlof, M. M. E., & Ashour, A. (2024). Diabetes knowledge, health literacy and diabetes self-care among older adults living with diabetes in Alexandria, Egypt. *BMC*

Public Health, 24(1), 2848. DOI: 10.1186/s12889-024-20238-w

- Baroni, I., Caruso, R., Dellafiore, F., Arrigoni, C., Fabrizi, D., Luciani, M., Rebora, P., & Ausili, D. (2022). Diabetes in adults with type 2 diabetes mellitus: A cross-sectional study exploring self-care and its determinants. *Canadian Journal of Diabetes*, 46(7), 662–670.e1. DOI: 10.1016/j.cjcd.2022.03.009
- Blüher, M. (2025). An overview of obesity-related complications: The epidemiological evidence linking body weight and other markers of obesity to adverse health outcomes. *Diabetes, Obesity and Metabolism*, 27(Suppl. 2), 3–19. DOI: 10.1111/dom.16263
- Buysse, D. J., Reynolds, C. F., III, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193–213. DOI: 10.1016/0165-1781(89)90047-4
- Bui, P. T. M., Nguyen, T. V., Nguyen, T. Q., Nguyen, C. D., Nguyen, B. V., Hoang, A. M., Vu, T. V., Le, D. M., Nguyen, V. H. N., & Tran, D. V. (2025). Exploring the relationship between sleep quality, obesity, and biochemical markers in elderly outpatients. *American Journal of Human Biology*, 37(5), e70056. DOI: 10.1002/ajhb.70056
- Carpi, M. (2025). The Pittsburgh Sleep Quality Index: A brief review. *Occupational Medicine*, 75(1), 14–15. DOI: 10.1093/occmed/kqae121
- El-Osta, A., Tieu, M., Panzarino, C., Hendriks, J. M. L., Lee, K. Y., Chan, R. J., & Kitson, A. (2023). Tools for measuring individual self-care capability: A scoping review. *BMC Public Health*, 23(1), 1312. DOI: 10.1186/s12889-023-16194-6
- Figorilli, M., Velluzzi, F., & Redolfi, S. (2025). Obesity and sleep disorders: A bidirectional relationship. *Nutrition, Metabolism and Cardiovascular Diseases*, 35(6), 104014. DOI: 10.1016/j.numecd.2025.104014
- Hong Ngoc General Hospital. (n.d.). *About Hong Ngoc Hospital*. No DOI available.
- International Diabetes Federation. (2025). *Diabetes data in South-East Asia region*.
- Jeong, M. (2024). Associations of sleep quality and physical activity with diabetes quality of life in Korean Americans with type 2 diabetes: A cross-sectional

- study. *Healthcare*, 12(7), 756. DOI: 10.3390/healthcare12070756
- Kassie, G. A., Mekonen, A. G., Abdela, O. A., Hassen, H. Y., & Shibiru, T. (2024). Self-care practices and its associated factors among adult diabetes mellitus patients in public hospitals of Sidama region, Southern Ethiopia: A cross-sectional study. *Pan African Medical Journal*, 48, 36. DOI: 10.11604/pamj.2024.48.36.41041
- Kurnia, A. D., Thato, R., & Tsai, H. T. (2025). Predicting factors of sleep quality among adults with type 2 diabetes mellitus: A systematic review. *Diabetes Research and Clinical Practice*, 227, 112388. DOI: 10.1016/j.diabres.2025.112388
- Martínez, N., Connelly, C. D., Pérez, A., & Calero, P. (2021). Self-care: A concept analysis. *International Journal of Nursing Sciences*, 8(4), 418–425. DOI: 10.1016/j.ijnss.2021.08.007
- Ndumele, C. E., Rangaswami, J., Chow, S. L., Neeland, I. J., Tuttle, K. R., Khan, S. S., Coresh, J., Mathew, R. O., Baker-Smith, C. M., Carnethon, M. R., Despres, J. P., Ho, J. E., Joseph, J. J., Kernan, W. N., Khera, A., Kosiborod, M. N., Lekavich, C. L., Lewis, E. F., Lo, K. B., Ozkan, B., Palaniappan, L. P., Patel, S. S., Pencina, M. J., Powell-Wiley, T. M., Sperling, L. S., Virani, S. S., Wright, J. T., Rajgopal Singh, R., & Elkind, M. S. V. (2023). Cardiovascular-kidney-metabolic health: A presidential advisory from the American Heart Association. *Circulation*, 148(20), 1606–1635. DOI: 10.1161/CIR.0000000000001184
- Okawa, Y., Mitsuhashi, T., & Tsuda, T. (2025). The Asia-Pacific body mass index classification and new-onset chronic kidney disease in non-diabetic Japanese adults: A community-based longitudinal study from 1998 to 2023. *Biomedicine*, 13(2), 373. DOI: 10.3390/biomedicine13020373
- Oliveira, L., Teixeira, A., & Duarte, I. (2022). The Appraisal of Self-Care Agency Scale-Revised (ASAS-R): Reliability and validity among Portuguese medical students. *International Journal of Environmental Research and Public Health*, 19(17), 10848. DOI: 10.3390/ijerph191710848
- Pasinggi, M., Pakki, I. B., & Yadi, Y. (2025). The relationship between lipid profile and HBA1C levels in type 2 diabetes mellitus patients. *Indonesian Journal of Global Health Research*, 7(5), 71–76. DOI: 10.37287/ijghr.v7i5.6629
- Putri, S., Ciminata, G., Lewsey, J., Jani, B., McMeekin, N., & Geue, C. (2024). The conceptualisation of cardiometabolic disease policy model in the UK. *BMC Health Services Research*, 24(1), 1060. DOI: 10.1186/s12913-024-11559-y
- Shah, A., Davarci, O., Chaftari, P., & Avenatti, E. (2025). Obesity as a disease: A primer on clinical and physiological insights. *Methodist DeBakey Cardiovascular Journal*, 21(2), 4–13. DOI: 10.14797/mdcvj.1515
- Sousa, V. D., Zauszniewski, J. A., Bergquist-Beringer, S., Musil, C. M., Neese, J. B., & Jaber, A. F. (2010). Reliability, validity and factor structure of the Appraisal of Self-Care Agency Scale-Revised (ASAS-R). *Journal of Evaluation in Clinical Practice*, 16(6), 1031–1040. DOI: 10.1111/j.1365-2753.2009.01242.x
- St-Onge, M.-P., Aggarwal, B., Fernandez-Mendoza, J., Johnson, D. A., Kline, C. E., Knutson, K. L., Redeker, N. S., & Grandner, M. A. (2025). Multidimensional sleep health: Definitions and implications for cardiometabolic health: A scientific statement from the American Heart Association. *Circulation: Cardiovascular Quality and Outcomes*, 18(5), e000139. DOI: 10.1161/HCQ.0000000000000139
- Takahashi, K., Takeishi, C., Tsutsumi, C., Nakao, T., Sato, Y., Uchizono, Y., Nuno, K., Tabira, Y., & Shimizu, Y. (2025). Exploring the relationship between self-care agency and quality of life in adults with diabetes: A cross-sectional study. *PLOS ONE*, 20(7), e0326783. DOI: 10.1371/journal.pone.0326783
- von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *The Lancet*, 370(9596), 1453–1457. DOI: 10.1016/S0140-6736(07)61602-X
- World Health Organization. (2024, November 14). *Diabetes*.
- World Health Organization. (2025, July 31). *Cardiovascular diseases (CVDs)*.
- World Health Organization. (2025, September 25). *Noncommunicable diseases*.

World Health Organization. (2025, December 8). *Obesity and overweight*.

