p-ISSN: 2338-5324
e-ISSN: 2442-7276

JKP

JURNAL KEPERAWATAN PADJADJARAN

p-ISSN : 2338-5324 e-ISSN: 2442-7276

Jurnal Keperawatan Padjadjaran

Volume 13 Issue 2: August 2025

Jurnal Keperawatan Padjadjaran Volume 13 Issue 2
E-ISSN: 2442-7276; P-ISSN: 2338-5324
http://jkp.fkep.unpad.ac.id

Faculty of Nursing Universitas Padjadjaran, Building Academic 2 Floor 1
Jl Ir. Soekarno KM. 21, Hegarmanah, Jatinangor District, Sumedang Regency,
West Java Province, Indonesia, 45363
Mobile: 085317736810; Phone: 022-7796647; Fax: 022-7796647

p-ISSN : 2338-5324 e-ISSN: 2442-7276
Jurnal Keperawatan Padjadjaran

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p-ISSN : 2338-5324 e-ISSN: 2442-7276
Jurnal Keperawatan Padjadjaran

JKP

Research Article

Volume 13 Issue 2
https://doi.org/10.24198/jkp.v13i2

p-ISSN : 2338-5324 e-ISSN: 2442-7276
Jurnal Keperawatan Padjadjaran
JKP
Research Article
Volume 13 Issue 2
https://doi.org/10.24198/jkp.v13i2

Strategies to enhance the integration of health services, education, research and community engagement within the Nursing Center Model

Neti Juniarti[1*], Jeffrey Fuller[2]

[1] Faculty of Nursing, Universitas Padjadjaran, Bandung, Indonesia
[2] College of Nursing and Health Sciences, Flinders University, Australia

Abstract

The Nursing Center (NC) Model is an innovative approach that integrates community engagement, education, research, and community health care services. We have identified a conceptual framework for a client-centered, service-learning-oriented nursing curriculum that revitalizes community health nursing and improves services through integrated practice and research. The six stages of integration approaches include preparation, orientation, working, pre-termination, termination, and adoption. Implementing these strategies can enhance the quality of nursing services, nursing graduates, and the health of people in the community. To improve outcomes for all stakeholders involved, the Academic Health System (AHS) may also incorporate the NC model within the system.

Keywords: academic health system, integration, nursing center, strategies

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 115-119

http://dx.doi.org/10.24198/jkp.v13i2.2888

Article Info

Received : July 29, 2025
Revised : August 08, 2025
Accepted : August 08, 2025
Published : August 14, 2025

Corresponding author

Neti Juniarti*
Faculty of Nursing, Universitas Padjadjaran, bandung, Indonesia; Address: Jl. Ir. Soekarno KM. 21, Hegarmanah, Jatinangor, Sumedang Regency, West Java; Telp/fax : (022) 7795596; Postal Code: 45363, Phone: 081214612686; Email: neti.juniarti@unpad.ac.id

Citation

Juniarti, N & Fuller, J. (2025). Strategies to enhance the integration of health services, education, research and community engagement within the Nursing Center Model. *Jurnal Keperawatan Padjadjaran, 13*(2), 115-119. http://dx.doi.org/10.24198/jkp.v13i2.2888

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

The Nursing Center (NC) Model

New forms of educational approach and support are necessary to prepare nurses to address the complex and costly challenges towards community health care. The NC model integrates nursing practice, education, and research to address these challenges (Juniarti et al., 2019). The NC represents a comprehensive action for nursing and community care. This globally acknowledged strategy aims to integrate nursing education, research, and community health care (Juniarti et al., 2015). Our research has identified four elements within a conceptual framework pertinent to integration in the NC: (1) client-centered care as the shared ground for integration in the NC; (2) service learning in nursing education; (3) employing the NC to enhance community health nursing (CHN) services; and (4) improving services through community engagement and research. The service-learning pedagogy is appropriate for meeting the requirements of educational institutions and practice as it integrates services with the learning process. The conceptual framework has global applicability and can be employed to enhance the functioning of NCs in Indonesia.

The Academic Health System may also incorporate the NC model. An Academic Health System (AHS) is a partnership that integrates research, education, and healthcare to enhance patient care and medical education. This approach employs transformational learning principles to improve the interplay between medical education and the healthcare system, aiming to increase health outcomes, community involvement, and translational research (Agustian et al., 2024). Collaboration, through the exchange of knowledge and the establishment of synergies between health services and educational institutions, serves as a powerful mechanism for integrating primary healthcare into the academic framework and enhancing educational standards through establishing an environment that fosters professional advancement and engagement with local communities to promote the of people in the community (Frenk, 2009; Frenk et al., 2010). The NC model may facilitate a conducive environment to integrating CHN practice into the nursing school curriculum, thereby cultivating high-quality nurses who will enhance community health. NC stakeholders must prioritize the seamless integration of CHN services, education, and research to fully actualize NC's full potentials.

Strategies to Enhance Integration

The NC's operation may be augmented by the integration of CHN services, education, and research. Consequently, the NC must focus on activities that ensure the continuous application of its theoretical framework, promote cohesion among stakeholders, and secure consensus regarding the NC's ownership. Improving integration inside the NC through these methods could yield numerous advantages for all stakeholders.

Nurses and students can acquire knowledge of optimal practices in family nursing and community health nursing through a service-learning approach (Juniarti et al., 2016). The NC model functions through multiple phases: pre-termination, orientation, working, termination, adoption, and pre-termination. The preparation, working, and ending phases in particular have been documented in the literature (Gupta, 2006; Riedford, 2011). To accomplish service-learning objectives, the preparation, action, reflection, and evaluation stages are important (Gupta, 2006). One crucial stage for effective service learning has been highlighted as preparation when the faculty and community partners can have clear expectations if evaluation planning is done throughout the preparation phase (Larson et al., 2011; Narvasage et al. 2002). Three more phases—the orientation, pre-termination, and adoption phases—have been identified by our research (Juniarti et al. 2019).

Preparation Phase

The primary objectives of the preparatory phase are to engage stakeholders in the NC's operations, ascertain their collaborative intentions, and establish their distinct requirements and ambitions. A requirements assessment is essential throughout the planning phase. Foss et al. (2003) indicate that this evaluation may consider how collaboration enhances the service- learning approach, either as a community-oriented service experience or as a student-centered learning experience through service, or both. Nursing schools can initiate novel partnerships by choosing these alternatives. To ascertain the necessity and desire for optimal integration, both educational and service institutions may ultimately do a formative assessment. The NC may proceed to the orientation phase when there is an increased necessity and willingness to integrate.

Orientation Phase

In the orientation phase, all participants get training on the theoretical foundations of the NC and are afforded the chance to delineate the specific outcomes they aspire to achieve through cooperation and integration. These are essential measures for achieving unanimity over the NC's mission. During the orientation period, the lecturer assists students in familiarizing themselves with the NC environment. Every individual imparts their knowledge and delineates explicit objectives and benefits for all stakeholders. The extent of knowledge-sharing inside an institution indicates its members' willingness to share their expertise with others (Bock et al., 2005). To create student learning experiences while addressing the requirements of the community partner, Peterson and Schaffer (1999) emphasized the importance of faculty engagement during both the design and implementation phases. Enhanced reciprocity can be attained by open, transparent, and readily accessible communication (Blouin & Perry, 2009; Hudson et al., 2011). Moreover, it is crucial to underscore the listening aspect of communication by employing clear terms and a common language (Foss et al., 2003).

Working Phase

Throughout the working phase, students, nurses, and lecturers collaborate regularly and persistently on research and community service initiatives, community health nursing and family nursing services, as well as experiential learning activities. A stable cohort of faculty members to participate in all clinical activities, a frequent and reliable presence in the service, and a sustained community-based collaboration requiring determination and resilience from all stakeholders are essential, as evidenced by Hamner et al. (2007).

Taylor et al. (2006) assert that nurses can engage in research in several capacities, including as autonomous, interdependent, and dependent participants. Nurses could engage in research and community service activities to advance the NC model, either at the dependent level through participation in data collection or at the interdependent level alongside decision-makers in the conceptualization, implementation, evaluation, and dissemination of research (Taylor et al., 2006). By recognizing their contributions, nurses may feel valued in a workplace that fosters integration and collaboration, particularly when they see that their participation influences the service system (Levett-Jones et al., 2007).

Pre-Termination of Collaboration between Education Institution and the Community Health Center Phase

A characteristic of collaboration in the CHN domain is the explicit articulation of terms and timelines for concluding the relationship (Allender et al., 2010). The comon term of partnership between the community health center and a nursing education institution is five years. Upon the attainment of collaborative objectives, a juncture arises wherein the partnership is rendered unnecessary and may be dissolved (Allender et al., 2010; Freeth, 2001). Consequently, the pre-termination phase is necessary prior to the termination of the collaboration.

A formative evaluation is undertaken during the pre-termination phase to assess the level of integration in the NC and to prepare for the termination phase. The literature has documented various evaluation methods for NCs and service learning with various focus, which are assessment of both service and student outcomes (Lutz et al., 2001; Yeh et al., 2009), assessment that focus on either service evaluations or student outcomes (Aponte & Egues, 2010; Barkauskas et al., 2006; Hong & Lundeen, 2009; Kent & Keating, 2013; Pohl et al., 2006; Resick et al., 2011). However, a comprehensive evaluation tool is necessary to measure the NC's performance.

A comprehensive study of integrated healthcare delivery identified 24 various assessment methodologies, nearly all of which indicated the need for clear evaluation criteria substantiated by empirical data (Strandberg-Larsen & Krasnik, 2009). Stakeholders can assess the degree of integration in their NC by employing a formative evaluation approach for integration during the pre-termination phase. If the integration was not evident, the NC would revert to the orientation phase to address the concerns identified by the formative evaluation. The NC may proceed to the end phase once integration has attained its goals.

Termination of of Collaboration between Education Institution and the Community Healt Center Phase

In the termination phase, the community health center and the CHN nurses are expected to manage the NC autonomously once the challenges inside the NC have been resolved and the integration of CHN services, education, and research has achieved its optimal state. This phase is characterized by robust integration plans, continuous CHN services, educational and research activities, stakeholder agreement on ownership of the NC, and the establishment of shared objectives. Certain ongoing collaborations, however, may not require termination such as the NC become a clinical practice site to provide clinical experiences for students from other universities or education institutions (Allender et al., 2010).

Adoption Phase

The stakeholders conduct a summative evaluation throughout the adoption phase. Heath et al. (2013) delineate the adoption phase as being characterized by the following: optimal integration has been attained, with all stakeholders sharing systems and facilities effortlessly. Consumers and providers possess aligned expectations regarding collaboration, while roles and cultures within the NC are comprehensively understood. Collaborative routines are consistent and fluid, accompanied by intentional knowledge sharing tailored to situational contexts and expertise levels.

In a community health center, collaboration between Community Health Nursing services and nursing education stakeholders could provide community members with integrated and continuous healthcare services. The CHN prioritizes health promotion and disease prevention programs, which may improve the patient treatment experience, boost the health of populations and families, and eventually reduce per capita healthcare costs (Heath et al., 2013).

Declaration of Interest

None to declare

Acknowledgment

None

Funding

None

Data Availability

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

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Effectiveness of create sensitivity model on glycemic control and quality of life among patients with type 2 diabetes

Dini Rudini*, **Yulia Indah Permata Sari**, **Putri Irwanti Sari**, **Yosi Oktarina**

Program Studi Keperawatan, Fakultas Kedokteran dan Ilmu Kesehatan Universitas Jambi, Jambi, Indonesia

Abstract

Background: Type 2 diabetes can negatively impact one's physical, emotional, and mental health, often leading to a diminished quality of life. Traditional care typically overlooks psychosocial aspects, and there is a gap in evaluating comprehensive psychosocial interventions. The "Create Sensitivity" model combines these aspects, emphasizing both blood sugar management and life quality.

Purpose: This quasi-experimental research sought to evaluate the impact of the "Create Sensitivity" intervention on enhancing glycemic control and quality of life in individuals with type 2 diabetes, in comparison to standard treatment.

Methods: Seventy individuals were divided into two groups through matched group allocation: the intervention group (n=35), which participated in the 12-week "Create Sensitivity" program, and the control group (n=35), which received standard care. The program involved weekly group meetings that concentrated on cognitive-behavioral education, individualized support, self-care techniques, and strategies for preventing relapse. "HbA1c, mean blood glucose, and Diabetes Quality of Life (DQOL) scores were evaluated at baseline and following a 12-week period. The data were examined through repeated-measures analysis of variance (ANOVA).

Results: The intervention group improved significantly more than the control group in all outcomes. HbA1c decreased by 2.82 percentage points ($p < 0.001$, $\eta^2p = 0.87$), blood glucose reduced by 81.13 mg/dL ($p < 0.001$, $\eta^2p = 0.87$), and quality of life scores increased by 26.91 points ($p < 0.001$, $\eta^2p = 0.86$). These findings indicate large effect sizes and clinically meaningful changes.

Conclusion: The "Create Sensitivity" program effectively improved both glycemic control and quality of life. Integrating psychosocial strategies into diabetes management may enhance patient outcomes, with further research needed on long-term impacts.

Keywords: blood sugar; "create sensitivity" treatment model; hba1c; type 2 diabetes mellitus; quality of life

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 120-129
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2608

Article Info

Received : September 17, 2024
Revised : June 01, 2025
Accepted : June 10, 2025
Published : August 14, 2025

Corresponding author

Dini Rudini*
Program Studi Keperawatan, Fakultas Kedokteran dan Ilmu Kesehatan Universitas Jambi Jambi, Indonesia; Address: Jl. Letjen Suprapto No.33, Telanaipura, Kec. Telanaipura, Kota Jambi, Jambi 36361; Phone:+6819871229; E-mail:dinirudini@unja.ac.id

Citation

Rudini, D., Sari, Y. I. P., Sari, P. I., & Oktarina, Y. (2025). Effectiveness of create sensitivity model on glycemic control and quality of life among patients with type 2 diabetes. *Jurnal Keperawatan Padjadjaran, 13*(2), 120-129. http://dx.doi.org/10.24198/jkp.v13i2.2608

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Type 2 diabetes represents a worldwide health emergency, impacting millions of individuals and severely compromising their quality of life and overall health outcomes (Davies et al., 2022). Diabetes mellitus (DM) remains highly prevalent in Indonesia, based on physicians' diagnoses among individuals aged 15 years, rose to 2%, according to the 2018 Riskesdas (Wahidin et al., 2024). This long-term and advancing condition requires ongoing care, frequently placing a significant physical, emotional, and psychological strain on individuals affected (Kroenke et al., 2024).

Managing blood glucose levels, adhering to treatment plans, and addressing potential complications on a daily basis can be burdensome, negatively impacting patients' well-being and overall quality of life (Janssen et al., 2020). Quality of life refers to a person's subjective evaluation of their physical, emotional, and social well-being. Studies have shown that adults living with diabetes mellitus typically report poorer quality of life compared to the general population (Gálvez Galán et al., 2021).

While the widespread occurrence and impact of type 2 diabetes are well established, traditional care approaches may fail to comprehensively address the multifactorial challenges faced by patients. This realization has led to a shift in healthcare perspective (Asmat et al., 2022). Traditional diabetes management primarily focuses on physiological aspects, such as medication regimens and lifestyle modifications. Nonetheless, there is an increasing awareness in the healthcare field that people with type 2 diabetes encounter significant psychological and emotional difficulties in coping with their illness (Reichert et al., 2025).

These psychological challenges—encompassing feelings of frustration, anxiety, depression, and a perceived loss of control—have been shown to adversely influence patients' overall quality of life and glycemic management outcomes (Jafari et al., 2024). Consequently, addressing the psychological and emotional needs of individuals with Type 2 diabetes mellitus is increasingly recognized as a critical component of comprehensive and holistic patient care (Mangoulia et al., 2024).

In response to these evolving needs, innovative treatment strategies have been developed to offer more holistic and patient-centered care for individuals with Type 2 diabetes mellitus. Existing literature shows that psychological interventions can enhance diabetes management by improving emotional regulation, coping strategies, and Diabetes self-care activities (Ngan et al., 2023). However, empirical evidence regarding the effectiveness of the 'Create Sensitivity' model in managing type 2 diabetes mellitus (T2DM) remains limited. This model integrated cognitive restructuring, structured discharge planning, scientific self-care training, and hope cultivation to build sensitivity among medical teams, patients, and their families. Although the model holds theoretical promise, its influence on quality of life and clinical outcomes remains underexplored, highlighting the need for further empirical investigation.

This gap highlights the need for interventions that not only address the physical aspect of diabetes but also incorporate the psychosocial dimensions into patient care. While psychological and behavioral interventions have shown promise, there remains a scarcity of structured models that comprehensively integrate these elements within a culturally and contextually relevant framework (Versloot et al., 2021). Specifically, there is limited empirical evidence evaluating holistic interventions that simultaneously target emotional regulation, self-efficacy, patient support systems, and structured discharge planning in a single integrated model.

The 'Create Sensitivity' model was developed to address existing gaps in holistic diabetes care. The term 'Create Sensitivity' reflects the model's central philosophy, which emphasizes cultivating awareness, empathy, and responsiveness among healthcare professionals, patients, and families toward the lived experiences of individuals managing diabetes (Hekmatpou et al., 2018). The model is theoretically grounded in cognitive behavioral principles, empowerment theory, and patient-centered care frameworks. It integrates four essential components: cognitive restructuring, structured discharge planning, scientific self-care training, and hope development. These components are designed to strengthen psychological resilience, improve self-management behaviors, and promote sustainable improvements in quality of life.

Significantly, this study advances previous work by Hekmatpou et al. by employing a more rigorous methodology. While Hekmatpou et al.'s original study introduced the "Making Sensitivity" concept without incorporating a control group, thus limiting causal inferences, the present study enhancing internal validity and enhancing the clarity of effectiveness evaluation for the intervention. Thus, the present study contributes novel evidence supporting the utility of the Create Sensitivity model by demonstrating its effectiveness in improving both glycemic control and quality of life outcomes within a controlled research setting.

Accordingly, the present study sought to evaluate the effectiveness of the 'Create Sensitivity' intervention model in improving quality of life among individuals with type 2 diabetes mellitus. This holistic approach—integrating cognitive restructuring, structured discharge planning, evidence-based self-care training, and the cultivation of hope—targets the psychological and emotional challenges faced by individuals with type 2 diabetes mellitus. By comparing the 'Create Sensitivity' model with standard diabetes care, the present study aims to generate critical insights into the potential of this integrated approach to enhance well-being and improve disease management among individuals with type 2 diabetes mellitus.

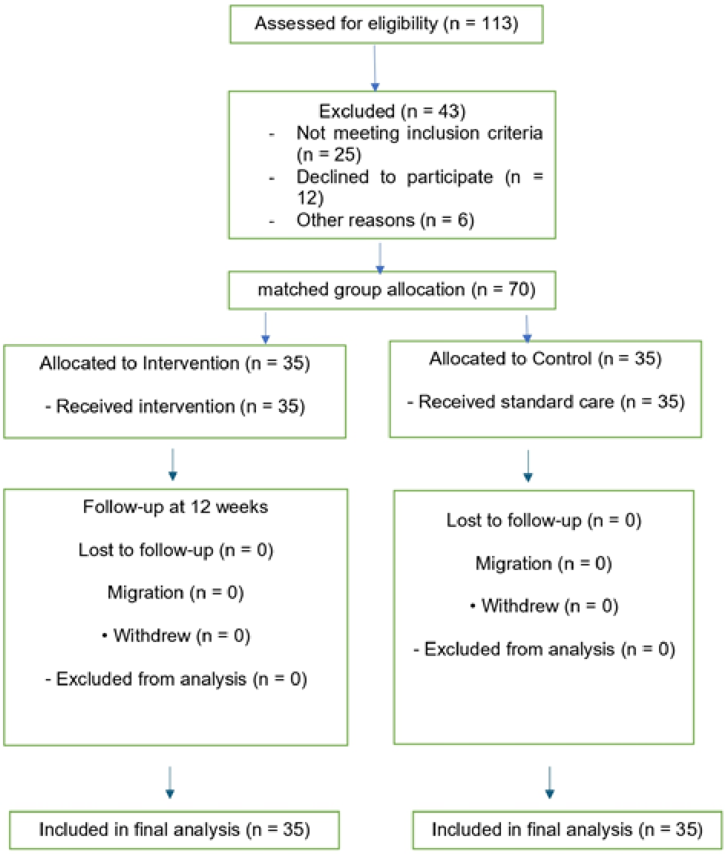
Materials and Methods

Design

To examine the impact of the 'Create Sensitivity' intervention, the study adopted a quasi-experimental pre–post design involving two groups: an intervention group and a control group receiving standard diabetes care. The intervention was delivered over 12 weeks and integrated cognitive restructuring, discharge planning, scientific self-care training, and hope development.

Sample and setting

Sample size estimation was conducted based on an independent two-group design, utilizing parameters reported in previous literature, including an effect size of d = 1.1, standard deviations of $S_1 = 1.74$ and $S_2 = 1.35$, a Type II error rate (β) of 0.2, and a significance level (α) of 0.05. The sample



size calculation indicated a requirement of 64 participants. To accommodate a projected attrition rate of 5–10%, a total of 70 individuals with type 2 diabetes were recruited from a local diabetes clinic, a community health center, and a hospital.

Eligibility criteria included a diagnosis of type 2 diabetes, age range of 30–60 years, a minimum of four months since diagnosis, active engagement in diabetes treatment, and the absence of documented mental health conditions or incurable diseases. Using a computer-generated group allocation sequence, participants were assigned using matched group allocation to either the intervention or control group.

Exclusion criteria during recruitment were terminal illness, cognitive impairment, or refusal to participate. Participants were excluded from analysis if they migrated, missed more than two sessions, or submitted incomplete post-intervention data. Lack of cooperation was operationalized as two or more unexcused absences or voluntary withdrawal from activities. The participant recruitment and flow are illustrated in Figure 1.

Variables

Diabetes-related quality of life (QOL) served as the dependent variable, with the independent variable being the participants' allocation to either the intervention or control group. Secondary outcomes included fasting blood glucose and glycated hemoglobin (HbA1c) levels.

Instruments

Fasting blood glucose was measured using the Gluco Dr. Biosensor, with a range of 30–600 mg/dL. Glycated hemoglobin (HbA1c) was measured using the SD Biosensor Standard F HbA1c test conducted in a certified clinical laboratory. The Diabetes Quality of Life (DQOL) instrument was employed to evaluate diabetes-related quality of life among participants, which demonstrated high validity and reliability in Indonesian populations (Cronbach's $\alpha > 0.70$; test-retest correlations between 0.830–0.975). All outcome measures were collected at two time points: baseline (Week 0) and following the intervention (Week 12). Due to the clinical recommendation

Table 1. Demographic and Baseline Characteristics

Characteristics	Intervention Group (n = 32)	Control Group (n = 33)	p-value
Age (years, mean ± SD)	48.3 ± 7.1	46.9 ± 6.8	0.387
Gender (n, %)			
- Male	14 (43.8%)	15 (45.5%)	0.891
- Female	18 (56.2%)	18 (54.5%)	
Education (n, %)			
- Primary	10 (31.2%)	9 (27.3%)	0.847
- Secondary	14 (43.8%)	16 (48.5%)	
- Higher	8 (25.0%)	8 (24.2%)	
Employment (n, %)			
- Employed	16 (50%)	15 (45.5%)	
- Unemployed/Retired	16 (50%)	18 (54.5%)	0.795
Diabetes Duration (years, mean ± SD)	5.6 ± 2.3	5.4 ± 2.1	0.678
Baseline HbA1c (% mean ± SD)	8.70 ± 1.11	8.03 ± 0.69	0.004
Baseline Fasting Blood Glucose (mg/dL, mean ± SD)	203.25 ± 31.89	184.05 ± 20.04	0.007
Baseline Quality of Life (mean ± SD)	31.63 ± 7.02	37.14 ± 5.88	0.002

that HbA1c be measured at intervals of at least three months, only two measurements (baseline and endline) were conducted for HbA1c. Other assessments (fasting glucose, QOL) followed the same schedule. Data collection was performed by trained research nurses.

Intervention

The intervention group received the 12-week "Create Sensitivity" treatment model in addition to standard diabetes care. The intervention was adapted from the preliminary work proposed by Hekmatpou et al. (2018) and structured into 12 weekly sessions. The program was divided into four phases:

Weeks 1–3: Cognitive restructuring; Weeks 4–5: Discharge planning; Weeks 6–9: Scientific self-care training; Weeks 10–12: Hope development

The intervention consisted of 12 weekly sessions, grouped into four phases: cognitive restructuring (weeks 1–3), discharge planning (weeks 4–5), scientific self-care training (weeks 6–9), and hope development (weeks 10–12). Sessions were conducted by trained nurses certified in diabetes education and counseling

Standard care group:

Standard clinical management, including four-weekly follow-up visits, was administered to control group participants in alignment with routine practice protocols. To reduce performance bias, participants in both groups continued their prescribed medication regimens without alteration. Nurses delivering the intervention were not given access to participants' outcome data, and outcome assessors remained blinded to group allocation.

Data collection

Demographic and clinical data were collected through self-report questionnaires and verified against medical records. All outcome variables (fasting blood glucose, HbA1c, and QOL scores) were assessed at baseline (Week 0) and Week 12 post-intervention.

Data analysis

The effectiveness of the intervention was assessed using repeated-measures ANOVA to detect significant time × group interaction effects. he analysis modeled time (baseline and Week 12) as a within-subjects variable and group assignment as a between-subjects variable to assess differential changes across groups. The main effects of Time and Group, and the Time × Group interaction, were examined. A significant Time × Group interaction would indicate that the pattern of change over time differed between groups(Miller et al., 2020).

Post-hoc tests were conducted after a significant time × group interaction to determine specific group differences at each point. Assumptions for repeated measures ANOVA (normality, sphericity, and equality of covariance matrices) were tested before analysis. To assess the nature of missing data, Little's MCAR test was performed. Data identified as missing completely at random were subsequently handled using suitable multiple imputation techniques (P. Zhang & Xie, 2025). All analyses were conducted using statisty.app, with an alpha level set at $p < .05$ (two-tailed). By employing a detailed data analysis strategy, the study ensures a methodologically sound examination of the intervention's effectiveness in improving glycemic control and quality of life.

Table 2 Result for pre- and post-intervention and Group (intervention vs. control) on the combined dependent variables blood sugar, HBA1C and Quality of life

Variable	Intervention group (N=35)	Control group (N=35)	Results of repeated measures ANOVAb						
	Mean ± Std	Mean ± Std	Sum of squares	df	Mean Squares	F	p	η2	η2p
Blood sugar			765027.6	2	382513.8	455.6	<.001	0.33	0.87
pre intervention	203.25 ± 31.89	184.05 ± 20.04							
post intervention	122.12 ± 25.61	175.02 ± 22.18							
Hba1c			86.37	1	86.37	458.94	<.001	0.33	0.87
pre intervention	8.7 ± 1.11	8.03 ± 0.69							
post intervention	5.88 ± 0.89	7.71 ± 0.77							
Quality of life			7651.61	. 1	7651.61	420.18	<.001	0.23	0.86
pre intervention	31.63 ± 10.63	37.14 ± 13.24							
post intervention	58,54± 10.06	39.8 ± 12.24							

Ethical consideration

Ethical approval for this study was granted by the Faculty of Medicine and Health Sciences, University of Jambi (Ref. No. 2510/UN21.8/PT.01.04/2024), with all research activities conducted in compliance with the Declaration of Helsinki. All participants provided written informed consent after receiving detailed information about the study's procedures, associated risks, and potential benefits. Data privacy and confidentiality were ensured through de-identification and secure storage on locked cabinets and password-protected computers. Participants were assured that their participation was voluntary and that they could withdraw at any point without consequence; they were also offered supplementary resources to support diabetes self-management.

Results

Participant Characteristics

Seventy participants (35 intervention, 35 control) were comparable regarding age, sex, education, occupation, and diabetes duration. However, the intervention group exhibited higher baseline levels of HbA1c and blood glucose compared to the control group. Pre-intervention glycated hemoglobin (HbA1c) levels averaged 8.70% (95% Confidence Interval [CI]: 8.32–9.08; Standard Deviation [SD]: 1.11) in the intervention group, versus 8.03% (95% CI: 7.80–8.27; SD: 0.69) in the control group. Similarly, the baseline mean blood glucose level was 203.25 mg/dL (95% CI: 192.29–214.21; SD: 31.89) in the intervention group and 184.05 mg/dL (95% CI: 177.16–190.94; SD: 20.04) in the control group. These differences were statistically significant ($p = 0.004$) (see Table 1)

Effect of Intervention on Outcomes

After 12 weeks, the intervention group demonstrated significantly greater improvements across all primary outcome measures compared to the control group (see Table 2)

Blood glucose levels in the intervention group decreased markedly by 81.13 mg/dL, from 203.25 mg/dL at baseline to 122.12 mg/dL post-intervention. In contrast, the control group experienced a modest reduction of 9.03 mg/dL, from 184.05 mg/dL to 175.02 mg/dL. This between-group difference was statistically significant ($p < 0.001$) and associated with a large effect size, as indicated by a partial eta squared (η^2_p) value of 0.87.

Glycated hemoglobin levels decreased by 2.82 percentage points in the intervention group (from 8.70% to 5.88%), versus 0.32 percentage points in the control group (from 8.03% to 7.71%) ($p < 0.001$, $\eta^2 p = 0.87$), indicating a large effect size.

Diabetes-related quality of life scores increased by 26.91 points in the intervention group, rising from 31.63 at baseline to 58.54 post-intervention. In contrast, the control group demonstrated only a modest improvement of 2.66 points, from 37.14 to 39.80. This difference was statistically significant

($p < 0.001$), with a large effect size indicated by a partial eta squared (η^2_p) of 0.86

Partial eta squared (η^2_p) was employed to assess the magnitude of the intervention's effects. In accordance with Cohen's conventions, η^2 values around 0.01 represent small effects, 0.06 medium effects, and values equal to or greater than 0.14 indicate large effects. All outcome measures in this study demonstrated large effect sizes, suggesting that the intervention had a substantial impact on both glycemic control and diabetes-related quality of life.

Discussion

This study demonstrated that the 'Create Sensitivity' intervention led to significant improvements in both glycemic control and diabetes-related quality of life among individuals with type 2 diabetes. The intervention group exhibited greater reductions in both blood glucose and glycated hemoglobin (HbA1c) levels, as well as significantly greater improvements in quality of life scores, compared to participants who received standard care. These findings highlight the critical role of incorporating psychosocial and behavioral components into the comprehensive management of chronic diseases. The "Create Sensitivity" model is a multifaceted approach that includes cognitive restructuring, structured discharge planning, scientific self-care training, and hope development (Hekmatpou et al., 2018). Each component appears to play a distinct role in achieving the intervention's effectiveness.

Cognitive restructuring helped patients develop more adaptive beliefs and coping strategies, enhancing emotional regulation and commitment to self-care. Evidence suggests that cognitive behavioral interventions play a vital role in promoting psychological adaptability and self-management confidence in individuals with chronic conditions, including diabetes (Abbas et al., 2023; Jenkinson et al., 2022; Li et al., 2023). By empowering patients to reinterpret their illness experiences, cognitive restructuring reduces psychological distress and diabetes-related burnout, factors that are strongly associated with poor treatment adherence. Moreover, addressing maladaptive beliefs about disease management has been linked to improved glycemic control through enhanced behavioral engagement and problem-solving skills (Wu et al., 2021) . Thus, in this study, the cognitive restructuring component likely played a central role in facilitating clinical and psychosocial improvements.

Structured discharge planning was crucial in facilitating a smooth transition from clinical settings to home care, ensuring continuity of care and minimizing fragmentation. Involving trained nurses in systematic follow-up and home visits provided patients consistent support during the vulnerable post-discharge period. Research has demonstrated that structured transitional care interventions improve clinical outcomes, enhance self-management behaviors, and significantly reduce hospital readmission rates among patients with chronic illnesses, including diabetes In particular, coordinated discharge planning has been shown to strengthen treatment adherence, enable early identification of self-care challenges, and support sustained glycemic control by maintaining patient engagement after hospitalization(Magny-Normilus et al., 2021). The results highlight the essential role of transitional support in enhancing the effectiveness of integrated diabetes care strategies.

Scientific self-care training provided participants with practical, evidence-based skills for managing their condition, including dietary planning, medication adherence, and physical activity. These behavioral competencies are critical for maintaining glycemic control and preventing diabetes-related complications. A substantial body of research consistently demonstrates that diabetes self-management education improves glycemic control, promotes medication adherence, and empowers patients to maintain long-term lifestyle modifications (Ranjbar et al., 2024). Regular feedback and structured problem-solving sessions reinforce behavior change, reduce relapse rates, and build self-efficacy in managing daily diabetes care. In this study, the scientific self-care training component likely played a direct role in the significant improvements observed in both clinical and psychosocial outcomes.

Finally, the hope development component provided essential emotional and social support by promoting a positive outlook and fostering psychological resilience. Through structured activities such as peer role modeling, goal-setting exercises, and motivational coaching, participants built greater confidence in their ability to manage diabetes and maintain healthy behaviors. Research has demonstrated that cultivating hope and optimism is strongly linked to improved self-care practices, reduced emotional distress, greater adherence to medication regimens, and enhanced quality of life among individuals with chronic illnesses, including type 2 diabetes (Zhang et al., 2022). Interventions that address emotional well-being have been shown to reduce diabetes-related distress and facilitate sustained engagement in long-term disease management (Javanmardifard et al., 2020). Therefore, the hope development component likely contributed substantially to the observed psychosocial and clinical improvements in this study

Unlike standard care—which often focuses narrowly on medication adherence, lifestyle counseling, and general disease education—the Create Sensitivity model adopts a holistic, patient-centered approach that integrates emotional, cognitive, and behavioral support. Evidence indicates that interventions integrating self-management education with psychological support are more effective in enhancing glycemic outcomes and quality of life than educational strategies alone

(Powers et al., 2020). By addressing psychological barriers, enhancing self-efficacy, and providing structured skill-building opportunities, the model empowers patients to engage in their care actively. The significant improvements in blood glucose levels and quality of life align with prior evidence that multifaceted interventions can produce substantial clinical and psychosocial benefits . These findings are particularly relevant in resource-constrained settings, where integrated behavioral strategies offer a feasible, scalable solution to improving chronic disease management.

This integrated approach aligns with the nursing discipline's foundational commitment to whole-person care, positioning nurses as essential facilitators of behavioral change in chronic disease management. By integrating emotional, educational, behavioral, and social support strategies, the Create Sensitivity model provided a comprehensive, patient-centered intervention that directly addressed the complex and multifaceted challenges experienced by individuals with type 2 diabetes. Unlike traditional diabetes care, which often focuses on physiological outcomes such as glycemic control, this model equally attaches to psychological well-being, self-management competencies, and social resilience. Previous research supports the value of holistic interventions in chronic disease care, highlighting their impact on both clinical and psychosocial outcomes (Al-Dwaikat et al., 2023; Litchfield et al., 2023; Ranjbar et al., 2024).

The substantial effect sizes observed in this study further confirm that addressing the whole person can lead to significant and lasting health improvements. hese findings are consistent with prior research demonstrating that integrated care models—combining psychosocial, educational, and clinical support—significantly enhance self-management behaviors and lead to improved clinical outcomes among individuals with chronic diseases. In line with previous studies highlighting the benefits of incorporating psychosocial elements into diabetes care, the significant improvements in glycemic control and quality of life observed in this study suggest that integrating psychosocial support into routine diabetes management may yield transformative outcomes—enhancing both metabolic regulation and emotional well-being. Integrating such holistic approaches into standard diabetes care pathways may be crucial for achieving long-term disease control and enhancing patient quality of life.

Existing knowledge underscores the importance of psychosocial and behavioral components in managing chronic diseases. However, few interventions have integrated these elements as thoroughly as the "Create Sensitivity" model (Hekmatpou et al., 2018). These findings align with earlier research on the 'Create Sensitivity' Caring Model, which has demonstrated beneficial effects on glycemic control and quality of life in individuals with type 2 diabetes. Hekmatpou et al. demonstrated that application of the 'Create Sensitivity' model among patients with type 2 diabetes was associated with significant reductions in fasting blood glucose and glycated hemoglobin levels, as well as improvements in overall quality of life. Following the intervention, the test group exhibited significantly lower fasting blood glucose levels (mean = 146.4 ± 51.3 mg/dL) compared to the control group (mean = 175.6 ± 59.8 mg/dL; p = 0.032). Similarly, glycated hemoglobin levels were significantly lower in the test group (mean = 67.89 ± 13.34 mmol/mol) than in the control group (mean = 80.03 ± 17.23 mmol/mol; p = 0.002). Quality of life scores also differed significantly between groups, with the test group reporting a higher mean score (58.25 ± 5.3) than the control group (47.02 ± 4.5; p = 0.0001)(Hekmatpou et al., 2018).

Enhancing glycemic control and quality of life in patients with type 2 diabetes is essential, as both factors are closely associated with long-term health outcomes and overall patient well-being. Unlike standard care, the "Create Sensitivity" intervention provided a multifaceted approach that resulted in superior glycemic control and enhanced quality of life. Contrary to some existing studies that emphasize medication adherence alone, our findings highlight the value of incorporating cognitive and emotional strategies into diabetes management. Statistical analyses demonstrated significant differences in both glycemic control and quality of life between the intervention and control groups, thereby supporting the effectiveness of the 'Create Sensitivity' model. This study highlights the potential of comprehensive interventions to address both the physiological and psychological dimensions of chronic disease management, thereby promoting a more holistic approach to patient care.

While the results are promising, caution is warranted in generalizing these findings to diverse patient populations without further research. The "Create Sensitivity" intervention is novel in its integration of cognitive restructuring, structured discharge planning, scientific self-care training, and hope development, offering a unique and holistic strategy for diabetes management. A notable limitation of this study is the relatively short follow-up period, which may not adequately reflect the long-term sustainability of the intervention's effects on glycemic control and quality of life.

Nursing Implications

By integrating holistic care, empowerment, and long-term behavioral guidance, the 'Create Sensitivity' model embodies the essential values of nursing practice. Nurses are ideally positioned to implement this model, as it integrates educational, emotional, and transitional care within their scope of practice. Incorporating this model into nursing education and practice can expand nurses' contributions to chronic disease care, foster better clinical and psychosocial outcomes, and promote integrated care delivery in both institutional and community-based settings.

Conclusion

Applying the ‘Create Sensitivity’ model led to notable enhancements in both blood glucose regulation and diabetes-related quality of life in individuals with type 2 diabetes. Compared to the standard care group, participants who received the intervention demonstrated more pronounced decreases in fasting blood glucose and HbA1c, as well as substantial enhancements in quality of life. The large effect sizes observed suggest that the benefits of this model are not only clinically meaningful but also potentially sustainable over time. These findings reinforce previous research demonstrating that integrated psychosocial and behavioral interventions enhance outcomes in chronic disease management. By simultaneously addressing cognitive, emotional, behavioral, and transitional care needs, the “Create Sensitivity” model offers a comprehensive and patient-centered approach to diabetes management. To confirm the broader relevance of the ‘Create Sensitivity’ model, future research should evaluate its long-term efficacy, cost-effectiveness, and scalability across different healthcare systems.

The “Create Sensitivity” model should be considered for integration into routine nursing practice and chronic disease management practices. Its structured yet flexible approach can enhance holistic patient care, improve clinical outcomes, and empower patients toward greater self-management. Implementation training for nurses and interdisciplinary teams is recommended to ensure effective adoption.

Additional studies are needed to evaluate whether the benefits of this model are sustained over time, to analyze its economic viability, and to explore its effectiveness across varying demographic groups and care environments. Multi-center studies with longer follow-up periods would help determine its broader utility and scalability.

Declaration of Interest

The authors declare no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Acknowledgment

This research was supported by a grant from the Directorate General of Higher Education, Ministry of Education and Culture (Kementerian Pendidikan dan Kebudayaan, Direktorat Jenderal Pendidikan Tinggi), Indonesia, grant number Dikti:052/E5/PG.02.00.PL/2024 Tanggal 11 Juni 2024. We also extend our gratitude to the research assistants at Jambi University for their help with data collection. Finally, we extend our sincere gratitude to the individuals with type 2 diabetes who generously contributed their time and participation to this study.

Funding

This research was supported by a grant from the Directorate General of Higher Education (Direktorat Jenderal Pendidikan Tinggi – DIKTI), Ministry of Education and Culture (Kementerian Pendidikan dan Kebudayaan), Indonesia, grant number Dikti:052/E5/PG.02.00.PL/2024 Tanggal 11 Juni 2024.

Data Availability

Data supporting the findings of this study are available from the corresponding author on reasonable request.

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Impact social rehabilitation program on quality of life of inmates with illicit drug use

Refonda Rias Anggiri, **Megah Andriany**[*]

Nursing Department, Medical Faculty, Universitas Diponegoro, Semarang, Indonesia

Abstract

Background: Inmates with illicit drug use have experienced various problems that affect their Quality of Life (QoL). The social rehabilitation program is expected to improve their QoL. Studies investigating the impact of social rehabilitation programs on QoL of inmates with drug abuse are limited.
Purpose: This study aims to describe the differences in the QoL of inmates with illicit drug use at the 0, 3rd, and 6th months of the program and to know the program's effectiveness in three Indonesian prisons.
Methods: This study used a secondary data analysis of comparison study with pre-post program intervention for inmates with illicit drugs in Indonesian Prisons by analyzing inmates' QoL. The instrument used the World Health Organization Quality of Life-BREF (WHOQOL-BREF). This study consists of documents from 400 male and 92 female inmates with illicit drug use who fully participate in social rehabilitation programs in three prisons. Data were analyzed by measuring the frequency and mean of QoL in the 0, 3rd, and 6th months using the One-Way Anova and the Kruskal Wallis to evaluate the program's effect on the QoL.
Results: The average QoL in physical, psychological, social relationship, and environment domains increased from the 0, to 3rd, and 6th months of the program. The rehabilitation program was effective in improving QoL ($p<0.001$) in Prisons A and C, but it was found no significant effect on QoL in Prison B ($p=0.069$).
Conclusion: The rehabilitation program was potentially effective in improving the QoL of inmates with illicit drug use. It is important for related parties to further evaluate the supporting and inhibiting factors that affect the QoL in the social rehabilitation program and overcome these inhibiting factors.

Keywords: inmates; illicit drug use; quality of life; social rehabilitation program

Introduction

Global prevalence estimation of drug use has increased globally. Furthermore, the most commonly used is alcohol 18.4%, followed by15.2% for daily tobacco smoking, and 3.8, 0.77, 0.37, and 0.35% for past-year cannabis, opioid, amphetamine, and cocaine use, respectively (Peacock et al., 2018). Inmates with illicit drug use have increased over the last ten years in Indonesia (Direktorat Jenderal Pemasyarakatan [Directorate General of Corrections], 2018). A drug addict can cause physical problems such as abnormal metabolism so that the body loses its ability to absorb nutrients and to self-repair (Adrian & Barry, 2003). "Skin popping" to an injected illicit drug in the skin can cause hyperpigmented, fibrotic, depressed, round papules and plaques (Saporito et al., 2018). Drug abuse may lead to psychosocial problems, negative emotions, peer pressure, self-efficacy, lack of assertiveness, and parental discord. It can also affect environmental issues such as difficulties in employment and economic self-sufficiency (Adrian & Barry, 2003; Rahman et al., 2016).

Changes in physical, psychological, social, and environmental conditions can reduce the QoL of drug addicts. Drug users are five times more likely to have a low perceived QoL than non-drug users. The studies have shown

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 130-141

http://dx.doi.org/10.24198/jkp.v13i2.2315

Article Info

Received : June 07, 2023
Revised : May 06, 2025
Accepted : August 01, 2025
Published : August 21, 2025

Corresponding author

Megah Andriany[*]
Nursing Department, Medical Faculty, Universitas Diponegoro, Semarang, Indonesia; Jl. Prof. Soedarto, S.H., Tembalang, Semarang, Indonesia, 50275; Phone: (024) 7460036; E-mail: megahandriany@fk.undip.ac.id

Citation

Anggiri, R. R., & Andriany, M. (2025). Impact social rehabilitation program on quality of life of inmates with illicit drug use. *Jurnal Keperawatan Padjadjaran, 13*(2), 130-141. http://dx.doi.org/10.24198/jkp.v13i2.2315

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

a negative relationship between QoL perceived and heroin use. Perceived QoL can be improved when methadone treatment is started (O'Brien et al., 2015). Substance use disorder (SUD) can cause adverse interaction effects of depression, social isolation, unemployment, and weight dissatisfaction. The psychological impact of QoL was explained by depression and being single (Muller et al., 2019).

To improve their QoL, drug users are required to participate in medical and social rehabilitation programs during the detention process. The social rehabilitation programs are carried out to improve the good QoL to prepare people in prison with illicit drugs to carry out their social functions in the environment (Direktorat Jenderal Pemasyarakatan [Directorate General of Corrections], 2018). QoL has been used as a variable of therapeutic results, to describe groups of people with SUD and presenting types of disorders, as a reference instrument in the validation process of QoL, and to test its association with other variables related to dependence or abuse (Campêlo et al., 2017). QoL evaluation can be conducted using the World Health Organization Quality of Life-BREF (WHOQOL-BREF).

Previous studies have known that improving QoL during improvement can be seen as a successful rehabilitation and reduction of re-crime. The psychological and physical conditions (psychological distress) also significantly affect their QoL (Muller & Bukten, 2019). Other research shows that providing comprehensive services (rehabilitation) will develop the client's personality and be able to obtain physical, emotional, and social well-being according to their abilities because they are personal values and aspirations in shaping the QoL (Anggarwati & Nawangsih, 2016). Studies that investigate the evaluation of the social rehabilitation programs on QoL of inmates with drug abuse in Indonesia are limited. Indonesia government has recommended to implement this program consisting of younger members, middle member, and older member phases and additional components for several years and measured the QoL of inmates at the zero, 3rd and the 6th month of the program as targeted by the Indonesian Ministry of Law and Human Right. The previous study applied experimental design in three single setting with time series data collection method 0, 3, and 6 months. However, the data were not further analysed yet thus the effectiveness of its implementation in each setting and comparation between three different setting have not been investigated. This time series data collection not only potentially provide the effect of this program but also the trend of this program after 3 and 6 months follow up including the comparation of its impact between setting. Therefore, the purpose of this study is to describe the differences of the QoL of inmates with illicit drug use at the zero, 3rd and 6th months of the social rehabilitation programs implementation and analyse the effect of the programs on the QoL of inmates with illicit drug.

Materials and Methods

Design

This study is secondary data analysis of previous one group experimental study conducted in three single setting with time series data collection.

Sample and setting

The population of this study were documents from 550 inmates with illicit drug use including 200 documents from Prison A, 100 from Prison B, and 250 from Prison C in Indonesian prisons. The purposive sampling technique was used with inclusion criteria: 1) Data from inmates with illicit drug use who fully participate in a social rehabilitation program; 2) Data were completed. There were 492 documents consisted information regarding quality of life met the criteria (150 documents from Prison A, 92 from Prison B, and 250 from Prison C). The exclusion criteria were documents that were damaged or unreadable.

Prison A has a capacity of 600 inmates, but accommodates up to 1700 male inmates. Prison B is a female prison with a capacity of 107 inmates but is inhabited by around 250 inmates. Prison C is a prison with a capacity of 221 prisoners but is occupied by 650 inmates. Thus, it can be concluded that all prisons are overcapacity.

Instruments

During the program implementation, it was also measured the inmates' quality of life using WHOQOL-BREF questionnaire. The WHOQOL-BREF questionnaire contains 26 questions developed by the World Health Organization (WHO). WHOQOL-BREF consists of four domains of QoL, including physical, psychological, social relation, and environmental domains, which are calculated based on a five-point Likert scale (1-5). The results of the validity and reliability tests from the WHOQOL-BREF questionnaire were declared valid with r=0.466-0.786 and the Cronbach-Alpha test α=0.859,99 (Pheny & Raymondalexas, 2014).

Implemented program

The program implemented on inmates with illicit drugs from three prisons in Indonesian Prisons, namely Prison A, Prison B, and Prison C. These setting were selected due to these three prisons implemented the same absolute intervention, namely Therapeutic Community (TC) correctional-based. The implementation of a social rehabilitation program is based on the guidelines for the implementation of social rehabilitation programs for drug users by the Ministry of Law and Human Rights of the Republic of Indonesia.

The social rehabilitation program used TC, which was modified based on inmates with illicit drug needs. TC consisted of physical and psychological evaluation activities carried out for 2 weeks. Furthermore, the core program was carried out for 19 weeks with a focus on behavioral change activities

Table 1. Distribution of demographic characteristics of inmates with social rehabilitation programs in Indonesian Prisons (n=492)

Characteristics	Frequency	Percentage (%)
Prisons		
Prison A	150	30.5
Prison B	92	18.7
Prison C	250	50.8
Age (mean+SD =……+ ….)		
18-40 years old	409	83.1
41-60 years old	82	16.7
61-70 years old	1	0.2
Gender		
Male	400	81.3
Female	92	18.7
Marital status		
Single	154	31.3
Married	247	50.2
Others	91	18.5
Education level		
Elementary school	72	14.6
Primary school	166	33.7
High school	244	49.6
Academic school	4	0.8
Graduate school	6	1.2

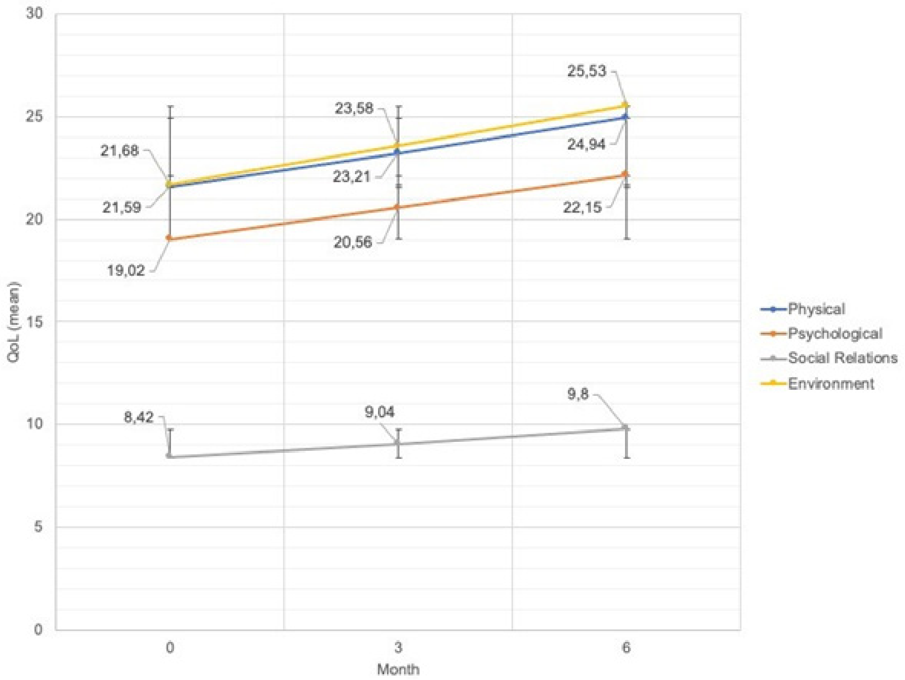

Figure 1. Graph of changes in average QoL of inmates with social rehabilitation program in Indonesian Prisons (n=492).

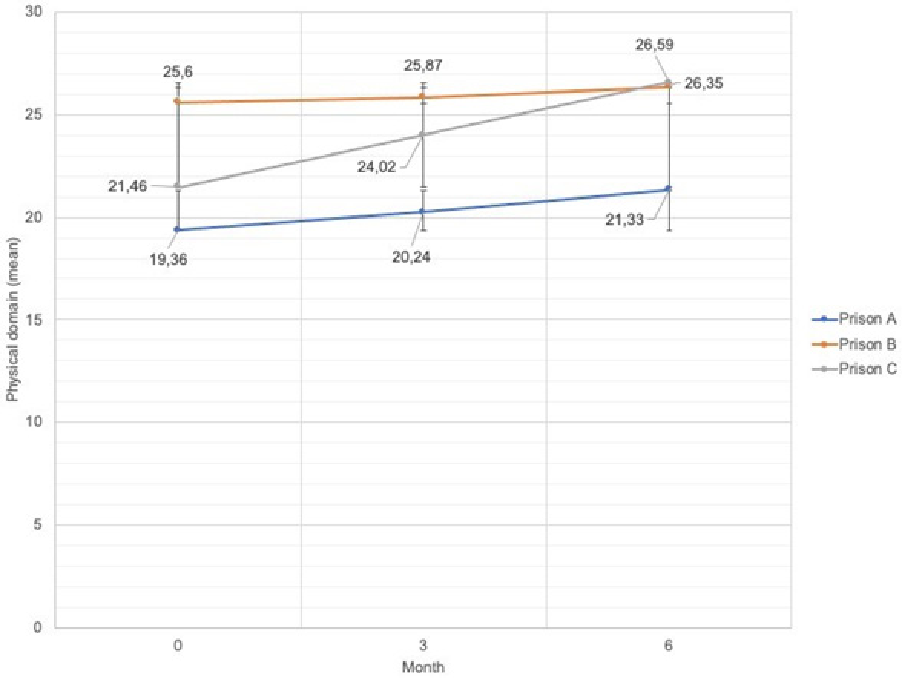

Figure 2. Graph of changes in average physical domain of inmates with social rehabilitation program in Indonesian Prisons

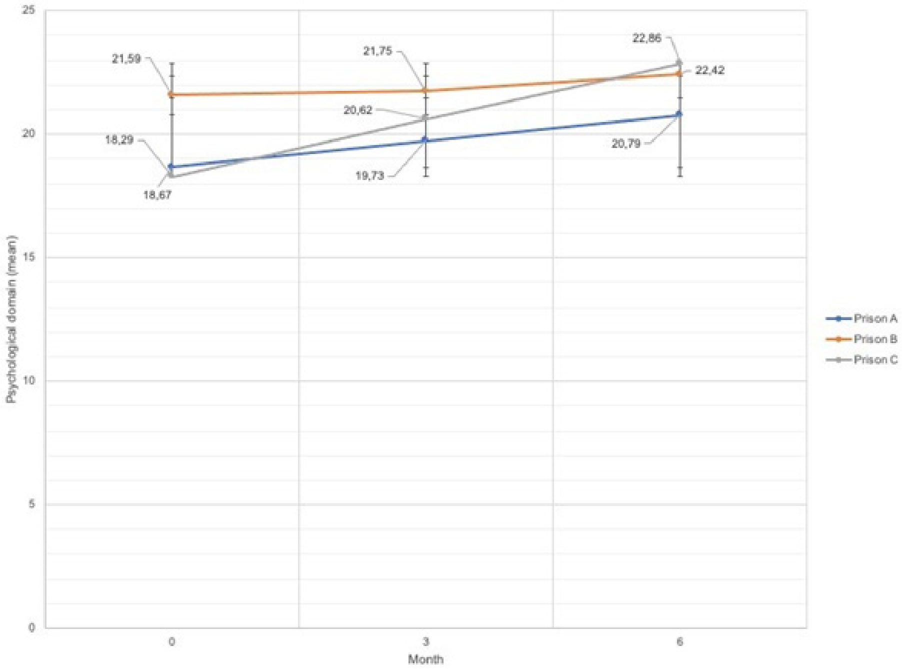

Figure 3. Graph of changes in average psychological domain of inmates with social rehabilitation program in Indonesian Prisons

Self – directed learning readiness

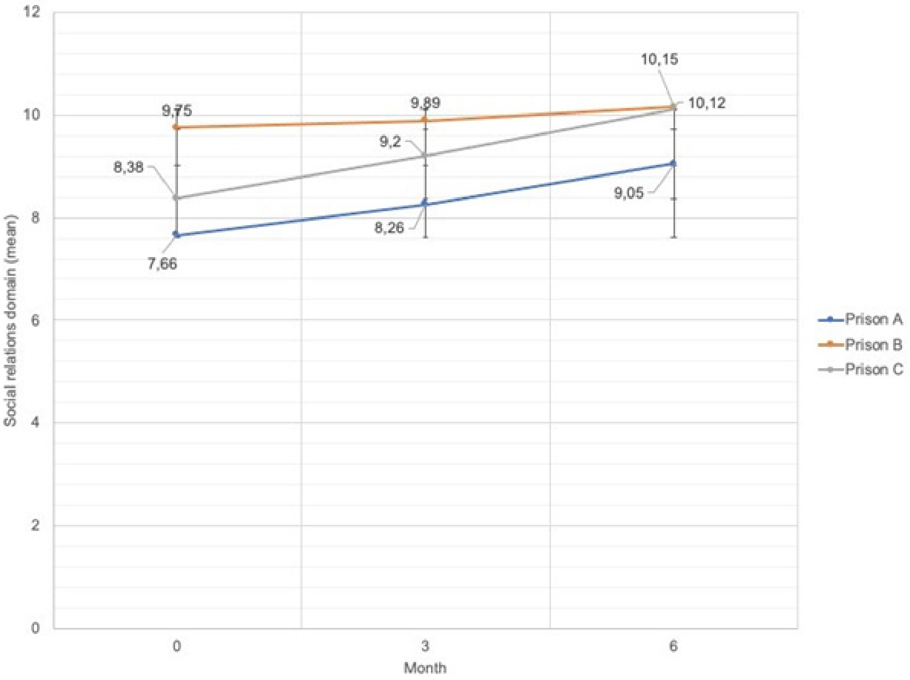

Figure 4. Graph of changes in average social relation domain of inmates with social rehabilitation program in Indonesian Prisons

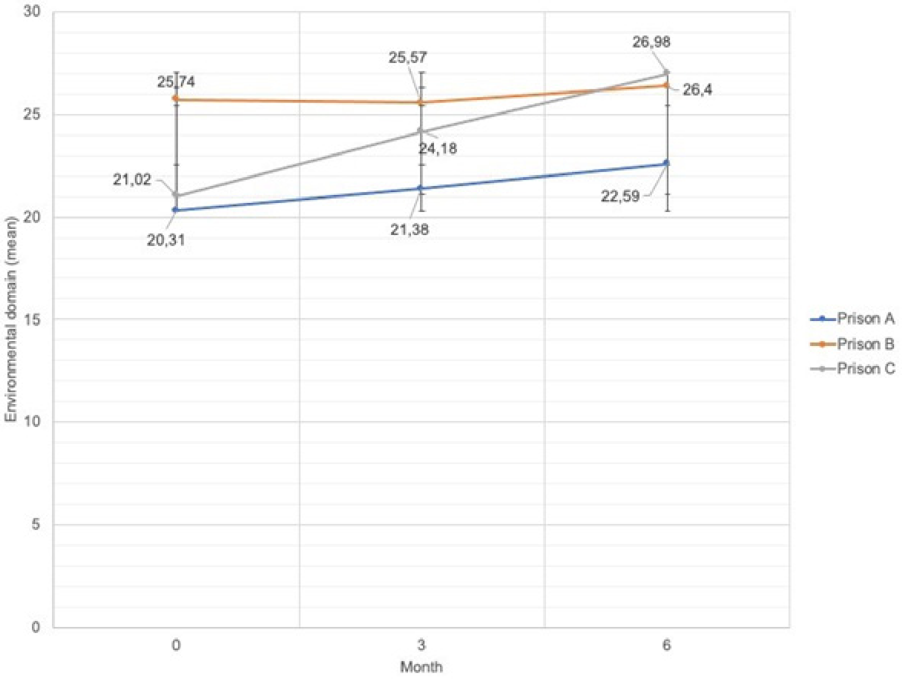

Figure 5. Graph of changes in average environmental domain of inmates with social rehabilitation program in Indonesian Prisons

and post-rehabilitation preparation activities, which were carried out for 3 weeks. This program was carried out by health workers (doctors and nurses worked in the prisons), correctional workers, and officers trained in addiction counselling. The stages of physical and psychiatric assessment aimed to assess physical problems as well as mental and behavioral disorders to carry out symptomatic therapy for withdrawal symptoms. Inmates who have completed the physical and psychiatric evaluation stages, where their physical, cognitive, and emotional conditions are generally stable, can follow the core program.

In the core program, inmates join a structured community with a hierarchy, daily schedules, therapy groups, group seminars, counselling, and vocational as a medium to support self-change. The activities carried out at this stage included: 1) Phase of Younger Members: In this phase, inmates were introduced to rehabilitation services such as the TC method approach, adaptation to environmental programs, devices used, applicable regulations, norms, and values upheld in the program. This phase was carried out for six weeks; 2) Middle Member Phase: This phase facilitated self-development by societal values and norms, understanding the relationship between the programs being implemented and the reality occurring in real life. This phase was carried out for nine weeks; 3) Older Member Phase: This phase was performed to train leadership skills, responsibility, interpersonal skills, and an understanding of more profound aspects of life. This phase was carried out for five weeks; 4) Additional components of the core program can also be given psychosocial interventions if needed, such as individual, group, and family counselling, psychoeducation, seminars, group dynamics, support groups, static groups, crisis intervention, special assessments, brief therapy, psychosocial and spiritual interventions.

The third stage was preparation for post-rehabilitation services given in the last three weeks of rehabilitation services (the second week of the older member phase). The stages in the post-rehabilitation preparation were resumes and recommendations for the types of post-rehabilitation services. The re-assessment was carried out using in-depth interviews, results of interests and talents, and a psychological examination. The program was implemented durin February-August 2020 in Prison A, January-July 2020 in Prison B, and January-July 2020 in Prison C.

Data Analysis

This study used univariate analysis on the raw score results by displaying changes in the mean at months 0, 3rd, and 6th in the physical, psychological, social relations, and environmental domains. Bivariate analysis was used to determine the results of the raw scores transformed by the transformed score table. The normality test results of the total QoL score pre and post-social rehabilitation program in Prison B (p=0.200 and p=0.200) and Prison C (p=0.007 and p=0.034) were normally distributed. The normality test results of the physical, psychological, social, and environmental domains of QoL in Prison A, B, and C were not normally distributed (p=0.000). The total QoL score test results in Prison A were not normally distributed (p=0.000). Therefore, the test carried out is the One-Way Anova for parametric test and the Kruskal Wallis for non-parametric test to evaluate the program’s effect on QoL at month 0th, 3rd, and month 6th.

Ethical Consideration

This research has passed the ethical test of the Health Research Ethics Commission, Faculty of Medicine, Universitas Diponegoro No. 55/EC/KEPK/FK/UNDIP/III/2021. This study was also conducted according to the WMA Declaration of Helsinki, Ethical Principles for Medical Research Involving Human Subjects (World Medical Association, 2013) by protecting participants’ right in incurring any harms, and based on guidelines by Kementerian Hukum dan Hak Asasi Manusia [Ministry of Law and Human Rights in 2020). Investigators ensured anonymity to maintain the confidentiality principles for the respondents and institutions involved and guaranteed that they will not obtain negative effects due to this study. There was no complain form the involved respondents regarding the program implemented and research project conducted.

Results

The study locations were based on the implementation of social rehabilitation programs in the three prisons that provided the same absolute intervention, namely the correctional-based TC.

Majority of the respondents in this study were male (81.3%), less than 40 years old (83.1%), married (50.2%), and graduated from high school level (49.6%). The demographic data of this study is shown in Table 1.

The results of the study explain an increasing change in the average QoL of the inmates with social rehabilitation program in 0, 3rd, and 6th months (e.g. figure 1). The increasing average QoL in total three prisons with the physical, psychological, social relations, and environmental domain between the 0 and 6th months has a difference of 3.35; 3.13; 1.38; and 3.85.

Table 2 shows the mean, mean difference, and statistical analysis in the total domains (physical, psychological, social relationships, and the environment) of QoL from the 0, 3rd, and 6th months in each prison. Across the total sample of 492 incarcerated individuals, significant improvements were observed in total QoL and its domains over six months. The mean overall QoL score increased by 11.70 points ($p<0.001$), with the most significant improvement noted in Prison C (17.40 points, $p<0.001$), followed by Prison A (7.78 points, $p < 0.001$). In contrast, changes in Prison B

Table 2. Comparison of mean, mean difference, and statistical tests of the effectiveness of social rehabilitation program on changes in QoL of inmates with illicit drug use in Indonesian Prisons (n=492)

QoL Domain	Mean			Mean Difference			p-value
	0 month	3rd month	6th month	0-3 month	3-6 month	0-6 month	
Total	70.72	76.40	82.42	5.68	6.02	11.70	<0.001*
Prison A	65.99	69.61	73.77	8.87	4.16	7.78	<0.001*
Prison B	82.67	83.08	85.33	0.41	2.25	2.66	0.223**
Prison C	69.15	78.02	86.55	3.62	8.53	17.40	<0.001*
Physical	21.59	23.21	24.94	1.62	1.73	3.35	<0.001*
Prison A	19.36	20.24	21.33	0.88	1.09	1.97	<0.001*
Prison B	25.60	25.87	26.35	0.27	0.48	0.75	0.267*
Prison C	21.46	24.02	26.59	2.56	2.57	5.13	<0.001*
Psychological	19.02	20.56	22.15	1.54	1.59	3.13	<0.001*
Prison A	18.67	19.73	20.79	1.06	1.06	2.12	<0.001*
Prison B	21.59	21.75	22.42	0.16	0.67	0.83	0.211*
Prison C	18.29	20.62	22.86	2.33	2.24	4.57	<0.001*
Social Relations	8.42	9.04	9.80	0.62	0.76	1.38	<0.001*
Prison A	7.66	8.26	9.05	0.60	0.79	1.39	<0.001*
Prison B	9.75	9.89	10.15	0.14	0.26	0.40	0.273*
Prison C	8.38	9.20	10.12	0.82	0.92	1.74	<0.001*
Environment	21.68	23.58	25.53	5.68	1.95	3.85	<0.001*
Prison A	20.31	21.38	22.59	3.62	1.21	2.28	<0.001*
Prison B	25.74	25.57	26.40	0.41	0.83	0.66	0.155*
Prison C	21.02	24.18	26.98	8.87	2.80	5.96	<0.001*

*) Kruskal Wallis Test
**) One-Way Anova Test

were minimal and statistically non-significant (2.66 points, p=0.223), indicating possible disparities in institutional environments or rehabilitative efforts. Consistent patterns were observed across specific domains. For instance, the Physical and Psychological domains improved significantly in the total sample (3.35 and 3.13 points, respectively; p < 0.001), with Prison C showing the most significant gains in both domains. Prison B, however, showed small and non-significant improvements, particularly in the physical domain (0.75 points, p=0.267) and psychological domain (0.83 points, p=0.211).

Social relations and rnvironmental domains followed similar trends. While the total sample experienced significant yet modest gains in Social Relations (1.38 points, p<0.001), Prison C again showed the highest increase (1.74 points, p<0.001), compared to a minimal and non-significant change in Prison B (0.40 points, p=0.273). The Environmental domain showed the most pronounced improvement in Prison C (5.96 points, p<0.001), whereas Prison B displayed the most minor and non-significant change (0.66 points, p=0.155). These findings highlight substantial inter-prison variability, with Prison C demonstrating the most impactful improvements, while Prison B lagged across most QoL dimensions. This underscores the importance of context-specific interventions in enhancing inmate well-being.

Discussion

Figure 1 shows that the QoL in the physical, psychological, social relations, and environmental domains of inmates with illicit drug use has increased from the 0, 3rd, and 6th months of the social rehabilitation program process. The difference average score of QoL in the physical domain was 16.6; psychological 22.25; social relations 9.85; and environment 32.65. Social rehabilitation program in the prison A and C was effective to improve QoL (p<0.001) and with no significant effect in prison B (p=0.069). Other studies showed that the environmental and social subscales of the World Health Organization Quality of Life Questionnaire Scale (WHOQOL-BREF-TR) had a significant correlation with alcohol use disorders in patients that perceived social support from the family and private person and total perceived support. In the opioid group, physical, environmental, and psychological subscales of the WHOQOL-BREF-TR did not show a significant correlation with the Multidimensional Scale of Perceived Social Support (MSPSS) and significantly correlated with the social subscale (Ates et al., 2019).

Physical Domain

The physical domain of inmates who use drugs has increased from the 0, 3rd, and 6th months of social rehabilitation program. The highest difference average increase was in Prison C 17.34, while the average increase with the lowest difference was in Prison B 2.41. Factors that influence changes in the physical domain QoL score based on the WHOQOL-BREF questionnaire include individual perceptions of daily activities, stamina and endurance, medication therapy, physical mobility, pain and discomfort, work capacity, and sleep rest. The increase in the physical domain is due to scheduled physical activity and regular sleep patterns. Studies in a patient with alcohol use disorders or substance use disorders find that physical exercise, both body–mind and physical fitness programs, can be effective in improving mental disorders, craving, and QoL (Giménez-Meseguer et al., 2020).

Rehabilitation has an impact on improving the physical quality of inmates to become fitter, more productive, and more effective in carrying out daily activities. Group exercise for patients with drugs disorder can improve the physical health domain and psychological health domain of QoL significantly (Muller & Clausen, 2015). Inmates with illicit drug use needed to follow strict discipline in terms of sleeping hours undergoing rehabilitation. The benefits conferred by physical activity and adequate sleep have been independently associated with better mental health and physical well-being in substance use disorder (Mahboub et al., 2021).

Psychological Domain

The data on the psychological QoL of inmates with drug users experienced an increase from the 0, 3rd, and 6th months of social rehabilitation program. Individuals with substance use disorders have more psychosocial problems, so they need support and counselling (Poudel et al., 2016a). Factors that influence changes in the psychological domain QoL scores based on the WHOQOL-BREF questionnaire include cognitive conditions, negative and positive feelings, levels of self-confidence, self-image, and spirituality. TC can improve the spiritual condition of drug addicts characterized by good emotional control and diligent worship. TC may increase patients' self-awareness and motivation to change their way of life and person-cantered approach (Testoni et al., 2018).

The improvement in psychological conditions was caused by counselling, changes in cognitive conditions, negative and positive feelings, and spirituality in inmates. Group counselling for the drug user education community is effective in reducing the desire to use drugs with a percentage of 86.12% (Guntara & Rohmat, 2020). Individual counselling by addiction counsellors affects the motivation to recover in drug addicts. Face-to-face counselling had reported on the effectiveness of alternative modes of motivational interviewing in treating and preventing substance abuse (Jiang et al., 2017). Drug users are prone to cognitive dysfunction. Cognitive dysfunction in drug users such as hallucinations can be handled after undergoing rehabilitation, indicated by changes in behaviour to be able to carry out normal activities without being disturbed (Verdejo-Garcia et al., 2019). The negative feelings felt by drug users are feelings of shame and regret. Positive feelings of drug users after undergoing rehabilitation, namely self-acceptance can change the mind-set of drug users with a sense of optimism to live life (Priddy et al., 2018). Spiritual activities carried out in prisons include congregational prayers, lectures, and Qur'an reading. Spiritual meditation can promote addiction recovery as well as improve psychological and mental health outcomes by reducing symptoms of depression, anxiety, and stress. Spiritual meditation has a positive impact on addictive behaviour and mental health and makes clear its reliability in addiction therapy issues (Kadri et al., 2020).

Social Relations Domain

Improving the QoL in social relations includes sexual activity, social relationships, and assistance from the environment. Inmates' sexual activities while in prison cannot be facilitated. Sexual activity that cannot be channelled affects the QoL in the domain of social relations (Ware & Galouzis, 2019). Social relationships while in prison affect the QoL of the inmates. The social relationship that exists is mutual support between inmates or prison officers. Inmates during social rehabilitation program are facilitated to communicate with their families and given TC intervention in the form of peer groups to practice socializing (Liu et al., 2020; Raheimi et al., 2018). Rehabilitation can have an impact on changing the mind-sets of inmates. Inmates experienced a change in mind-set with better habits than before the program. The pattern of behaviour of the inmates becomes more effective and productive. Inmates become more confident, easy to socialize with, and easy to express opinions External assistance can increase optimism and confidence in inmates during their detention period. A high sense of optimism and self-confidence can improve the QoL of inmates (Kelly et al., 2018).

The mediating effects of social support on the relationship between stress and life satisfaction were significant among people with an illicit drug user. Individuals with low-stress levels can maintain higher social support than others. The life satisfaction of people with illicit drugs can be enhanced in many ways. Their stress level can be alleviated and their social support or resilience can be enhanced, thereby increasing their life satisfaction. Several previous studies have indicated that social support can enhance life satisfaction and decrease stress (Kelly et al., 2018). The increasing decisional conflict and decreasing social support, recovery, and QoL.

The higher recovery scores predict better QoL ratings and as ratings for social support decline, this is associated with lower QoL. The lower decisional conflict is associated with a higher QoL. The QoL for people with mental health disorders is positively associated with social support (Coffey et al., 2019).

Environmental Domain

Improving the QoL in the environmental domain includes welfare, willingness to develop oneself, access to health, and recreation. The social rehabilitation program process carried out personal life skill guidance activities for the inmates. Social rehabilitation program carried out aims to reduce the unemployment rate after undergoing the program. The consequences of illicit drugs user often manifest as difficulty in obtaining employment and stable housing had important factors when considering QoL related to the environment (Poudel et al., 2016b). Access to health services is carried out during inmates with social rehabilitation program assessed by health workers at the Medical, Physical, and Evaluation (MPE) stage. Health care services are available in three prisons in this study. Health services while in prison can improve the health and QoL of inmates (McLeod et al., 2020). Environmental aspects in the form of recreation can also improve the QoL. Recreation carried out by the inmates includes exercising, watching TV, and playing musical instruments. Recreational activities in prison are recognized as the key to increasing QoL as a significant predictor of social support (Baharudin et al., 2020).

Social Rehabilitation Program Effectiveness

Table 1 shows that social rehabilitation program in Prisons A and C had a significant change (p-value=0.000) in the total score of the QoL domain, physical, psychological, social relations, and environmental domains. The results of the research supported by Fernanda (2020) explaining that prisons are quite effective in carrying out social rehabilitation program for inmates who use drugs. Rehabilitation activities are beneficial because the inmate activities are scheduled from waking up to going back to sleep. Inmates who use drugs try to be productive and forget negative thoughts to return to consuming drugs. TC method is effective in social rehabilitation program in prisons. The TC method can increase self-confidence and foster emotional and spiritual management of drug addicts. Social support during social rehabilitation program has an important role on the QoL (Ates et al., 2019)

An insignificant difference was found in the Prison B. QoL did not significantly changes in the total and each domain of QoL. It may due to structural barriers including inadequate time, training and management of care providers (Farhoudian et al., 2022). Moreover, rehabilitation might not be seen as a correctional staff key concern. Rehabilitation is perceived as responsibility of prisoners themselves. On the other hand, inmates' cynicism sometimes wears good intentions of officers in supporting their rehabilitation. These situations impact on relationship during the process (Bullock & Bunce, 2018).

The increase in QoL in each domain is due to supporting factors. The increase in QoL was due to a system of reward, punishment, and learning experiences for inmates to maintain compliance, discipline, and enthusiasm in carrying out social rehabilitation program activities (Zhang, 2020). A previous study explains that the emphasis on punishment should be shifted to the holistic care approach that focuses on finding the cause of drug use (Majidah & Kettel, 2020). The prison also cooperates with relevant agencies to give individual counselling such as the department of religion and church ties in spiritual development. Counselling can increase self-esteem by feeling more independent, having advantages, and being optimistic about life (Kelly et al., 2018). Social rehabilitation program participants were given a walking paper containing the creed, cardinal rules, and a prayer of peace that must be memorized by inmates and read every time before they start activities at the morning meeting. This is used so that prisoners remember the goals of social rehabilitation program and the mind-set of the importance of social rehabilitation program. Psychological mind-set change involves commitment during the recovery of illicit drugs (Stokes et al., 2018).

The difference in the results of social rehabilitation program towards improving the QoL is caused by internal and external factors. The internal factor, namely the condition of the QoL scores on the inmates of social rehabilitation program participants at Prison B, was quite high from month 0 so there was no significant change in the increase in the 6th month. Prison B with woman respondent and Prison A and C with man respondent. Women reported lower satisfaction with their physical and psychological health at treatment entry compared with men, but these differences were not present at treatment review (Best et al., 2013). External factors that can influence based on the results of the preliminary study are the differences in support and barriers to the implementation of social rehabilitation program in each Indonesian prisons. Prisons A and B have implemented social rehabilitation program programs since 2020, therefore the data used in these two prisons in this study is the first data on the implementation of social rehabilitation program. This is different from Prison C which has experience carrying out social rehabilitation program since 2015. Factors that hinder the absence of significant changes in the QoL include minimal prison preparation, prison human resources (HR), most of which have not attended training and do not understand social rehabilitation program guidelines, and the COVID-19 pandemic that affects program implementation (Du et al., 2020).

Strengths and limitations

The strength of the study is the study involved most of available documents, thus it may improve the sample representativeness and internal validity of this study . However, the prisons involved in this study only from one province so it may less represents the overall Indonesian prisons. The different of facilities, organizational, and socio-cultural background may exist in the prison at the other provinces must be also considered as additional generalizability issues of this study.

Nursing implication

The results show the importance of social rehabilitation program on quality of life of inmates with illicit drug use in all domains. Nurses should be actively involved in this program by improving their skills in behavioral change therapies. The finding also highlight improvement score in each domain of QoL during 3rd to 6th months which include post-rehabilitation preparation program. Thus, nurses should maintain inmates' behavoiral modifications so these change can be sustainable particularly after release from prisons. Since there was a prison which is a female prison that did not experience QoL improvement, further research should be explore this phenomenon. This exploration will be crucial to identify related factors or barriers in the implementation of the program so Indonesian government and related parties can determine problem solving of those challenges.

Conclusion

The study concluded that the average QoL in the physical, psychological, social relations, and environmental domains in inmates with illicit drug use has increased from the 0, 3rd, and 6th months of social rehabilitation program. Social rehabilitation programs were effective in improving QoL in two prisons and has no significant effect in another one.

It is important for nurses or other healthcare professional work in the prison to use the results of the WHOQOL-BREF questionnaire as a consideration in making nursing assessments on inmates as part of social rehabilitation implementation. Educational institutions can make correctional-based TC programs as teaching materials in the community nursing curriculum. Prison institutions can implement a system of rewards, punishments, and learning experiences and consider the results of the research in identifying the supporting and inhibiting factors of the social rehabilitation process and determining appropriate interventions to deal with them. Future researchers are expected to be able to conduct qualitative research, exploratory studies on changes in the quality of life of inmates in social rehabilitation, and conduct experimental research by providing Holistic Therapeutic Community (HTC) interventions to improve the quality of life of inmates with illicit drugs.

Declaration of Interest

This study has no conflict of interest during the study and publication process.

Acknowledgment

Researchers would like to thank prison officers in the work area of the Ministry of Law and Human Rights of the Republic of Indonesia.

Funding

The research received no external funding.

Data Availability

The datasets used or analysed during the study are available from the corresponding author on reasonable request.

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The relationship between the current knowledge's satisfaction of disaster preparedness and the practice of family emergency planning

Elsi Dwi Hapsari[1], **Salma Nur Azizah**[2], **Diki Nanang Surahman**[3], **Sutono Sutono**[4], **Satoko Watanabe**[5], **Jihan Siti Lathifa Luthfiyah**[2]

[1] Department of Pediatric and Maternity Nursing, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
[2] Nursing Science Study Program, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
[3] Directorate of Research and Innovation Funding, National Research and Innovation Agency, Indonesia
[4] Department of Basic and Emergency Nursing, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
[5] Mie Prefectural College of Nursing, Mie, 1-1-1, Yumegaoka, Tsu-shi, Mie, Japan

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 142-150
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2770

Article Info

Received	: March 17, 2025
Revised	: July 05, 2025
Accepted	: August 07, 2025
Published	: August 25, 2025

Corresponding author

Elsi Dwi Hapsari*
Department of Pediatric and Maternity Nursing, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia ; Ismangoen Building, 2nd Floor, Jl. Farmako Sekip Utara, Yogyakarta, Indonesia, Postal code 5528, Phone: (+62-882-0071-42483), E-mail: elsidh@ugm.ac.id

Citation

Hapsari, E. D., Azizah, S. N., Surahman, D. N., Sutono, S., Watanabe, S., & Luthfiyah, J. S. L. (2025). The Relationship Between the Current Knowledge's Satisfaction of Disaster Preparedness and the Practice of Family Emergency Planning. *Jurnal Keperawatan Padjadjaran, 13*(2), 142-150. http://dx.doi.org/10.24198/jkp.v13i2.2770

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Since the 2020 version, the content of family emergency planning (FEP) has been included in the Indonesian Maternal and Child Health (MCH) handbook. However, there is still limited information on whether pregnant women, especially those who are living in disaster-prone areas like Yogyakarta Province, practice it in their day-to-day lives.
Purpose: to analyse the relationship between the current knowledge's satisfaction of disaster preparedness and the practice of FEP among pregnant women based on the MCH handbook.
Methods: A quantitative descriptive survey with a cross-sectional design was applied in this study. Data collection was conducted between March and September 2024 using three questionnaires, which included demographic data, current knowledge's satisfaction with disaster preparedness, and practice of FEP. The samples were 277 pregnant women. Data were analysed with a chi-square test and Cramer's V test.
Results: Most of respondents reported of having quite satisfied (43.32%) with their current knowledge of disaster preparedness. As many as 135 respondents (48.73%) reported practicing FEP, but only 35.56% of them completed the practice. There is a significant relationship between the satisfaction of current knowledge about disaster preparedness with the practice of FEP, but the association is weak (p=0.04, Cramer's V=0.04).
Conclusions: The current knowledge's satisfaction with disaster preparedness and the practice of FEP has a significant relationship, but the association is weak. Policymakers need to develop disaster preparedness and FEP strategies based on the findings in the field and the identification of barriers. Health care professionals should improve pregnant women's FEP and ensure that they practice it in their daily lives through various activities such mobile reminders, group education, and integration into digital platforms.

Keywords: child health; disaster; maternal health; pregnancy

Introduction

The Special Region of Yogyakarta (DIY) Province, Indonesia, is one of the regions with a moderate Indonesian Disaster Risk Index (IRBI) category (National Disaster Management Agency, 2023). It has experienced a decrease in value from 2015 to 2022, however, the threat of natural disasters such as earthquakes, volcanic eruptions, and floods can still occur at any time. This area is prone to volcanic eruptions with the presence of an active volcano, namely, Mount Merapi. Based on the Volcanic Eruption Risk Index, the Sleman Regency area is included in the high category. In addition, the area in the DIY Province is also passed by the Opak fault which was the source of the destructive earthquake in Yogyakarta in 2006. Based on the Earthquake Disaster Risk Index, the Bantul Regency area is included in the high category, while the Kulonprogo, Sleman, Gunung Kidul, and Yogyakarta City Regencies are included in the moderate category.

Disasters have a greater impact on vulnerable groups. Pregnant women, as one of the vulnerable groups, need to be prioritized for protection in the event of a disaster (Hapsari et al., 2020). The vulnerability is higher among women than men. In post-disaster situation, they tend to experience secondary disasters (Septanaya & Fortuna, 2023). In 2020, 484 women in DIY were victims of disasters, 3% of whom were pregnant women (Regional Disaster Management Agency of the Special Region of Yogyakarta, 2020). Pregnant women who experience disasters are vulnerable to health problems and increased rates of pregnancy-related illnesses due to the reduced mobility and changed reflexes and balance experienced during pregnancy, limited access to health centers, the risk of impaired prenatal care, and vulnerability to stress during disasters (Harville et al., 2021; Partash et al., 2022). Other risks that can occur in pregnant women during disaster situations include congenital anomalies, low birth weight, preterm birth, and reduced fetal growth (Harville et al., 2021).

Pregnant women need to face emergencies by preparing basic needs and personal needs that are adequate because maintain health and safety is very important during a disaster (US Centers for Disease Control and Prevention, 2024b). Those needs include equipment and supplies to support mental, physical, and emotional safety. Other basic needs that can be prepared include a 3-day food supply, medical and first aid equipment, prescription drugs, baby and child care supplies, and supplies for pets (US Centers for Disease Control and Prevention, 2024a).

Research on the disaster preparedness among pregnant women that includes an assessment of FEP in Indonesia is very limited. In a case study with a limited sample size of 3 people (families and pregnant women) conducted in Pasie Nan Tigo Village, Sumatra, it was reported that families with pregnant women had not prepared equipment and had not made maximum preparations when a disaster occurred (Sari, 2021). Another study conducted in Bantul, Yogyakarta, after the 2006 earthquake, showed that not a single pregnant woman identified the need for information related to the disaster (Hapsari et al., 2020). The Ministry of Health of the Republic of Indonesia has published Mother and Child Health Handbook which recommends that there be preparedness and readiness before facing a disaster (Ministry of Health of the Republic of Indonesia, 2022) In this handbook, how to prepare for FEP was explained, but there has been no evaluation of how it is practiced among pregnant women, especially in a disaster prone area. Therefore, the researcher intends to identify how pregnant women in the Special Region of Yogyakarta are prepared to face disasters. This study focuses on analysing the relationship between the current knowledge's satisfaction of disaster preparedness and the practice of FEP among pregnant women based on the MCH handbook.

Materials and Methods

Design

It was a quantitative descriptive survey with a cross-sectional design.

Sample and Setting

This research was conducted in Public Health Centres (PHC) located in 3 regencies and one city in the Special Region of Yogyakarta Province, which includes Bantul Regency, Sleman Regency, Gunung Kidul Regency, and Yogyakarta City. The selection of locations is based on the frequency of antenatal visits in 2023 and the calculation of disaster risk in the Indonesian Disaster Risk Index in 2022. The number of locations is based on considerations of the duration of the research, the availability of resources, and funding sources from the researcher. The population in this study was pregnant women who resided in regencies and cities in the Special Region of Yogyakarta Province. In this study, consecutive sampling was used as the sampling technique. The minimum number of samples was 110, calculated based on the formula from Lwanga & Lemeshow (1991) with considering a previous study that pregnant women who have prepared for an earthquake were 51.4% (Wahyuni, 2020), and 10% precision. The sample of this study is pregnant women who meet the sample selection criteria: pregnant women who undergo pregnancy check-ups at health centres, with a minimum gestational age of 20 weeks, have no chronic/metabolic/respiratory diseases, reside in the DIY Province, and has and able to operate gadgets/devices. This study involved 277 pregnant women. Samples were collected from those who met the criteria in each PHC based on the schedule of antenatal visits and the availability of resources.

Variable

The independent variable in this study was satisfaction with current knowledge of disaster preparedness, and dependent variable was the practice of FEP based on the MCH handbook.

Instruments

Instruments used in this study consisted of three parts. The first part is demographic data.

Table 1. Characteristics of respondents based on age, gestational age, and antenatal care (n=277)

Characteristics	Mean	SD
Age (years)	28.39	5.33
Gestational age (weeks)	29.16	5.55
Number of attending pregnancy check-ups (times)	7.11	2.94

Table 2. Indicators of FEP and responses from respondents (n=277)

Items	Yes (%)
Have recognized the disaster threat	53.42
Have saved important contact number	62.45
Have identified the location to turn off the water, gas, electricity	64.26
Have identified assembly point and safe point	61.37
Have learned the evacuation route	53.07
Have identified a family member who is vulnerable	62.45
Have listened to information from radio/television/online media/formal information from National Board of Disaster Management	76.17
Have prepared the disaster kit	36.82
a. Have prepared the identity card	44.76
b. Have prepared special equipment for the baby	43.32
c. Have prepared the cleaner	45.49
d. Have prepared special equipment for the mother	45.49

Table 3. Relationship between level of satisfaction of knowledge with the practice of FEP (n=277)

Level of satisfaction of knowledge	Practice of FEP		p Value	Cramer's V Value
	Yes (f)	No (f)		
Very satisfied	15	11	0.04	0.04
Satisfied	59	50		
Quite satisfied	56	64		
Dissatisfied and very dissatisfied	5	17		

Table 4. Additional equipment/food and beverages specific to the region that participants would like to prepare for emergencies (n=40)

Items	f	%
Equipment		
Money	6	15.00
Clothes	2	5.00
Cell phone	1	2.50
Blanket	1	2.50
Medicine	1	2.50
Foods and beverages		
Snack food (cake, Indonesian toffee, fried fish, pecel sauce, tiwul, rice, gudeg, bakpia)	21	52.50
Dry food (biscuit, salty fish, instant noodle, rice, meat floss)	12	30.00
Foods	2	5.00
Beverages (milk)	1	2.50

Demographic data consisting of questions such as date of birth, mother's occupation, husband's occupation, mother's last education, husband's last education, marital status, current health status, mother's medical history, health insurance ownership, gestational age, number of pregnancy check-ups that have been done, health centre where pregnancy check-ups were done.

The second part is the current knowledge's satisfaction of disaster preparedness. It is one out of four items in the experience and knowledge of disaster questionnaire. This questionnaire was developed based on Yamamoto et al. (2006) and Pangesti (2012). It consisted of 4 items: if the respondent have ever experienced a disaster (yes/no answer), the impact they feel from the disaster (no direct effect, feel the direct effect, or other), the type of disaster that is most at risk of occurring in their residential environmental (earthquake, volcanic eruption, landslides, etc), and how satisfied are they with their current level of knowledge regarding disaster preparedness measured with a Likert five-point Likert scale indicating "very satisfied", "satisfied", "quite satisfied", "dissatisfied", and "very dissatisfied". The validity test resulted in 0.42-0.72 and the reliability is 0.60 (Luthfiyah, 2020).

The third part is the FEP questionnaire that is based on the MCH handbook published by the Ministry of Health of the Republic of Indonesia 2020 version which was published in 2022 (Ministry of Health of the Republic of Indonesia, 2022). Each participant was asked whether they had created of FEP (yes/no answer). If participant answered 'yes' to the question, then we categorized it as 'have practiced the FEP'. Then, they were asked to answer whether they have done eight items as follows (yes/no answer): recognize the threat of disaster; save important contact numbers; identify locations to turn off water, gas, and electricity; identify gathering points and safe points in buildings or houses; know evacuation routes; identify vulnerable family members; listening to information from the radio/television/online media/official information from BPBD, BNPB; and preparing a disaster kit. For each question, those who answered 'yes' were scored '1' and 'no' were scored '0'. After that, if participants answered 'yes' to a question whether they have prepared a disaster kit, the next 4 questions were about the contents of the disaster kit, which include (yes/no answer): identification, special items for babies and toddlers, hygienic cleaners, and special items for pregnant/delivery/postpartum mothers. For each question, those who answered 'yes' were scored '1' and 'no' were scored '0'. If participants answered 'yes' to total of 12 questions, they were categorized as 'have completed the practice of the FEP'. There were no validity and reliability tests conducted before this study; however, it was reported that before the handbook was launched to be used by pregnant women, the trial activities were conducted. It consisted of developing and revising the MCH handbook, facility-based health worker and health worker training, and monitoring and supervising the operation of the MCH handbook at health centers (Osaki & Aiga, 2016).

Intervention

There was no intervention in this study.

Data collection

A flyer informing this study to prospective participants was made and distributed offline and online by the authors to PHCs that were chosen in this study, midwives, health cadres, professional organizations, and pregnant women, and on social media (Facebook, Instagram, WhatsApp). Google Forms was made by the authors for respondents to complete the questionnaires that could be done while waiting for their turn at antenatal check-ups at PHCs or when they were at home. Google Forms that should be completed by the respondents comprised 2 parts. The first part explained information about this study, and the prospective respondent was asked to click the 'agree' button so that she could move to the second part, which was the questionnaire. They could complete the questionnaire within 20 to 30 minutes. Data was collected between March and September 2024.

Data analysis

Data was analysed with univariate (frequency, percentage, mean, SD) and bivariate analysis (Chi-square test and Cramer's V test). Each participant received an e-booklet about Readiness to Anticipate Disaster for Pregnant Women in Yogyakarta after completing the questionnaire.

Ethical consideration

Ethical permission was granted before data collection started from the Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada number KF/FK/0368/EC/2024.

Results

In this study, 244 out of 277 respondents (88.09%) were between 20 and 35 years old. The mean of gestational weeks was 29.16 weeks. The mean of attending ANC was 7.11 times (Table 1). More than half of the respondents have graduated from a junior high school (56%). Almost three-quarters of respondents were housewives (71.6%). The respondent's husband has a senior high school education background (53.80%) and works as a labourer (37.20%). All respondents were married and held the MCH Handbook. Almost all respondents (99.6%) have national health insurance. 53.79% participants were primigravida. 83.39% of pregnancies were planned pregnancies.

In this study, 63.90% respondents have ever experienced of disaster which 49.15% of them reported they felt the direct impact of the disaster. The type of disaster that was at risk of occurring in their residential environment was earthquake (83.75%), volcanic eruption (11.19%), landslides (4.69%), tornado (4.69%), floods (4.33%), tsunami (2.53%), fire (0.36%), and none (4.33%). Based on the level of satisfaction with their current knowledge of disaster preparedness, 9.39% reported being very satisfied, 39.35% were satisfied, 43.32% were quite satisfied, 7.22% were dissatisfied, and 0.72% were very dissatisfied.

In this study, 135 respondents (48.73%) reported practicing the FEP, but only 48 (35.56%) of them have completed the practice (Table 2). Based on Table 3, there was a significant relationship between the level of current knowledge's satisfaction about disaster preparedness with the practice of FEP, but the association is weak (p=0.04; Cramer's V=0.04).

In this study, 40 respondents (14.44%) reported wanting to prepare additional equipment/food and beverages. Table 4 showed that regarding equipment, participants would prepare money, clothes, cell phones, blankets, and medicine, whereas for food and beverages, they would prepare snack food, dry food, unspecified foods, and beverages.

Discussion

This study found that the current level of knowledge's satisfaction of disaster preparedness has a significant relationship with the practice of FEP, but the association is weak. This finding strengthens previous reports about knowledge and disaster preparedness. In their study, Thomas et al. (2015) reported that knowledge, including attitudes and beliefs, influences behavior and that persons with advanced knowledge were inclined to have assembled an emergency kit, created of FEP, and been alerted by the county about an emergency than those with basic preparedness knowledge. A previous study in Indonesia reported that there is a relationship between the pregnant women's experience of an earthquake and the preparedness in Bengkulu City (Silviani et al., 2022). It was reported that people's efficacy in disaster preparedness activities, have experienced disasters, and have received preparedness information positively influence the probability that they will have created of FEP (Rivera, 2020), A study in Ternate City, Indonesia, reported that disaster knowledge and preparedness attitudes have a significant positive relationship (Abdullah et al., 2024).

This study suggests that the current level of knowledge's satisfaction with disaster preparedness and the practice of FEP among pregnant women in Indonesia needs to be increased. Policymakers need to develop disaster preparedness and FEP actions based on the findings in the field. Preparing for uncertain disasters may be difficult, but the process of adjusting preparations in response to changes in local situations is important. Although FEP have introduced not only in MCH handbook but also through the government's website and social media such as X and Instagram, health care professionals should ensure that the patients read the content of FEP and practice it in their daily lives through various activities such as antenatal education, mobile reminders, group education, and integration into digital platforms. Interventions that focus on gaining knowledge based on natural disasters that patients have experienced or reflection about what they should have at home, and share the experience with other mothers and health care professionals, need to be developed.

In this study, 63.90% respondents have ever experienced of disaster which 49.15% of them felt the direct impact of the disaster. Considering that the age range of respondents was between 20 to 43 years, it was found that between 1981 to 2024, there were big earthquakes that occurred in 1981, 1992, 2001, 2004, and 2006 in Yogyakarta (Lupiyanto, 2021). In this province, each regency and city has a moderate to high risk of disaster (National Disaster Management Agency, 2023). Between January to December 2024, 833 disasters occurred in Yogyakarta that caused 2.551 houses damaged, 4.278 people affected, 44 suffer from injury, seven die, and 56 needed to be evacuated (Regional Disaster Management Agency Special Region of Yogyakarta, 2025). A study in Japan reported that 70.39% of puerperium women had had one or more disaster experiences (Ogawa S et al., 2021).

The type of disaster that is most reported as at risk of occurring in this current study was earthquake (83.75). Yogyakarta province has 11 potential disasters (Lupiyanto, 2021). Types of disaster that were not identified by respondents were extreme waves and abrasion, drought, technology failure, and social disaster. Among respondents, there were 4.33% who reported no disaster risk in their environment. This needs to be addressed because a lack of awareness of disaster risk could hinder disaster preparedness and mitigation efforts. Health personnels could ensure the disaster risk awareness through antenatal education, mobile reminders, etc.

In this study, most of the respondents reported of having quite satisfied (43.32%) with their current knowledge of disaster preparedness. This finding could not be compared with previous studies because its information is very limited. A previous study reported the negative direction relationship between the current awareness level of the community towards disaster with risk of having lower community preparedness for disaster preparedness efforts (Hargono et al., 2023). Since pregnant women have a 1.5-fold greater likelihood of requiring admission to a critical care unit and are at high risk for health complications resulting from disasters compared to those who were not pregnant, this data can be used for public health education campaigns and to support health policymaker in increasing the preparedness and help in planning the response to the pregnant women's need during a disaster (Strid et al., 2022; Horn et al., 2024).

This study found that less than half of the respondents have practiced FEP. In addition, from this percentage, only 35.56% of them have completed the practice. This finding is specific to the context of Indonesia since the content of FEP may differ in each country. In Indonesia, the content of FEP was included in the MCH handbook in 2020 (Ministry of Health of the Republic of Indonesia, 2022). The MCH handbook is a unique perinatal healthcare initiative that was published for the first time in Japan in 1948 (Nakamura, 2019; Kyozuka et al., 2022). It helps maintain a record of women's prenatal and postnatal checkups by physicians (Kyozuka et al., 2022). In Japan, the content of disaster preparedness during pregnancy was not included in the MCH Handbook, but some local governments distribute this information in leaflets. Pregnant women who used the self-recording sections in the MCH Handbook had disaster preparedness knowledge about the recognition of the Disaster Emergency Dengon Dial 171, the cellular phone disaster message board, and a hazard map (Ogawa S et al., 2021). In Myanmar, pregnant women and their families did not have specific plans for emergencies and did not even know which health center they should refer to in case of emergency (Kyaw et al., 2023).

There was no validity and reliability test conducted before this study for the FEP instrument, but based on the data analysis of this current study, it was found that this instrument was valid (r count between 0.444 – 0.786) and reliable (Cronbach's Alpha 0.770). Respondents were categorized as having practiced the FEP if they answered 'yes' to a question of whether they had created of FEP. Then, if respondents answered 'yes' to all 12 questions related to the practice of FEP (total score was 12), they were categorized as having complete practice of FEP. Based on this finding, the FEP instrument is recommended to be used for future studies related to the practice of FEP among pregnant women, especially in the context of Indonesia.

Indonesian MCH handbooks have been reported in several studies in terms of persons involved, variables being investigated, and types of disasters, but none have investigated how they guide pregnant women to practice the FEP. Further study is needed to confirm the findings of this current study and to further investigate the factors that contribute to the practice of FEP. Especially now that the 2024 version has been published by the Ministry of Health of the Republic of Indonesia. Based on the findings of the current study, healthcare personnels should improve pregnant women's FEP and encourage them to start the practice, for example, with antenatal care education, mobile reminders, family counselling, etc.

The number of FEP indicators was different in each country. In Indonesia MCH Handbook 2020 version, there were eight indicators (Ministry of Health of the Republic of Indonesia, 2022). In Hawaii, FEP for postpartum mothers includes eight behaviours, namely having enough supplies at home for at least seven days, having an evacuation plan for their child(ren), having methods to keep in touch, having an emergency meeting place, having an evacuation plan to leave home, having emergencies supplies to take with if they have to leave quickly, having copies of important documents, and having practiced what to do. It was reported that 79.3% reported at least one preparedness behavior, and 11.2% performed all eight behaviors (Strid et al., 2022).

In this study, 14.44% of respondents reported that they want to prepare additional equipment/food and beverages. Money, clothes, cell phones, blankets, and medicine were listed by participants as the equipment they would like to prepare for emergencies. All those equipments was important to be prepared for disaster preparedness. It has been included in Household Emergency Preparedness (Heagele et al., 2022). Additionally, snack food (cake, Indonesian toffee, fried fish, pecel sauce, tiwul, rice, gudeg, bakpia) was listed by 52.5% of respondents while dry food (biscuit, salty fish, instant noodle, rice, meat floss) was listed by 30% of respondents as the food that they would like to prepare for emergencies. Based on these findings, education related to the choice of foods to be prepared for emergencies needs to be implemented in the future because during a disaster, safe, quality, and nutritious food may be very difficult to find but a safe, palatable, easy to deliver, easy to use, and nutritionally complete should be provided. Local food is one of the local wealth in an area and is acceptable culturally to the people (Pribadi et al., 2021; Penafiel et al., 2016). Providing formula food that is ready to eat made from local foods that are commonly consumed by local people needs to be anticipated and researched (Agustini et al., 2022).

Strength and limitation of the study

The limitations of this study include respondents who have not yet covered all PHCs in regencies and cities in Yogyakarta. Some participants completed the questionnaires independently or with help from researchers while they were waiting for antenatal check-ups in PHCs, whereas others completed the questionnaires online from their homes.

Nursing implication

This study provides detailed information about the current knowledge's satisfaction and the practice of FEP among pregnant women living in disaster-prone areas. Based on these findings, nurses from various fields of study, such as community health nursing, maternity nursing, pediatric nursing, and disaster nursing should improve the pregnant women's knowledge of FEP to increase their level of knowledge satisfaction and practice FEP. Nurses could use the FEP instrument to regularly assess the practice of FEP while providing nursing care for pregnant women.

Conclusions

In conclusion, there is a significant relationship between the level of current knowledge satisfaction with disaster preparedness with the practice of FEP, but the association is weak. Information about disaster preparedness was available in the Indonesia MCH handbook that was distributed nationally, however, its utilization among pregnant women still needs to be improved. Further study is needed to investigate the factors that are related to the knowledge and practice of FEP. Exploration that focuses on gaining knowledge based on natural disasters that patients have experienced or reflection about what they should have at home, sharing the experience with other mothers and health care professionals needs to be developed. Preparing for uncertain disasters may be difficult, but the process of adjusting preparations in response to changes in local situations is important. Health care professionals should improve pregnant women's FEP and ensure that the patients read the content of FEP and apply it in their daily lives through various activities such as antenatal education, mobile reminders, etc.

Declaration of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

The authors would like to thank all participants in this study.

Funding

There was no funding for this study.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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“Hope Amidst Uncertainty”- Parents’ Experiences During Their Children Stayed in Pediatric Intensive Care Unit with Respiratory Failure: A Qualitative Phenomenology Study

Nisachon Sangsuk[1*], **Watcharawan Wongkruasorn**[1], **Kanokwan Pethsuwan**[2], **Jidapa Poogpan**[1]

[1] Faculty of Nursing, Mahasarakham University, Thailand
[2] Mahasarakham Hospital, Thailand

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 151-159
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2769

Article Info

Received : March 17, 2025
Revised : August 15, 2025
Accepted : August 21, 2025
Published : August 30, 2025

Corresponding author

Nisachon Sangsuk*
Faculty of Nursing, Mahasarakham University, Khamriang Sub-District, Kantarawichai District, Mahasarakham Province, Thailand; Postal code: 44150: Mobile phone: +66819075853, E-mail: nisachon.c@msu.ac.th

Citation

Sangsuk, N., Wongkruasorn, W., Pethsuwan, K., & Poogpan, J. (2025). “Hope Amidst Uncertainty”- parents’ experiences during their children stayed in pediatric intensive care unit with respiratory failure: A qualitative phenomenology study. *Jurnal Keperawatan Padjadjaran, 13*(2), 151-159. http://dx.doi.org/10.24198/jkp.v13i2.2769

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: The hope of parents was vital, especially in the context of children’s high risk of mortality due to respiratory failure.
Purpose: To discover how parents hoped with children who had respiratory failure in pediatric intensive care unit of a general hospital located in northeastern, Thailand.
Methods: This qualitative research method was based on Heideggerian hermeneutic phenomenology. Participants were purposively chosen. A semi-structured interview guide was used to keep focus during the interviews. The 12 participants were recruited by the principle of data saturation. Lifeworld’s approach of van Manen concept used for data analysis. Lincoln and Guba’s criteria were used in approaching trustworthiness.
Results: This study found 8 main themes: Lived body: 1) Blaming my lateness, hopefully recovery. 2) Comforting myself, come to terms with the truth (Tum jai). Lived space: 3) Floating in the dark, death was imminent, hopefully hospital discharge. Lived Time: 4) Waiting was torturous, every second counts. Lived relation: 5) Requiring humanized care. 6) Hoping holy things help my child heal. Lived things: 7) Enduring excruciating pain with life-saving devices. 8) Keeping a phone close at hand but not wanting to hear its call.
Conclusion: Parents depended on hope as the way to cope with uncertainty and the possibility of death. Nurses should support parents in coping with guilt, uncertainty, and despair by fostering holistic approaches, humanized care, enhanced communication, effective pain management and promoting family centered care.

Keywords: coping; guilt; hope; pain; stress; uncertainty

Introduction

In positive outcomes for individuals in good health or those suffering from severe and chronic illnesses (Paramos et al., 2023). Hope could improve the well-being of children, adolescents, and adults across all age group (Murphy, 2023). Children dealing with chronic illness gained both emotional and physical benefits from hope (Piasai et al., 2024). Conversely, hopelessness was associated with depression in children and adolescents (Liu et al., 2021). In critical illness conditions, children face higher risks of physical and functional impairment, increased invasive interventions, and symptoms of acute stress. Children who were admitted to the pediatric intensive care unit (PICU) experienced significant psychological effects. They had more emotional and behavioral problems along with poorer memory (Ko et al., 2022). During the first week of PICU admission, their family members experienced depression and would exhibit signs of post-traumatic stress disorder (Chaiyakulsil et al., 2020). Most families had disruption in their physical and mental well-being, family cohesion, and financial stability (O’Meara et al., 2022). The worsening more the severity of children's illness conditions, the parental stress levels also increasing kept rising (Upadhyay & Parashar, 2022). Parents' greatest stressor was their children's dependence on the ventilator for breathing (Debelić et al., 2022).

In Thailand, the incidence of PICU patients using a ventilator for more than 14 days was as high as 10.9 %. Consequently, tracheostomy rates, ventilator associated pneumonia, and mortality rate by disease were 63.5%, 98%, and 34.6% (Chongcharoenyanon et al., 2023). For critically ill patients, acute respiratory failure and acute kidney injury were associated with a higher risk of hospital death (Kulvichit et al., 2022). Mortality among PICU patients was linked to vancomycin treatment and had been on mechanical ventilators and renal replacement therapy (Khangtragool et al., 2022). Extended stays in intensive care units longer than seven days were associated with social, cognitive, and physical dysfunction (Tippayawong & Chaiyakulsil, 2022). The worse serious problems their children got, the more uncertainty the parents felt. (Maneekunwong et al., 2022).

When children experienced respiratory failure in PICU, patients and their families needed hope. Despite the fact that, Thai nurses could measure hope using the Hope scale. (Inyoo & Polsook, 2021), there were notable gaps in our knowledge of parents' experiences of hope in Thai northeastern context. This research aimed to understand how parents hope with children who faced respiratory failure in PICU of a general hospital located in northeastern, Thailand. It would be useful in nursing practice to improve positive outcomes for pediatric patients and their families.

Materials and Methods

Sensitive to lifeworld exploration, the Heideggerian hermeneutic phenomenological qualitative research approach was conducted (Suddick et al., 2020). To provide insights from parents' lived experiences, this study focused on the importance of meaning, thoughts, emotion, feelings of parents when their children had respiratory failure and were on ventilators in pediatric intensive care unit.

Design

According to Van Manen's concept of lifeworld's' approach, corporeality (lived body), spatiality (lived space), temporality (lived time), relationality (lived relation) and lived things dimension were reflected the meanings of parents' live experiences of hope in study phenomena (Mac Ginty, 2024).

Participants and setting

A purposive sampling technique was used. We utilized the small samples that were adequate to address the research question of this study (Bartholomew et al., 2021). Parents who were the primary caregivers of the children with respiratory failure admitted in PICU of a general hospital in the northeastern part of Thailand served as the key informants. After obtaining permission from the hospital, researchers secured participants' consent for interviews in a private room to collect data in a relaxed setting. Participants had to be emotionally stable, willing to share their own experiences of hopes, and willing to have conversation recorded to meet the study's inclusion criteria. In accordance with exclusion criteria, they were free to leave the study at any time. The code of participants was done during the information presentation to secure their identities. The 12 participants were recruited by the principle of data saturation and none of them withdrew from the study (Table 1).

Ethical consideration

This research has been reviewed and approved by the ethics committee for research involving human subjects of Mahasarakham University, Thailand. The approval number 215-233/2024. The Helsinki declaration was used by the hospital's ethics committee to approve this study. The hospital approval number COA No. 67/042, MSKH_REC 67-02-044.

Data collection

Data was collected between April 2024 and September 2024. Using face to face in-depth interviewing technique, the researchers asked parents in the Issan and Thai dialects with open ended questions to share their experiences, feelings, and hopes in caring for children admitted in PICU with respiratory failure. Additionally, they were asked to talk about the troubles and problem-solving techniques they used when caring for children in critical conditions. Each interview lasted between 45 – 60 minutes, using a semi-structured interview guide to ensure focus (Adeoye-Olatunde & Olenik, 2021). The questions were: "When your child admitted in PICU with respiratory failure, can you describe how did you feel and what hope did you have?" Further inquiries were made based on the participants' answers and reactions during interview, including, "Could you elaborate on that?" "How did that make you feel?" "What is your viewpoint on that? "How was your experience?" "Please provide some examples of the events that occurred." "What was your involvement in that situation?". During the interviews, parents' feelings and emotions were respected by the researchers. Verbal and non-verbal responses were recorded to reveal hidden information. They were no consequences, if they wish to pause providing information. Data saturation occurred when there were no new issues in data collection from interviews and data were repeated.

Data analysis

Researchers considered the key informants' background and context as well as their real-life experiences to formulate interview questions. Following the interviewing process, researchers

Table 1. Participant’s characteristics data

Person	Sex	Age (yrs.)	Education	Occupation	Patients Relationship	patient’s age (yrs.)	Diagnosis
1	Female	40	Grade 6	Farmer	Grandmother	4	Asthma with respiratory failure
2	Female	23	Grade 9	Factory worker	Mother	4	Pneumonia with respiratory failure
3	Female	34	Grade 12	Merchant	Mother	10	Pneumonia, Duchene muscular dystrophy, post cardiac arrest
4	Female	53	Grade 4	Farmer	Grandmother	6	Pneumonia with respiratory failure, Epilepsy
5	Female	29	Grade 12	Nurse aid	Mother	7	Pneumonia with respiratory failure, Head injury
6	Female	32	Bachelor’s degree	Teacher	Mother	2 mo.	Pneumonia with diarrhea, born with meconium aspiration syndrome
7	Female	28	Grade 12	Goods truck driver	Mother	4	Pneumonia with severe asthmatic attack
8	Female	37	Grad 6	Labor	Mother	2	Pneumonia with respiratory failure
9	Female	31	Bachelor’s degree	Teacher	Mother	8 mo.	Pneumonia with respiratory failure, born preterm 25 weeks birth weight 780 gram. Bronchopulmonary dysplasia
10	Female	39	Grade 9	Housewife	Mother	5	Pneumonia with respiratory failure
11	Male	49	Grade 6	School Janitor	Grandfather	2	Pneumonia with respiratory failure
12	Female	56	Grade 4	Stay at home, raising grandchildren	Grandmother	4	Pneumonia with respiratory failure, diarrhea, born with meconium aspiration syndrome

Table 2. Themes of parents’ lived experiences

Lived existential Theme	Themes
Lived body	1. Blaming my lateness, hopefully recovery 2. Comforting myself and coming to terms with the truth (Tum jai).
Lived space	3. Floating in the dark, death was imminent, hopefully hospital discharge
Lived Time	4. Waiting was torturous, every second counts
Lived relation	5. Requiring humanized care. 6. Hoping holy things help my child heal.
Lived things	7. Enduring excruciating pain with life-saving devices. 8. Keeping a phone close at hand but not wanting to hear its call.

listened to the recordings, transcribed the interviews verbatim, and read the transcripts to ensure understanding. All transcriptions were confirmed to be accurate in Thai by first and second authors. To perform qualitative analysis, several codes were allowed for the interpretation of data. The data was analyzed, reduction, reflection, interpretation, and categorized for each the van Manen's domain by research team (Monaro et al., 2022) . The key issues that came up were identified and synthesized the words and sentences that reflect the meaning as themes. Significant themes were interpreted to understand the lived experiences of parents of the study phenomena. The study phenomena findings were examined by an experienced qualitative researcher to reduce bias for validity and consistency. (Hemming et al., 2021). Finally, English translation was carried out after the discovered of every quote explaining the themes.

Trustworthiness

The researchers used Lincoln and Guba's criteria in approaching trustworthiness (Stahl & King, 2020). For creditability, the third author, who is a PICU senior nurse researchers established rapport and trust with participants prior to interviews. The first and third authors Researchers prolonged engagement and persistent observations in the research context. During the interviews, the accuracy of information was verified by using reverse questions to determine whether the informants and the researchers share the same understanding and summarizing throughout the conversation. Data was systematically recorded and verbatim transcribed. Transcripts and field notes were clearly recorded, coded and references checkable for confirmability by the research team. For dependability, peer debriefing and member checking were designed to guarantee data accuracy. To reduce the bias, the first and fourth authors, who had experiences in qualitative research, examined the study phenomena findings for validity and consistency. For transferability, researchers realistically explored the parents' experiences when their children were admitted in PICU with respiratory failure whether the research findings can be applied to similar context.

Results

The participants included mothers, grandmothers, and just one grandfather. They served as main caregivers for the children admitted to PICU with respiratory failure in the study context. Table 1 presents their characteristics. According to the experiences of parents, the findings were grouped into 8 themes presented in table 2.

Lived body

Parents reflected the meaning of their own world about their mind, body, emotions and spirit on their experiences when their children were admitted to PICU due to respiratory failure as follows:

Theme 1: Blaming my lateness, hopefully recovery.

The parents addressed their own feelings of inadequacy in caring for children. They were guilty of arriving at the hospital too late, which led to the children using the endotracheal tube with ventilators. They hope for their children to recover as shown in the following statement:

"I blamed myself. Why didn't I bring my child to see the doctor earlier? My child felt like a chest tight, but I didn't know the disease. I didn't know how to do. I didn't want her to be like this. I very worried about serious condition, but on the other hand I hope for my child's recovery." (Person 1)

"(Cry) I feel disheartened and blame myself, I am not good at caring. Why did I wait until the illness was serious? I blame myself. I should have noticed that something was wrong with my child. The endotracheal tube was not used if I hurried 2 days earlier. My husband said it was fine; our child would heal. Hopefully, the doctor will remove the respiratory tube tomorrow." (Person 8)

Theme 2: Comforting myself, come to terms with the truth (Tum jai)

Parents comforted themselves that their children must recover from the critical illness, even though they were terrified that they wouldn't. They gradually come to terms with the fact that their children's condition was serious, the procedures were painful, and the death was a possibility. They used Thai words "Tum Jai" or tried to accept truth and comforted themselves that their children were under the care of doctors and nurses. Things would improve. The statements were examples below:

"I cried and couldn't sleep. I considered my son's illness and gradually came to terms with the truth (Tum jai) that on a day in the future his heart will not beat. I told the nurses not to resuscitate. He may be in pain and suffering. It's tormented. Eventually all that lives must die. I feel tight in my chest. Look in my eyes. When that day comes, I still need my child to be alive. (Person 3)

"I've already come to terms with it (Tum jai or try to accept it). Since she was the size of a bottle, my little girl has been struggling to survive. I must be here alongside to help her." (Person 9)

"I'm anxious, but I must come to terms with the treatment. If I'm afraid of suffering, my child won't be cured. I must accept. It's the doctor's treatment plan. It's necessary for my child's recovery. I talk to myself that things will improve." (Person 10)

Lived space

Parents reflected their own world to space when their children were admitted to PICU due to respiratory failure as follows.

Theme 3: Floating in the dark, death was imminent, hopefully hospital discharge

Parents felt floating in the dark. They worried about the imminent death of their children who had life-threatening illness housed in an intensive care unit. They hope their children to exit the intensive care unit soon and eventually be discharged from the hospital. Example of statements as follows:

“I never imagined that my child would need a breathing tube with a ventilator and be admitted to the intensive care unit. I didn’t see that coming. This visit to the ICU is the second time. I feel more depressed than last time. I feel like I’m floating. My tears are uncontrollable. All I hope for at this moment is my child’s recovery, discharge from ICU, and eventual hospital discharge.” (Person 6)

“When doctor said he must take my child to ICU, oh ICU stands for waiting to die. I feel sorrow. Noting death, will my child pass away?” (Person 12)

Lived Time

Parents expressed their emotions about time regarding their children’s admission to the pediatric intensive care unit as the following manner.

Theme 4: Waiting was torturous, every second counts.

Parents felt that every second mattered to them. Waiting was so torturous. The only thing to do was to wait, including waiting for a visit to children in the intensive care unit, waiting for the patients’ symptoms and indications to improve, waiting for the nurses and doctors to provide the information and waiting for the day to return home. The statements were shown below:

“Nurses allow parents to visit patients twice a day at noon and in the evening. I will wait to visit at noon after arriving here at 9 o’clock and I’m longing for my child while waiting outside. The time to visit my child is too brief. I worry that if he wakes up, he will feel alone.” (Person 5)

“Time is mattered to me. Every second counts, I eagerly wait for the opportunity to see my child whether it’s five minutes, an hour, or short time. It’s okay. I would like him to know mom and dad are here with him. I want to know whether he’s feeling less tired and how he’s doing. He is on my mind. I’m waiting for an ICU visit, just waiting patiently. I’m hoping he will get off the endotracheal tube, but it will take time. If my child improves, we should be able to go home in a few days.” (Person 7)

Lived relation

Parents reflected their feelings towards those around them including doctors and nurses, and supernatural beings when their children admitted in PICU with respiratory failure, as follows:

Theme 5: Requiring humanized care

Parents put their hope into nurses and doctors. They need nursing with quality care. They need not only physically support to help their children recover but also need humanized care. The statements were follows:

“I put my hope in nurses and doctors. They will help my child recover, but I couldn’t. What mom hoped would happen was that the nurses would be able to provide my child with the best care possible. In the intensive care unit, nurses look after my child instead of me. I hope they do all the same as I used to do such as comforting when she cries and save my child’s life.” (Person 6)

“I didn’t know what’s wrong with my child, but the nurses and doctors knew. My child had more secretion, they must know how to remove. They cared for and treated so many patients. My child was in the hands of nurses and doctors. If they can’t treat, then in this life, my child probably had only made this much merit.” (Person 11)

Theme 6: Hoping holy things help my child heal

For supernatural beings, parents hoped the holy objects to help their children’s recovery. They prayed and kept the deceased parents in mind to ensure their children’s safety and recover from critical illness as the statement shown below.

“I must sit cross legged down on the floor. I prayed and thought of my deceased parents. Mom and dad please support me, helping my child recover. I will provide merit. I told my brother to light incense at the Don Phi Pu Ta shrine in my home village to pray for my child’s survival. I called the spirit of my child to return and hope her to stay with me. Please don’t pass away.” (Person 4)

“I close my eyes, meditate and repeat saying “Budho” for helping my child recover from critical illness. The only things that will help me were meditation and requesting my child healing. I need my child to get better so we can return home.” (Person 12)

Lived things

Parents felt to things when their children suffered respiratory failure and were admitted to the PICU as outlined below.

Theme 7: Enduring excruciating pain with life-saving devices.

Although parents knew that inserting endotracheal tube, ventilator, and lines were the life -saving for critical ill children. They need their normal well-being children. They did not want their children to be intubated and inserted lines. They worried that the children would not survive, enduring excruciating pain.

“My heart was broken. (cry) I can’t do anything. I feel sorry for my child to be like this. Just seeing my child get bitten by ants, it hurts me. In this condition, she had the tube with respirator and full of lines on her body. It hurts me more. I want to pain instead of my child.” (Person 2)

“All I did was cry. I’m afraid my child won’t wake up. I knew that the placement of tube, ventilator and lines could save lives. But I worry that my child would be in severe pain.” (Person 5)

Theme 8: Keeping a phone close at hand but not wanting to hear its call.

Parents reflected that they must carry the phone with them all the time. They worried about hearing from the intensive care unit that their children were getting worse. They didn't want to hear the hospital calls from. If they received a call, they would head to the intensive care unit as quickly as possible.

"The phone is with me. I worry that I might miss the hospital call in the event of an emergency. My worst fear is that the phone rings at night while I'm asleep. I'm afraid of hearing from ICU that my child is dying. I get anxious about the phone ringing every day. Before he passes away, I must arrive in time for the final moment." (Person 3)

Discussion

According to the findings, we found the parent's bereavement. They reflected their grief started when their children diagnosed a life-threatening condition and moved to PICU with respiratory failure. Grief might be considered a form of learning that required time and experiential feedback (O'connor & Seeley, 2022) They cried and felt disheartened. They placed the blame on themselves, which was like their guilt. Guilt was associated with posttraumatic stress symptoms (Shi et al., 2021). Parents were guilty about not being good parents in raising their children because they felt stressed, anxious, and fearful about losing their children. When individuals had moral injury and moral distress but were not at fault, they felt guilty, self- blaming and powerlessness (Čartolovni et al., 2021). They started the questions with "Why I didn't…". These sentences demonstrated that their guilts were focused on solving problems rather than hurting themselves. If nurses allow parents to feel guilty without communicating with them, depression which had been connected to guilt may result (Luck & Luck-Sikorski, 2021) .

When individuals expected the impending loss of a loved one's death, they may feel uncertainty, fear, and sadness. Uncertainty served as a necessary source of fear and hope that were interconnected (Han et al., 2021). Hope encompassed the awareness that the desired result might not be realized. We might hope for a positive outcome while still feeling anxious that things might not turn out as we desire (Vazard, 2024). In this study context, parents comforted themselves with the hope that their children might recover from critical illness. They used positive self-talk that things would improve. They used the Thai words "Tum Jai", which signifies coming to terms with the truth or attempting to accept the treatment in PICU despite experiencing pain and suffer. They felt like floating in the dark because death was imminent when their child had respiratory failure. Floating in the dark symbolized various emotions experienced by parents of children admitted to PICU such as feeling lost, distress, hopelessness, and helplessness (Kichu et al., 2024).

In the study context, waiting was so torturous and every second counts for parents. Waiting frequently had a negative impact on them and resulted in their distress. While waiting could not be completely avoided, family centered care, together with the warm and comforting hospital environment, could help ease the stress for family members of patients in PICU. They needed humanized care for their children and wished for nurses to deliver exceptional nursing care to critically ill children by employing a holistic approach such as comforting children when they cried, just like their mothers did. In addition, they needed nurses and physicians to assist their children in healing. When caring for critical ill children in the PICU, nurses typically prioritized clinical outcomes, patient safety, and basic care requirements (Danielis et al., 2021). Nurses should be sensitive to parents' perceived level of satisfaction, either. Parental satisfaction would increase due to care and cure, communication and parental involvement (Cintra et al., 2022). Communication posed a significant challenge for nurses in supporting patients and their families and reducing stressors during difficult life experiences (Tager et al., 2024).

In this research, parents hope for holy objects to protect their children and help in healing. Offering spiritual support to families was essential in critical care environment (Stevens et al., 2024). Spirituality and beliefs in religion were vital when coping and making decision (Nageswaran et al., 2022). The research participants utilized meditation as a mindfulness technique, allowing them to concentrate on the present rather than worry about the stressors. Mindfulness practices helped individuals cope with stress by reducing biological and behavioral responses to stress and by lessening emotional reactions to stressors (Grossman, 2022).

Parents sensed their children suffered from tubes, lines, ventilators, and life-saving devices. Severe pain was the most frequent occurrence in critically ill patients. Even though they required pain management for their children, they were worried about their children's unconsciousness. Thus effective assessment and management of pain not only benefited the child by symptom relief and improving quality of life, but also enhance well-being of the families that nurses should concerned (Grunauer et al., 2021).

In the end, parents kept the mobile phone close at their hands but did not want to hear its call. They were anxious about the phone call from PICU informing them that their children were either nearing death or facing worsening conditions. They hoped to be with their children in PICU as soon as they got a call. For patients and their families, hope is essential. It had a favorable impact on their body-mind and emotions. Nurse should increase patient's hope by encouraging their inner resources, pleasant experiences, and emotional support (Piasai et al., 2024). For parents, hope was the way to cope with the situation linked to the possibility of death, an unpredictable situation. Hope was related to the survival of children in any way, irrespective of the experts’ statements and the reality they face. Nurses should support families in facing these situations (Cabeça & Melo, 2020).

Limitation of the study

The limitation of from this study was that it focused on the parent’s hope only during the time their children stayed in PICU may have limited its ability to capture how hope changed over time following recovery and discharge, necessitating a longitudinal approach.

Conclusion

When parents witnessed, their children being admitted to PICU due to respiratory failure, they experienced feeling grief, stress, anxiety, and fear of losing their children, which made them felt guilty. Uncertainty arose when they were afraid of losing. Despair and powerlessness were their feelings drifting in the darkness. The wait was incredibly agonizing for them. Parents relied on hope as a mean to handle uncertain situations and the prospect of death. Mindful practice, faith and spirituality assisted them in managing with stress. When supporting patients and their families, nurses should adopt a safe space to express their feelings without judgement, use deep listening techniques and build trusting relationships, help them to express their needs and concerns, provide information and promote shared decision-making, and encourage positive coping mechanism.

Declaration of Interest

The authors confirm that there was no conflict of interest, and no competing financial interest could have influenced any of the work mentioned in this article.

Acknowledgement

We are grateful to parents who responded to the research study on hope of their children who were admitted to pediatric intensive care unit. We express our gratitude to the pediatric intensive care staff and hospital administrators for facilitating researchers accomplishing the study’s objective.

Funding

We are thankful of the research funding provided by Faculty of Nursing at Mahasarakham University in Thailand.

Data Availability

The data that originated from the participants’ explanation during the interviews can be provided by the corresponding author.

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Alcohol use and sociodemographic risk factors for severe intimate partner violence among women in Timor-Leste

Amin Zakaria[1*], Yuni Asri[1], Heny Nurma Yunita[1], Vendi Eko Kurniawan[2], Thomas Senghore [3], Muhammad Solihuddin Muhtar[4], Christopher Blair[5]

[1] Department of Nursing, Faculty of Health Science, Institute of Technology Science and Health, Dr Soepraoen Kesdam V/Brawijaya Hospital, Malang, Indonesia
[2] Department of Nursing, Sekolah Tinggi Ilmu Kesehatan Husada Jombang
[3] Department of Nursing and Reproductive Health and the Department of Public and Environmental Health, University of the Gambia
[4] International Ph.D. Program in Biotech and Healthcare Management, Taipei Medical University, New Taipei City, Taiwan
[5] Program Manager, Malawi AIDS Counselling and Resource Organization (MACRO), Lilongwe, Malawi

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Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 160-171
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2788

Article Info

Received : April 11, 2025
Revised : August 11, 2025
Accepted : August 21, 2025
Published : August 30, 2025

Corresponding author

Amin Zakaria*
Department of Nursing, Faculty of Health Science, Institute of Technology Science and Health, Dr Soepraoen Kesdam V/Brawijaya Hospital, Malang, Indonesia; Jl. S. Supriadi No.22, Sukun, Kec. Sukun, Kota Malang, Jawa Timur 65147, Phone: 081-330045895, E-mail: amin@itsk-soepraoen.ac.id

Citation

Zakaria, A., Asri, Y., Yunita, H. N., Kurniawan, V. E., Senghore, T., Muhtar, M. S., & Blair, C. (2025). Alcohol use and sociodemographic risk factors for severe intimate partner violence among women in Timor-Leste. *Jurnal Keperawatan Padjadjaran, 13*(2), 160-171. http://dx.doi.org/10.24198/jkp.v13i2.2788

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E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Intimate partner violence (IPV) remains a significant public health concern in Timor-Leste, with sociocultural norms, economic disparities, and partner behaviors contributing to its prevalence. Understanding the associated risk factors is crucial for informing prevention strategies.
Purpose: This study aimed to examine sociodemographic and behavioral factors associated with severe IPV among women in Timor-Leste.
Methods: A cross-sectional analysis was conducted using data from 3,694 women aged 15–49 years who participated in the 2016 Timor-Leste Demographic and Health Survey (DHS). The outcome variable was self-reported severe IPV. Independent variables included age, marital status, education, household wealth index, place of residence, geographic region, and husband/partner's alcohol consumption. Weighted logistic regression models were used to calculate crude and adjusted odds ratios (COR, AOR) with 95% confidence intervals (CI).
Results: Severe IPV was significantly associated with being aged 25–34 (AOR = 1.74; 95% CI: 1.19–2.52), being unmarried/widowed/divorced (AOR = 2.56; 95% CI: 1.33–4.92), and having a partner who consumed alcohol (AOR = 2.41; 95% CI: 1.85–3.11). Higher education and better economic status were protective against IPV.
Conclusion: Alcohol consumption by partners, lower education levels, and economic disadvantage are key risk factors for severe IPV in Timor-Leste. Policies targeting alcohol reduction, women's empowerment, and tailored regional interventions are essential to mitigate IPV and its health impacts.

Keywords: alcohol use, demographic and health surveys; intimate partner violence; socioeconomic factors; Timor-Leste

Introduction

Intimate Partner Violence (IPV) remains a critical public health concern worldwide, affecting nearly one in three women during their lifetime (WHO, 2021). IPV encompasses physical, sexual, and emotional abuse perpetrated by a current or former partner and is associated with adverse health outcomes, including injury, depression, and reproductive health complications (Hailu et al., 2023; Kirkbride et al., 2024; Rollero & Speranza, 2020). In low- and middle-income countries (LMICs), the burden of IPV is particularly severe due to entrenched gender inequalities, limited legal protections, and inadequate access to support services (Aboagye, 2023; Coll et al., 2020; Gunarathne et al., 2023).

Timor-Leste, a nation emerging from conflict and characterized by strong patriarchal traditions, has one of the highest rates of intimate partner violence in Southeast Asia. The Demographic and Health Survey (DHS) reveals that a considerable number of women report enduring severe violence from their (Jean Simon et al., 2025; Manna et al., 2024; Yount et al., 2022). The sociocultural context, shaped by traditional gender roles and inadequate legal protection for women, exacerbates the risk of IPV (González & Rodríguez-Planas, 2020; Gunarathne et al., 2023). In Timor-Leste, women encounter additional obstacles in accessing support services due to inadequate infrastructure and resources, which further sustain the cycle of violence. Consequently, it is essential to understand the factors linked to IPV to create effective strategies to reduce its occurrence and aid survivors. Previous research has identified several sociodemographic and behavioral factors contributing to IPV, including age, marital status, education, economic status, and alcohol consumption by partners (Aboagye et al., 2022; Tolstrup et al., 2025). For example, younger women, those with lower educational attainment, and women from economically disadvantaged households are often at higher risk of experiencing IPV (Aboagye et al., 2022; Ikuteyijo et al., 2024; Klencakova et al., 2023). Additionally, alcohol consumption by partners is a well-documented trigger for IPV, as it can escalate conflict and reduce self-control (Sáez et al., 2020; O. Shubina et al., 2023; Sontate et al., 2021). In Timor-Leste, alcohol consumption is a particularly relevant factor due to the social norms surrounding drinking that can worsen household tensions.

However, the way in which these elements interact with the cultural dynamics specific to Timor-Leste has not been thoroughly examined. Current research shows a strong link between alcohol use and both perpetration and experience of intimate partner violence (IPV) (Gibbs et al., 2024; Shorey et al., 2025). Research indicates that consuming too much alcohol can lead to impaired decision-making and heightened aggression, which in turn raises the chances of violent events occurring (Ohurira et al., 2022). Interventions aimed at reducing alcohol availability have shown the potential to decrease IPV rates by limiting the opportunities for excessive drinking (Ghoshal, 2024). Furthermore, the presence of alcohol outlets in a community has been associated with an increase in IPV-related emergency department visits, emphasizing the need for targeted public health strategies (Forbes et al., 2024). This study focused on exploring the sociodemographic and behavioral elements linked to severe intimate partner violence (IPV) in Timor-Leste, utilizing data from the 2016 Demographic and Health Survey (DHS). This study aimed to identify the primary risk factors for IPV by analyzing factors such as age, marital status, education, economic status, regional differences, and alcohol use by husbands or partners. Understanding these factors is essential for policymakers and public health practitioners to design effective prevention and support strategies tailored to the unique sociocultural context of Timor-Leste (Shwartz et al., 2020). By addressing these risk factors, it is possible to reduce the significant impact of IPV and enhance the overall well-being of women in the nation.

Materials and Methods

Design

This study utilized a cross-sectional design using data from the 2016 Demographic and Health Surveys (DHS) conducted in Timor-Leste. The DHS is a nationally representative survey that collects comprehensive data on population health indicators, including maternal and child health, fertility, and intimate partner violence (IPV). The data collection employed standardized protocols and tools, ensuring data comparability and reliability across different regions and demographic groups.

Sample and setting

The study included a total of 3,694 women aged 15–49 who participated in the 2016 Timor-Leste DHS. Women were selected using a two-stage stratified cluster sampling technique to ensure a nationally representative sample. Eligible participants were those who provided complete responses to the IPV-related questions in the survey

Variable and Instruments

The DHS questionnaire was used to collect data on sociodemographic characteristics, marital status, educational attainment, wealth index, and partner behaviors. The outcome variable of interest in this study was the experience of severe violence from a husband or partner. Severe violence was defined based on physical acts, such as being hit, kicked, or choked, as reported by women. Independent variables included age (15–24, 25–34, and ≥35 years), marital status (currently in union, never married, widowed/divorced), educational level (no education, primary, secondary, higher), wealth index (poorest, poor, middle, rich, richest), residence (urban, rural), region, and husband/partner alcohol consumption (yes/no)

Data collection

Data collection for the 2016 Timor-Leste DHS was conducted by trained fieldworkers who received extensive instruction in handling sensitive topics such as IPV. Interviews were conducted face-to-face using a standardized and validated DHS questionnaire. To ensure confidentiality and privacy, interviews took place in a private setting without the presence of family members, especially in communal or rural households. Female interviewers were primarily assigned to administer the domestic violence module to minimize distress and promote disclosure. The average duration of each interview was approximately 45 minutes to one hour, allowing adequate time for rapport-building and accurate data collection.

Data analysis

Data analysis was conducted using Stata version

Table 1. Frequency Distribution of Respondent Characteristics among women in Timor Leste (N = 3.694)

Variable	Frequency (n)	Percent (%)
Age (Years)		
15-24	538	14.9
25-34	1.583	43.5
>35	1.573	41.6
Marital Status		
Currently in union	3.573	96.7
Never in a union/widowed/divorced	121	3.3
Education Level		
No education	1.097	30.2
Primary	708	19.3
Secondary	1.632	43.4
Higher	257	7.1
Wealth index combined		
Poorest	734	20.1
Poor	768	21.0
Middle	805	21.1
Rich	777	20.5
Richest	610	17.3
Residence		
Urban	1.025	24.4
Rural	2.669	75.6
Region		
Aileu	254	3.4
Ainaro	255	4.6
Baucau	277	7.2
Bobonaro	317	8.4
Covalima	257	6.4
Dili	365	18.5
Ermera	312	10.9
Lautem	287	6.0
Liqui	269	6.0
Manatuto	269	4.5
Manufahi	328	5.4
Oecussi	227	5.5
Viqueque	277	6.9
Husband/partner drinks alcohol		
No	2.406	65.1
Yes	1.288	34.9

Table 2. Bivariate analysis of severe intimate partner violence by sociodemographic factors and partner alcohol use (N = 3,694)

Variable	Experienced any severe violence by husband/partner		p-value
	No	Yes	
	N (%)		
Age (Years)			0.003
15-24	483(13.5)	55(1.4)	
25-34	1.341(36.3)	242(7.3)	
>=35	1.380(35.8)	193(5.8)	
Marital Status			0.011
Currently in union	3.111(83.1)	462(13.6)	
Never in a union/widowed/divorced	93(2.4)	28(0.9)	
Education Level			0.001
No education	902(23.8)	195(6.4)	
Primary	604(16.2)	104(3.1)	
Secondary	1.463(38.9)	169(4.5)	
Higher	235(6.6)	22(0.5)	
Wealth index combined			0.001
Poorest	586(15.8)	148(4.8)	
Poor	655(17.6)	113(3.4)	
Middle	692(17.9)	113(3.2)	
Rich	704(17.6)	73(1.9)	
Richest	567(16.5)	43(1.1)	
Residence			0.001
Urban	933(22.3)	92(2.1)	
Rural	2.271(63.2)	398(12.4)	
Region			0.001
Aileu	237(3.2)	17(0.2)	
Ainaro	216(3.9)	39(0.7)	
Baucau	250(6.1)	27(1.1)	
Bobonaro	286(8.3)	31(0.1)	
Covalima	224(5.3)	33(1.1)	
Dili	331(16.8)	34(1.7)	
Ermera	219(7.3)	93(3.6)	
Lautem	260(5.4)	27(0.6)	
Liqui	218(4.9)	51(1.1)	
Manatuto	240(4.0)	29(0.5)	
Manufahi	292(4.7)	36(0.7)	
Oecussi	181(5.4)	46(0.1)	
Viqueque	250(6.1)	27(0.8)	
Husband/partner drinks alcohol			0.001
No	2.194(58.1)	212(6.1)	
Yes	1.010(27.9)	278(8.4)	

Note: * p<0.05.

Table 3. Multivariable logistic regression of factors associated with severe intimate partner violence among women in Timor-Leste

Variables	Model 1	Model 2
	COR (95% CI)	AOR(95% CI)
Age (Years)		
15-24	Reference	Reference
25-34	1.87(1.30-2.68)**	1.74(1.19-2.52)**
>=35	1.52(1.06-2.18)*	1.34(0.90-1.97)
Marital Status		
Currently in union	Reference	Reference
Never in a union/widowed/divorced	2.16(1.17-3.98)*	2.56(1.33-4.92)*
Education Level		
No education	Reference	Reference
Primary	0.71(0.52-0.97)*	0.88(0.63-1.21)
Secondary	0.43(0.32-0.58)***	0.68(0.48-0.96)*
Higher	0.26(0.15-0.46)***	0.67(0.35-1.28)
Wealth index combined		
Poorest	Reference	Reference
Poor	0.64(0.47-0.87)**	0.71(0.52-0.96)*
Middle	0.59(0.44-0.79)***	0.73(0.53-1.00)
Rich	0.36(0.25-0.51)***	0.52(0.37-0.73)***
Richest	0.21(0.13-0.36)***	0.36(0.21-0.61)***
Residence		
Urban	Reference	Reference
Rural	2.11(1.54-2.89)***	1.09(0.73-1.63)
Region		
Aileu	Reference	Reference
Ainaro	2.30(1.08-4.91)*	2.25(1.03-4.92)*
Baucau	1.42(0.67-2.30)	1.77(0.85-3.71)
Bobonaro	1.56(0.62-3.92)	1.63(0.68-3.92)
Covalima	2.67(1.18-6.04)*	3.06(1.36-6.93)**
Dili	1.33(0.63-2.79)	2.51(1.13-5.59)*
Ermera	6.36(2.90-14.0)***	5.22(2.37-11.5)***
Lautem	1.42(0.61-3.31)	1.91(0.85-4.28)
Liqui	3.03(1.48-6.21)**	3.30(1.58-6.88)**
Manatuto	1.59(0.76-3.33)	1.98(0.95-4.11)
Manufahi	1.81(0.83-3.97)	2.11(0.96-4.62)
Oecussi	3.40(1.51-7.63)**	2.59(1.16-5.82)*
Viqueque	1.62(0.74-3.55)	1.87(0.85-4.11)
Husband/partner drinks alcohol		
No	Reference	Reference
Yes	2.90(2.25-3.72)***	2.41(1.85-3.11***)

15.1. To account for the complex survey design and ensure representativeness, all analyses applied sampling weights using the “svy” command. Descriptive statistics summarized participant characteristics, followed by bivariate analysis to explore associations between independent variables and severe IPV. Multivariable logistic regression was then employed to identify adjusted associations, reported as odds ratios (OR) and adjusted odds ratios (AOR) with 95% confidence intervals (CI). Variable selection for the multivariable model was guided by theoretical relevance and p-values <0.20 from the bivariate analysis. We assessed multicollinearity using the Variance Inflation Factor (VIF), and all variables included had VIFs <2.5. Missing data were minimal (<5%) and handled via listwise deletion.

Ethical consideration

This study utilized publicly available, anonymized secondary data from the 2016 Timor-Leste Demographic and Health Survey (DHS). As such, no additional ethical approval was required for this secondary data analysis. The original DHS survey protocol received ethical approval from the National Ethics Committee of the Timor-Leste Ministry of Health and the Institutional Review Board (IRB) of ICF International. All respondents provided informed consent at the time of data collection. Permission to use the dataset was granted by the DHS Program. The study adheres to the ethical principles outlined in the Declaration of Helsinki and follows the International Committee of Medical Journal Editors (ICMJE) guidelines.

Results

Table 1 provides an overview of the respondents’ sociodemographic and partner-related characteristics in Timor-Leste. The majority of women were aged 25 years and older, and most were currently in a union. Educational attainment varied, with a considerable proportion of women having no formal or only primary education, suggesting potential barriers to empowerment and access to information. The distribution of wealth was relatively even across quintiles, though a notable share of respondents belonged to the poorest and poorer categories, reflecting broader economic vulnerability. Most respondents resided in rural areas, consistent with the country’s demographic profile, and representation across regions showed slight concentration in Dili and select municipalities. Partner alcohol consumption was reported by more than one-third of women, indicating a potential behavioral risk factor within households. Notably, 13.3% of respondents reported experiencing severe violence from their husband or partner, underscoring the ongoing relevance of intimate partner violence as a public health concern in Timor-Leste.

Figure 1 illustrates the prevalence of women in Timor-Leste who have experienced severe violence by their husband or partner. The data shows that 13.26% of women reported experiencing severe violence, while the majority, 86.74%, indicated they had not. This significant disparity highlights that although severe violence affects a smaller proportion of women, it remains a critical issue requiring attention.

Table 2 presents the bivariate associations between severe intimate partner violence (IPV) and key sociodemographic characteristics. Several variables were significantly associated with increased prevalence of severe IPV among women in Timor-Leste.

Age was a significant factor, with the highest prevalence observed among women aged 25–34 years. Marital status was also relevant, as women currently in a union were significantly more likely to report severe IPV compared to those who were

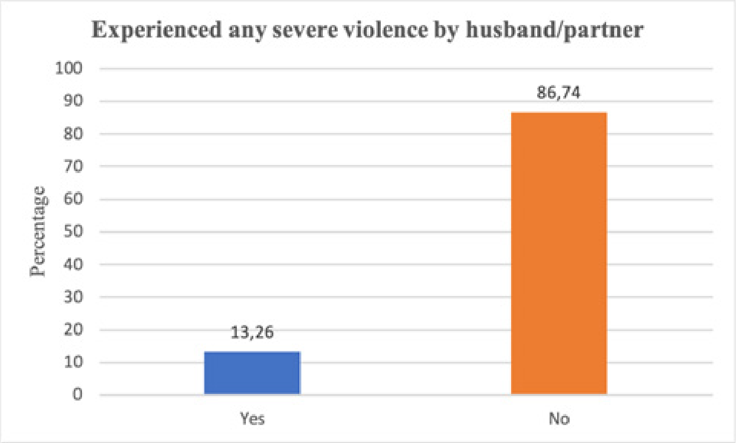

Figure 1. Prevalence of experienced any severe violence by husband/partner among women in Timor Leste

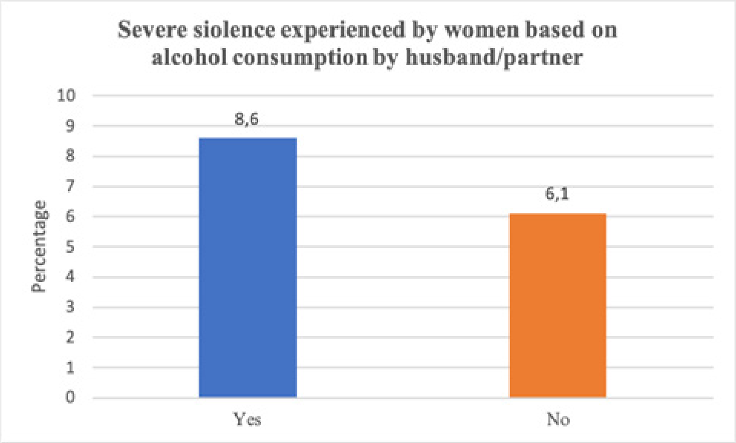

Figure 2. Women faced severe violence linked to their husbands' or partners' alcohol consumption In Timor Leste

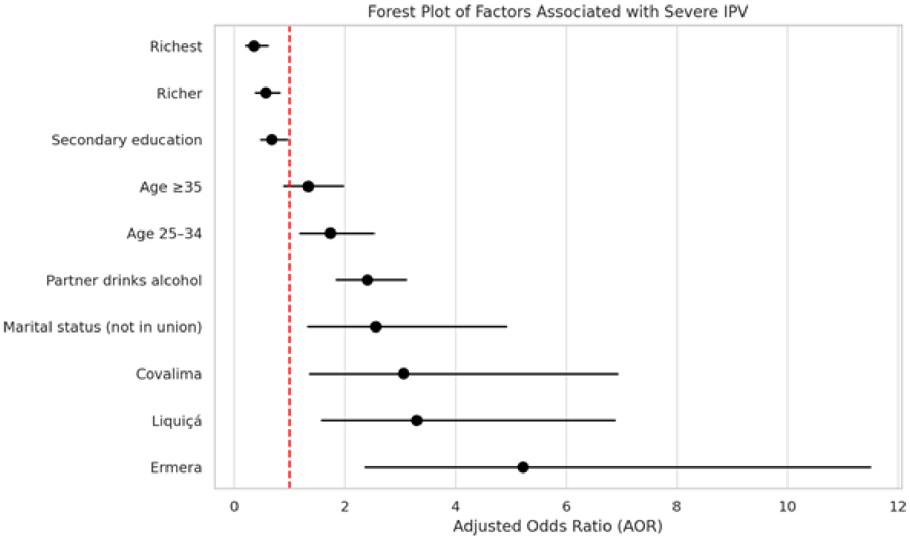

Figure 3 Forest plot of adjusted odds ratios (AOR) for factors associated with severe intimate partner violence among women in Timor-Leste

never married, divorced, or widowed. Educational attainment showed an inverse relationship with IPV; women with no or low education levels reported higher violence, while those with higher education experienced the least. Similarly, economic status, measured by wealth index, was inversely associated with IPV, with the highest rates among women from the poorest households. Rural residence was linked to increased reports of violence compared to urban settings. Significant regional variation was also observed, indicating potential geographic disparities in IPV prevalence. One of the strongest associations emerged with partner alcohol consumption: women whose husbands or partners consumed alcohol had markedly higher rates of severe IPV than those whose partners did not drink.

Figure 2 illustrates the relationship between husbands' and partners' alcohol consumption and the incidence of severe violence against women in Timor Leste. The statistics indicate that 8.6% of women reported experiencing severe violence when their husbands or partners drank alcohol, in contrast to 6.1% of women whose husbands or partners abstained from alcohol. These results suggest a possible link between alcohol use and severe violence, highlighting the need for targeted measures to combat alcohol-related violence in intimate relationships.

Table 3 presents the multivariable logistic regression results identifying factors associated with severe intimate partner violence (IPV) among women in Timor-Leste. Both crude (Model 1) and adjusted (Model 2) odds ratios are reported.

Women aged 25–34 were significantly more likely to experience severe IPV than those aged 15–24, even after adjustment (AOR = 1.74; 95% CI: 1.19–2.52), suggesting increased vulnerability in early adulthood. Although older women (≥35 years) showed elevated odds in the unadjusted model, this association lost significance after controlling for confounders.

Marital status remained a strong predictor, with women who were never married, divorced, or widowed having more than twice the odds of experiencing severe IPV (AOR = 2.56; 95% CI: 1.33–4.92), possibly reflecting lingering exposure to or consequences of prior abusive relationships.

Education and wealth emerged as protective factors. Women with secondary education had significantly lower odds of IPV compared to those with no formal education (AOR = 0.68; 95% CI: 0.48–0.96), and those in the richest wealth quintile had the lowest risk (AOR = 0.36; 95% CI: 0.21–0.61), reinforcing the importance of socio-economic empowerment.

Geographic disparities were also evident. Women residing in Ermera, Covalima, and Liquiçá districts faced markedly higher risks of severe IPV, highlighting the need for region-specific interventions.

Notably, partner alcohol consumption was the strongest behavioral risk factor identified. Women whose husbands or partners drank alcohol had more than twice the odds of experiencing severe IPV (AOR = 2.41; 95% CI: 1.85–3.11), emphasizing the urgency of addressing alcohol-related violence in prevention efforts.

Figure 3 presents a forest plot illustrating the adjusted odds ratios (AORs) and 95% confidence intervals for key variables associated with severe intimate partner violence (IPV) among women in Timor-Leste. The plot highlights significant sociodemographic and behavioral risk factors identified in the multivariable logistic regression model.

Notably, women aged 25–34 years had a significantly higher likelihood of experiencing severe IPV compared to the 15–24 age group. Being divorced, widowed, or never married also substantially increased the risk. In contrast, women with secondary education and those from wealthier households, particularly the richest quintile, had reduced odds of experiencing severe IPV, underscoring the protective effects of education and economic empowerment.

Geographic variation was evident, with women from districts such as Ermera, Covalima, and Liquiçá showing markedly elevated risks. Among all factors, partner alcohol consumption emerged as a particularly strong predictor, with women whose partners drank alcohol having more than twice the odds of experiencing severe IPV.

Discussion

The results of this study offer essential insights into the elements linked to severe violence faced by women from their husbands or partners in Timor-Leste. Various sociodemographic and behavioral factors were identified as significant correlates of intimate partner violence (IPV), with a particular focus on age, marital status, education, wealth, regional differences, and alcohol consumption by the husband or partner

The analysis reveals that women aged 25–34 years are at a significantly higher risk of experiencing severe violence than their younger peers aged 15–24 years. This observation aligns with the existing literature, which suggests that women in their childbearing years may be more susceptible to prolonged exposure to violent relationships and increased reliance on their partners during family raising periods (Cleaver, 2025; Kusunoki et al., 2023). Interestingly, although women aged 35 years and older also showed a higher likelihood of encountering violence, this connection became non-significant when other factors were controlled for, indicating that the heightened risk might be influenced by variables such as socioeconomic status or partner behavior (Alothman et al., 2024; Shahriar & Alam, 2024). This finding indicates a complex interaction between age and other risk factors for IPV.

The research also indicated that women who have never been married, widowed, or divorced are more prone to experiencing severe violence than those who are currently married. This finding is consistent with earlier studies suggesting that women not in formal relationships, especially those separated from their spouses, might encounter retaliatory violence (Hulley et al., 2023; Vikander et al., 2024). The increased vulnerability of widowed or divorced women is often intensified by societal stigma and reduced social support, making them more susceptible to violence from current or former partners (Wessells & Kostelny, 2022). This finding highlights the importance of implementing targeted interventions to assist women in unstable marital situations.

Education has been identified as a key protective factor for IPV. Women with secondary education were significantly less likely to experience severe violence than those without any education. This observation is supported by global evidence linking higher education levels to a decreased risk of IPV, as education empowers women and raises their awareness of their rights (Donkoh et al., 2024; Naseem et al., 2024; Shaikh, 2022). Although the protective effect of higher education was not statistically significant, this trend suggests that educational attainment plays a crucial role in reducing the risk of IPV. Improving women's access to education, particularly in rural areas, could be a critical strategy for decreasing violence (Patwary & Esha, 2025; Shaikh, 2022).

A clear inverse relationship was found between wealth and IPV, indicating that women with greater financial resources are much less likely to suffer from severe violence than those with fewer resources. This connection underscores the influence of economic inequality on the susceptibility of women to violence. Women with more wealth typically have better access to resources such as legal and social protection, which can lessen their reliance on abusive partners (Carolina de Vargas Nunes et al., 2020; Sarac & Odabas, 2025). Conversely, financial difficulties can heighten stress and conflict within families, potentially increasing the risk of violence (Carolina de Vargas Nunes et al., 2020). Tackling economic disparities and fostering women's financial independence are crucial strategies to prevent IPV.

The study also revealed notable regional differences in IPV rates, with areas such as Ermera, Covalima, and Liquiçá exhibiting a significantly higher risk of severe violence. This observation aligns with other studies that have identified geographic areas with high IPV rates, often associated with cultural, economic, and infrastructural differences (Leite, 2023; White et al., 2024). The increased prevalence in these regions may be due to variations in social support systems, law enforcement, and cultural views of gender roles and violence. Therefore, interventions should be customized to address the unique needs of these high-risk areas, emphasizing community-based programs to change norms and enhance services for survivors (Angehrn et al., 2021; Leite, 2023).

A particularly noteworthy finding was the strong link between a husband's or partner's alcohol consumption and the likelihood of severe violence, with women whose partners drank alcohol having more than double the odds of experiencing severe violence compared to those whose partners did not drink alcohol. This finding is consistent with extensive research connecting alcohol use to IPV, as alcohol can impair judgment and escalate conflict into violence (Olena Shubina et al., 2023; Sontate et al., 2021; Wilson et al., 2024). Tackling alcohol abuse through public health initiatives and incorporating alcohol screening and IPV risk assessments into routine health services could be crucial in reducing IPV in Timor-Leste (Coll et al., 2021).

The results of this study have significant consequences for policies and interventions designed to decrease IPV during Timor-Leste. Initially, enhancing women's access to education and economic opportunities diminished their susceptibility to violence. Policies that encourage female empowerment, offer vocational training, and improve access to financial services are also advantageous. Moreover, specific interventions for women who are not in formal marital relationships, such as those who are divorced, widowed, or separated, are vital, as these groups are at an increased risk of violence. Furthermore, tackling harmful alcohol consumption through public health initiatives could address one of the most significant behavioral risk factors for IPV. Programs focused on reducing alcohol intake, especially among men, and providing treatment for alcohol dependency may be effective in reducing domestic violence. Finally, interventions should be geographically focused, concentrating on high-risk areas where women are more prone to experiencing violence. Community-based strategies that involve local leaders, increase awareness of gender-based violence, and promote non-violent conflict resolution methods are crucial for addressing regional disparities.

In addition to policy and community interventions, nursing practices play an essential role in addressing IPV. Nurses, as frontline health providers, are positioned to identify women at a higher risk, such as those with partners who consume alcohol or those from disadvantaged households, through routine screening in reproductive and maternal health services. They can also provide trauma-informed care, deliver health education that empowers women, and advocate supportive environments to protect survivors. At the community level, nurses may serve as agents of change by raising awareness of the health impacts of IPV and harmful alcohol use while promoting protective factors such as education and women's empowerment. Strengthening nursing involvement in IPV prevention and management is therefore crucial to improving women's health outcomes in Timor-Leste.

Nursing implication

This study highlights the critical role of nurses in addressing intimate partner violence (IPV) during Timor-Leste. Nurses should incorporate routine IPV and alcohol use screening into reproductive and maternal health services to identify at-risk women and provide timely referrals. Strengthening nursing education with training in IPV management, trauma-informed care, and culturally sensitive communication is essential to improve nurses' readiness. At the community level, nurses can serve as advocates and educators, promoting awareness of the harmful effects of alcohol consumption and empowering women through health education. By integrating these strategies, nursing practice can contribute significantly to IPV prevention and the protection of women's health.

Limitation of the study

This study had several limitations. First, the cross-sectional design limited the ability to establish causal relationships between risk factors and severe IPV. Second, the use of self-reported data may be subject to recall and social desirability bias, potentially leading to underreporting of violence. Third, the data were derived from the 2016 DHS, which may not fully capture recent trends in IPV in Timor-Leste. Despite these limitations, the findings remain relevant, as they highlight structural risk factors, such as education, wealth, and alcohol use, which are relatively stable over time. Future studies should consider using longitudinal or mixed-method approaches and more recent datasets to better capture changing patterns and provide deeper insights into IPV dynamics.

Conclusion

This study highlights the significant impact of sociodemographic and behavioral factors on the likelihood of severe intimate partner violence (IPV) among women in Timor-Leste. The study's main findings revealed that factors such as a partner's alcohol use, socioeconomic status, and level of education play a crucial role in influencing IPV risk. Women in vulnerable circumstances, such as those in lower-wealth brackets or with partners who consume alcohol, are at an increased risk. Additionally, geographical differences suggest the necessity for region-specific strategies. To effectively combat IPV in Timor-Leste, a comprehensive approach is needed, which includes educational initiatives to empower women, economic programs to lessen dependency, and public health policies aimed at reducing alcohol abuse. It is also important to implement targeted interventions for high-risk areas and to support women in unstable marital situations. When these efforts are culturally sensitive and community focused, they can greatly reduce the prevalence of IPV, thereby enhancing the overall health and well-being of women in Timor-Leste.

Declaration of Interest

The author(s) declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Acknowledgment

The authors would like to thank all participants, Institute of Technology Science and Health, Dr Soepraoen Kesdam V/Brawijaya Hospital, Malang, and the Demographic and Health Surveys (DHS) program for providing access to the data used in this study. We also extend our thanks to the women who participated in the survey, sharing their experiences and contributing to the understanding of intimate partner violence in Timor-Leste. Additionally, we acknowledge the support and input from colleagues and institutions that contributed to the successful completion of this manuscript.

Funding

No funding

Data Availability

The supporting data are available:
https://dhsprogram.com/data/dataset/Timor-Leste_Standard-DHS_2016.cfm?flag=0

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Original Article

The effect of dance movement therapy on physical activity levels, mood, and emotional resilience among older adults in Indonesia

Gilang Dwi Pratiwi[1*], **Vita Lucya**[1], **Linlin Lindayani**[2]

[1] Department of geriatric nursing, STIKep PPNI Jawa Barat, Bandung, Indonesia
[2] Department of medical surgical nursing, STIKep PPNI Jawa Barat, Bandung, Indonesia

Abstract

Background: Dance movement therapy (DMT) is a promising intervention integrating physical activity with creative expression to enhance physical, psychological, and social well-being. While evidence of DMT's benefits exists, studies in non-Western contexts, particularly Indonesia, are scarce.
Purpose: This study aimed to evaluate the effect of DMT on physical activity levels, mood, and emotional resilience among older adults in Indonesia.
Methods: A quasi-experimental study with pre-test and post-test design was conducted among 350 older adults (≥60 years) in Bandung, Indonesia. Participants were allocated into intervention (n=175) and control groups (n=175). The intervention group participated in 12 weeks of DMT inspired by traditional Sundanese dance, conducted twice weekly for 60 minutes per session. Outcomes, including physical activity levels (IPAQ-SF), mood (PANAS), and emotional resilience (CD-RISC-10), were measured at baseline and post-intervention. Data were analyzed using paired t-tests, independent t-tests, and multivariate regression.
Results: The intervention group showed significant improvements in physical activity (mean MET-min/week: 1584 ± 420 vs. 1230 ± 356, $p < 0.001$), positive mood (mean PANAS score: 35.6 ± 8.4 vs. 28.3 ± 7.6, $p < 0.001$), and resilience (mean CD-RISC-10 score: 31.2 ± 7.3 vs. 24.8 ± 6.2, $p < 0.001$) compared to the control group. Multivariate regression analysis confirmed that the intervention was a significant predictor of outcome changes, controlling for baseline characteristics.
Conclusion: DMT significantly enhanced physical activity, mood, and emotional resilience in older adults. This culturally tailored intervention demonstrates potential as a holistic strategy to promote healthy aging in Indonesia. Future research should explore its scalability and long-term impact.

Keywords: dance movement therapy, emotional resilience, healthy aging, mood, older adults, physical activity.

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 172-181
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2695

Article Info

Received : December 31, 2024
Revised : August 12, 2025
Accepted : August 25, 2025
Published : August 30, 2025

Corresponding author

Gilang Dwi Pratiwi*
Department of geriatric nursing STIKep PPNI Jawa Barat, Indonesia; Jln, Muhammad No 31, Bandung, Indonesia; Phone: (022) 612 1914, E-mail: gilangdwipratiwi@gmail.com

Citation

Pratiwi, G. D., Lucya, V., & Lindayani, L. (2025). The effect of dance movement therapy on physical activity levels, mood, and emotional resilience among older adults in Indonesia. *Jurnal Keperawatan Padjadjaran, 13*(2), 172-181. http://dx.doi.org/10.24198/jkp.v13i2.2695

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Population aging is a global phenomenon, with older adults increasingly forming a significant proportion of society. Worldwide, the proportion of individuals aged 60 years or older is expected to double by 2050, reaching 22% of the global population (World Health Organization (WHO), 2021). Similarly, in Indonesia, the percentage of people aged 60 and older is projected to rise sharply, from 10% in 2020 to nearly 20% by 2045 (Mitchell & Walker, 2020; BPS, 2022). This demographic shift presents complex challenges, including ensuring adequate health care, addressing social isolation, and fostering economic sustainability. Another pressing concern is the rising prevalence of non-communicable diseases (NCDs), such as hypertension, diabetes, and cardiovascular diseases, among older adults. Globally, NCDs account for over 70% of deaths among older adults

(WHO, 2021), while in Indonesia, they contribute significantly to morbidity and mortality rates in this demographic (The Ministry of Health of Republic of Indonesia, 2021).

Low physical activity is a global public health concern among older adults, significantly contributing to the burden of non-communicable diseases and increased mortality (Zhu, Gu, & Xu, 2020). Beyond its direct physical health consequences, inadequate physical activity also affects mental well-being; physically inactive older adults are more likely to experience depression and anxiety, which in turn can further reduce their motivation to be active, creating a negative cycle that diminishes overall quality of life (Maharani, 2022). These mental health challenges also compound social problems, as limited mobility and reduced participation in activities can lead to social isolation, depriving older adults of the community engagement that supports both mental and physical health (Chase et al., 2020). In Indonesia, the interplay of these physical, psychological, and social factors is especially concerning given the rapid growth of the aging population. The lack of structured, age-friendly physical activity programs not only accelerates physical decline but also indirectly contributes to emotional distress and reduced resilience, further perpetuating withdrawal from social and physical engagement (Maharani, 2022; Utomo et al., 2019).

The scale of the problem is reflected in global and national data. The World Health Organization (WHO) estimates that over 25% of adults worldwide fail to meet the recommended levels of physical activity, with older adults disproportionately affected due to age-related physical and functional decline (WHO, 2020; Kong et al., 2021). In Indonesia, the prevalence of low physical activity is alarmingly high, with 33.5% of the adult population insufficiently active, and rates among older adults particularly elevated (The Ministry of Health of Republic of Indonesia, 2021). Physical inactivity is driven by multifactorial influences, including cultural norms, environmental constraints, and systemic gaps in healthcare, as well as disparities between rural and urban areas, limited access to exercise facilities, and the effects of urbanization (Syaukani et al., 2024; Katzmarzyk et al., 2022; Koa et al., 2024). These same factors also shape mental health outcomes, as environments that limit physical activity opportunities can heighten the risk of depression and anxiety, which in turn further discourage physical participation, reinforcing the inactivity–mental health cycle.

Mood disorders, including depression and anxiety, are among the most common psychological conditions affecting older adults and are deeply intertwined with physical inactivity. Globally, approximately 14% of individuals aged 60 and older experience a mental disorder, with depression and anxiety most prevalent (WHO, 2020). In Indonesia, the prevalence of mental health disorders in those over 15 years increased from 6% in 2013 to 9.8% in 2018, with depression affecting 6.1% of this group (Hisan et al., 2023). Depression is not only linked to cardiovascular disease, cognitive decline, and increased mortality (Jiang, 2020) but also reduces resilience that the capacity to adapt to challenges, thereby making it more difficult to maintain physical activity or social engagement. Furthermore, depression exacerbates memory decline and elevates stress levels, contributing to hypertension and other cardiovascular risks (Faustino & Fonseca, 2023; Shao et al., 2020). Addressing mood disorders in older adults is critical, as these conditions are often underdiagnosed and undertreated, contributing to a reduced quality of life and increased disability (Luo et al., 2022). This bidirectional relationship means that poor mental health both results from and contributes to reduced physical activity and diminished resilience, perpetuating a downward health trajectory.

Resilience, defined as the capacity to adapt effectively to stressors or adversity, plays a pivotal role in breaking this cycle. It is shaped by emotional regulation, social support, and a sense of purpose; all of which can be eroded by both physical inactivity and mood disorders (MacLeod et al., 2016; Windle et al., 2011). Declining resilience not only increases vulnerability to depression and anxiety but also undermines motivation and ability to engage in physical activity (Fisher et al., 2016; Zheng et al., 2020). Conversely, higher resilience can buffer the negative effects of aging, helping older adults remain active, socially connected, and psychologically healthy. Evidence suggests that interventions promoting physical activity, enhancing social engagement, and supporting emotional coping skills, such as mindfulness-based stress reduction can strengthen resilience and simultaneously improve mental health and physical functioning (Smith et al., 2018; Wu et al., 2023). Therefore, addressing low physical activity, mood disorders, and poor resilience in an integrated manner is essential to improving healthy aging outcomes in Indonesia and beyond.

To address these interconnected challenges, interventions promoting physical activity, mood, and psychological resilience have shown promise. Programs incorporating aerobic and resistance training have been found to improve mood and cognitive function while reducing the risk of chronic diseases (Giebel et al., 2022). Simultaneously, resilience-building strategies such as mindfulness training, community engagement, and structured counseling have demonstrated effectiveness in mitigating stress and enhancing emotional well-being (Keadle et al., 2016). These approaches highlight the need for comprehensive strategies to support the mental and physical health of older adults in Indonesia and globally.

Dance movement therapy (DMT) has emerged as an effective non-pharmacological intervention for older adults, integrating rhythmic physical activity with creative expression to enhance physical, emotional, and social well-being (Millman et al., 2021). Its low-impact nature makes it particularly suitable for aging populations, as it promotes physical activity while addressing emotional resilience and fostering social connection (Hyvönen et al., 2020; Karkou et al., 2019a). Research indicates that DMT can improve physical activity levels by enhancing motivation and adherence through its enjoyable and social nature (Burzynska et al.,2017; Murillo-Garcia et al., 2021). Additionally, it has been shown to reduce symptoms of depression and anxiety, while simultaneously enhancing emotional resilience and social bonding (Karkou et al., 2019b; Millman et al., 2021). Furthermore, DMT has been linked to improved mood, cognitive functioning, and quality of life among older adults, offering a holistic approach to age-related health challenges (Karkou et al.,2023).

In Indonesia, cultural expressions often involve dance, suggesting that DMT could be particularly relevant and well-received among older adults (Rahmawati et al, 2020). However, studies on DMT in this population remain scarce, and most existing evidence originates from Western contexts, limiting its applicability to Indonesia's unique cultural and societal settings. Moreover, while DMT has demonstrated benefits in improving mood and emotional resilience, few studies have examined its effects on physical activity levels among older adults (Millman et al., 2021).

Despite increasing interest in DTM as a therapeutic approach, research examining its comprehensive effects on physical, psychological, and emotional outcomes in older adults remains limited, particularly in non-Western contexts like Indonesia. Most existing studies emphasize singular outcomes, such as mood enhancement or improved social connectedness, without addressing the interconnected benefits across multiple domains, including physical activity levels, emotional resilience, and overall well-being. Moreover, the cultural relevance and feasibility of adapting DMT interventions in Indonesian settings are underexplored, restricting their potential for broader implementation and acceptance (Bradt et al.,2015; Millman et al., 2021).

This study aims to evaluate the effectiveness of dance movement therapy in improving physical activity levels, enhancing mood, and fostering emotional resilience among older adults in Indonesia. The findings are expected to contribute to the development of culturally tailored interventions to promote healthy aging in the Indonesian context.

Materials and Methods

Design

This study employed a quasi-experimental design with pre-test and post-test measures to evaluate the effect of dance movement therapy (DMT) on physical activity levels, mood, and emotional resilience among older adults. The intervention was conducted over 12 weeks in selected community health centers in Bandung, West Java, Indonesia.

Intervention

The intervention was rooted in Sundanese cultural traditions, incorporating movements inspired by Jaipongan, a traditional Sundanese dance characterized by its dynamic and rhythmic patterns. The inclusion of culturally resonant elements aimed to enhance participant engagement and cultural connection (Rahapsari, 2017).

The DMT sessions were conducted over a 12-week period at selected community centers. Each session lasted approximately 60 minutes, with participants attending two sessions per week. The therapy combined traditional Jaipongan dance movements, including swaying arm motions (lenggang lenggok), rhythmic hand gestures (ulah tangan), and gentle footwork (jelema), with relaxation techniques to ensure accessibility for older adults. The movements were adapted to accommodate varying levels of physical fitness, emphasizing inclusivity and safety (Kusuma & Priyanti, 2020). Each session began with a 10-minute warm-up to prepare participants physically and mentally, followed by a 40-minute guided dance segment focusing on fluidity and coordination. The sessions concluded with a 10-minute cooldown involving light stretches and breathing exercises, fostering relaxation and mindfulness. Participants were encouraged to maintain their comfort and avoid overexertion during the sessions (Douka et al., 2019).

Participants were provided with step-by-step guidance by certified instructors familiar with both traditional Sundanese dance and DMT principles. Regular feedback and motivational reminders every two weeks were integral to sustaining motivation and promoting adherence throughout the program (Chen et al., 2024) To maintain consistency, all sessions followed a standardized schedule, and attendance was recorded.

Sample

The study included a total of 350 older adults aged 60 years and above, residing in community settings in Indonesia. Participants were divided into intervention and control groups using a non-randomized allocation method. Participants were included if they were aged 60 years or older, able to perform moderate physical activity as confirmed by a physician, had no severe cognitive impairments (Mini-Mental State Examination [MMSE] score ≥ 24), and provided written informed consent. Participants were excluded if they had acute or chronic illnesses that could hinder participation in the intervention, currently participating in other physical activity programs, haad a history of severe mental health conditions.

The required sample size was calculated using G*Power software version 3.1.9.7 (Faul et al., 2007). Based on an expected effect size of 0.25 (medium), a significance level of 0.05, and a power of 0.80, the required total sample size for a two-group comparison was 350 participants.

Table 1. Demographic Characteristics of Participants (N = 350)

Variable	Intervention Group (n = 175)	Control Group (n = 175)	p-value
Age (mean ± SD)	67.2 ± 4.5	67.0 ± 4.8	0.662
Gender (Female, n, %)	112 (64.0)	108 (61.7)	0.687
Education (n, %)			
Primary	56 (32.0)	61 (34.9)	0.562
Secondary	87 (49.7)	80 (45.7)	
Higher	32 (18.3)	34 (19.4)	
Marital Status (Married, n, %)	129 (73.7)	126 (72.0)	0.744

Table 2. Comparison of Outcomes Between Intervention and Control Groups

Outcome	Timepoint	Intervention Group (mean ± SD)	Control Group (mean ± SD)	p-value (between groups)
Physical Activity (MET-min/week)	Baseline	1230 ± 356	1254 ± 342	0.541
	Post	1584 ± 420	1278 ± 365	<0.001
Positive Mood (PANAS)	Baseline	28.3 ± 7.6	27.9 ± 7.2	0.638
	Post	35.6 ± 8.4	28.1 ± 7.8	<0.001
	Baseline	24.8 ± 6.2	24.4 ± 6.1	0.551
Resilience (CD-RISC-10)	Post	31.2 ± 7.3	25.0 ± 6.4	<0.001

Table 3. Multivariate Regression Analysis of Outcome Changes

Outcome	β (95% CI)	SE	t-value	p-value
Physical Activity (MET-min/week)	0.62 (0.54, 0.70)	0.04	15.5	<0.001
Positive Mood (PANAS)	0.68 (0.60, 0.76)	0.04	17.0	<0.001
Resilience (CD-RISC-10)	0.58 (0.49, 0.67)	0.05	11.6	<0.001

Community health centers were assigned to either the intervention (Dance Movement Therapy, DMT) or comparison (usual activities/waitlist) group based on operational feasibility and to minimize cross-contamination. In centers hosting both groups, a staggered schedule was used: the first 8-week cohort received DMT, while a later comparable cohort served as the comparison group and was offered DMT after follow-up. Baseline comparability was enhanced through matching on sex and 5-year age bands, and key covariates (physical activity, depressive symptoms, resilience, comorbidities) were documented for adjustment in multivariable and propensity score analyses. Outcome assessors and data analysts were blinded; separate rooms/times and non-overlapping facilitators limited contamination. Session reminders and flexible scheduling supported retention, with all withdrawals recorded for intention-to-treat analysis.

Instruments

The International Physical Activity Questionnaire-Short Form (IPAQ-SF) (Craig et al., 2003) was used to measure physical activity levels. The IPAQ-SF includes 7 items that assess walking, moderate-intensity activities, and vigorous-intensity activities in the last 7 days. Scores are expressed as MET-minutes/week. The original version of the IPAQ-SF has good reliability (Cronbach's α = 0.79) and was validated for use in Bahasa Indonesia (Cronbach's α = 0.82) (Dharmansyah & Budiana, 2021).

Mood was assessed using the Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988), which consists of 20 items, with 10 items measuring positive affect and 10 measuring negative affect. Responses are rated on a 5-point Likert scale, with higher scores indicating higher levels of affect. The PANAS demonstrates excellent reliability (Cronbach's α > 0.80), and its Bahasa Indonesia version has shown similar reliability (Cronbach's α = 0.81) (Haywood et al., 2024).

The Connor-Davidson Resilience Scale (CD-RISC-10) (Connor & Davidson, 2003) was used to measure emotional resilience. This 10-item scale evaluates adaptability and coping under stress, with responses scored on a 5-point Likert scale. Higher scores indicate greater resilience. The CD-RISC-10 has good reliability (Cronbach's α = 0.85) and is validated in Bahasa Indonesia (Cronbach's α = 0.84) (Ningsih et al., 2023).

Procedure

The study received ethical approval from the Institutional Review Board (IRB) at STIKep PPNI Jawa Barat, Protocol No: III/0111/KEPK/STIKep/PPNI/Jabar/III/2024. After IRB approval, community centers were approached for collaboration. Recruitment materials were distributed, and interested participants attended an orientation session. Eligible participants provided written informed consent before baseline data collection. The intervention group participated in 12 weeks of dance movement therapy sessions, conducted twice a week for 60 minutes per session, led by certified instructors. The control group continued with their usual activities and received an educational brochure about general physical activity benefits. Pre-test assessments for physical activity levels, mood, and emotional resilience were conducted prior to the intervention. Post-test assessments were conducted immediately after the 12-week intervention. Feedback from participants was collected at the end of the intervention through a structured questionnaire.

Data Analysis

Descriptive statistics were used to summarize demographic and baseline characteristics. Paired t-tests and independent t-tests were performed to evaluate within-group and between-group differences, respectively. Multiple regression analysis was conducted to explore the association between intervention exposure and changes in physical activity levels, mood, and emotional resilience, controlling for baseline characteristics. Statistical significance was set at $p < 0.05$, and analyses were performed using SPSS version 26 (IBM Corp., 2019).

Results

The study included 350 participants equally divided into intervention and control groups (n = 175 per group). The demographic characteristics of the participants are summarized in Table 1. Participants in both groups were predominantly female, with a mean age of approximately 67 years. Most participants had completed secondary education, and the majority were married. Baseline characteristics were comparable between groups, with no significant differences observed.

Table 2 presents the means and standard deviations for physical activity levels, mood, and emotional resilience at baseline and post-intervention. Significant improvements were observed in the intervention group for all three outcomes compared to baseline. In contrast, the control group showed minimal changes.

Multivariate regression analysis was conducted to examine the association between the intervention and changes in outcomes, controlling for baseline characteristics (age, gender, and education). The intervention was a significant predictor of improvements in physical activity levels, positive mood, and resilience, as shown in Table 3.

Discussion

The findings of this study demonstrate the significant impact of the intervention on physical activity levels, mood, and emotional resilience among older adults. These results highlight the effectiveness of structured programs in promoting holistic health outcomes, which is consistent with previous research emphasizing the importance of tailored interventions in aging populations (Barak et al., 2022; Porter et al.,2017; Sathianet al., 2024). The observed improvements in physical activity levels are particularly noteworthy. Regular physical activity is a critical component of healthy aging, linked to reduced risks of chronic diseases and improved functional abilities (Giebel et al., 2022; WHO, 2021; Rebelo-Marques et al., 2018). The intervention's design, incorporating structured and accessible activities, likely contributed to these outcomes. This finding aligns with the work of Sims-Gould et al. (2020) Click or tap here to enter text., who reported similar enhancements in physical activity through community-based programs targeting older adults.

The significant positive effects on mood and emotional resilience observed in this study further underscore the intervention's value. In this context, Dance Movement Therapy (DMT), particularly the form implemented in this study with a cultural approach appears to have been a key driver of these psychosocial benefits. DMT operates on the principle that movement and emotional states are interconnected; rhythmic, expressive, and improvisational movement stimulates the release of endorphins and modulates neurotransmitters such as serotonin and dopamine, which are directly linked to improved mood and reduced symptoms of depression and anxiety (Kong et al., 2021; Sampath & Soohinda, 2023; Zheng et al., 2020). Moreover, the structured group format of DMT promotes social bonding and non-verbal communication, enhancing a sense of belonging and reducing feelings of isolation both of which are essential to building resilience in older adults (Sánchez-González et al., 2020). From a resilience perspective, DMT fosters self-efficacy and adaptive coping by encouraging participants to explore and express emotions through movement, reinforcing a sense of mastery and control over their physical and emotional states (Delhom et al., 2020).

The cultural adaptation of DMT used in this study likely amplified these benefits. Incorporating familiar traditional music, movements, and cultural narratives not only increased engagement and enjoyment but also enhanced emotional resonance by evoking shared memories and collective identity (Giebel et al., 2022; Ingrand et al., 2018; Sathian et al., 2024). This cultural grounding can deepen participants' emotional connection to the activity, improve adherence, and strengthen the therapeutic impact by integrating personal and community meaning into the movement experience. Such culturally relevant approaches have been shown to improve both participation rates and psychosocial outcomes in older adult interventions (Han et al., 2022). Therefore, the combination of DMT's intrinsic therapeutic mechanisms and its cultural tailoring in this study likely contributed to the observed gains in mood and resilience.

Older adults often face increased risks of emotional distress due to factors such as social isolation and health decline (Kong et al., 2021; Sampath & Soohinda, 2023; Zheng et al., 2020). By integrating components aimed at improving emotional well-being — including group interactions, mindfulness elements within the movement sessions, and culturally familiar artistic expression that the intervention addressed key psychosocial determinants of health (Sánchez-Gonzálezet al., 2020). This aligns with findings from Delhom et al. (2020), who demonstrated that structured psychosocial interventions significantly enhance emotional resilience in aging populations. These results support the growing body of literature advocating for evidence-based, culturally adapted interventions to address physical, emotional, and social health dimensions in older adults (Giebel et al., 2022; Ingrand et al., 2018; Sathian et al., 2024). The use of regression analysis provided further insights into the predictors of health improvements, suggesting that both the duration of participation and baseline levels of activity were significant moderators of the outcomes (Buyl et al., 2020). These findings resonate with similar studies, such as those by Patel et al. (Che & Cheung, 2024), which highlight the moderating effects of engagement duration on intervention efficacy.

The predominance of female participants in this study may reflect cultural and family role dynamics that influence participation in community-based health programs. In many Indonesian communities, older women particularly those who are retired or no longer engaged in formal employment tend to have greater availability to participate in scheduled group activities compared to men, who may still be involved in income-generating work or community leadership roles (Absor et al., 2024). Additionally, societal norms often position women as primary caregivers within the family, making them more accustomed to engaging in community health or social programs, while men may perceive such activities as less aligned with traditional masculine roles (Utomo et al., 2019). In contrast, older women may be more likely to receive support from children or relatives to engage in such programs, both as a form of social interaction and as a way to maintain health. These cultural and family dynamics could partly explain the gender distribution observed in this study and should be considered when designing outreach strategies to increase male participation.

Nursing implication

The implications of this study are multifaceted and significant for both policymakers, nursing and other healthcare providers. First, it provides robust evidence supporting the prioritization of structured interventions as a cost-effective strategy to enhance the quality of life (QoL) among older adults. Structured interventions, particularly those combining physical activity with behavioral and psychosocial components, have been shown to positively impact mental health, physical function, and overall well-being in aging populations (Biddle et al., 2019; Ngandu et al., 2015). This evidence reinforces the importance of adopting holistic approaches in healthcare policy to improve the quality of care for older adults. Second, the study underscores the necessity of designing programs that integrate physical activity with psychosocial support to address the complex and multifaceted needs of older adults. Tailored interventions that focus on the interplay between physical and psychosocial health are essential for managing age-related challenges, including loneliness, mobility limitations, and chronic health conditions (Jeong et al., 2023; Keadle et al., 2016). By addressing these interconnected factors, such programs can enhance not only physical health but also the emotional resilience and social engagement of older adults. Lastly, the findings encourage future research to explore scalable models of similar interventions to ensure broader accessibility and sustainability. The scalability of interventions is crucial for reaching diverse populations and reducing healthcare disparities among older adults, especially in resource-limited settings (Beard et al., 2016; Lee & Zhong, 2019). Future studies should focus on leveraging technology and community-based approaches to deliver these interventions at scale, maximizing their impact while minimizing costs.

Limitations of the study

While the study provides valuable insights, several limitations should be acknowledged. The sample was limited to a specific geographic region, potentially restricting the generalizability of the findings. Furthermore, the relatively small sample size may have reduced the statistical power, limiting the ability to detect subtle but meaningful effects. The study also relied on self-reported measures for mood and emotional resilience, which may be subject to response biases, such as social desirability or recall inaccuracies. The cross-sectional design of the study limits the ability to infer causality, as it only provides a snapshot of associations at a single point in time. Additionally, unmeasured confounding variables, such as socioeconomic status or access to mental health resources, may have influenced the results. Future studies should consider employing objective measures, such as biomarker analysis or third-party assessments, and expanding the participant pool to include more diverse populations across various regions. Longitudinal designs and randomized controlled trials would also strengthen the evidence base by enabling causal inferences and tracking changes over time.

Conclusions

In conclusion, the intervention significantly enhanced physical activity levels, mood, and emotional resilience among older adults, offering a promising and culturally adaptable approach to improving health outcomes in this demographic. The use of Dance Movement Therapy (DMT) as a central component proved effective not only in stimulating physical engagement but also in fostering emotional expression, social connection, and adaptive coping. Importantly, the integration of a cultural approach through the use of traditional music, familiar movement patterns, and community-centered narratives appeared to enhance participant engagement, emotional resonance, and sustained participation, thereby amplifying the therapeutic effects. These findings emphasize the importance of implementing health promotion programs that integrate physical and psychosocial elements, while also tailoring activities to align with participants' cultural identities and lived experiences. Future research should build on these findings to refine DMT-based intervention strategies, examine their long-term sustainability, and expand their reach to diverse aging populations across different cultural settings.

Declaration of Interest

All authors declare no conflict of interest

Acknowledgment

The authors are grateful to the participants in this study

Funding

The author received no financial support in manuscript research

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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Motivation and self-efficacy as key factors influencing self-care in hypertensive adults: A cross-sectional study in Indonesia

Arif Setyo Upoyo[1*], Yunita Sari[1], Eman Sutrisna[2], Agis Taufik[1], Hae-Ra Han[3]

[1] Nursing department, health sciences faculty, Universitas Jenderal Soedirman, Indonesia
[2] Medicine Faculty, Universitas Jenderal Soedirman, Indonesia, Indonesia
[3] School of Nursing, The Johns Hopkins University, Baltimore, Maryland, USA

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 182-190

http://dx.doi.org/10.24198/jkp.v13i2.2609

Article Info

Received : Sept 18, 2024
Revised : July 23, 2025
Accepted : August 25, 2025
Published : August 30, 2025

Corresponding author

Arif Setyo Upoyo*
Nursing department, health sciences faculty, Universitas Jenderal Soedirman, Indonesia; Address: Jalan Prof. Dr. HR. Boenjamin 708 Kotak Pos 115 Grendeng Purwokerto, 53122, Indonesia; Phone: (0281) 635292, E-mail: afkarfadholi@gmail.com

Citation

Upoyo, A. S., Sari, Y., Sutrisna, E., Taufik, A., & Han, H. R. (2025). High blood pressure self-care profile and its related factors among hypertension patient. *Jurnal Keperawatan Padjadjaran, 13*(2), 182-190. http://dx.doi.org/10.24198/jkp.v13i2.2609

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Self-care is crucial for enhancing life quality and and preventing cardiovascular, renal, and vascular complications in individuals with hypertension. However, self-care among patient's hypertension remains suboptimal.
Purpose: Our research aimed to identify the determinants of self-care practice among hypertensive patients in Indonesia.
Methods: A survey that was cross-sectional. It carried out among 209 adults with hypertension attending community health centers in Central Java, Indonesia. Self-care behaviors, motivation, self-efficacy, and knowledge were assessed using the validated Hypertension Self-Care Profile (HBP-SCP) and Hypertension Knowledge-Level Scale (HKLS). Chi-square and multivariable logistic regression tests were used to evaluate the data.
Results: Bivariate analysis revealed significant correlation between self-care behavior and motivation ($p<0.001$), self-efficacy ($p<0.001$), and history of hypertension in the family ($p=0.018$). No significant associations were observed for age, gender, education, occupation, body mass index, blood pressure, or knowledge (all $p>0.05$). Multivariable analysis demonstrated that motivation (OR=2.22, 95% CI=1.10–4.45, $p=0.025$) and self-efficacy (OR=7.84, 95% CI=3.99–15.39, $p<0.001$) were independent determinants of good self-care.
Conclusion: Motivation and self-efficacy are key determinants of hypertension self-care behaviors among Indonesian adults. Interventions should prioritize strengthening motivation and building self-efficacy through motivational interviewing, skills training, and structured follow-up by nurses and other healthcare professionals.

Keywords: hypertension; motivation; self-care behavior; self-efficacy

Introduction

According to data from the World Health Organization (WHO), 22% of the world's population had high blood pressure (HBP) in 2019, with Southeast Asia accounting for more than one-third (36%) of all cases. By 2025, the prevalence of hypertension is projected to increase, affecting an estimated 29% of adults worldwide (WHO, 2023). In Indonesia, hypertension remains a major public health concern, with more than 185,000 reported cases in 2018, making it the most common non-communicable disease in the country (Widyawati, 2021). This rising burden underscores the need for effective strategies that strengthen self-care practices to decrease complications and enhance life quality.

Self-care is essential part of managing chronic diseases, enabling patients to maximize their well-being by monitoring, controlling, and managing symptoms, while also preventing complications and minimizing disturbances in body functions (Gusty & Merdawati, 2020). In the context of hypertension, self-care encompasses a range of daily health-promoting behaviors such as adhering to a low-salt diet, taking prescribed medications consistently, engaging in regular physical activity, avoiding smoking, maintaining a healthy weight, and abstaining from alcohol consumption (Konlan & Shin, 2023). These practices not only support blood pressure control but also play a central role in preventing target-organ damage and long-term complications involving the heart, kidneys, and vascular system. Evidence further indicates that effective hypertension self-care contributes to better quality of life, improved treatment outcomes, and reduced healthcare costs (Wilandika, 2019). Thus, strengthening self-care behaviors is crucial for addressing the growing burden of hypertensive in both clinical and community settings.

Despite the well-documented benefits of hypertension self-care, research shows that adherence in Indonesia remains alarmingly low. One study reported that fewer than 10% of patients with hypertension engaged in the expected self-care behaviors (Hussen et al., 2020). Similarly, a study involving 209 Indonesian patients found that more than half (59%) demonstrated poor self-care (Upoyo et al., 2021). Another investigation reported an average self-care score of 52.56 on a scale of 20–80, reflecting suboptimal practice levels (Ulya, 2023). Evidence from systematic reviews also highlights the complexity of factors influencing self-care, ranging from demographic characteristics such as age, gender, and socioeconomic status to more proximal factors such as limited knowledge of blood pressure management, inadequate follow-up treatment, and unaddressed risk factors for hypertension (Konlan & Shin, 2023). Collectively, prior studies confirm that self-care among Indonesian patients with hypertension is consistently poor, yet the underlying determinants remain insufficiently understood. Therefore, the present study aimed to examine the determinants of hypertension self-care behaviors in Indonesia.

Materials and Methods

Design

The research used a cross-sectional design as part of quantitative methodology. Researchers can find correlations between independent variables and self-care practices among people with hypertension by using the cross-sectional technique, which gathers data at a specific point in time. While this design does not establish causality, it is particularly useful for examining the prevalence of behaviors and exploring potential determinants within a defined population.

Population and sampling

Patients with hypertension who lived in Banyumas Regency, Central Java, made up the study population. Jacob Cohen's formula was utilized to determine the sample size, which indicated a minimum requirement of 203 participants. Ultimately, 209 respondents were recruited, meeting or exceeding the calculated threshold. Inclusion criteria consisted of individuals with a history of hypertension who were prepared to

participate in the study. Criteria for exclusion included a documented history of mental disorders, the presence of complications, or severe visual and hearing impairments as recorded in medical charts at the community health center. Participants were selected using a consecutive sampling technique, whereby all eligible patients visiting the community health center during the study period and meeting the criteria were invited to participate. Those who agreed and provided written informed consent were included as research subjects. This sampling strategy ensured adequate representation of hypertensive patients in the study setting while maintaining ethical standards.

Instrument

The research instruments consisted of five components: respondent characteristics, knowledge, self-efficacy, motivation, and self-care practices for hypertension. The measured variables were defined in accordance with Orem's self-care theory, which emphasizes the individual's capacity to perform activities that maintain health and well-being (Orem, 2021). Respondent characteristics included age, gender, educational attainment, occupation, body mass index, family history of hypertension, and blood pressure status.

Knowledge was assessed using the Hypertension Knowledge-Level Scale (HKLS) originally created by Erkoc (2012). The instrument was translated and adapted into the Indonesian context by Ernawati et al. (2020), demonstrating good reliability, as evidenced by the hypertension subscale's Cronbach's alpha rating of 0.758 and the non-hypertension subscale's of 0.858.

Self-efficacy, motivation, and self-care practice were assessed utilizing the Hypertension Self-Care Profile (HBP-SCP), developed by Han (2014) and subsequently validated in Indonesia (Upoyo et al., 2021). The Indonesian version of the HBP-SCP demonstrated excellent psychometric properties, with a content validity index of 0.963 and internal consistency reliability coefficients ranging from 0.911 to 0.955 ($p \leq 0.05$). The instrument is structured as a Likert-type questionnaire with response options ranging from 1 ("not at all") to 4 ("very much"), encompassing domains of self-care behaviors, motivation, and self-efficacy. Higher total scores indicate greater levels in each domain with minimal score 20 and maximal score 40. For analysis, scores above the sample mean were categorized as "high," while scores equal to or below the mean were categorized as "low."

Data collection

The research was carried out in Banyumas Regency, Central Java, Indonesia, between May and August

Table 1. Respondent Characteristics (n=209)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	20	9.6
Female	189	90.4
Work		
No Work	126	60.3
Active Work	83	39.7
History hypertension in family		
Yes	83	39.7
No	126	60.3
Knowledge		
Poor	102	48.8
Good	107	51.2
Self-efficacy		
Low	106	50.7
High	103	49.3
Motivation		
Low	91	43.5
High	118	56.6
Age		
High risk (>60 years old)	66	31.6
Low risk (<60 years old)	143	68.4
Education Level		
Primary education	197	94.3
High education	12	5.7
IMT		
Abnormal	136	65.1
Normal	73	34.9
Blood pressure		
Uncontrolled (>140/90 mmHg)	187	89.5
Controlled (<140/90 mmHg)	22	10.5
Self-care behaviors		
Poor	101	48.3
Good	108	51.7

2024. Data collection was conducted at several community health centers that routinely provide services for patients with hypertension. Each patient was given a thorough description of the study's goals, methods, possible dangers, and advantages prior to participation. Patients who agreed to participate provided written informed consent in accordance with ethical research standards. After consent was obtained, respondents were asked to complete the structured questionnaire under the supervision and guidance of trained members of the research team. Assistance was provided to participants who had difficulties in understanding or reading the items to ensure accuracy and completeness of responses. This process helped maintain data quality and minimized the risk of missing or invalid responses.

Data analysis

The study variables and sample characteristics were summarized using descriptive statistics, such as means, standard deviations, frequencies, and percentages. For analytical purposes, participants were categorized as having either high or low levels of self-care behavior, motivation, self-efficacy, and knowledge based on whether their scores were above or below the sample mean for each variable.

Table 2. Factors influencing self-care behaviors (n=209)

Variable	Self-care behaviors (n= 209)				p value
	Poor		Good		
	n	%	n	%	
Age					
High risk (>60 years old)	37	56.1	29	43.9	0.170
Low risk (<60 years old)	64	44.8	79	55.2	
Blood pressure					
Uncontrolled (>140/90 mmHg)	88	47.1	99	52.9	0.399
Controlled (<140/90 mmHg)	13	59.1	9	40.9	
IMT					
Abnormal	63	46.3	73	53.7	0.429
Normal	38	52.1	35	47.9	
Gender					
Male	9	45	11	55	0.938
Female	92	48.7	97	51.3	
Education Level					
Primary education	97	49.2	100	50.8	0.284
High education	4	33.3	8	66.7	
Work					
No Work	60	47.6	66	52.4	0.912
Active Work	41	49.4	42	50.6	
History hypertension in family					
Yes	49	59	34	41	0.018*
No	52	41.3	74	58.7	
Self-efficacy					
Low	76	71.7	30	28.3	<0.001*
High	25	24.3	78	75.7	
Motivation					
Low	65	71.4	26	28.6	<0.001*
High	36	30.5	82	69.5	
Knowledge					
Poor	55	53.9	47	46.1	0.149
Good	46	43	61	57	

Note: *there is significant correlation (<0.05)

To find the variables linked to self-care practice, bivariate analyses were performed. Variables with a p-value <0.25 in the bivariate tests, including age and family history of hypertension, were subsequently entered into the multivariable logistic regression model along with motivation, self-efficacy, and knowledge. This approach was adopted to reduce the risk of excluding potentially important predictors. Multivariable logistic regression was then performed to examine the independent associations between these variables and hypertension self-care behavior. Odds ratios (ORs) with 95% confidence intervals (CIs) were computed in order to measure the associations' strength. A p-value of less than 0.05 was used to determine statistical significance.

Ethical consideration

The Ethics Commission of Jenderal Soedirman University's Faculty of Health Sciences granted ethical approval for this study (Approval No. 1438/EC/KEPK/V/2024; dated May 2, 2024). All procedures were carried out in compliance with accepted ethical guidelines for studies involving human subjects. Prospective participants were given thorough explanations by the research team about the study's goals, potential advantages,

Table 3. Dominant factors influencing self-care behavior (n=209)

Variable	Coef	S.E.	Wald	df	p value	OR	CI 95%	
							min	Max
Motivation	0.796	0.356	5.002	1	0.025	2.216	1.103	4.449
Self-efficacy	2.059	0.344	35.811	1	<0.001	7.841	3.994	15.391
Age	-0.322	0.376	0.734	1	0.391	0.725	0.347	1.514
Knowledge	0.308	0.339	0.823	1	0.364	1.361	0.700	2.646
History Hypertension in family	-0.201	0.356	0.319	1	0.572	0.818	0.407	1.644

potential hazards, and procedures. They were also made aware that there would be no monetary reward. Patients were reassured that their choice to participate or not would not impact the quality of healthcare they received, and participation was completely voluntary. Before any data was collected, written informed consent was sought from each responder. Throughout the study, participant data was de-identified and used only for research, ensuring confidentiality and anonymity.

Results

The study's respondents' attributes were age, sex, blood pressure, education, occupation, body mass index, family history of hypertension, knowledge, motivation, self-efficacy, and self-care behavior. The results of the frequency distribution are presented in Table 1. As shown in the table, the majority of respondents were younger than 60 years (143 respondents; 68.4%) and female (189 respondents; 90.4%). A total of 126 respondents (60.3%) were unemployed, and 197 respondents (94.3%) had only basic education. Most respondents reported no family history of hypertension (126 respondents; 60.3%); however, 136 respondents (65.1%) had an abnormal body mass index and 187 respondents (89.5%) presented with uncontrolled blood pressure (systolic ≥140 mmHg). Regarding psychosocial and behavioral factors, Over 50% of those surveyed said they practiced self-care well (51.7%), good knowledge (51.2%), and high motivation (56.6%), although low self-efficacy was reported by 50.7% of respondents.

A number of variables, such as responder characteristics, knowledge, motivation, and self-efficacy affected self-care practice. Table 2 shows the results of a bivariate analysis that looked at the link between these characteristics and self-care practice using the chi-square test (2×2). According to the findings, 49 respondents were more likely to report poor self-care practices if they had a family history of hypertension. Additionally, the majority of respondents who had low motivation (71.4%) and low self-efficacy (71.7%) also showed poor self-care. Self-care practice was found to be significantly correlated with motivation (p<0.001), self-efficacy (p<0.001), and family history of hypertension (p=0.018), according to statistical analysis. Age (p=0.170), gender (p=0.938), education (p=0.284), occupation (p=0.912), body mass index (p=0.429), blood pressure (p=0.399), and knowledge (p=0.149) did not show any significant associations.

Multivariate analysis was conducted using logistic regression to identify independent predictors of self-care behavior. Variables with a p-value <0.25 in the bivariate analysis were included in the model, namely motivation, self-efficacy, age, knowledge, and family history of hypertension. The results of the logistic regression are presented in Table 3. Findings indicated that motivation and self-efficacy were significant determinants of self-care behavior, with p-values of 0.025 and <0.001, respectively. The strength of association was reflected in the odds ratios (OR), where participants with higher motivation were more than twice as likely to report good self-care behavior (OR=2.22, 95% CI=1.10–4.45), while those with higher self-efficacy were nearly eight times more likely to do so (OR=7.84, 95% CI=3.99–15.39). In the adjusted model, other factors such as age, knowledge, and family history of hypertension did not show statistical significance.

Discussion

This study highlights the crucial role of motivation, self-efficacy, and family history of hypertension in shaping self-care behaviors among patients. Motivation emerged as a key factor influencing compliance with suggested treatment plans and lifestyle changes. This result is in line with earlier research, like Tan et al. (2022), which found that motivational factors have a significant impact on medication adherence in people with hypertension. Motivation, both intrinsic and extrinsic, is closely tied to an individual's needs, drives, and goals (Bandhu et al., 2024). Patients who are motivated tend to demonstrate greater persistence in following medical advice, engaging in healthy lifestyle practices, and maintaining consistent self-care routines. Similarly, Ainiyah et al. (2023) emphasized that motivated individuals are more likely to integrate self-care practices, such as maintaining a balanced diet, engaging in physical activity, and adhering to prescribed therapy, into their daily lives. Collectively, these findings underscore the central role of motivation in enabling patients to take active responsibility for managing their condition and achieving better control of hypertension.

The majority of respondents reported that they did not smoke; however, only a few paid attention to the salt content listed on food packaging. This pattern suggests that while awareness of the dangers of smoking has been well internalized—leading to healthier behavior—knowledge regarding the importance of salt restriction remains limited. People who are well-informed about the negative effects of smoking are more likely to stop or abstain from smoking, but there is still a lack of knowledge regarding dietary salt. Many respondents may not fully recognize the role of excessive sodium intake in raising blood pressure and increasing cardiovascular risk. Motivation, which is a central driver of behavior, is shaped not only by knowledge but also by prior experiences and perceived relevance (Kassahun et al., 2020; Tan et al., 2022). Therefore, patients who understand the direct link between salt intake and blood pressure control are more likely to be motivated to monitor food labels and adopt healthier dietary practices. Strengthening health education that emphasizes practical strategies for salt reduction could therefore enhance both self-care adherence and motivation in hypertensive people.

Self-care behavior is closely related to self-efficacy, which is the belief in one's own ability to take medication as prescribed, eat a healthy diet, exercise regularly, and lower risk factors. This is in line with the results of Tan et al. (2021), who found a significant correlation between hypertension patients' self-efficacy and self-care behaviors. In the current investigation, however, more than half of the respondents demonstrated low self-efficacy (50.7%), suggesting limited confidence in their ability to consistently perform recommended self-care activities. Interestingly, the majority of respondents reported abstaining from alcohol consumption, which may be influenced by cultural and religious norms in Indonesian society that stigmatize alcohol use (Maula & Yuniastuti, 2017). Such negative social perceptions may encourage healthier behavior in this area. By contrast, most respondents reported rarely paying attention to nutritional information, particularly the composition of saturated and trans fats on food packaging. This gap reflects limited health awareness and highlights the influence of educational level, social support, and environmental factors on self-care practices (Khairy et al., 2021; Setyopranoto et al., 2022; Ulya, Upoyo, & Taufik, 2023). According to Bandura (2004), self-efficacy can be strengthened through mastery experiences, observational learning from peers, verbal persuasion, and the enhancement of physical and emotional states. Therefore, interventions aimed at building self-efficacy—such as peer modeling, skills training, and supportive counseling—are essential to empower patients with hypertension to engage more consistently in effective self-care behaviors.

In this investigation, the vast majority of respondents did not have a history of hypertension in the family. However, among those with a positive family history, 59% reported poor self-care behaviors, indicating a significant association between family history and self-care practices. This finding is consistent with Setiandari (2020), who observed that family history is not only correlated with an increased risk of developing hypertension but also shapes individuals' health-related experiences and behaviors. Ideally, having a history of hypertension in family should heighten awareness and encourage more proactive self-care. Nevertheless, the opposite pattern was observed in this study, suggesting that awareness alone may not be sufficient to drive healthy behavior. This discrepancy may be explained by differences in health consciousness and public awareness. Prior research in the same region reported that community awareness of the dangers of hypertension remains low, which may contribute to inadequate self-care practices even among individuals from families with a history of the disease (Setyopranoto et al., 2022). These results highlight the need of strengthening health education and family-based interventions to improve self-care behaviors among at-risk groups.

Age, gender, education, occupation, and body mass index were among the characteristics that were found to have no significant correlation with self-care behavior. This result is in line with Gusty et al (2022) 's study, which likewise found no connection between these demographic factors and self-care behaviors. Table 1 indicates that the vast majority of research participants were under 60 years of age (68.4%), female (90.4%), and not employed (60.3%). These characteristics may contribute to a level of cognitive maturity that allows respondents to make decisions regarding their health behaviors, regardless of demographic differences. Moreover, recent evidence indicates that lifestyle changes, particularly the global trend toward sedentary behavior, have increased the risk of hypertension across diverse population groups, making traditional demographic distinctions less predictive of self-care behavior (Spehar et al., 2020). This suggests that behavioral and psychosocial factors, rather than demographic characteristics, may play a more critical role in determining adherence to hypertension self-care.

Although the majority of respondents had abnormal body mass index values (<18.5 or >24.9; 65.1%) and uncontrolled blood pressure (systolic ≥140 mmHg; 89.5%), more than half (51.7%) reported good self-care behavior. This may be partly explained by the fact that over half of the respondents (51.2%) demonstrated good knowledge of hypertension. As noted by Kassahun et al. (2020), knowledge can influence individual behaviors and decision-making related to health. However, the present study found that knowledge and education were not significantly associated with self-care behavior. This apparent contradiction suggests that knowledge alone may not be sufficient to change health practices. Similar findings have been reported in previous studies, which observed that knowledge and educational attainment do not necessarily translate into greater awareness, positive perceptions, or consistent engagement in self-care activities (Pahria et al., 2022; Setyopranoto et al., 2021). These findings underscore the significance of addressing psychosocial elements including social support, self-efficacy, and motivation

in addition to knowledge enhancement when designing interventions to improve self-care among hypertensive patients.

This study revealed no correlation between self-care behavior and knowledge, a finding consistent with previous research (Pahria, et al, 2022; Tan et al., 2022). Similarly, other demographic and clinical variables, including age, sex, education, occupation, BMI, and blood pressure, showed no significant relationship with self-care behavior. To identify the key determinants, multivariate logistic regression was carried out employing bivariate analytic variables with $p<0.25$. The findings showed that the main variables impacting hypertension self-care behavior were motivation and self-efficacy.

This aligns with the Health Belief Model, which emphasizes that behavior is strongly influenced by an individual's perceived self-motivation and self-efficacy (Joho & Alphonce, 2021; Jones et al., 2016). These findings suggest that improving motivation and strengthening self-efficacy are critical strategies for enhancing self-care practices among patients with hypertension. Interventions designed to empower patients, build confidence in their ability to perform self-care, and foster internal motivation are therefore essential components of effective hypertension management.

Strengths and Limitation

This study has several strengths. It utilized validated instruments, including the Hypertension Self-Care Profile (HBP-SCP) and the Hypertension Knowledge-Level Scale (HKLS), both of which had been adapted and psychometrically tested in the Indonesian context, thereby enhancing the reliability of the findings. The sample size also exceeded the minimum required by Jacob Cohen's formula, providing sufficient statistical power and representativeness. In addition, the study examined a broad range of factors encompassing demographic, clinical, psychosocial, and behavioral variables, offering a more comprehensive understanding of the determinants of self-care behavior. The integration of Orem's Self-Care Theory and the Health Belief Model further strengthened the conceptual grounding of the analysis.

Nevertheless, It is important to recognize constraints. The cross-sectional design prevents causal inference, which restricts the potential to determine whether the identified factors directly influence self-care behavior over time. The fact that the study was limited to one regency may limit the findings' applicability to other areas with distinct cultural norms or socioeconomic contexts. Moreover, data collection depended on self-reported surveys, which can be vulnerable to social desirability or recall bias, particularly when it comes to delicate lifestyle choices like food and exercise.

Finally, while motivation, self-efficacy, and knowledge were examined, other potentially influential factors such as health literacy, social support, or comorbidities were not assessed, which may have provided a more nuanced understanding of self-care practices.

Nursing implication

The findings of this study underscore the central role of motivation and self-efficacy in shaping self-care behaviors among patients with hypertension. For nurses, this highlights the need to move beyond traditional education-based approaches and incorporate strategies that actively build patient confidence and internal drive. Nursing interventions should focus on enhancing self-efficacy through skills training, peer modeling, and guided practice in daily self-care routines such as blood pressure monitoring, dietary management, and medication adherence. Motivational interviewing techniques can also be employed to strengthen patients' intrinsic motivation, help them set realistic goals, and support sustained lifestyle changes.

In addition, nurses can integrate family members into care planning, especially for patients with a history of hypertension in family, to create a supportive environment that reinforces healthy behaviors. Community-based nursing programs should also prioritize culturally tailored education that emphasizes practical aspects of hypertension management, including reducing salt intake and monitoring food labels—areas where patient awareness remains limited. Regular follow-up through nurse-led clinics or community outreach can provide ongoing encouragement and problem-solving support. Ultimately, by prioritizing strategies that enhance both motivation and self-efficacy, nurses can be extremely importantin empowering patients to adopt and sustain effective self-care practices, thereby lowering complications and enhancing life quality for individuals living with hypertension.

Conclusions

This study provides important implications for nursing practice and hypertension management. Motivation and self-efficacy emerged as the key determinants of self-care behaviors among patients with hypertension, highlighting the need for healthcare providers to give focused attention to these psychological and behavioral dimensions. Nurses, in particular, are strategically positioned to support patients by fostering motivation through individualized counseling, motivational interviewing, and goal-setting strategies, while also enhancing self-efficacy through skills training, positive reinforcement, and structured follow-up. Strengthening these two factors can empower patients to adhere more consistently to self-care routines, including as taking medications as prescribed, making dietary changes, exercise, and regular medical treatment. By prioritizing interventions that build motivation and self-efficacy, nursing practice can make a significant contribution to reducing complications, improving blood pressure control, and ultimately enhancing the life quality of individuals living with hypertension.

Declaration of Interest

None

Acknowledgment

We are grateful to LPPM Universitas Jenderal Soedirman for providing financing for the study under the 2024 Basic Research Scheme.

Funding

None

Data Availability

None

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The effect of an empowerment program on knowledge and cancer cervical screening participation among reproductive age women in Indonesia: A randomized clinical trial

Nofa Anggraini*, **Susi Susanti**, **Rima Akhiri**, **Sisi Amelia**, **Dewi Cahyani**

Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Bekasi, Indonesia

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 191-202

http://dx.doi.org/10.24198/jkp.v13i2.2642

Article Info

Received	: Nov 11, 2024
Revised	: June 12, 2025
Accepted	: August 07, 2025
Published	: August 30, 2025

Corresponding author

Nofa Anggraini*
Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Bekasi, Indonesia; Address: Jl. Swadaya No.7, RT.001/RW.014, Jatibening, Kec. Pd. Gede, Kota Bks, Jawa Barat 17412.; Phone: (021) 86901352; E-mail: nofaanggraini06@gmail.com

Citation

Anggraini, N., Susanti, S., Akhiri, R., Amelia, S., & Cahyani, D. (2025). The effect of an empowerment program on knowledge and cancer cervical screening participation among reproductive age women in Indonesia: A randomized clinical trial. *Jurnal Keperawatan Padjadjaran, 13*(2), 191-202. http://dx.doi.org/10.24198/jkp.v13i2.2642

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Cervical cancer in Indonesia is the second leading cause of death and a significant health burden, largely due to low screening coverage. Indonesia faces challenges in developing women's health due to a lack of information, studies, weak relationship between research, management, planning, and service provision, and limited resources and expertise.

Purpose: This study aimed to examine the effect of an empowerment-based educational intervention on improving knowledge and participation in cervical cancer screening among women of reproductive age in Indonesia.

Methods: A randomized clinical trial was conducted in Jakarta, Indonesia, from February to July 2023, involving 150 eligible women. Participants were allocated to intervention or control groups using block randomization (block size = 4) with a 1:1 ratio. The intervention group received a three-week empowerment program consisting of six educational sessions. Outcomes, including cervical cancer knowledge and screening participation, were measured at baseline and eight weeks post-intervention. Data were analyzed using t-tests, chi-square tests, and linear regression. Risk ratios and differences were estimated using marginal standardization. Analyses followed the intention-to-treat principle, with blinding applied during data analysis.

Results:A randomized study with 80 participants showed an improvement in knowledge about cervical cancer and cancer cervical screening participation at 8 weeks. The intervention group showed a mean difference of 3.91 (1.38) and 4.24 (0.45) $p<0.05$. More participants in the intervention group reached Minimal Clinically Important Differences (MCIDs) in knowledge about cervical cancer and cancer cervical screening participation than in the control group, with a relative risk of 2.34 (95% CI=1.08-4.36) and 2.57 (95% CI=1.21-4.90), respectively.

Conclusion: An empowerment program significantly enhances knowledge and participation in cancer cervical screening among reproductive age women in Indonesia after intervention, but further studies are needed to determine its long-term impact.

Keywords: cancer cervical; empowerment; Indonesia; knowledge; screening participation

Introduction

Cervical cancer is the second biggest cause of death with 36,633 cases and a growing death rate in 2020 globally (WHO, 2020). The World Health Organization (WHO) estimates that 95% of cases are caused by Human Papillomavirus (HPV) (WHO, 2020). Nevertheless, the Ministry of Health (Ministry of Health of Republic of Indonesia, 2018) has identified insufficient screening coverage as a prominent contributing cause to the elevated prevalence of cervical cancer in Indonesia. As of 2021, only 9.32% of women aged 30–50 years in Indonesia underwent Visual Inspection with Acetic Acid (VIA) screening, according to Ministry of Health reports (Ministry of Health of Republic of Indonesia, 2018). By 2023, cervical cancer screening coverage in Indonesia is projected to reach only 7.02%, significantly below the national target of 70%. Regular screening remains crucial for the early detection of precancerous lesions, timely intervention, improved survival rates, and better long-term clinical outcomes (NASEM, 2019).

Women's decisions about whether or not to participate in cervical cancer screening have been shown to be complex and multi-factorial. Tran et al. (2022) have identified several household-level factors that can influence the adoption of screening practices. These factors encompass both direct costs associated with diagnosis and treatment, such as out-of-pocket expenses, as well as indirect costs including transportation expenses and potential loss of pay during hospital visits. Furthermore, sociodemographic and cultural variables, with medical distrust and perceived vulnerability, advantages, and obstacles have been identified as influential determinants (Ibekwe et al., 2021; Vrinten et al., 2019). Conceptual models like the Health Belief Model (HBM) and the Ecological Systems Theory provide insight into the various levels of influence affecting cervical cancer screening behavior. The HBM centers on personal beliefs, including perceived risk, seriousness of the condition, expected benefits of screening, and perceived barriers, offering a lens through which individual health-related choices can be understood (Rosenstock, 1974). In contrast, the Ecological Model considers the interconnections across multiple levels ranging from personal and interpersonal relationships to community dynamics and broader societal systems which together influence health behavior (McLeroy et al., 1988). Ahmadian and Samah (2013) emotional and cognitive factors such as fear, misinformation, and low motivation often deter women from participating in screening programs. Yet, limiting analysis to these behavioral dimensions may overlook deeper social determinants. The Fundamental Cause Theory (FCT), introduced by Link and Phelan (1995), underscores the role of structural factors, such as income level, educational access, and social support in shaping both health outcomes and access to healthcare services. Applied to cervical cancer screening, this perspective implies that even when women are informed, those with fewer socioeconomic resources may still encounter barriers. Thus, while psychological models like the HBM are valuable in understanding readiness for action, incorporating structural frameworks like FCT enriches our understanding of the persistent inequalities in screening uptake. Combining both approaches is crucial for designing interventions that are both behaviorally effective and socially responsive.

Interventions targeting the enhancement of screening uptake represent a significant strategy for addressing multiple issues. Behavior change is a complex and multifaceted process, as demonstrated by an international consensus that identified 93 distinct Behavior Change Techniques (BCTs) as part of a standardized taxonomy for designing and reporting behavior change intervention (Michie et al., 2013). Active components found in behavior change interventions include a variety of tactics, such as financial incentives, threat perception, habit reversal, social support, knowledge development, imagining future outcomes, and goal-setting, among others. A growing body of randomized controlled trials (RCTs) has explored the effectiveness of interventions designed to increase participation in cervical cancer screening. These studies typically compare screening uptake between individuals who received targeted interventions and those provided with standard care (Mehta et al., 2020; Moscicki et al., 2021; Valdez et al., 2018). Across the literature, numerous strategies have been implemented to improve health literacy and reduce access barriers. Interventions commonly include automated screening reminders, personalized counseling delivered by lay health workers or trained professionals, culturally adapted educational materials (print or video), and, in some cases, financial incentives to motivate individuals to undergo screening (Mehta et al., 2020; Moscicki et al., 2021; Tanjasiri et al., 2019; Valdez et al., 2018). For instance, Mehta et al. (2020) reported a significant increase in screening completion among women who received community health worker-led home education visits compared to the control group. Similarly, Valdez et al. (2018) found that tailored video interventions in Spanish significantly improved screening intent among Latina women. However, Moscicki et al. (2021) highlighted that while informational interventions raised awareness, their impact on actual screening uptake was modest, indicating the need for more comprehensive approaches.

Despite these efforts, structural and sociocultural factors continue to constrain women's ability to engage with screening services. In particular, limited autonomy and restricted decision-making power within the household have been identified as persistent barriers in many low- and middle-income contexts. Women who lack control over financial resources or healthcare decisions are less likely to prioritize preventive care, even when interventions are available (Tanjasiri et al., 2019). These constraints highlight a critical gap in the existing literature, while many interventions focus on improving knowledge and access, few address the deeper social dynamics that shape women's health behaviors. Therefore, further research is needed to develop and evaluate interventions that not only inform but also empower women to act on that information within their social and familial contexts.

The enhancement of women's empowerment is a crucial and indispensable goal in the field of public health. Studies have suggested that women who possess economic empowerment are capable of assuming a more proactive role in making decisions for their families, as well as gaining improved access to health and educational resources (Woods, 2008). Kabeer (1999, 2017) explains the concept of women's empowerment as a transformative process wherein individuals who have been deprived of the ability to make choices acquire this capability. This process encompasses interconnected and inseparable aspects, namely resources (pre-conditions), agency (process), and achievements (outcomes). Kabeer (2017) further underscores the notion that women play a significant role as integral and engaged participants in their own societies. Consequently, the empowerment of women possesses the potential to instigate transformative social progress in contexts where gender parity remains elusive. Empowerment models have demonstrated efficacy in facilitating the promotion of women's health and enhancing their overall quality of life (Ghanbari et al., 2017). Alhani (2004) proposed an innovative empowerment paradigm aimed at enhancing health promotion and illness prevention. The aforementioned approach has been employed in several studies to enhance the overall well-being of individuals suffering from chronic illnesses such as iron deficiency anaemia (Roshan et al., 2014), myocardial infarction (Vahedian-Azimi et al., 2015), diabetes (Sadeghi et al., 2013), and asthma (Rajabi et al., 2013). The primary aim of this model is to facilitate individuals in developing an in-depth awareness of health promotion. It encompasses four key elements, including the perception of health threats, problem-solving, educational engagement, and evaluation (Alhani, 2004).

The expansion of women's health services in Indonesia continues to face significant challenges, including limited data on the specific health needs of women, a shortage of relevant and contextualized research, weak integration between research, policy, program implementation, and service delivery, as well as constrained resources and workforce capacity (Ministry of Health, 2018; Titaley et al., 2020). Despite the growing burden of cancer among women, few studies have focused on empowerment-based interventions tailored to cancer survivors in Indonesia. To the best of the authors' knowledge, this study is among the first to explore the implementation of an empowerment program specifically for female cancer survivors, thereby offering a novel contribution to women's health research and survivorship care in the Indonesian context (Eyanoer et al., 2020). This study was conducted to assess the impact of an empowerment program on both the level of knowledge and the participation rate of women in Indonesia for cervical cancer screening.

Materials and Methods

Study design

This randomized clinical trial was conducted at a Community Health Center in Jakarta, Indonesia, with 150 eligible women from February to July 2023. The study followed both the original Consolidated Standards of Reporting Trials (CONSORT) guideline proposed by Moher et al. (2010) and the CONSORT Extension guideline proposed by Eysenbach and Group (2011) (Figure 1).

Sample

Participants in this study were Indonesian women who met the following inclusion criteria: aged 18 years or older, married, not currently pregnant or breastfeeding, free from any clinically diagnosed chronic illnesses or psychological disorders, and able to read and write. Women were excluded if they had previously participated in a similar educational program or were unable to attend two or more consecutive intervention sessions, as the empowerment-based approach required sequential and continuous participation to ensure conceptual understanding and progression. A consecutive sampling technique was employed to recruit eligible participants from community health centers in Jakarta. This method was chosen due to its practicality in identifying and enrolling participants who met the study criteria within a defined time frame and location.

The G*Power analysis software version 3.1 was used to determine the appropriate sample size for this study. To assess whether the educational intervention would produce a statistically significant effect, the sample size calculation was based on a 95% confidence interval, an 80% power (1–β), and a medium effect size threshold of $d = 0.3$, as reported in a previous study by Tanjasiri et al. (2019). Based on this analysis, a minimum of 30 participants per group was required. To accommodate a potential dropout rate of 10%, the sample size was increased to 40 participants in each group.

Randomization

The researchers gained written approval from the Ethics Committee of Sekolah Tinggi Ilmu Keperawatan Abdi Nusantara, with the assigned code ETIK/134/2023. After the completion of the sampling process, the research objectives were explained to participants throughout two distinct sessions. Following that, the participants were asked to complete the demographic information questionnaires that corresponded to their personal details. In advance of conducting baseline assessments, informed consent was acquired electronically via the use of an online form. Subjects meeting the specified inclusion and exclusion criteria were subsequently chosen for participation. Participants who met the eligibility criteria and provided informed consent were randomly assigned to either the intervention or control group using a block randomization method. This approach was selected to ensure that group sizes remained balanced throughout the enrollment period, thereby minimizing potential allocation bias. A fixed block

Table 1. Intervention protocol

Session	Empowerment Phase	Topic/Material	Activities	Format
1	Risk Awareness	Understanding cervical cancer: risk factors, signs, and severity	Lecture, group discussion	Group (10–15)
2	Risk Awareness	Screening methods (IVA, Pap smear), national recommendations	Video, Q&A, myth-busting exercise	Group
3	Problem Solving	Identifying barriers to screening; hypothetical scenarios	Problem-solving simulation, paired activity	Group
4	Problem Solving	Building decision-making skills; managing health priorities	Case studies, reflection, role-play	Group
5	Educational Engagement	Health-promoting behaviors & their benefits	Interactive game, behavior mapping, personal action plan	Group
6	Outcome Evaluation	Evaluating understanding and intention to undergo screening	Quiz, recap discussion, booklet distribution	Group

Table 2. Demographic comparison between intervention and control group (n=80)

Variables	Intervention group n=40 (%)	Control group n=40 (%)	p-value
Age, years, Mean ± SD	27.67 ± 3.41	26.13 ± 3.22	0.455a
Education Attainment			0.732b
Primary school	19 (47.5)	15 (37.5)	
Secondary school	15 (37.5)	19 (47.5)	
Higher than secondary school	6 (15.0)	6 (15.0)	
Employment status			0.216b
Yes	11 (27.5)	16 (40.0)	
No	29 (72.5)	24 (60.0)	
Having national health insurance			0.376b
Yes	19 (47.5)	23 (57.5)	
No	21 (52.5)	17 (42.5)	

Note: a p-value obtained from t test, b p-value obtained from Chi Square test.

Table 3. Change within groups and difference in change between groups

Variable	Group	Baseline, mean (SD)	At 8-weeks, mean (SD)	Change within groups a, mean (SD)	p-value
Knowledge in cervical cancer	Intervention group	9.65 (2.76)	13.56 (3.56)	3.91 (1.38)	0.003
	Control group	8.35 (3.09)	10.24 (3.44)	1.89 (1.22)	0.076
	Difference in change between groups b, Mean difference (95% CI)			2.02 (1.04 to 3.59)	0.001
Cervical cancer screening participation	Intervention group	4.65 (1.22)	8.89 (1.33)	4.24 (0.45)	0.001
	Control group	5.35 (1.34)	5.87 (2.14)	0.52 (0.32)	0.882
	Difference in change between groups b, Mean difference (95% CI)			3.8 (0.43 to 3.76)	0.001

Note: a: posttest-pretest; b: pretest to post test. Within groups, positive change indicates improvement. Positive group change differences favour the intervention.

Table 4. Percentage of participants achieving minimal clinically important improvements

Improvement, units	Intervention	Control	Relative risk (95% CI) a	p-value	Risk difference (95% CI) b	p-value
Overall knowledge, ≥3.0	76.4	32.4	2.34 (1.08-4.36)	0.001	0.45 (0.13-0.75)	0.001
Overall participation, ≥2.2	70.3	27.4	2.57 (1.21-4.90)	0.001	0.57 (0.11-0.91)	0.001

Note: a: Relative risk of >1 favors the intervention; b Risk difference of >0 favors the intervention.

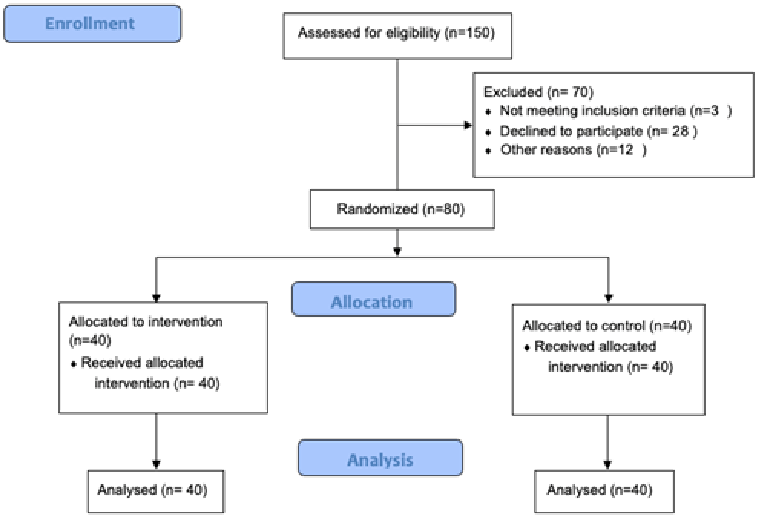

Figure 1. CONSORT Flow Diagram

size of four was used in conjunction with a 1:1 allocation ratio, meaning that for every block, two participants were assigned to the intervention group and two to the control group in a randomized order. The randomization sequence was generated using an online randomization tool (https://www.randomization.com), which produced a pre-specified allocation list. To maintain allocation concealment, the sequence was prepared in advance by an independent researcher not involved in participant recruitment or data collection. Upon enrollment, each participant was assigned to their group in accordance with the predetermined sequence, thereby preserving the methodological rigor and internal validity of the study.

To ensure allocation concealment, opaque envelopes were prepared for all participants. Each envelope contained a sealed card with the randomly generated allocation sequence. At the beginning of the participant registration process, each individual received an envelope containing the instructions for their assigned group. Allocation concealment was managed by two neutral staff members who were not involved in the sampling process.

Blinding

This study employed a single-blind design. Although it was not feasible to blind participants or intervention facilitators due to the nature of the educational program, measures were taken to minimize bias. Specifically, the individuals responsible for collecting post-intervention outcome data were not informed of participants' group allocations, helping to maintain objectivity during assessment. In addition, statistical analysis was conducted by an independent analyst who was not involved in the intervention delivery and remained blinded to group assignments throughout the analysis phase.

Measures

In this study, outcome data were collected at two time points: the first measurement was conducted at week 0 (prior to the intervention), and the second was carried out at week 11, which corresponds to eight weeks after the completion of the three-week intervention. The data gathering instrument utilized in this study was a questionnaire. The majority of the items utilized in this study were derived from the works of Ebu et al. (2014) and Walton et al. (2014), supplemented by a limited number of newly produced items informed by the existing body of literature.

Knowledge of cervical cancer was measured using a 15-item questionnaire adapted from the Indonesian version of the Cervical Cancer Awareness Measure (Cervical CAM), originally developed by Della Devara et al. (2020). This tool evaluates participants' understanding of cervical cancer across four domains: general definition, risk factors, symptoms and signs, and screening methods. Each item offers a "Yes" or "No" response, with correct answers scored as 1 and incorrect as 0. Individual scores range from 0 to 15, with higher totals indicating greater knowledge. The adapted questionnaire underwent psychometric evaluation to ensure its appropriateness in the Indonesian context. Content validity was established through review by three experts in maternal and reproductive health, resulting in a scale-level CVI (S-CVI) of 0.92, which indicates excellent agreement. Construct validity was supported by exploratory factor analysis, with a Kaiser–Meyer–Olkin (KMO) value of 0.78 and Bartlett's test of sphericity reaching statistical significance ($p < .001$). Factor loadings ranged from 0.52 to 0.81, confirming acceptable structural validity. Reliability testing demonstrated strong internal consistency, with a Cronbach's α of .84, indicating that the instrument was reliable for measuring cervical cancer knowledge among Indonesian women.

The objective of this study was to assess the level of participation in cervical cancer screening (CCS) among the target population. Participants were presented with a series of ten statements designed to explore their motivations and attitudes toward cervical cancer screening. They were asked to indicate whether they agreed or disagreed with each statement. Individuals who had previously undergone screening were also asked about their willingness to participate in future screening, while those with no prior screening history were queried about their openness to undergoing screening for the first time. Responses were binary, with participants selecting either "yes" or "no" for each item. A higher cumulative score reflected a greater degree of engagement in cervical cancer screening, with the composite score calculated by summing the total number of affirmative responses.

Content validity of the instrument was confirmed through expert panel review by three specialists in oncology nursing and reproductive health, yielding a scale-level CVI (S-CVI) of 0.91, which indicates excellent agreement. Construct validity was supported by exploratory factor analysis, which produced a Kaiser–Meyer–Olkin (KMO) value of 0.76 and a significant Bartlett's test of sphericity ($p < .001$), confirming sampling adequacy and factorability of the data. Factor loadings ranged from 0.48 to 0.79 across the ten items, indicating acceptable structural validity. The instrument also demonstrated good internal consistency, with a Cronbach's α of .80, reflecting acceptable reliability for use in this study.

Data were collected on various socio-demographic parameters to evaluate the participants' characteristics, including age, marital status, health insurance coverage, educational attainment, and employment status (see Table 1).

Intervention

To design the intervention, the research team utilized an empowerment-based approach rooted in a thorough understanding of the participants' educational needs. Before launching the intervention, an initial assessment was conducted to explore the women's current knowledge, misconceptions, barriers to screening, and preferred learning formats. This preliminary phase ensured that the educational content was tailored to the participants' specific context. Reference materials were sourced from established health authorities, including the World Health Organization and the Ministry of Health of Indonesia, to ensure accuracy and cultural relevance. Insights from prior studies emphasizing empowerment strategies in women's health promotion, such as Noori et al. (2021), also informed the conceptual and structural framework of the intervention. Following content development, several professionals with expertise in oncology, health education, and public health reviewed and validated the learning materials for clarity, relevance, and educational value.

Prior to the full trial, the intervention was pilot-tested with 15 women from a different community health center to examine feasibility, clarity of materials, and appropriateness of session length. Feedback from this pilot led to minor revisions in language simplification and the addition of more visual aids. The final version of the intervention was reviewed and validated by a panel of three professionals in oncology, reproductive health, and health education to ensure content accuracy, cultural relevance, and educational value. While the study was not formally registered as a clinical trial, the intervention protocol was documented and reviewed by the institutional ethics committee, aligning with local requirements for health education programs.

The intervention itself was implemented over a span of three weeks, consisting of six sessions delivered twice weekly. Each session lasted approximately one hour and was held at accessible community health centers during regular operational hours. The sessions were conducted in small groups of 10 to 15 participants, led by qualified health educators or nurses with experience in women's reproductive health. A group setting was intentionally selected to encourage collaborative discussion, enhance motivation through peer interaction, and build a sense of collective learning. The session themes aligned with the four key elements of the empowerment model: understanding health risks, applying problem-solving techniques, participating in interactive education, and reflecting on learning outcomes. Educational strategies used throughout the sessions included participatory lectures, open discussions, simulated scenarios, role-play exercises, and distribution of printed information booklets (Table 1).

During the first week, the focus was on raising awareness about cervical cancer, including risk factors, signs, and the significance of early screening. These discussions also addressed common misconceptions and provided clear explanations about screening techniques like IVA and Pap smears. The second week shifted toward developing practical problem-solving abilities. Women engaged in scenario-based discussions that mimicked real-life challenges in accessing screening services, and were encouraged to propose feasible solutions. These exercises were designed to strengthen self-confidence and decision-making skills. In the third week, participants explored ways to adopt healthier behaviors and created individualized action plans for maintaining their health. The final session served as a wrap-up, allowing for a review of key concepts, clarification of remaining questions, and reflection on personal intentions related to screening practices. Educational materials were compiled and shared with participants in printed form at the end of the program for future reference.

Participants assigned to the control group continued to receive standard care as provided in the community health centers. Standard care in this context consisted of routine maternal and child health services, occasional general health education sessions provided by local health cadres, and access to existing informational leaflets on women's health topics (e.g., maternal nutrition, child immunization, and hygiene practices). Importantly, no structured or empowerment-based cervical cancer education sessions were delivered to the control group during the study period. This ensured that differences observed between groups could be attributed to the empowerment-based intervention.

Data collection was carried out at two points during the study. The first round, or pre-test, was administered before the start of the intervention using a structured questionnaire to assess baseline indicators. The second round, or post-test, was conducted eight weeks after the final session, providing adequate time for participants to absorb the material and potentially apply what they had learned. Both groups, intervention and control completed the same instruments at both stages. While the control group had no contact with the research team, women in the intervention group received supportive follow-up calls twice a week throughout the three-week period to clarify concepts and address any concerns. After the study concluded, all individuals in the intervention group received printed copies of the educational content to support long-term learning.

Ethical consideration

Prior to conducting the baseline evaluations, informed consent was obtained digitally via an online form. We successfully secured approval from the Ethics Committee of Sekolah Tinggi Ilmu Keperawatan Abdi Nusantara, with approval code ETIK/134/2023. Participants were provided with their results upon request, and strict adherence to anonymity and confidentiality standards was maintained throughout the process.

Data analysis

Differences in baseline characteristics between groups were analyzed using independent t-tests for numerical data and chi-square tests for categorical variables. To analyze the change in outcomes within the intervention group from before to after the intervention, a paired t-test was selected. This statistical method is appropriate when comparing measurements taken from the same participants at two different time points. When comparing the differences between the intervention and control groups at either the baseline or the follow-up stage, independent t-tests were applied, provided that the data met the assumptions of normal distribution and equal variance. The use of both t-test approaches was based on the structure of the dataset: paired testing for intra-group comparisons and independent testing for inter-group differences. To further explore the impact of the intervention while adjusting for potential confounders, such as initial knowledge scores, linear regression modeling was used. This method is appropriate for analyzing continuous outcomes when the data meet the necessary assumptions, particularly normal distribution of residuals. The Kolmogorov–Smirnov test indicated that the distribution of the main study variables did not significantly deviate from normality ($p > .05$ for all variables). Visual inspection of Q–Q plots confirmed that data points closely followed the diagonal line, supporting the assumption of normality. Residual-versus-fitted value plots showed no evidence of heteroscedasticity, and residuals appeared randomly scattered, confirming the assumption of constant variance. In addition, residuals were independent across observations, fulfilling the assumption of independence. Collectively, these diagnostics confirmed that the assumptions of normality, linearity, homoscedasticity, and independence were adequately met. It should be noted that linear regression was not intended to compare groups directly, but rather to evaluate adjusted changes over time within the intervention group. By incorporating baseline scores into the model, the analysis accounted for individual variability at the start of the study. This approach allowed for a more precise understanding of the intervention's effect. Linear regression also provides flexibility in controlling for additional variables, such as age, education, and other demographic characteristics that might influence the results.

The analysis followed the intention-to-treat (ITT) approach, ensuring that all participants who were initially randomized were included, regardless of their level of participation. In addressing missing data at the eight-week follow-up, the study employed multiple imputation techniques. The imputation procedure incorporated baseline measures, follow-up outcomes, and participant demographics to estimate missing values, thus helping to minimize bias and preserve statistical power. Both analyses using imputed datasets and those limited to complete cases were conducted to confirm the reliability of the results. All statistical procedures were performed using SPSS version 26. The significance level was set at p < .05 for all two-sided tests.

Results

Study participants

Out of 150 individuals who met the eligibility criteria for this study, 80 participants agreed to enroll and completed the baseline assessment, resulting in a recruitment rate of 53.3%. The reduction in sample size from eligibility to enrollment was primarily due to eligible individuals declining to participate after being informed about the study procedures. Common reasons for refusal included lack of time, disinterest, or concerns related to follow-up commitments. These 80 participants were then randomly assigned into two equal groups: 40 individuals in the intervention group and 40 in the control group. Out of the 40 individuals allocated to the intervention group, all participants attended at least 5 of the 6 scheduled sessions, and 37 participants (92.5%) completed the full six-session program. Three participants missed one session each due to family or work commitments but continued in subsequent sessions and were retained for follow-up assessments. Importantly, all 40 participants in the intervention group completed the pre-test and post-test assessments, ensuring that their data were included in the final analysis. No participants withdrew from the study, and there was no attrition in either the intervention or control group (Figure 1).

Table 2 outlines the demographic profiles of participants across the intervention and control groups. The average age of individuals in the intervention group was 27.67 years (SD = 3.41), while those in the control group had a mean age of 26.13 years (SD = 3.22). Baseline demographic characteristics, including age, education, employment status, and health insurance coverage, were comparable between the intervention and control groups. None of the identified variables differed significantly (p > .05), confirming that randomization produced well-balanced groups at baseline (Table 1). These findings confirm that baseline demographic characteristics were well balanced between groups, supporting the validity of the randomization process.

Table 3 presents the within-group and between-group comparisons of changes in cervical cancer knowledge and screening participation over an eight-week period. In the intervention group, the mean knowledge score significantly increased from 9.65 (SD = 2.76) at baseline to 13.56 (SD = 3.56) at eight weeks, reflecting a mean improvement of 3.91 points (p = 0.003). In contrast, the control group showed a smaller, non-significant increase in knowledge, from 8.35 (SD = 3.09) to 10.24 (SD = 3.44), with a mean change of 1.89 points (p = 0.076). When comparing the change between the two groups, the intervention group demonstrated a significantly greater improvement, with a mean difference of 2.02 points (95% CI: 1.04 to 3.59; p = 0.001), favoring the effectiveness of the educational intervention.

For cervical cancer screening participation, the intervention group also experienced a notable increase, with mean scores rising from 4.65 (SD = 1.22) at baseline to 8.89 (SD = 1.33) post-intervention, indicating a significant gain of 4.24 points (p = 0.001). The control group, however, exhibited a minimal change, increasing from 5.35 (SD = 1.34) to 5.87 (SD = 2.14), with a non-significant improvement of 0.52 points (p = 0.882). The difference in change between the groups was statistically significant, with a mean difference of 3.8 points (95% CI: 0.43 to 3.76; p = 0.001), again supporting the effectiveness of the intervention in promoting screening participation (Table 3).

Table 4 further supports these findings by presenting the percentage of participants who achieved clinically meaningful improvements. Among those in the intervention group, 76.4% experienced a knowledge improvement of at least 3.0 points, compared to only 32.4% in the control group. This corresponds to a relative risk of 2.34 (95% CI: 1.08 to 4.36; p = 0.001) and a risk difference of 0.45 (95% CI: 0.13 to 0.75; p = 0.001), indicating that participants in the intervention group were more than twice as likely to experience a meaningful improvement in knowledge. Regarding screening participation, 70.3% of the intervention group achieved an increase of 2.2 points or more, versus 27.4% in the control group. This yielded a relative risk of 2.57 (95% CI: 1.21 to 4.90; p = 0.001) and a risk difference of 0.57 (95% CI: 0.11 to 0.91; p = 0.001), further emphasizing the positive impact of the intervention (Table 4).

Discussion

The objective of this study was to examine the impact of an empowerment program on the knowledge and participation in cervical cancer screening among women of reproductive age in Indonesia. The results indicated that the empowerment program had a significant positive effect on various health-promoting behaviors, enhancing both the knowledge and involvement of women in cervical cancer screening. According to Brandstetter et al. (2015), in a systematic review, revealed that only a limited number of studies had focused on empowerment strategies for fostering healthy behaviors, particularly regarding diet. In line with this, our study demonstrates that empowerment-based interventions can also be effective in the context of cancer prevention services, specifically by enhancing women's understanding and increasing their participation in cervical cancer screening as a secondary prevention strategy. According to a recent study conducted by Noori et al. (2021), it has been claimed that treatments rooted in the empowerment model might effectively enhance health-promoting behaviors. These findings align with the outcomes observed in the current study. According to Pender (WHO, 2021), health-promoting behaviors can be described as voluntary daily activities that are impacted by various demographic, environmental, and social factors, and have a significant impact on an individual's health status. Hence, research employing passive teaching approaches such as lectures and question-and-answer sessions proved ineffective in eliciting behavioral modifications. Based on the findings of this study, it is imperative to involve individuals in the process of devising strategies for adopting novel health behaviors, thereby fostering active engagement and ultimately facilitating behavioral modifications (Safabakhsh et al., 2016).

The present study adopted an empowerment-based educational approach aimed at enhancing participants' self-efficacy, with the ultimate goal of increasing their knowledge and participation in cervical cancer screening. Participants provided feedback throughout the evaluation phase, contributing to the continuous refinement of the intervention. The development of the health education program was informed by an assessment of the participants' specific health needs, allowing the intervention to be tailored accordingly. This personalized approach helped to optimize the use of participants' time and energy, encouraged a sense of involvement, and improved both engagement and self-confidence in the learning process (Ghanbari et al., 2017). As participants gain accurate knowledge and practical strategies through structured education, their confidence in managing their health and making informed decisions improves. This growing sense of capability empowers individuals to overcome psychological barriers such as fear, doubt, or perceived helplessness, which often deter screening participation. Increased self-efficacy, therefore, facilitates a transition from intention to action, promoting higher rates of screening adherence (Rajabi et al., 2013). Furthermore, the empowerment model emphasizes active participation and shared decision-making, which reinforces autonomy and perceived control; two essential components in enhancing self-efficacy. When women feel capable and supported in their decision to undergo cervical cancer screening, they are more likely to translate awareness into sustained health-promoting behaviors. Thus, the link between self-efficacy and screening participation lies in the empowerment of individuals to believe in their ability to engage with preventive health services confidently and consistently.

Empowerment is a healthcare intervention utilized by midwives and nurses that is rooted on the actual expectations of both the participants themselves and others around them. The idea under consideration is one that is characterized by a positive outlook, since it takes into account the strengths and capabilities of participants, as well as their surrounding environment, in order to identify problems and areas of improvement. Subsequently, appropriate interventions are implemented to address these identified issues. Empowerment is a dynamic process that facilitates the transfer of power from one individual to another or across groups through the enhancement and fortification of individual capacities (Borghei et al., 2016). Hence, the findings of this study indicate that treatments targeting the empowerment of female workers provide discernible good outcomes in terms of women's engagement in health-promoting behaviors. Furthermore, the intervention employed in this study holds potential for empowering individuals who are susceptible to vulnerability.

Strengths and Limitations

There exist multiple strengths associated with academic studies. The implementation of a rigorous randomized clinical trial methodology, which integrates dependable and credible measures of outcomes, as well as a high level of participant retention, contributes to enhancing the internal validity of the research. To enhance the generalizability of the study, it is important to establish inclusive eligibility criteria and recruit participants from Jakarta, the capital city of Indonesia. Jakarta is known for its culturally diverse and complex population.

This study is subject to several noteworthy limitations. To begin with, while the participants primarily came from backgrounds with limited formal education, the construct of self-efficacy was not directly measured using a standardized assessment tool. As such, any assumptions about participants' confidence or motivation to engage in health-promoting behaviors should be interpreted cautiously. Without validated data, conclusions regarding self-efficacy remain speculative. Future research would benefit from incorporating established instruments to assess this important psychological factor. Another limitation concerns the use of self-administered questionnaires to evaluate both knowledge and reported behavior. This method carries an inherent risk of bias, particularly related to social desirability and recall inaccuracies. It is possible that participants, especially after receiving an intervention, may have overestimated their understanding or their likelihood of following through with screening. Additionally, the follow-up period of eight weeks may be insufficient to gauge whether the observed changes are sustained over time. Longer-term follow-up is essential to determine the durability of the intervention's effects. Selection bias also presents a potential concern. Individuals who chose to participate may have been more engaged with their health or more motivated than those who declined, thereby limiting the extent to which these findings can be generalized. Moreover, the study did not account for a number of potentially influential factors, such as existing health knowledge, cultural attitudes toward cancer, prior experiences with the healthcare system, or structural barriers like financial costs and transportation access that could have shaped participants' screening behaviors independently of the intervention. Given these considerations, the findings should be applied with caution beyond the immediate study sample. Future investigations should strive to address these limitations by including broader, more heterogeneous populations and by systematically evaluating additional psychosocial and contextual variables that may impact outcomes.

Nursing implication

The findings of this study demonstrate that structured empowerment programs can effectively enhance knowledge and screening participation for cervical cancer among Indonesian women of reproductive age. These results reinforce the pivotal role of nurses as health educators, advocates, and facilitators of behavior change in community-based settings. By integrating empowerment-based strategies into routine nursing practice, nurses can optimize women's understanding of cervical cancer risks, address misconceptions, and actively encourage participation in screening programs. Furthermore, the group-based and participatory learning methods used in this study illustrate how nursing interventions can be designed to foster engagement, confidence, and self-determination, thereby contributing to sustainable health-promoting behaviors. At the knowledge level, this study expands the evidence base supporting empowerment as a theoretical and practical framework within nursing. At the practice level, it provides actionable insights for implementing nurse-led educational interventions in primary health care and community health centers. Taken together, the findings underscore that empowerment-focused approaches can serve as an effective, culturally relevant nursing strategy for strengthening women's preventive health behaviors, particularly in resource-limited contexts.

Conclusion

The findings of this study demonstrate that structured empowerment programs can effectively enhance knowledge and screening participation for cervical cancer among Indonesian women of reproductive age. While the findings of this study highlight the positive impact of an empowerment-based educational program on women's knowledge and participation in cervical cancer screening, several constraints experienced by participants warrant further exploration. Many of the women involved in the intervention faced challenges such as limited access to healthcare facilities, low baseline awareness about cervical cancer, fear or stigma surrounding screening procedures, and competing responsibilities such as childcare or work obligations that limited their availability to attend sessions. In some cases, cultural norms and misconceptions about cervical health also acted as barriers to participation. These factors may have affected not only engagement with the program but also follow-through with actual screening behavior. Future research should investigate strategies to overcome these barriers, such as incorporating community-based outreach, flexible scheduling, and involvement of family or peer support to enhance accessibility and sustainability of participation. Additionally, longer-term studies are needed to determine whether behavioral changes can be maintained once these constraints are addressed more systematically.

Acknowledgments

The researchers also appreciate the cooperation of participants in this study.

Authors' contributions

NA: Contribute to the conception design of the work, the acquisition, analysis and interpretation of data, have drafted the work or substantively revised it;SS, RA, SA, DC: Contribute the acquisition, analysis and interpretation of data, have drafted the work or substantively revised it; All authors have read and approved the manuscript.

Availability of data and materials

The data that support the findings of this study are available from [NA] but restrictions apply to the availability of this data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [NA].

Declaration

Ethics approval and consent to participate

Digital informed consent was obtained using an online form prior to baseline assessments. The written approval of the Ethics Committee of Sekolah Tinggi Ilmu Keperawatan Abdi Nusantara was obtained (code: ETIK/134/2023). The principles of anonymity and confidentiality were applied and the participants were provided with the results upon their request.

Funding

This research is funded by the Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara Jakarta, Indonesia.

Conflicts of interest

There are no conflicts of interest.

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Original Article

Cross-Culture Adaptation and Validation of Indonesian version of CRAFFT substance abuse screening test among adolescents

Tuty Yanuarti[1,2], Mohd Nazri Bin Mohd Daud[1]*, Noor Hassline Binti Mohamed[1], Azman Bin Atil[1], Linlin Lindayani[3]

[1] Rehabilitation Medicine Unit, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Malaysia
[2] Department Kebidanan, STIKES Abdi Nusantara, Indonesia
[3] STIKep PPNI Jawa Barat, Indonesia

Abstract

Background: Substance abuse among adolescent in Indonesia remains public health problem. The CRFFT is the most widely utilized high-risk drug screening tool. Its use in different countries and contexts shows its enormous potential. Although the CRAFFT has been utilized on occasion by professionals and researchers in Indonesia, no psychometric tests have been conducted to ensure that it works reliably in our country.
Purpose: This study aimed to examine the psychometric performance of the CRAFFT screening tool among Indonesian adolescents.
Methods: Eighty adolescents aged 15–18 years, recruited from a drug rehabilitation facility in West Java, Indonesia, participated in the research. The CRAFFT instrument underwent a four-step translation and adaptation process. Content validity was assessed using Aiken's V index. The factorial structure of the instrument was explored through exploratory factor analysis (EFA) and subsequently verified with confirmatory factor analysis (CFA). Internal consistency reliability was evaluated using the Kuder–Richardson 20 (KR-20) coefficient.
Results: CRAFTT CVI was 0.80–1.00 with the factor loadings for each of the three scales in the CRAFTT was 0.65–0.88. The results of the confirmatory factor analysis (CFA) for CRAFFT were as follows: I2 = 64.11, p-value = 0.121, and df = 78. Pearson correlation coefficients for the six different subscales ranged from 0.450 to 0.637. KR-20 coefficient of CRAFFT was 0.767. Corrected Homogeneity Index (CHI) ranged from 0.314 to 0.580.
Conclusion: The results of this study demonstrate that the CRAFFT instrument can serve as a practical and effective tool for identifying substance use issues among adolescents in Indonesia. Further investigations are recommended to examine its sensitivity and specificity in order to establish stronger evidence for the validity of the CRAFFT within this population.

Keywords: adolescents; CRAFFT; Cross-Culture Adaptation; Indonesia; substance abuse; validation

Introduction

Adolescence is a developmental stage that occurs between childhood and adulthood. Adolescents will go through various biological, psychological, and social changes. This stage of adolescent development is vital in the development of character or identity, as well as a critical transition period from child to adult (Yusof et al., 2015). Teenagers, in general, have a high level of curiosity and want to try new things. Aside from being driven by curiosity and the desire to become an adult, it motivates teenagers to want to try to accomplish activities that adults frequently do, such as dealing with sexual issues (Steinberg & Morris, 2001). Teenagers are one of the age groups most at risk for sexual conduct, and they also frequently use injectable drugs (Purnama et al., 2018).

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 203-210

http://dx.doi.org/10.24198/jkp.v13i2.2551

Article Info

Received : May 26, 2024
Revised : April 27, 2025
Accepted : May 31, 2025
Published : August 30, 2025

Corresponding author

Mohd Nazri Bin Mohd Daud*
Rehabilitation Medicine Unit, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Malaysia; Address: Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia; E-mail: mohd.nazri@ums.edu.my

Citation

Yanuarti, T., Daud, M. N. B. N., Mohamed, N. H. B., Atil, A. B. & Lindayani, L. (2025). Cross-Culture Adaptation and Validation of Indonesian version of CRAFFT substance abuse screening test among adolescents. *Jurnal Keperawatan Padjadjaran, 13*(2), 203-210. http://dx.doi.org/10.24198/jkp.v13i2.2551

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

The National Narcotics Agency has explicitly stated that adolescent substance abuse among adolescents in Indonesia is significant health issues. The National Narcotics Agency reported that the prevalence of drug abuse was increased from 1.80% in 2019 to 1.95 in 2021, with total number 4,827,616 ever used and 3,662,646 used in the last year (National Narcotics Agency, 2022). Based on the age range, the prevalence of drug abuse was 1.93% in aged 15 to 24 years old, and it was increased from 2019 (1.80%). This number of those who currently used has increased by 11.1% compared to the previous year which amounted to 766 cases in year of 2021.

The CRFFT is the most widely utilized high-risk drug screening tool. Its use in different countries and contexts shows its enormous potential (Agley et al., 2015; Bernard et al., 2005; Cote-Menendez et al., 2013; Cummins et al., 2003; Dieppe et al., 2009; Harris et al., 2014, 2016; Karila et al., 2007; van Weelden et al., 2016). Although the CRAFFT has been utilized on occasion by professionals and researchers in Indonesia, no psychometric tests have been conducted to ensure that it works reliably in our country. This study aimed to examine the psychometric characteristics of the CRAFFT screening tool among Indonesian adolescents.

Material and Methods

Participants

A total of 80 adolescents, aged between 15 and 18 years, participated in this study. Participants were recruited from a drug rehabilitation center located in West Java, Indonesia. The sample comprised individuals who voluntarily agreed to join the research, with written informed consent obtained from both the adolescents and their parents.

Instrument

The CRAFFT is a test used to identify adolescents who have had substance abuse problems within the last 12 months. It consists of two distinct components. The first section includes three questions designed to determine whether or not the adolescent has used alcohol, cannabis, or other drugs in the past 12 months. Substance use is assessed in the second section of the CRAFFT, which consists of six questions (Knight et al., 2002). The CRAFFT instrument defines substance abuse as riding in a "car" driven by someone (including self) while high on alcohol or other substances; using alcohol or other substances to "relax" or feel better about herself/himself; using them while "alone"; and "forgetting" to complete a task while using them. The CRAFFT also asks if "family or friends" advised the youngster to cut back on alcohol or other drug usage and if they ever got into "trouble" with the law. All items were "Yes" (1 point) or "No" (0 point). CRAFFT scores, the sum of second-part questions, range from 0 to 6. Higher values may suggest problematic use (Knight et al., 2002). The CRAFFT demonstrated acceptable internal consistency in this sample (Cronbach's alpha was 0.68) (Knight et al., 2002).

Translation process

The process of translating this instrument into Bahasa Indonesia was carried out in four structured phases. The first step involved forward translation, followed by a reverse translation conducted by a panel of experts, then pre-testing, and finally cognitive interviewing. The purpose of these stages was to ensure that the adapted version not only matched the English source but also reflected the cultural and conceptual context of the target population (WHO, 2019).

For the initial forward translation, two bilingual translators were engaged. The first (T1) held a doctoral degree from an overseas university, while the second (T2) had no clinical background, which allowed a balance between technical accuracy and lay interpretation. Their translations were then synthesized into a single version, referred to as "T-12," after reviewing and reconciling differences. In the third stage, an independent translator who had no prior exposure to the original English version were then back-translated the T-12 document into English. This process was repeated by two native speakers to verify consistency and accuracy. The final stage brought together a multidisciplinary review committee consisting of psychometricians, medical professionals, linguists, and translators. This expert panel critically assessed the draft to ensure that the Indonesian version achieved equivalence with the original in terms of semantics, linguistic clarity, experiential meaning, and conceptual alignment. A five-point Liker scale for cultural equivalence and linguistic clarity (5-perfectly readable and understood to 1-completely unreadable and unintelligible). This classification method was applied to assess how clearly each item was understood and whether it was appropriate within the cultural context of all participants. The evaluation produced scores of 88% for linguistic clarity and 90.8% for cultural suitability.

Content validity

Content validity was determined by looking at the instrument's significance, relevance, and vocabulary. Each question on the survey is evaluated by a specialist. If an item is improper and should be removed from the questionnaire, it will receive a score of 1 point; if it is possibly not acceptable or relevant, it will receive a score of 2 points; and if the questionnaire items are reasonable, they will receive a score of 3 points. The Content Validity Index (CVI) was determined by the panel of experts through summing the assigned scores for each item and dividing the total by the number of evaluators. Any revisions to the instrument were made in accordance with the CVI outcomes and the professional judgment of the experts (Bolarinwa, 2015). To assess the content validity of the instrument items, we applied Aiken's V formula, which is widely used to quantify the degree of agreement among experts regarding the relevance of each item. Aiken's V is particularly suitable when using ordinal rating scales. The formula for Aiken's V is as follows:

$$V=\sum s/\ n(c-1)$$

Where: $s=r-ls$; r is the score given by each expert; l is the lowest possible score on the scale; n is the number of experts; and c is the number of possible categories or response points on the rating scale. Each expert rates the item on a Likert scale (e.g., 1 to 4), indicating the degree of relevance or appropriateness. The resulting Aiken's V coefficient ranges from 0 to 1, where a value closer to 1 indicates strong agreement among experts that the item is relevant A value below 0.70 typically indicates that the item may require revision or removal (Lynn, 1986). In this study, we engaged a panel of expert validators to rate each item for clarity, relevance, and representativeness.

Construct validity

To describe the characteristics of the participants, descriptive statistical methods were applied. The dimensional structure of the CRAFFT instrument was examined through both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Model fit was evaluated using established indices, including the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI) (Hu & Bentler, 1999). A good fit has a root mean square error less than 0.06 and a standard deviation less than 0.08. According to literature, CFI values more than 0 suggest a good fit, whereas values less than 0.8 imply an adequate fit. (Browne & Cudeck, 1992). The item correlation of CRAFFT was analyzed by means of a Pearson correlation test. When the subscales are combined and certain items are deleted, correlation coefficients above 0.7 suggest that the dimensions have captured the same notion (Calvache et al., 2020).

Reliability

The term "reliability" describes the degree to which a measurement is free of errors (Mokkink et al., 2016). This study used KR-20 coefficient to determine its reliability.

Procedure

All study protocols followed the ethical standards outlined in the Declaration of Helsinki. Ethics committee of the STIKes Abdi Nusantara approved

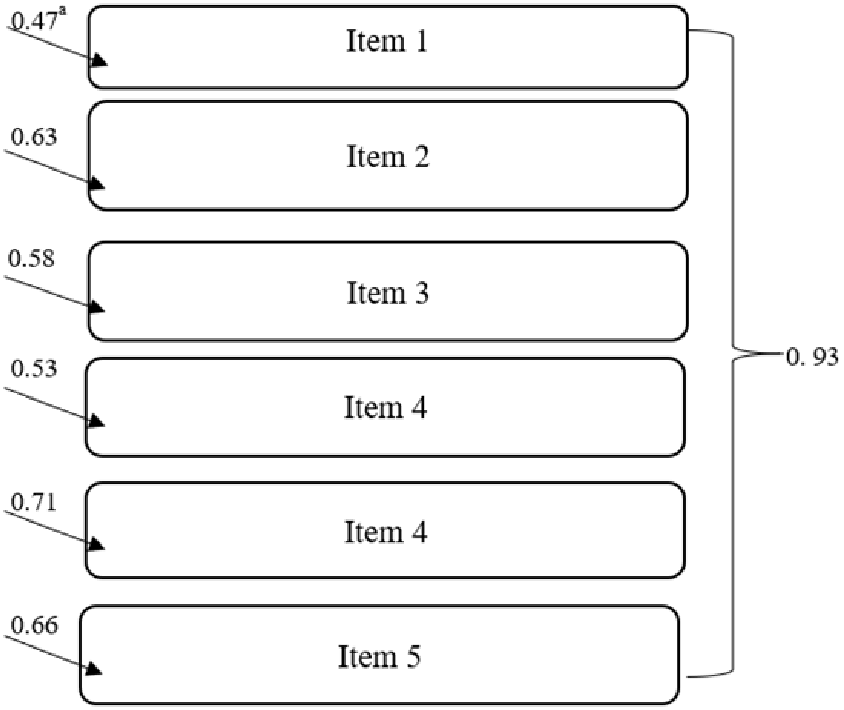

Figure 1. The CRAFFT-Indonesian Measurement Model for the unidimensional. a: Measurement Error. b: Squared Multiple Correlation (SMC) value. c: Standardized Factor Loadings

Table 1. Demographic of respondent (n=80)

Variables	Intervention group (n=80 (%))
Age, Mean ± SD	16.7±2.55
Gender	
Male	43 (53.7)
Female	37 (46.2)
Current education	
Elementary school	23 (28.8)
Junior high school	50 (57.5)
Drop out/uneducated	11 (13.8)
Age at first diagnose	13.32±3.57
Parent age	40.7±8.64
Working status	
Yes	52 (65)
No	28 (35)
Rehabilitation	
Yes	67 (83.3)
No	13 (16.3)

Table 2. Validity content based on Aiken's Value formula of CRAFFT (n=5)

Item	Examiner 1		Examiner 2		Examiner 3		Examiner 4		Examiner 5		∑s	V	
	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo			
1	4	3	4	3	4	3	4	3	4	3	15	1.00	Valid
2	4	3	4	3	4	3	4	3	4	3	15	1.00	Valid
3	4	3	4	3	3	2	3	2	3	2	12	0.80	Valid
4	4	3	4	3	4	3	4	3	4	3	15	1.03	Valid
5	4	3	4	3	4	3	4	3	4	3	15	1.04	Valid
6	3	2	4	3	4	3	3	2	3	2	12	0.80	Valid

s=R-Lo; r is the score given by each expert; Lo is the lowest possible score on the scale; n is the number of experts.

Table 3. Factor loading of individual items in CRAFTT

	Factor loading	Eigen Value	Variance explained (%)
Have you ever ridden in a car driven by someone (including yourself) who was high or had been using alcohol or drugs?	0.76	4.54	40.76
Do you ever use alcohol or drugs to Relax, feel better about yourself, or fit in?	0.88		
Do you ever use alcohol or drugs while you are b yourself or alone?	0.65		
Do you ever Forget things you did while using alcohol or drugs?	0.66		
Do your Family or Friends ever tell you that you should cut down on your drinking or drug use?	0.58		
Have you ever gotten into Trouble while you were using alcohol or drugs?	0.76		

Table 4. Empirical Data Correlation Matrix of CRAFFT (n=80)

Items	1	2	3	4	5	6
1	0.543**					
2	0.484**	0.537**				
3	0.637*	0.463**	0.561**			
4	0.501**	0.458*	0.415*	0.450*		
5	0.637**	0.532**	0.313*	0.565**	0.552**	
6	0.611**	0.456**	0.619*	0.594**	0.594*	0.474**

Note: Correlation between raw survey scale score values using the Pearson correlation coefficient. * p<0.05; **p<0.00.

Table 5. Reliability of CRAFFT

Item no.	KR-20 if item eliminated	Corrected Homogeneity Index
1	0.653	0.513
2	0.663	0.442
3	0.701	0.325
4	0.632	0.417
5	0.672	0.314
6	0.620	0.580

the study with a waiver of written informed parental consent and written assent. Research assistants in the waiting areas of three different primary care clinics between June 2012 and February 2013 addressed adolescents who had been identified by clinic staff. Patients within the specified age range were asked to take part in an anonymous survey research study. Patients who consented verbally were moved into a separate room where they were given a battery of questionnaires to fill out.

Result

Demographic characteristics

The participants' demographic information is presented in Table 1. The average age was 16.7 (SD=2.55), there were 53.7% males, and 57.5% had completed the eighth grade. Most of them (61.7%), on average (SD=3.57), started abusing drugs at the age of 13.32. In addition, 61.2% of their parents had jobs (Table 1) and their average age was 40.7 (SD=8.64).

Content validity

Before psychometric testing, we incorporated expert panel advice for minor modifications. The CRAFTT CVI was 0.80–1.00 (Table 2).

Construct validity

Exploratory factor analysis (EFA) is applied to the instrument's item structure in order to determine whether or not the measuring tool can be trusted to produce accurate results. The eigen value of only one of the factors was greater than one. The Kaiser–Meyer–Olkin (KMO) score was 0.942, which indicates that the study could have been conducted with the representative sample. The fact that the Bartlett test produced a significant result (X2 = 1476.42; P= 0.001) indicates that factor analysis is very necessary. Table 3 shows the factor loadings for each of the three scales in the CRAFFT was 0.65–0.88; this indicates that the construct validity is satisfactory, with 40.765% of the variation has been explained.

The confirmatory factor analysis (CFA) of the CRAFFT instrument produced the following fit indices: I² = 64.11 with a p-value of 0.121 and 78 degrees of freedom. The chi-square test did not yield significant results, suggesting that the proposed model adequately represents the observed data. In addition, the Root Mean Square Error of Approximation (RMSEA) was 0.058, with a confidence interval ranging from 0.05 to 0.089, further supporting that the model provided a reasonable fit (Figure 1).

As shown in Table 4, the Pearson correlation coefficients for the six different subscales ranged from 0.450 to 0.637 (p-value less than 0.05), indicating that there was significant independence among the subscales.

Reliability

The coefficient of reliability known as KR-20 determined that the CRAFFT has a reliability of 0.767. The Corrected Homogeneity Index (CHI) was used to conduct independent tests on each component to determine whether or not they were consistent. The results of these tests ranged from 0.314 to 0.580. It was determined that Items 3 and 5 were the ones that had the least amount of consistency in relation to the overall scale (Table 5).

Discussion

In an Indonesian sample consisting of 80 adolescents, positive psychometric properties of the CRAFFT were shown to be present. In the first place, a satisfactory value of.767 was obtained in terms of the instrument's internal consistency. This value is higher than the one that was obtained in the initial validation research conducted by (Knight et al., 2002) (=.68), as well as in other investigations (Bertini et al., 2015; Kelly et al., 2004; Subramaniam et al., 2010; Wartberg et al., 2016). The analyses that were carried out have corroborated the one-dimensional structure of the CRAFFT scale, which demonstrates the construct validity of the instrument. This was previously noted by (Subramaniam et al., 2010; Wartberg et al., 2016). However, the study did not provide a cutoff score for determining which patients with cannabis and alcohol use disorders warrant more in-depth evaluation. Most of the research looked at how well the CRAFFT could detect problematic alcohol or drug use (defined as meeting one or more DSM criteria) and substance use disorders (defined as meeting two or more DSM criteria).

Finally, researchers and practitioners in the field of addictive behavior have access to a version of the CRAFFT Abuse Screening Test that has been modified and scientifically validated. The findings indicate that the CRAFFT has reliable psychometric features and can be useful in a classroom setting. It has also been shown that none of its benefits are lost when provided by people who are not trained in medicine, expanding its scope of application. Our findings also pave the way for the CRAFFT to be used as a screening tool in the context of potential early detection and intervention programs.

However, this study has some drawbacks. The sample size of 80 teenagers is less than prior validation studies (Bernard et al., 2005; Bertini et al., 2015; Cummins et al., 2003; Kelly et al., 2004). This is insufficient for tool evaluation in socio-demographic subfields. Self-reports may misrepresent survey respondents' substance use and skew information due to fear of punishment or criticism. To avoid questioning or intimidation, replies were collected in sealed, opaque envelopes with no identifying information, and parental consent was waived in accordance with CIOMS protocols. Clinical and educational research has established that self-reported alcohol and psychotropic substance usage is reliable. However, researchers must examine the scale's psychometric properties in other independent societies. Clinical information, such as comorbidities and family history, would have been beneficial. Finally, since the data were obtained in schools rather than through a clinical interview, the characteristics evaluated were self-reported, making it hard to objectively determine whether teenagers understated or exaggerated their substance use. According to addiction experts (Babor et al., 2001; Winters et al., 1990), self-report measures are more accurate and reliable than other methods for assessing alcohol and drug use. In Indonesia, much preventive work is done in schools, making the CRAFFT a powerful instrument.

Conclusion

The results of this study demonstrate that the CRAFFT questionnaire serves as a practical and effective tool for identifying substance use among Indonesian adolescents. While such screening instruments are not intended to provide a clinical diagnosis of substance use disorders, their accuracy and reliability make them valuable in directing healthcare providers' attention to adolescents who may be at higher risk. This is particularly important in busy clinical settings, where the majority of young patients are not engaged in alcohol or drug misuse. Further research examining the sensitivity and specificity of the CRAFFT is recommended to ensure stronger validation and to support its use as a comprehensive screening instrument.

Acknowledgement

The authors of this paper would like to thank STIKES ABDI NUSANTARA for the funding received for this study

Declaration of interest

The authors of this article declare that they have no conflict of interest

Funding

None

Data Availability

None

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Perceived stress and anxiety in government employees during remote work arrangements: A correlation study

Myra D. Oruga[1*], **Jessica Mae D. Viray-Inciong**[1], **Laili Rayuwahati**[2]

[1] University of the Philippines Open University, Los Baños, Laguna, Philippines
[2] Faculty of Nursing, Universitas Padjadjaran, Bandung, Indonesia

Abstract

Background: The transition to remote work has significantly reshaped workplace structures, posing unique challenges for employees. Government workers, accustomed to face-to-face interactions, faced substantial adjustments when transitioning to remote arrangements, leading to concerns about their mental health, particularly stress and anxiety.
Purpose: This study examines perceived levels of stress and anxiety among government employees in remote work arrangements and investigates the relationship between these mental health outcomes and socio-demographic factors.
Methods: A descriptive correlational study design was employed, targeting 257 government employees from 11 PhilHealth offices in the National Capital Region. Stratified random sampling recruited 173 employees completing an online self-administered survey. The Perceived Stress Scale (PSS-10) and Generalized Anxiety Disorder Assessment (GAD-7) tools were used to measure stress and anxiety levels. Descriptive statistics and Chi-Square tests were applied for data analysis.
Results: Most respondents (96.32%) reported moderate stress levels (mean PSS score = 19.51), while nearly half (49.69%) exhibited mild anxiety (mean GAD-7 score = 6.83). Severe stress and anxiety were minimal, at 3.07% and 0.61%, respectively. No significant correlations were identified between socio-demographic factors and mental health outcomes.
Conclusion: The study highlights moderate stress and mild anxiety levels among government employees during remote work. Findings emphasize the importance of mental health support and structured remote work policies to address workplace stress during periods of significant organizational change.

Keywords: anxiety; government employees; mental health; remote work; stress

OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 211-218
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2676

Article Info

Received : Dec 11, 2024
Revised : August 23, 2025
Accepted : August 28, 2025
Published : August 30, 2025

Corresponding author

Myra D. Oruga*
Faculty of Management and Development Studies, University of The Philippines Open University, Los Baños Laguna, Philippines; Address: Los Baños Laguna, Philippines; Postal Code: 4031; Phone: +639171077920; E-mail: myra.oruga@upou.edu.ph

Citation

Oruga, M. D., Viray-Inciong J. M. D., & Rahayuwati, L. (2025). Perceived stress and anxiety in government employees during remote work arrangements: A correlation study. *Jurnal Keperawatan Padjadjaran, 13*(2), 211-218. http://dx.doi.org/10.24198/jkp.v13i2.2676

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

The transition to remote work has become a prominent feature of modern workplaces, driven by advancements in technology and the growing need for flexible work arrangements. While remote work offers several benefits, such as reduced commuting time and increased autonomy, it also presents significant challenges, particularly for government employees. Unlike their counterparts in the private sector, government employees often perform roles that require public interaction and are heavily reliant on face-to-face transactions. The abrupt shift to remote setups has required them to adapt to unfamiliar telework systems and tools, often without adequate preparation or training (Milch et al., 2021; Van Zoonen et al., 2021).

Remote work environments are associated with unique stressors, including technological challenges, social isolation, and difficulty maintaining a balance between personal and professional responsibilities. Studies have shown that these stressors can contribute to heightened levels of stress and anxiety among employees, particularly in roles where human interaction and collaboration are integral (O'Neill et al., 2020; Wang et al., 2020). Poor technological infrastructure, insufficient organizational support, and increased workloads further exacerbate these challenges (Tavares, 2020; Yildiz & Çalışkan, 2021).

For government employees, the demand to maintain operational efficiency while adapting to new ways of working can significantly impact mental health. Research has indicated that stress and anxiety in remote work settings often stem from the absence of social support, blurred work-life boundaries, and uncertainties associated with changes in workplace dynamics (Birtus & Lăzăroiu, 2021; Ragu-Nathan & Tarafdar, 2020). These factors highlight the importance of understanding how workplace transitions affect employee well-being and identifying strategies to mitigate their psychological impact.

Socio-demographic factors such as age, gender, marital status, educational attainment, job position, employment status, years of service, income level, and type of remote work arrangement play a critical role in shaping employees' experiences of stress and anxiety in remote work contexts. For instance, younger employees may struggle with limited resources and unstable work environments, while older employees may face greater technological challenges (Wang et al., 2020). Gender dynamics also influence stress perceptions, with women often experiencing additional pressures from caregiving and household responsibilities (Tavares, 2020). Similarly, differences in marital status, income levels, and job security can significantly affect an employee's coping capacity and psychological resilience. Understanding these relationships is vital for developing targeted workplace interventions that address the specific needs of diverse employee groups.

This study examines the levels of perceived stress and anxiety among government employees engaged in remote work and investigates how socio-demographic factors relate to these mental health outcomes. By focusing on government employees, this research contributes valuable insights to the growing body of knowledge on remote work and mental health, offering guidance for policymakers and organizational leaders in creating supportive and responsive work environments.

The primary aim of this study is to assess the perceived levels of stress and anxiety among government employees working in remote arrangements and to explore the relationship between socio-demographic factors and these mental health outcomes. Given the significant adjustments required during remote work, it is crucial to understand how these factors contribute to employees' psychological well-being. By aligning the objectives explicitly with the research goals, the study seeks to provide evidence-based insights that can inform workplace mental health policies and targeted interventions (American Psychological Association [APA], 2020; Giorgi et al., 2020).

Materials and Methods

Design

This study employed a descriptive-correlational research design to examine the perceived levels of stress and anxiety among government employees engaged in remote work. The descriptive component focused on summarizing participants' socio-demographic characteristics and the overall levels of stress and anxiety. The correlational componentexplored the relationships between socio-demographic factors and the measured mental health outcomes, using appropriate statistical analyses to determine the strength and significance of these associations.

Sample and Setting

The research targeted government employees in the National Capital Region (NCR) of the Philippines, focusing on 11 selected offices of PhilHealth. These employees had transitioned to remote work arrangements. Using proportionate stratified random sampling, 173 participants were recruited from a population of 257 employees. Inclusion criteria included being aged 20–60 years, having a role dependent on face-to-face interactions, and stable internet access. Exclusion criteria ruled out and those unable to complete the online survey due to technological or cognitive barriers.

Variables

Independent Variables: Socio-demographic factors, including age, gender, marital status, parental status, living arrangement, job position, employment status, and income; Dependent Variables: Perceived levels of stress and anxiety.

Instruments

Two standardized and widely used instruments were employed to measure perceived stress and anxiety levels:

Perceived Stress Scale (PSS-10)

The PSS-10 is a validated tool designed to measure the degree to which situations in an individual's life are appraised as stressful. It consists of 10 items scored on a five-point Likert scale, with total scores ranging from 0 to 36, where higher scores indicate greater perceived stress. The scale has demonstrated high internal consistency, with reported Cronbach's alpha values ranging from 0.78 to 0.91 across various studies (Cohen et al., 1983; Lee, 2012). In this study, the PSS-10 was adapted to reference the context of remote work during organizational change to ensure contextual relevance.

Generalized Anxiety Disorder Assessment (GAD-7)

The GAD-7 is a seven-item self-report questionnaire used to assess anxiety severity. Scores range from 0 to 21, categorized as:0–4: Minimal anxiety5–9:

Mild anxiety10–14: Moderate anxiety15–21: Severe anxiety.

The GAD-7 has shown excellent internal consistency, with Cronbach's alpha values ranging from 0.89 to 0.92 (Spitzer et al., 2006). Similar to the PSS-10, the GAD-7 was contextually adapted to reflect stressors related to remote work and organizational change.

Intervention

No intervention was administered; this observational study aimed to capture baseline stress and anxiety levels during remote work transitions.

Data Collection

A self-administered online survey was conducted over six weeks using Google Forms. Participants received an email containing the survey link, informed consent, and detailed information about the study's objectives and procedures. Follow-up reminders were sent weekly to encourage participation. Only responses from verified government employeeswere included in the dataset to ensure the validity of the findings.

The survey collected two primary types of data:

Socio-demographic information – including age, gender, marital status, employment status, position level, and monthly income. These were measured using categorical and ordinal variables; Psychological measures – participants' levels of perceived stress and anxiety were assessed using standardized scales:

Perceived Stress Scale (PSS-10): A 10-item, 5-point Likert scale ranging from 0 (never) to 4 (very often), designed to measure the degree to which situations in one's life are appraised as stressful. Higher scores indicate greater perceived stress (Cohen et al., 1983).

Generalized Anxiety Disorder Scale (GAD-7): A 7-item, 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), used to screen for and assess the severity of anxiety symptoms. Higher scores reflect more severe anxiety (Spitzer et al., 2006).

These measurement tools were selected due to their validated reliability and widespread use in assessing stress and anxiety levels among adult populations.

Data Analysis

The author's application of chi-square tests of independence is appropriate given the study's objective of examining potential associations between socio-demographic factors (e.g., age, gender, employment status) and mental health outcomes (stress and anxiety levels). Since both the independent variables (socio-demographic factors) and dependent variables (stress and anxiety categories) are categorical in nature, chi-square analysis provides a robust method to test whether observed differences in distributions are statistically significant rather than due to chance.

For example, a typical contingency table could compare gender (male/female) against stress level categories(low/moderate/high). If the chi-square test yields a p-value < 0.05, it indicates a significant association — suggesting that gender may influence the distribution of stress levels. Conversely, a non-significant result implies that gender differences are unlikely to affect stress outcomes.

Conducting chi-square tests enables the researchers to:

Determine relationships between demographic variables and psychological outcomes; Identify potential risk factors by highlighting which socio-demographic groups are more susceptible to higher stress or anxiety levels; Support targeted interventions based on statistically validated findings.

However, it is critical that the authors report:

The assumptions of the chi-square test (e.g., expected cell counts should generally be ≥5).

The effect size (e.g., Cramer's V) to interpret the strength of any significant relationships.

By addressing these points, the analysis will not only be statistically sound but will also provide meaningful insights into the interplay between socio-demographic characteristics and mental health among government employees.

Ethical Considerations

Ethical approval was obtained from the National Ethics Committee with tag number NEC Code-2021-024- Viray-Inciong Remote Work. Informed consent was secured electronically before participation. Data privacy was strictly observed, with participants' personal identifiers removed from the dataset. All data were encrypted and stored securely on password-protected systems. Participants were assured of their right to withdraw at any time without consequences, and findings were shared in aggregate to maintain confidentiality.

Results

Table 1 presents the socio-demographic characteristics of the respondents. The sample was predominantly middle-aged (31–40 years), female, and married. Most participants were casually employed and held entry-level positions, with a significant proportion earning between PHP 20,001 and 30,000 monthly. These demographic traits provide essential context for interpreting findings on perceived stress and anxiety, as existing research has shown that middle-aged individuals may experience heightened stress due to reduced coping resources and increased burnout risk in remote work settings (Gómez-García et al., 2025)

Most respondents (96.32%) reported moderate levels of stress, with only a small percentage (3.07%) experiencing high stress. The mean score of 19.51

Table 1. Socio-Demographic Characteristics of Respondents by Age Gender, Marital Status, Parental Status, Employment Status, Job Level, and Income Range

Variable	Frequency (f)	Percentage (%)
Age		
20–30 years	33	19.08
31–40 years	81	46.82
41–50 years	47	27.17
51–60 years	12	6.94
Gender		
Male	67	38.73
Female	106	61.27
Marital Status		
Single	73	42.20
Married	90	52.02
Separated	3	1.73
Widowed	10	5.78
Parental Status		
With child/children	91	52.60
Without child	30	17.34
Not applicable	52	30.06
Employment Status		
Regular employee	54	31.21
Casual employee	95	54.91
Job order contractor	24	13.88
Job Level		
Entry-level	121	69.94
Mid-level (Supervisory)	42	24.28
Senior/Executive Level	10	5.78
Income Range		
Less than PHP 20,000	37	21.39
PHP 20,001–30,000	86	49.71
PHP 30,001–40,000	37	21.39
PHP 40,001–50,000	10	5.78
More than PHP 50,000	7	4.05

Table 2. Perceived Stress Levels of Respondents Based on PSS-10 Scores

Perceived Stress Level	Frequency (f)	Percentage (%)	Mean Score
Low Stress (0–13)	1	0.61	19.51
Moderate Stress (14–26)	157	96.32	
High Stress (27–36)	5	3.07	

Table 3. Anxiety Levels of Respondents Based on GAD-7

Anxiety Level	Frequency (f)	Percentage (%)	Mean Score
None to Low Risk (0–5)	66	40.49	6.83
Mild (6–10)	81	49.69	
Moderate (11–15)	15	9.20	
Severe (16–21)	1	0.61	

Table 4. Selected Correlation Between Socio-Demographic Factors and Stress/Anxiety Levels

Socio-Demographic Factor	Outcome Variable	χ^2 (Chi-Square)	P-value	Significance
age	Perceived stress	2.04	0.562	Not significant
gender	Anxiety levels	1.39	0.491	Not significant
Marital Staus	Perceived stress	2.87	0.324	Not significant
Monthly Income	Anxiety levels	1.12	0.731	Not significant

on the Perceived Stress Scale (PSS) indicates that, on average, participants experienced moderate perceived stress. This finding aligns with previous research indicating that government employees frequently encounter moderate stress levels due to heavy workloads, organizational demands, and bureaucratic constraints (Ganster & Rosen, 2013).

Moderate stress levels can be explained by the nature of public sector work, which often involves high responsibility but limited autonomy (Bakker & Demerouti, 2017). Additionally, government employees are expected to meet strict performance targets while managing scarce resources, contributing to consistent but manageable stress. Similar patterns were observed in a study by Sharma and Cooper (2016), which found that public sector workers in Southeast Asia commonly experience moderate stress levels related to workload pressures and institutional expectations.

Moreover, moderate perceived stress may also reflect adaptive coping mechanisms among employees. As Lazarus and Folkman's (1984) Transactional Model of Stress and Coping suggests, stress levels are influenced not only by external demands but also by how individuals appraise and manage these demands. In this study, the prevalence of moderate stress suggests that employees may possess adequate coping strategies to buffer against extreme distress, though sustained exposure to stressors could still negatively affect well-being and productivity if not addressed (Huang et al., 2020).

A significant portion of respondents (49.69%) experienced mild anxiety, while 40.49% had none to low anxiety. Only a small percentage reported moderate to severe anxiety. These results highlight that anxiety was present but predominantly mild in severity.

Selected Correlations Between Socio-Demographic Factors and Stress/Anxiety Levels

The relationships between selected socio-demographic factors and the respondents' perceived stress and anxiety levels were analyzed using the Chi-square (χ^2) test. As shown in Table 4, age and marital status were tested for their association with perceived stress, while gender and monthly income were tested for their association with anxiety levels. None of the examined associations were found to be statistically significant ($p > 0.05$). This suggests that within this sample, the selected socio-demographic factors did not significantlyinfluence respondents' perceived stress or anxiety levels.

Discussion

The primary aim of this study was to assess the perceived levels of stress and anxiety among government employees in remote work arrangements and to explore the relationship between socio-demographic factors (e.g., age, gender, marital status, income) and these mental health outcomes. This discussion interprets the results in light of these objectives and compares the findings with existing literature.

Perceived Levels of Stress and Anxiety

The findings revealed that the majority of government employees (96.32%) experienced moderate stress levels, with only 3.07% reporting high stress. These results align with studies indicating heightened stress levels during periods of workplace transitions and changes in work environments (Van Zoonen et al., 2021). The moderate stress levels observed in this study may be attributed to the sudden transition to remote work, which often comes with challenges such as technological adjustments, isolation, and blurred boundaries between work and personal life (Febriyanti & Mellu, 2020; Antara et al., 2022).

Similarly, the results from the GAD-7 assessment showed that nearly half (49.69%) of respondents experienced mild anxiety, with a smaller percentage reporting moderate (9.20%) and severe anxiety (0.61%). These findings are consistent with broader research on workplace stress, which highlights the psychological impact of adapting to new work arrangements, particularly in roles involving high levels of interaction and collaboration (Wang et al., 2020). The prevalence of mild anxiety suggests that while government employees experienced psychological distress, it was largely manageable and did not escalate to clinical levels for most participants. However, even mild anxiety can affect job performance and overall well-being if left unaddressed (Hayes et al., 2021).

Selected Socio-Demographic Factors and Stress/Anxiety Levels

The chi-square test results indicated no significant associations between socio-demographic factors—such as age, gender, marital status, and income—and participants' perceived stress or anxiety levels. As shown in Table 4, all p-values exceeded the commonly accepted threshold for statistical significance ($p < .05$), suggesting that these demographic variables did not substantially influence mental health outcomes in this study.

These findings imply that external and situational factors, rather than inherent individual characteristics, may play a more crucial role in shaping psychological responses. Previous studies have similarly highlighted that work-related demands, organizational pressures, and the challenges of remote work often exert stronger effects on stress and anxiety levels compared to socio-demographic variables (Giorgi et al., 2020; Kniffin et al., 2021).

For example, Giorgi et al. (2020) found that pandemic-driven occupational uncertainties significantly heightened stress levels across different age groups and income brackets, indicating that external stressors can overshadow individual differences. Similarly, Kniffin et al. (2021) reported that remote work challenges—including increased workloads, blurred work-life boundaries, and reduced social interactions—contributed more to employee anxiety than personal demographic profiles.

Thus, the lack of significant relationships in this study underscores the importance of considering environmental and contextual factors, such as workplace conditions and remote work challenges, when designing interventions aimed at improving employee well-being.

Impact of Remote Work on Mental Health

The results of this study highlight remote work as a potential source of stress and anxiety for government employees, consistent with broader research on remote work environments. Factors such as unclear work expectations, difficulty maintaining work-life balance, and reduced social interaction were likely contributors to the moderate stress and mild anxiety levels observed (Birtus & Lăzăroiu, 2021). For government employees, who often rely on in-person interactions to perform their duties, the shift to remote work can exacerbate feelings of isolation and disconnection (Hayes et al., 2021).

The findings suggest that organizational interventions, such as providing clear communication, improving access to technological resources, and fostering virtual social connections, could significantly alleviate stress and anxiety. Studies have shown that structured remote work policies, coupled with mental health resources, can improve employee satisfaction and well-being (Mahmoud et al., 2021).

Implications for Future Research and Policy

This study underscores the importance of developing workplace policies and support systems that address the unique challenges of remote work. As remote work becomes increasingly common in government and other sectors, future research should focus on the long-term psychological effects of such arrangements. Additionally, it is essential to explore how factors such as organizational culture, leadership styles, and technology use can mitigate workplace stress and promote employee well-being (Krug et al., 2021).

Further research could also investigate individual coping mechanisms and social support systems that help employees navigate the psychological demands of remote work. Understanding these dynamics will help organizations implement evidence-based strategies to foster resilience and ensure the mental health of their workforce.

Conclusions

This study found that most government employees experienced moderate stress and mild anxiety while working remotely, with no significant associations between socio-demographic factors and these outcomes. These findings suggest that work-related challenges—such as increased job demands, technological issues, and blurred work-life boundaries—rather than personal characteristics, play a greater role in influencing employees' psychological well-being (Kniffin et al., 2021; Oakman et al., 2020). To address this, organizations should strengthen mental health support, implement clear remote work policies, and foster open communication to promote employee resilience and productivity (Bakker & Demerouti, 2017; Toscano & Zappalà, 2020).

Declaration of Interest

The authors declare that they have no conflict of interest in the publication of this study. The design, implementation, and analysis of the research were conducted independently, with no financial or personal interests influencing the results. The authors confirm that there were no external funding sources or commercial relationships that might have influenced the outcomes of this study. All authors have approved the final manuscript and have contributed to the study in a manner consistent with academic integrity.

Acknowledgment

I am deeply grateful to God for the strength and wisdom to complete this study. My sincere thanks to my advisor, Dr. Myra D. Oruga, for her invaluable guidance and support. I also appreciate my thesis committee for their constructive feedback during my defense. Lastly, I am thankful to my family—my husband, Francis Louie D. Inciong, and my daughters, Francesca Louisse V. Inciong and Annicka Charlotte V. Inciong—for their constant support and encouragement.

Funding

This is a self funded project

Data Availability

The data supporting the findings of this study are available upon reasonable request to the corresponding author. The data includes de-identified information collected from participants, which are stored securely in accordance with ethical guidelines to ensure privacy and confidentiality. Access to the dataset will be provided after appropriate approval from the relevant ethical review board.

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Factors associated with type 2 diabetes mellitus in older adults living in Coastal Areas: Implications for community nursing practice

La Ode Hidayat ZI[1,2]*, Sri Susanty[3], Suhadi Suhadi[4]

[1] Magister of Public Health Study Program, Faculty of Public Health, Halu Oleo University, Kendari, Indonesia.
[2] Puskesmas Sampolawa, South Buton Regency Health Office, Southeast Sulawesi Province, Indonesia
[3] Nurse Professional Education Study Program, Faculty of Medicine, Halu Oleo University, Kendari, Indonesia
[4] Public Health Study Program, Faculty of Public Health, Halu Oleo University, Kendari, Indonesia

Abstract

Background: Indonesia's growing older adult population is experiencing a rising burden of type 2 diabetes mellitus (T2DM). Coastal populations face unique risks, including limited health service access, dependence on fisheries-based livelihoods, and dietary patterns high in salt and low in fresh produce. These factors may heighten vulnerability to T2DM, yet remain underexplored.
Purpose: This study aimed to examine determinants of T2DM among older adults living in a coastal community.
Methods: A cross-sectional study was conducted with 86 older adults selected using purposive sampling between October 30 and December 14, 2024. Data were collected using demographic questionnaires, the Mini Nutritional Assessment (MNA), the Geriatric Depression Scale (GDS), and the Physical Activity Scale for the Elderly (PASE). Chi-square tests assessed associations between independent variables and T2DM, and variables with $p < 0.25$ were entered into multivariable logistic regression to identify significant predictors.
Results: Comorbidity ($p < 0.001$), nutritional status ($p = 0.001$), physical activity ($p < 0.001$), and depression ($p < 0.001$) were significantly associated with T2DM. In multivariable analysis, lower physical activity emerged as the strongest predictor (OR = 4.13, 95% CI: 1.18–14.48; Wald = 4.92; $p = 0.027$). Comorbidity (OR = 3.61), depression (OR = 3.64), and nutritional status (OR = 3.28) also remained significant independent factors.
Conclusion: T2DM among older adults in coastal areas was more likely in those with comorbidities, depressive symptoms, altered nutritional status, and especially low physical activity. These findings highlight the need for community-based nursing interventions emphasizing physical activity promotion, nutritional counseling, and depression screening to mitigate T2DM risk in vulnerable coastal populations

Keywords: community; older adults; T2DM

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 219-228

http://dx.doi.org/10.24198/jkp.v13i2.2767

Article Info

Received	: March 15, 2025
Revised	: August 17, 2025
Accepted	: August 28, 2025
Published	: August 30, 2025

***Corresponding author**

Sri Susanty*
Nurse Professional Education Study Program, Faculty of Medicine, Halu Oleo University, Kendari 93232, Indonesia; Address: Kampus Bumi Tridharma Anduonohu, Jalan H.E.A. Mokodompit, Kodya Kendari, Sulawesi Tenggara; Phone: 0401-3194163; E-mail: sri.susanty@uho.ac.id

Citation

Zi, L. O. H., Susanty, S., & Suhadi, S. (2025). Factors associated with type 2 diabetes mellitus in older adults living in Coastal Areas: Implications for community nursing practice. *Jurnal Keperawatan Padjadjaran, 13*(2), 219-228. http://dx.doi.org/10.24198/jkp.v13i2.2767

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Introduction

Global life expectancy is expected to increase from 73.6 years in 2022 to 78.1 years in 2050 (Institute for Health Metrics and Evaluation (IMHE), 2024). Life expectancy for female reaches 78.3 years, higher than for male (68.4 years) (Dattani & Rodés-Guirao, 2023). In Indonesia, increasing life expectancy has led to an increase in the elderly population, which has a significant impact on the health, social and economic aspects of the country (Central Bureau of Statistics (BPS), 2023). This reflects the success of the health sector accompanied by improved health services for older adults (Ministry of Coordinating Human Development and Culture of the Republic of Indonesia, 2021). Aging population, if managed properly, can be a demographic bonus if older adults remain healthy, active and productive. The main challenge faced is how to maintain the quality of life of the elders, considering that increasing age is often accompanied by physical and health decline (Central Bureau of Statistics (BPS), 2021, 2023).

Individuals who are 60 years old and above, commonly referred to as the older adults, who are experience the aging process (World Health Organization (WHO), 2024a), which includes both physical decline (Malik et al., 2024; Susanty et al., 2023) and changes in mental health (Susanty et al., 2022; Susanty et al., 2025). The World Health Organization (WHO) reported that, as of 2020, the global elderly population reached 1 billion and is expected to increase to 1.4 billion by 2050 (World Health Organization (WHO), 2024a). Southeast Asia is witnessing a similar trend, with the percentage of elderly individuals at 9.8% in 2017, projected to rise to 13.7% in 2030 and 20.3% in 2050 (World Health Organization (WHO), 2025). By 2022, the percentage of elderly individuals grew to 10.48%, and by 2023, it had risen to 11.75% (Central Bureau of Statistics (BPS), 2023). In Southeast Sulawesi Province, the elderly population stood at 7.67% in 2022, with 66.61% living in rural areas and 33.39% in urban locations; regarding gender, elderly males represented 49.21% while elderly females accounted for 50.79% (Central Bureau of Statistics (BPS) Southeast Sulawesi Province, 2022).

Older individuals frequently face intricate health issues, one of which is diabetes mellitus, necessitating continuous management to avert complications. Diabetes mellitus (DM) is a metabolic disorder defined by elevated blood glucose levels resulting from irregularities in insulin secretion or function (World Health Organization (WHO), 2024b). As per the American Diabetes Association, an individual is diagnosed with DM if their fasting blood glucose concentration is ≥ 126 mg/dL or the glucose level two hours post-meal is ≥ 200 mg/dL. DM arises when the pancreas fails to produce sufficient insulin or when the body is unable to effectively utilize the insulin produced (American Diabetes Association (ADA), 2013; World Health Organization (WHO), 2024b). According to a report by the International Diabetes Federation (IDF), the incidence of DM among individuals aged 60 and above stands at 17%, with projections estimating it will rise to 25% by 2045, and 90% of the elderly population worldwide is affected by type 2 DM (Internationa Diabetes Federation, 2021). In Indonesia, the prevalence of DM among older adults was reported 5.39% (Oktaviyani et al., 2022). Furthermore, the 2023 Indonesian Health Survey Report highlighted that DM in older adults was 18.1%, while type 2 DM was 51.7% (Ministry of Health of the Republic of Indonesia, 2023).

Several factors have been identified as associated with diabetes mellitus (DM), including age, sex, educational level, marital status, place of residence, and employment status (Oktaviyani et al., 2022). Socioeconomic and biodemographic characteristics such as lower educational attainment, family history of diabetes, obesity, and higher socioeconomic background have also been linked to increased risk of DM (Das & Kar, 2023). Among older adults, the presence of DM elevates the risk of serious health problems, including cardiovascular disease, visual impairment, and cognitive decline, particularly Alzheimer's disease and other forms of dementia (Chentli et al., 2015). Older adults living in coastal communities may face additional challenges, such as limited access to healthcare services and lifestyle patterns shaped by fisheries-based livelihoods and dietary practices, which may further increase their vulnerability to type 2 diabetes mellitus (T2DM). This study aimed to analyze the determinant factors associated with T2DM among older adults living in coastal areas.

Materials and Methods

Design

This quantitative study employed an observational analytical design with a cross-sectional approach

Sample and setting

The study population consisted of older adults aged 60 years and above residing in Buton, Indonesia, totaling 627 individuals (Central Statistics Agency of South Buton Regency, 2024). Among them, 298 were diagnosed with type 2 diabetes mellitus (T2DM). The sample was determined using purposive sampling, considering the characteristics of the target population. The sample size was calculated using Slovin's formula, assuming a 95% confidence level ($\alpha = 0.05$) and a 10% margin of error ($e = 0.10$), resulting in 86 participants. This estimate was cross-validated with Cochran's formula for proportions ($p = 0.5$) and finite-population correction, which produced a similar requirement of 86 participants. Eligible respondents were identified through records of older adults who had received services at Primary Health Centers via the Integrated Development Post, Elderly Service Post, and the Chronic Disease Management Program. Inclusion criteria were older adults aged ≥60 years, diagnosed with T2DM, willing to participate, cooperative, and able to communicate verbally. Exclusion criteria included those under 60 years, unwilling to participate, uncooperative, or unable to communicate verbally. Recruitment was carried out in collaboration with community health workers, and respondents were enrolled sequentially until the target sample size was achieved.

Instruments

Data were collected using anthropometric measurements, respondent characteristic forms, and validated questionnaires assessing nutritional status, physical activity, and depression. Weight and height were measured with a flexible measuring tape and standardized equipment. Respondent characteristics, including age, gender, marital status, education level, employment status, and family medical history, were obtained from medical records and confirmed through direct interviews with participants.

Nutritional status was assessed using the Mini Nutritional Assessment (MNA), developed by Guigoz, et al., (1994). The instrument has demonstrated high reliability (Cronbach's α = 0.83), sensitivity (96%), and specificity (98%) (Vellas et al., 2009). It consists of 15 items with a maximum score of 30. Scores between 17–30 indicate good nutrition, while scores <17 indicate malnutrition (Audaya et al., 2022).

Depression was measured using the Geriatric Depression Scale–Short Form (GDS-SF), developed by Yesavage et al., (1982). The GDS-SF has demonstrated strong psychometric properties (sensitivity 92%, specificity 89%) and good reliability in the Indonesian version (Cronbach's α = 0.80) (Susanty et al., 2024). The 15-item scale uses dichotomous ("Yes/No") responses, with higher scores indicating greater depressive symptoms.

Physical activity was measured using the Physical Activity Scale for the Elderly (PASE), developed by Washburn et al., (1993). The PASE demonstrated excellent reliability (Cronbach's α = 0.94) and consists of 10 items covering leisure, household, and volunteer activities. Responses are scored on a 4-point Likert scale (0–3). Scores ≥15 were categorized as good physical activity, while scores <15 indicated poor activity levels (Sari, 2022).

Data analysis

Data were analyzed using IBM SPSS Statistics for Mac, version 23.0 (IBM Corp., Armonk, NY, USA). Univariate analysis was performed to describe respondent characteristics, including age, family history of disease, gender, education level, employment status, and marital status, as well as independent variables (comorbidity, nutritional status, physical activity, and depression) and the dependent variable (type 2 diabetes mellitus). Results are presented as frequency distributions and percentages. Bivariate analysis was conducted using the Chi-square test with a significance level of α = 0.05 and a 95% confidence interval to assess associations between independent variables and T2DM. Variables with $p < 0.25$ were entered into multivariable analysis. Binary logistic regression was then used to identify independent predictors of T2DM.

Ethical consideration

Ethic research was perform from the South Buton District Health Service (No. 546/UN29.15.1.2/KM/2024), the Regional Research and Innovation Agency of Southeast Sulawesi Province (No. 070/3992/X/2024), and obtaining ethical approval from the Health Research Ethics Commission of the Association of Indonesian Public Health in Southeast Sulawesi (No. 060/UN29.15.1.2/KR/2025). We ask for consent from each participant in accordance with ethical research guidelines; informed consent was obtained prior to data collection, and participants were assured of confidentiality and their right to withdraw at any time. The total questionnaire consists of 43 items questions, with a duration of 25-30 minutes.

Results

Characteristics of respondents

Most respondents were in the young-old age group (60–69 years) and the majority were women. Many participants had low educational attainment, were unemployed, and relied on informal sources of livelihood. More than half demonstrated normal nutritional status, while low levels of physical activity were common. These demographic and socioeconomic characteristics reflect the typical profile of older adults residing in coastal communities, where reliance on fisheries, limited education, and restricted access to health services contribute to health vulnerabilities (Table 1).

The Chi-square test results indicated significant associations between several variables and the presence of type 2 diabetes mellitus in older adults. Comorbidity was significantly related to T2DM ($p < 0.001$), as were nutritional status ($p = 0.001$), physical activity ($p < 0.001$), and depression ($p < 0.001$). These findings suggest that older adults with comorbid conditions, poor nutritional status, lower physical activity, and depressive symptoms were more likely to experience T2DM (Table 2).

Multivariate logistic regression analysis

Multivariable logistic regression analysis demonstrated that comorbidity, nutritional status, physical activity, and depression were independently associated with the presence of type 2 diabetes mellitus in older adults. Among these, physical activity emerged as the strongest predictor. Older adults with low levels of physical activity had more than four times higher odds of developing T2DM compared with those who were more active (OR = 4.13, 95% CI: 1.18–14.48; Wald = 4.92; $p = 0.027$). Comorbidity (OR = 3.61, 95% CI: 1.06–12.29), nutritional status (OR = 3.28, 95% CI: 1.04–10.36), and depression (OR = 3.64, 95% CI: 1.12–11.77) also showed significant associations, highlighting the multifactorial nature of T2DM risk in this population. These findings underscore the importance of addressing not only physical activity but also comorbid conditions, nutrition, and mental health when designing community-based nursing interventions to reduce the burden of T2DM in older adults living in coastal communities (Table 3).

Table 1. Characteristics of respondent

Variable	Frequency (n)	Percentage (%)
Age		
60-69	79	91,9
70-79	5	5,8
≥ 80	2	2,3
Gender		
Male	25	29,1
Female	61	70.9
Family Medical History		
There are Sufferers	30	34,9
There are No Sufferers	56	65,1
Level of Education		
Not school	8	9,3
Elementary School	27	31,4
Junior High School	25	29,1
High School	22	25,6
University	4	4,7
Employment Status		
Working	35	40,7
Not Working	51	59,3
Marital status		
Married	41	47,7
Divorced	45	52,3
Not Married	-	-
Comorbidity		
Yes	42	48,8
No	44	51,2
Nutritional status		
Normal	46	53,5
Malnutrition	40	46,5
Physical Activity		
Poor	46	53,5
Good	40	46,5
Depression		
Yes	36	41,9
Normal	50	58,1

Discussion

Characteristics of respondent

The majority of respondents in this study were in the young-old age group (60–69 years), comprising 79 participants (91.9%), with a predominance of females (70.9%). This finding underscores the vulnerability of older adults in the early stages of aging to type 2 diabetes mellitus (T2DM). Our results are consistent with Azadbakht et al. (2020), who reported a mean age of 68.38 years (SD = 6.78) with more than half of participants being female (53.6%). The transition into the young-old stage is often accompanied by metabolic changes, including reduced pancreatic β-cell function, diminished mitochondrial activity in skeletal muscle, and increased insulin resistance. Advancing age is also associated with declining physical activity, sarcopenia, and impaired glucose regulation, all of which further heighten T2DM risk (Bellary et al., 2021). In women, hormonal changes during menopause, particularly declining estrogen and progesterone levels, exacerbate insulin

Table 2. Bivariate Analysis

Variable	Type 2 Diabetes Mellitus				Total		p value
	Yes		No				
	n	%	n	%	n	%	
Comorbidity							
Yes	31	73,8	11	26,2	42	100	<0.001
No	10	22,7	34	77,3	44	100	
Nutritional status							
Normal	27	67,5	13	32,5	40	100	0.001
Malnutrition	14	30,4	32	69,6	46	100	
Physical Activity							
Poor	34	73,9	12	26,1	46	100	<0.001
Good	7	17,5	33	82,5	40	100	
Depression							
Yes	28	77,8	8	22,2	36	100	<0.001
Normal	13	26,0	37	74,0	50	100	

Table 3. Analysis multivariate

Variables	Wald	Sig.	Exp(B)	95% Confidence Interval	
				Lower	Upper
Comorbidity	4.227	0.040	3.613	1.062	12.294
Nutritional status	4.078	0.043	3.275	1.036	10.360
Physical Activity	4.917	0.027	4.132	1.179	14.482
Depression	4.645	0.031	3.637	1.124	11.766

resistance and contribute to a higher risk of T2DM (Cerdas Pérez, 2023).

Most participants in this study did not report a family history of T2DM (65.1%). Nevertheless, family history remains an established risk factor, as demonstrated in other studies (Alharithy et al., 2018; Hao et al., 2022). Educational attainment among participants was generally low, which is consistent with findings from previous Indonesian studies. Limited education often contributes to low health literacy, impairing diabetes self-management and disease understanding (Rachmawati et al., 2019). In terms of employment, most respondents were unemployed, which is consistent with other studies involving older adults aged 60 years and above (Mutambudzi & Javed, 2016). Lack of employment or retirement may reduce daily physical activity, lowering tissue sensitivity to insulin and increasing T2DM risk. Additionally, a higher proportion of participants were divorced, a factor associated with reduced quality of life, higher stress, and increased vulnerability to depression. Stress and psychological distress can elevate cortisol and adrenaline levels, further contributing to insulin resistance and the development of T2DM (Sari et al., 2021).

Determinant factors

Our findings showed that nearly half of the older adult participants (48.8%) had comorbid conditions. Among those with type 2 diabetes mellitus (T2DM), many experienced multiple coexisting illnesses. This aligns with previous studies reporting a high prevalence of comorbidities such as hypertension, cerebrovascular disease, cardiovascular disease, and chronic kidney disease among older adults with T2DM (Kim et al., 2020). The presence of comorbidities complicates diabetes management, increases treatment burden, and elevates the risk of adverse outcomes, particularly in community-dwelling older adults (Huang, 2016; Markle-Reid et al., 2018). Furthermore, the interaction between T2DM and comorbidities may intensify metabolic dysregulation, resulting in poorer glycemic control and accelerating disease progression (Morley et al., 2017; Thaenpramun et al., 2024). These findings highlight the importance of comprehensive geriatric assessments and integrated, patient-centered care models that address both diabetes and coexisting conditions. Tailored nursing interventions focusing on multimorbidity management, medication adherence, and self-care support are crucial to improving health outcomes and quality of life in older adults with T2DM.

Nearly half of the older adult participants (46.5%) were malnourished, which is consistent with previous studies emphasizing the critical role of malnutrition as a risk factor for type 2 diabetes mellitus (T2DM) in older adults (Thaenpramun et al., 2024). Malnutrition may exacerbate metabolic dysregulation, impair glucose homeostasis, and accelerate the development and progression of diabetes. It has also been associated with rapid weight loss, poor health status, reduced physical activity, and inadequate food intake. Predictors such as male gender, albuminuria, and poor glycemic control have been linked to higher prevalence of malnutrition among older adults with T2DM (Junaid et al., 2022; Rashid et al., 2025).

At the physiological level, malnutrition can reduce adiponectin production due to fat tissue shrinkage, which disrupts glucose metabolism, promotes insulin resistance, and worsens systemic inflammation. These changes elevate pro-inflammatory cytokines, damage pancreatic β-cells, and contribute to hyperglycemia (Rajamanickam et al., 2020). Consequently, addressing malnutrition is essential for both prevention and treatment of T2DM in older adults. Incorporating routine nutritional assessments into diabetes care and implementing targeted dietary interventions, such as low-glycemic and low-phosphate nutritional strategies, may help reduce the risk and burden of T2DM in this population (Brown, 2020).

More than half of the older adult participants (53.5%) reported low levels of physical activity. Physical inactivity is a well-established risk factor for type 2 diabetes mellitus (T2DM) and has been consistently linked to adverse health outcomes in older adults (Kelly et al., 2016). Previous studies have also shown that physical inactivity contributes to increased medical costs associated with circulatory, endocrine, nutritional, and metabolic diseases (Kikuti-Koyama et al., 2019). Conversely, engaging in regular physical activity improves insulin sensitivity, enhances glucose metabolism, and reduces the risk of cardiovascular disease, which commonly coexists with T2DM in older populations. Promoting health literacy regarding the importance of maintaining regular, age-appropriate physical activity can play a significant role in reducing complications and lowering healthcare costs. These findings highlight the necessity of integrating physical activity promotion into diabetes management and prevention strategies for older adults, particularly those living in resource-limited coastal communities.

Depression was reported by 41.9% of older adult participants, consistent with evidence showing a strong link between depression and type 2 diabetes mellitus (T2DM) in older populations (Gao et al., 2025). Depression in individuals with T2DM can worsen glycemic control, reduce adherence to treatment regimens, and increase the risk of complications (Kim et al., 2019; Sirirak et al., 2022; Yang et al., 2023). The chronic stress of living with diabetes and its associated comorbidities may also contribute to the onset or exacerbation of depressive symptoms (Joseph & Golden, 2017). While some studies note that depression is more common among those with shorter disease duration and insulin-based therapy, older patients often present lower rates of depression compared to younger patients (Elnaem et al., 2025). These findings emphasize the importance of integrating routine mental health screening and psychosocial interventions into diabetes care for older adults, as addressing depression may improve both psychological well-being and diabetes outcomes.

This study further demonstrates that comorbidities, nutritional status, physical activity, and depression significantly influence the risk of T2DM in older adults. Among these, physical inactivity emerged as the most influential factor. Many older adults experience joint pain, muscle weakness, and bone deterioration, which limit mobility. Those previously engaged in physically demanding work, such as fishing or farming, often become less active after retirement due to loss of physical ability and social roles. Similar to earlier reports, inactivity is a major contributor to chronic disease (Booth et al., 2012). In coastal communities, this decline is compounded by seasonal livelihoods, environmental barriers, limited elderly-friendly exercise facilities, and low awareness of the benefits of physical activity. These findings underscore the need for community-based nursing interventions that promote safe and accessible physical activity, while also addressing nutrition and mental health, to reduce the burden of T2DM among older adults in coastal settings.

Nursing implication

This study contributes to nursing knowledge by providing new insights into how coastal living conditions shape risk factors for type 2 diabetes mellitus in older adults. The findings expand nursing theory by applying the Health Believe Model within a unique coastal context, highlighting how occupational transitions, limited health access, and sociocultural habits influence health behaviors. From a practice perspective, this study emphasizes the importance of community-based nursing intervention tailored to coastal populations, such as targeted health education, elderly-friendly physical activity programs, and psychosocial support strategies. Moreover, it underscores the critical role of nurses as advocates and health promoters in resource-limited coastal settings, bridging gaps between health services and vulnerable elderly communities. By integrating these elements, the study enriches nursing practice with evidence-based strategies for chronic disease prevention and exercise facilities, and high-salt diets further increase vulnerability. These findings justify the term coastal community by contextualizing T2DM risk within the unique socioeconomic management in under-researched populations.

Strengths and limmitations

This study provides novel insights into the influence of comorbidities, nutrition, physical activity, and psychological factors on type 2 diabetes mellitus among older adults in coastal communities. The focus on a coastal population is a strength, as this group is often underrepresented in previous research despite facing unique health vulnerabilities. The study also applied standardized instruments and involved direct community engagement, which increases the reliability and contextual relevance of the findings. However, the study has several limitations. First, the cross-sectional design does not allow for causal inferences between risk factors and diabetes incidence. Second, the sample size, although adequate, was limited to one coastal district, which may reduce generalizability to other coastal or inland populations. Third, self-reported measures of diet, physical activity, and psychological status may be subject to recall and reporting bias. Despite these limitations, the study provides important preliminary evidence to guide nursing practice and future research.

Conclusions

This study identified comorbidity, nutritional status, physical activity, and depression as significant factors associated with type 2 diabetes mellitus (T2DM) among older adults in South Buton Regency. Physical inactivity emerged as the strongest predictor, reflecting the influence of occupational transitions and environmental constraints unique to coastal communities. Strengthening early detection through routine screening and comprehensive interventions—such as education on balanced nutrition, promotion of physical activity, and stress management—is essential. Cross-sector collaboration should also be reinforced by optimizing existing programs, including the Integrated Service Post for Non-Communicable Diseases, Elderly Service Post, Home Care, and the Chronic Disease Management Program, to ensure continuous monitoring and support for older adults. These findings provide novel evidence on the critical role of physical activity in preventing and managing T2DM in coastal populations and highlight the need for community-based nursing strategies tailored to this vulnerable group.

Declaration of Interest

There is no conflict of interest

Acknowledgment

The authors would like to express their gratitude to all volunteers who participated in this study and health workers at the Sampolawa PHCs who facilitated the data collection process in this study.

Funding. None

Data Availability. The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Factors influencing the understanding of diabetic retinopathy complications amongindividuals with type 2diabetes mellitus: A qualitative study

Rif'atunnailah Mat Isa[1*], Chong Mei-Chan[2], Lee Wan Ling[2], Tajunisah Iqbal[3], Mohd Iman Saiful Suhardi[4], Thandar Soe@Sumaiyah Jamaludin[5]

[1] Department of Professional Nursing Studies, Kulliyyah of Nursing, International Islamic University Malaysia.
[2] Department of Nursing Science, Faculty of Medicine, Universiti Malaya, Malaysia.
[3] Department of Ophthalmology, Faculty of Medicine, Universiti Malaya, Malaysia.
[4] Department of Emergency Medicine, Kulliyyah of Medicine, International Islamic University Malaysia, Malaysia.
[5] Department of Medical Surgical Nursing, Kulliyyah of Nursing, International Islamic University Malaysia, Malaysia.

Jurnal Keperawatan Padjadjaran (JKP)

Volume 13(2), 229-236
© The Author(s) 2025
http://dx.doi.org/10.24198/jkp.v13i2.2650

Article Info

Received	: Nov 22, 2024
Revised	: August 24, 2025
Accepted	: August 24, 2025
Published	: August 30, 2025

***Corresponding author**

Rif'atunnailah Mat Isa*
Department of Professional Nursing Studies, Kulliyyah of Nursing, International Islamic University Malaysia, Bandar Indera Mahkota Campus, 25200 Kuantan, Pahang, Malaysia; Address: Jln Gombak, 53100 Kuala Lumpur, Selangor, Malaysia; Phone: +6014-8394518 ;E-mail: rifatunnailahmatisa@iium.edu.my

Citation

Isa, R. M., Mei-Chan, C., Ling, L. W., Iqbal, T., Suhardi, M. I., S., & Jamaludin, T. S. S. (2025). Factors influencing the understanding of diabetic retinopathy complications among individuals with type 2 diabetes mellitus: A qualitative study. *Jurnal Keperawatan Padjadjaran, 13*(2), 229-236. http://dx.doi.org/10.24198/jkp.v13i2.2650

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Theincidence of diabetes mellitus continues to rise steadily over the years, contributing to a significant increase in the risk of developing eye-related complications. The escalating burden of vision-related complications urge the early prevention measuresfor type 2diabetes mellituspopulation.
Purpose: Explore factors influencing the understanding of diabetic retinopathy among participants with type 2 diabetes mellitus who attended a diabetic clinic in a tertiary teaching hospital in Malaysia.
Methods: This study employed a descriptive qualitative design using purposive sampling. From March to April 2021, three focus group discussions ranging in length from 30 minutes to an hour were performed utilising a semi-structured interview guide conducted with nine participants (five women and four men) aged 35 to 65 visited the diabetic clinic. Participants included in the study were who had type 2 diabetes mellitus diagnosed after six months or more. Data retrieved was thematically analysed using ATLAS/ti software, following the qualitative data analysis stages.
Results:. Two themes emerged: challenges in practicing self-care and facilitating factors for health education. Subthemes within the challenges of practicing self-care included lack of knowledge about eye anatomy, changes in vision quality, concerns about medication intake, issues with glucose monitoring, challenges in nutritional management, and alternative practices. Subtheme for facilitating factors for health education included team work for giving health education, elements in diabetic retinopathy health education and teaching aid.
Conclusions: Despite the availability of health education materials in the clinical context, participants identified a need for greater depth in diabetic retinopathy implications. Future studies and efforts include developing educational programs.

Keywords: diabetes mellitus, type 2; diabetic retinopathy; focus groups; health education

Introduction

The rising prevalence of diabetic retinopathy (DR), a condition expected to affect an estimated 245 million people worldwide by 2045, underscores its significant potential to progress into sight-threatening diabetic retinopathy (STDR) (Burton et al., 2021). This advanced stage of the disease can lead to severe visual loss, profoundly diminishing an individual's quality of life and overall well-being. The projected increase from 162 million cases in 2019 to 245 million by 2045 not only highlights the growing public health burden but also reinforces the critical importance of prioritizing eye health as a cornerstone for achieving the Sustainable Development Goals (SDGs).

Visual impairment, particularly blindness, is associated with numerous adverse outcomes, including reduced independence, heightened safety risks, and a marked decline in quality of life. These factors collectively contribute to frailty, decreased productivity, and increased mortality rates. Among this group, the leading causes of distance vision impairment and blindness include cataract (94 million cases), uncorrected refractive error (88.4 million), age-related macular degeneration (8 million), glaucoma (7.7 million), and diabetic retinopathy (3.9 million). The most significant cause of near vision impairment is presbyopia, affecting approximately 826 million people (World Health Organization, 2023). These staggering statistics illustrate the urgent need for comprehensive public health interventions and sustainable policies to address the escalating burden of vision-related complications, particularly those stemming from DR.

The prevalence of diabetes mellitus (DM) in Southeast Asia is projected to double by 2025, highlighting the urgent need for targeted healthcare strategies (Internation Diabetes Federation Atlas, 2022). However, national data on diabetic retinopathy (DR) remains limited due to the absence of large-scale, population-based studies, which impedes comprehensive understanding and policy development. Asia, home to 60% of the global diabetic population, faces a staggering burden, with 22 million individuals suffering from blindness and 67 million experiencing low vision, much of which is preventable with early intervention (Wong et al., 2019).

In Malaysia, the prevalence of DR and sight-threatening diabetic retinopathy (STDR) is alarmingly high, further emphasizing the critical need for effective blindness prevention initiatives (Chew et al., 2018; Goh et al., 2010). Despite this provision of information regarding the macrovascular and microvascular complications of diabetes mellitus, there is a paucity of research examining the in-depth understanding of diabetic retinopathy toward the eye health among individuals with type 2 diabetes mellitus. This gap underscores the importance of exploring these aspects to inform the development of targeted strategies aimed at reducing DR risks, improving early detection, and preserving eye health on a national scale.

Objectives

This study sought to investigate existing knowledge and practices among this population, laying the foundation for evidence-based interventions to combat the rising burden of diabetes-related visual impairment.

Materials and Methods

Design

This study uses a qualitative design for need assessment for web-based health education. Focus Group Discussions (FGDs) were utilized as a qualitative research method to gather in-depth insights into participants' experiences, opinions, and perceptions (Creswell & Poth, 2018). This approach involves guided discussions among small groups of individuals, facilitated by a moderator to ensure a focused yet open exchange of ideas. FGDs are particularly effective in exploring complex issues as they allow participants to interact, build on each other's responses, and provide nuanced data reflecting collective and individual perspectives. In this study, FGDs served to bridge participants' experiences with scientific inquiry, generating rich, contextual qualitative data. This method aligns with contemporary practices in qualitative research, which emphasize understanding participant perceptions in their social and cultural contexts. The discussions were carefully planned and structured using a semi-structured guide, ensuring the inclusion of relevant themes while leaving room for emergent topics of interest (Nyumba et al., 2018).

Participants and Setting

This study was conducted at a tertiary teaching hospital located in Kuala Lumpur, Malaysia. Participants were recruited using purposive sampling technique. The inclusion criteria were participants living with type 2 diabetes mellitus (T2DM) at least six months diagnosed at the time of screening which conducted based on the stages of the diabetic retinopathy, while those with severe NPDR and proliferative diabetic retinopathy were excluded.

Three FGDs were conducted, each of it comprises of three participants. The FGD was conducted about 30 to one hour per session moderated by the researcher and assisted by the nurses to ensure smooth flow of the discussions and addressed any participants' concerns during the sessions. A semi-structured interview guide was used to facilitate the data collection process. The FGD sessions were audio-recorded.

Ethical consideration

This research was conducted when ethical approval obtained from the ethics committee, under the reference number 202068-8726.. In addition, formal permission was sought and granted from the Nursing Department to ensure compliance with institutional policies and to facilitate the smooth execution of the study. This dual approval process underscores the commitment to maintaining ethical integrity and adhering to established guidelines throughout the research.

Data collection

The study involved three focus groups, each with three participants, conducted by the researcher (female, nurse graduated with master degree) and assisted with two diabetic educators during focus group discussions. These sessions, lasting 30 minutes to an hour, provided in-depth insights into participants' experiences and perceptions prompted by an semi-guided interview guide using Malay language. The focus group discussions (FGDs) included brief personal remarks from participants before concluding (Nyumba et al., 2018; Braun and Clarke, 2019). Sessions were recorded and meticulously transcribed, capturing not just the verbal dialogue but also contextual elements like the environment, nonverbal cues, tone of voice, body language, and facial expressions, ensuring a comprehensive understanding of the participants' experiences. Data collected stop until reached data saturation. Table 1 provides the details of study participants. All FGDs were conducted by the PI between March 2021 and April 2021. The following inclusion and exclusion criteria were utilized:

Inclusion criteria

Participants living with type 2 diabetes mellitus diagnosed with Non-Proliferative Diabetic Retinopathy (NPDR) to mild NPDR with cognitive capability. The assessment process guided by the staging of diabetic retinopathy clinical practice guideline from Ministry of Health Malaysia and diagnosis given by ophthalmologist based on patient registry system.

Exclusion criteria

Participants living with type 2 diabetes mellitus who have blindness, bedridden and dementia with cognitive impairment.

Themes, patterns, and key concepts begin to repeat across different interviews or data sources. Once data saturation is reached, researchers halted data collection process.

Data analysis

All FGDs were recorded, transcribed, and translated into English from Malay language. The thematic analysis during the qualitative data analysis process was utilized (Lincoln and Guba, 2013), including (a) reading and re-reading the transcriptions for familiarization with the depth and breadth of the data; (b) data coding to generate initial codes; (c) developing the theme and subthemes based on descriptions; (d) reviewing the theme and subthemes; (e) defining and naming the theme and subthemes; and (f) writing the report.

The researcher used Microsoft Word to create the codebook and Atlas-ti software to organize the data and to create the coding framework to ensure accuracy in the coding process. In addition, the researcher and two more researchers (CMC, LWL) independently coded two transcriptions to enhance coding consistency. The transcripts were return to participants for cross checking the information before finalizing the theme.

Trustworthiness

The study's trustworthiness was ensured by considering credibility, transferability, confirmability, and dependability (O'Connor and Joffe, 2020; Lincoln and Guba, 2013). Credibility was achieved through the researcher's expertise and cultural understanding, with initial coding verified by the research team, including experienced coauthors. Transferability was ensured by collecting data from participants with varying diabetes mellitus diagnoses. To maintain confirmability, the researcher practiced reflexivity, conducting interviews in comfortable settings without influencing participants' responses. Dependability was ensured through rigorous, ongoing assessments by the research team. The study's two-step coding process, using both manual methods and Atlas-ti, and adherence to the Consolidated Criteria for Reporting Qualitative Research, support its replicability (O'connor and Joffe, 2020). The study followed COREQ guidelines, ensuring transparent reporting, rigorous analysis, and participant-centred insights through ethical, reflexive practices.

Results

The study's results identified two primary themes: Challenges in Practicing Self-Care and Facilitating Factors for Diabetic Retinopathy (DR) Health Education. Pseudonyms applied to ensure participants' privacy. This section presents a comprehensive summary of the main themes along with their corresponding subthemes, offering a clear and organized overview of the findings.

Theme: Challenges in the practice self-care

There are a few challenges in practicing self-care that elaborated in the subthemes.

Subtheme 1: Lack of information on eye anatomy

A few participants only had minimal knowledge of the outer structure of the eyes but not the inner structure and pathophysiology of the eyes.

"I know a bit about it but not sure the detail.." (PT1)

"I am not sure about it...I just know our outer structure only...might need more information on this..." (PT2)

"I am not sure about the inner structure, just know the outer layer of our eye structures..., I am not sure about it...the doctor explains to me but it's hard for me to digest... (giggling)" (PT4)

When the participants were asked about the changes in the inner anatomy of the eyes through the disease process, the participants looked confused. The excerpts below describe the statement.

"I know outer part but uncertain regarding inner issue..oo I see..there are difference..(mumbling and staring at fundus photo.."(PT3)

"Am not sure what it is..is it related to diabetes complication?...I think you should add on more on how the glucose affect the eye structure..also how I could take care more.." (PT4)

Generally, the participants were quite familiar with checking their vision using the vision chart. However, certain terms such as visual field and fundus camera procedure were unfamiliar to them. They might have undergone the procedure but are unfamiliar with the terms of the procedure.

" I am not sure..what is visual field? I usually read the alphabet..and then the nurses snap my both.." (PT3)

"...hmm. I am not sure...maybe just want to see my eyes problem...I don't really know about it. also I don't know the fundus photo on that board" (PT6)

"I am not sure about that..I know about eye screening.. checking my power for spectacle..like that la" (PT1)

Hence, the emphasis is to improve their knowledge and prevent confusion due to the difference between the layman and scientific terms of the procedure or instrument included in health education.

Subtheme 2: Altered quality of vision issues

Participants reported altered vision quality due to diabetes, affecting daily activities. They faced difficulties with reading small text, watching TV, and driving at night, reflecting significant impairments in visual health. These issues underscore the need for effective diabetes management and regular eye care to maintain quality of life.

"For reading, I have to wear glasses especially small letters and reading subtitles on the television… Sometimes, I experienced black line in my visual field..but it faded away.." (PT2)

"I am far-sighted person..so I need to wear spectacles while driving and traveling" (PT1)

"I think now I must change my spectacle... because you know, my power keeps changing. I have to wear my glasses while reading.. , Sometimes I can see the big letters but small letters quite difficult without glasses.."(PT5)

The issue of being short-sighted or near-sighted was commonly recognized among the participants , and they understood that wearing glasses was a typical solution. Consequently, they were conscious of the need to reassess their prescription strength when they noticed a decline in their vision quality. The following excerpts illustrate their concerns regarding this matter.

"But I need to wear glasses to read small letters. Now I feel no changes in my power, no problem driving during day but some difficulty during night" (PT6)

"I wear spectacles for long time ago for driving but it needs rechecking on my power" (PT4)

However, there was a participant diagnosed with type 2 diabetes mellitus on top of the migraine problem. This makes the participant situation worsen with the glaring issue.

" I have glare issue and diagnosed with diabetes mellitus..and also have migraine issue under neuro-medicine.." (PT6)

Thus, the visual-related changes become a liability for most of the participants .

Subtheme 3: Medication consumption issues

Most of the participants were compliance with medication regime but some of the participants forgot to take the medication on time. These excerpts detail on the participants' experience,

"I have diagnosed with diabetes for 7 years ago.. so now I am taking oral medication..but sometime I forgot.." (PT2)

"I am taking tablet medication as ordered." (PT1)

"I take oral mediation regularly for the time being..sometimes, I forgot to eat the medication.." (PT6)

However, one participant blatantly revealed that he modified by reduce the dosage of his medication because of the side effect which affect the effectiveness of the drug.

"After take two tablets, I felt nauseated...so I took half half only as advice by my daughter..." (PT5)

Hence, medication intake should become a routine to participants living with type 2 diabetes mellitus to enhance their health quality.

Subtheme 4: Glucose monitoring issue

While exploring the glucose monitoring issue among the participants, a few participants own a blood monitoring device and they self-monitor their glucose level at least once a week at home.

"...monitor my glucose at home...last week only" (PT5)

"Check my blood glucose level once a week" (PT3)

Most of the participants monitor their blood glucose levels during the routine checkup and at the nearest pharmacy. However, during the pandemic phase, they seldomly monitor their blood glucose level due to the COVID restrictions.

"No, I did not have it..I just go to nearby pharmacy to check my glucose level.." (PT2)

"No I don't have at home..sometimes, I check at pharmacy sometimes..but due to covid I rarely check i…I checked last night 9.0 but this morning 7 I think..why aa my glucose quite high at night?.. Yes sometimes..but I am not sure is it normal or not" (PT1)

"I seldomly check my blood glucose..usually the reading between 6 to 9.." (PT6)

Although there are many challenges in monitoring blood glucose levels, most of the participants are aware that they must check their blood glucose level at least weekly and adhere to their regular hospital follow-ups to maintain optimal glucose levels.

Subtheme 5: Dietary management issues

A range of diverse dietary patterns were observed among the participants. Some of the participants honestly admitted to eating rice, bread, and drinking tea, while others followed the dietitian's advice to control their glucose levels.

"During my breakfast, I do eat rice, bread with tea..during lunch depends, sometimes I ate rice.. I just took plain milo at night la..sometimes three times per day I just took milo..but doctor asked… They asked me to take goat milk..so I just started it" (PT5)

"Currently, I have no appetite...I just took my breakfast but delay in taking my lunch and dinner" (PT3)

However, some participants control their rice intake as low as twice monthly. They also reported having appetite loss especially sugary-based food.

"Rice contains high sugar, so I took twice monthly..I don't like to eat roti canai dan teh Tarik.. but sometimes I ate less because no appetite" (PT6)

"I did not eat sugary food..even my friend persuade me to eat ice cream, I also refuse..i am very careful.." (PT7)

The participants actively applied knowledge from dietitian consultations and medical advice to maintain a balanced diet, demonstrating an understanding of their condition and a commitment to adhering to dietary guidelines.

Subtheme 6: Alternative practices

For alternative practices, some participants take vitamin supplements and herbal treatments to enhance their healing process.

" I take vitamin supplement to boost my energy.. (PT4)

"Sometimes, I asked by my friends to try *traditional supplement such as 'root (akar kayu)' and herbal treatment.."* (PT3)

Furthermore, the participants engaged in activities like brisk walking and yoga to alleviate stress. Many of the female participants chose to do household chores as a form of daily exercise to stay active. However, one participant mentioned that a spinal degeneration condition had interrupted her regular exercise regimen.

"..but sometimes I did perform yoga to release my stress.." (PT4)

" For the time being, I just perform yoga" (PT2)

" I rarely do my exercise because of my spinal degeneration long time ago, so it was painful if I do.."(PT3)

Therefore, the incorporation of contemporary and alternative methods to divert the attention from the disease process motivated them to tune in to new activities.

Theme: Facilitating factors for health education

Several enabling factors for health education were identified during the FGDs, including teamwork, components of diabetic retinopathy education, and the usage of teaching aids.

Subtheme 1: Team work for giving health education

The participants consistently attended their clinic appointments, adhering as closely as possible to the doctor's recommendations and guidance. In these sessions, the doctor discussed their current health status and outlined the treatment plans.

"Yes I follow what doctor prescribed..I take before meal.." (PT4)

"..just follow whatever doctor said to me" (PT8)

However, some participants expressed difficulty in understanding the explanations provided. They mentioned awaiting further clarification during consultations with doctors and dietitians.

"I am not sure about it..the doctor explain to me but it's hard for me to digest.."(PT9)

As a result, to encourage the implementation of best practices and provide information to participants , healthcare professionals must support them.

Subtheme 2: Elements in diabetic retinopathy health education

Participants suggested several key elements for inclusion in diabetic retinopathy (DR) health education. These include a detailed explanation of the eye's internal structure, an understanding of how glucose levels impact eye health, and a focus on interpreting fundus images. These aspects should be emphasized during educational sessions.

" I think you should add on more on how the glucose affect the eye structure.."(PT9)

"Yes sure, it might help me to improve my knowledge about my eye health" (PT4)

I know outer part but uncertain regarding inner issue..oo I see..there are difference..(mumbling and staring at fundus photo..).. (PT5)

These components must be included in the health education materials that were given to the participants.

Subtheme 3: Teaching aid

Multiple educational aids were recognized as helpful in providing information to participants, including brochures, videos, and eye models. The usage of graphical presentations, featuring vivid colours and straightforward layouts, was particularly effective in helping participants understand and retain the information.

"Yes, I got brochure sometimes..what I love is the graphical information that I can benefit from it. It captures my sight if the colour is bright and simple layout to see the information.." (PT1)

" It captures my sight if the colour is bright and simple layout to see the information"(PT4)

Diabetes mellitus information and ophthalmology procedures such as laser video being shared in the television during the waiting time indirectly helps the participants to understand the disease and procedures.

"We have video playing in the laser room and in the waiting area.. so that the participants will look at.."(PT6)

Besides, the eye model with additional information and the image from the computer eases the explanation process during the doctor's consultation session.

"..during consultation with the doctor, he show me the eye model..I could understand that.. . images also shown in the computer allow me to show all the image.." (PT1)

Discussion

Theme 1: Challenges in Practicing Self-Care

This study's findings indicate that participants face challenges in practising diabetes self-care, yet they demonstrate awareness of diabetic ocular complications. According to American Association of Diabetes Educators (2020), effective self-care management includes adherence to prescribed medication, exploration of alternative treatment methods, dietary improvement through appropriate food choices, recognition of the importance of regular exercise, vigilance towards diabetes symptoms, effective stress management, and acceptance of available support systems. This study in line with the Meng et al. (2016) and Stewart and Shamdasani (2014) which stated that participants' perceptions of the benefits derived from diabetes-related self-care activities significantly influence their dedication to self-care (Stewart and Shamdasani, 2014). Perceived benefits, central to the Health Belief Model, motivate lifestyle changes by highlighting positive outcomes of adopting healthier behaviours. In addition, people with diabetes learn based on their capacity and relate beliefs relying on subjective measurement (Huang et al., 2015).

The finding from Moura et al. (2019) indicate that the people living with type 2 diabetes mellitus possess a moderate understanding of diabetes, diet, and physical activity. Notably, one-fifth of diabetic participants exhibited poor level of knowledge, with female participants generally less informed than their male counterparts. Additionally, a significant positive correlation was observed between participants' attitudes and their quality of life scores. Moreover, a moderate level of health-related quality of life was reported among the participants.

Hence, modifying lifestyle factors such as self-care management education, nutrition interventions to healthy eating, increasing physical activity, periodic screening of participants and determining the main modifiable risk factors of chronic diseases can be considered efficient approaches to achieving the goals (Zarkogianni et al., 2015).

Theme 2: Facilitating Factors for Diabetic Retinopathy (DR) Health Education

The participants consult physicians regularly and undergo annual eye examinations. This is influenced by the participants' diabetic education. This was supported by Murray et al. (2019) stated that attending education program was associated with increased visits to the ophthalmologist. The patients become empowered because of clear insights into eye health through fundus photography (Moinul et al., 2020, Moura et al., 2019, Khalaf et al., 2019). This was supported by Li et al. (2020) found that 20% of participants that undergo fundus examination requested more information on serious effects of type 2 diabetes mellitus.

Additionally, participants valued free online education for diabetes self-management, especially as diabetic retinopathy is often overlooked by healthcare providers. The use of internet-based resources enhances patient support and engagement. Thus, the access to information and healthcare services, effective communication with healthcare professionals, and engaging in activities to manage the disease are crucial (FItzpatrick, 2023).

Besides, family support plays a vital role in enhancing participants' understanding and management of their condition. In the cultural context, family support strengthens shared responsibility, aligns with communal values, and promotes learning, decision-making, and action in diabetes care (Ligita et al., 2020). This can be enhanced by sharing stories or experiences and information related to diabetes with each others and their caregivers via electronic mediums such as social media (Zarkogianni et al., 2015) and mobile application (American Association of Diabetes Educators, 2020).

Strength of the study

This study serves as a foundation for investigating the diabetic retinopathy issue through the knowledge and practice of eye care among individuals living with type 2 diabetes mellitus.

Nursing Implication

This study identifies key factors affecting how individuals with Type 2 Diabetes Mellitus understand diabetic retinopathy complications. It reveals significant barriers to effective self-management and early intervention, such as gaps in knowledge and misconceptions. The findings highlight the need for customized educational strategies and improved communication between healthcare providers including nurses and patients. Addressing these issues can increase patient awareness, encourage timely treatment, and potentially reduce the risk of severe diabetic retinopathy. Overall, the research provides valuable insights for developing targeted interventions to better support patients in managing their condition and preventing vision-related complications.

Limitation of the study

The data was limited to single setting, potentially affecting the generalization of the findings. Another limitation was the limited interaction time with participants during clinic sessions, restricted to just an hour. However, the rapport maintain through online interaction.

Conclusions

In conclusion, the study emphasizes the need for tailored diabetic retinopathy education for type 2 diabetes patients, focusing on effective communication, regular eye exams, and proper diabetes management. Leveraging digital tools and adapting to cultural needs is essential. Continuous program evaluation and institutional care procedures are vital for improving patient outcomes and eye health. Future research should explore diverse locations and participants to identify therapy effectiveness across different groups. In Malaysia, studies on diabetic eye conditions, hypertension, viral eye diseases, and AI-based diagnostics are needed. Retrospective hospital data analysis and research on eye health in children and young adults should also be conducted

Declaration of Interest

No potential conflict of interest was reported by the author(s).

Acknowledgment

The authors would like to express their heartfelt gratitude to all the participants who generously shared their time and experiences, contributing invaluable insights to this study. Special thanks are extended to the research team members for their unwavering support and dedication throughout the research process. The authors also acknowledge the university for providing the necessary resources, guidance, and institutional support that made this study possible.

Funding

The authors reported there is no funding associated with the work featured in this article.

Data Availability

The datasets generated and analysed during this study are not publicly available due to confidentiality agreements with participants and ethical restrictions. However, they are available from the corresponding author upon reasonable request and with approval from the relevant ethics committee.

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p-ISSN : 2338-5324 e-ISSN: 2442-7276

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p-ISSN : 2338-5324 e-ISSN: 2442-7276

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Thanks to the excellent cooperation for supporting the Jurnal Keperawatan Padjadjaran