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Editorial

The unsung heroes in the fight to end HIV: The role of nurses in Indonesia

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Abstract

Reporting of new HIV cases persistin Indonesia. Althoughsignificant progress has been made in the prevention and control HIV , but Indonesia continues to face significant challenges in its fight against HIV. Continued efforts to expand treatment, reduce stigma, and strengthen prevention initiatives by involving health care workers and all stakeholders are essential to controlling the epidemic and improving the lives of those affected by HIV in the country. As a health care worker, Nurses are central to the country's efforts to control and eventually end the HIV epidemic. Their roles are diverse and impactful, ranging from direct patient care to community outreach, education, and policy advocacy. As Indonesia continues to face challenges in its HIV response, the contributions of nurses will remain essential in overcoming these barriers and improving the lives of those affected by HIV.

Keywords: fight; heroes; HIV; Indonesia; nurses

HIV-related Challenges in Indonesia

HIV remains a major public health concern worldwide, including in Indonesia. The country has one of the fastest-growing HIV epidemics in Asia. The number of people living with HIV (PLHIV) has been steadily increasing, with an estimated 570,000 people by 2023 (UNAIDS, 2023). The HIV epidemic is concentrated among key populations, including men who have sex with men (MSM), people who inject drugs (PWID), sex workers, and transgender individuals (Johnston et al., 2021). These groups face higher risks of infection due to a combination of social stigma, discrimination, and limited access to healthcare services. Challenges remain exist in tackle HIV in Indonesia, including: 1) Stigma and Discrimination: Social stigma and discrimination against people living with HIV and those from key affected populations remain significant barriers to accessing testing, treatment, and care (Nursalam et al., 2022). This stigma often leads to late diagnosis and delayed treatment, worsening health outcomes; 2) Limited Access to Healthcare: In some regions, particularly in remote and rural areas, access to HIV testing and treatment services is still limited (Ibrahim et al., 2023; Jocelyn et al., 2024; Mulyawijaya et al., 2022). This is compounded by a lack of trained healthcare workers and infrastructure; 3) Low Treatment Coverage: Despite efforts to expand access to antiretroviral therapy (ART), coverage remains low. As of 2023, only about 32% of people living with HIV in Indonesia were receiving ART (UNAIDS, 2023). This low coverage is partly due to gaps in the healthcare system, stigma, and logistical challenges in delivering services; 4) High Rates of HIV Among Youth: Although the highest proportion of People Living with HIV was 25-49 years ages, there has been an alarming rise in HIV cases among young people aged 15-24, driven by risky behaviors, lack of education on sexual health, and insufficient access to prevention services (Ministry of Health of the Republic of Indonesia, 2023).

Nurses' Role and Contribution

Nurses in Indonesia play a pivotal role in the control and management of HIV, especially given the unique challenges the country faces, such as geographic diversity, stigma, and limited healthcare infrastructure. Nurses

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have been contributing to HIV control in, but not limited to, several areas:

Prevention and Education

Nurses are at the forefront of educating communities about HIV prevention, safe sexual practices, and the importance of regular testing. They conduct outreach programs in schools, workplaces, and community centers, tailoring their messages to local cultural contexts. Nurses provide pre- and post-test counseling, helping individuals understand their risk factors and the implications of their HIV status. This counseling is crucial in encouraging people to get tested and in reducing fear and stigma. Nurses often participate in or lead awareness campaigns aimed at reducing stigma associated with HIV. These campaigns may include distributing educational materials, hosting community dialogues, and using local media to spread accurate information about HIV.

Testing and Early Diagnosis

Nurses administer HIV tests in clinics, hospitals, and community settings, often being the first point of contact for individuals getting tested. They ensure that testing is done confidentially and with sensitivity to the patient’s needs. In remote and underserved areas, nurses work in mobile testing units to reach populations that might not otherwise have access to healthcare services. This is particularly important in Indonesia’s vast archipelago, where many communities are isolated. After diagnosing HIV, nurses play a key role in linking individuals to appropriate care services, ensuring they receive the necessary support to begin and adhere to treatment.

Treatment and Care Management

Nurses are essential in initiating and managing ART for people living with HIV. They monitor patients for side effects, manage drug interactions, and provide ongoing support to ensure adherence to the treatment regimen. Nurses often coordinate care between different services, such as linking HIV treatment with other necessary medical care, including treatment for opportunistic infections like tuberculosis, which is common in people with HIV. Given that HIV is a lifelong condition, nurses help patients manage their health over the long term, providing support for issues such as mental health, nutrition, and other chronic conditions that may arise.

Patient Advocacy and Support

Nurses advocate for the needs of people living with HIV within the healthcare system, helping them navigate bureaucratic challenges and access the full range of services they need. Nurses often provide the emotional and psychological support necessary for patients to cope with the diagnosis and ongoing challenges of living with HIV. This support is crucial in reducing dropout rates from treatment programs. Nurses may facilitate or coordinate support groups for people living with HIV, creating a safe space for individuals to share their experiences, gain peer support, and learn from each other.

Community Engagement

Nurses collaborate with community leaders, NGOs, and other stakeholders to implement HIV control programs that are culturally appropriate and tailored to the specific needs of different regions in Indonesia. Nurses work to reach key affected populations, such as men who have sex with men (MSM), sex workers, and people who inject drugs (PWID). They often provide targeted interventions, such as harm reduction programs and condom distribution, to these groups. In some regions, nurses provide home-based care to individuals living with HIV, particularly those who may not be able to regularly visit health facilities due to mobility issues or stigma.

Training and Capacity Building

Nurses are involved in training other healthcare workers on HIV-related issues, ensuring that there is a well-informed and competent workforce across the healthcare system. In areas with a shortage of doctors, nurses take on expanded roles in HIV care, a practice known as task shifting. This includes responsibilities like initiating ART and managing treatment, which are critical in extending care to more patients. Nurses themselves receive ongoing training to stay updated on the latest HIV treatment protocols, public health strategies, and patient management techniques.

Policy and Program Implementation

Policy Advocacy: Nurses contribute to policy development at local and national levels, advocating for policies that support HIV prevention, treatment, and care. They provide insights based on their frontline experience, which is invaluable in shaping effective HIV strategies. Nurses are involved in implementing national and regional HIV programs, such as the National AIDS Strategy, ensuring that these programs reach the communities most in need.

Addressing Stigma and Discrimination

Nurses actively work to reduce stigma and discrimination against people living with HIV, both within healthcare settings and in the broader community. This is critical in improving access to testing and treatment. Nurses promote inclusive care practices that respect the dignity of all patients, regardless of their HIV status, sexual orientation, or lifestyle choices.

The Road Ahead

The role of nurses in the fight against HIV will only become more critical in the future. With advancements in treatment and prevention, there is hope that the HIV epidemic will be ended within our lifetimes. But this will only be possible if there is continuing effort to support and empower nurses in their work. This means investing in their education, providing them with the resources they need, and recognizing the vital contributions they make to public health. In the fight to end HIV, nurses are not just participants—they are leaders, advocates, and warriors. Their work saves lives, and their impact is felt across communities, countries, and continents. Their dedication, compassion, and expertise are the foundation upon which a future free of HIV will be built.

Declaration of Interest

None to declare

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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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More with document work, less with patient care: An institutional ethnography of discharge planning practices for diabetic patients

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Abstract

Background: Diabetic patients required comprehensive discharge planning. However, this is a complex and challenging process. Nurses play significant roles and experience tensions in operating the everyday discharge planning practices.
Purpose: to explore how nurses' everyday activities in providing DP for diabetic patients were regulated by the ruling relations operating in the hospital as an institutional context.
Methods: This institutional ethnography study applied phone-call interviews with 18 participants, participant observation, and document review to collect the data. Data analysis was concurrently conducted with the data collection processes following the institutional ethnography analytical approach. Trustworthiness was established.
Results: The everyday discharge planning practices for diabetic patients follow the flow of patient care. Nurses perceived these practices to be problematic as the initial assessment form did not guide the discharge education, which was informal and unstructured, and documentation was burdensome. The hospital accreditation, nurse ward manager, and the registered nurse were identified as the ruling relations that regulate those practices through the hospitals' standards and forms, monitoring, and completeness principle.
Conclusion: The hospital's forms, monitoring, and completeness principles are activated as the ruling relation that regulates the discharge planning practices for diabetic patients for satisfying good hospital service quality through standards and forms, monitoring, and completeness principles. This situation drives nurses to work more closely with the documents. Further study is crucial to identify a strategy to effectively bridge discharge planning practices and documentations works.

Keywords: accreditation; diabetes mellitus; documentation; hospital discharge; nurses

Introduction

Discharge planning (DP) is defined as a strategy established to facilitate patients' continuity of care once they leave the hospital and return to their home (An, 2015). The American Diabetes Association - [ADA] (2021) strongly recommends that every diabetic patient should have a structured DP before being discharged from the hospital, which should be initiated since the hospital admission and regularly updated following the change of the patient's needs. The current evidence also notes that providing discharge education not only effectively bridges the hospital and post-acute care periods, but also successfully lessens the rate of unplanned readmission among diabetic patients (Braet et al., 2016; Gonçalves-Bradley et al., 2016).

However, previous studies found that diabetic-related DP tends to be neglected. Most diabetic patients missed receiving diabetes-related education or only 12% of the admitted diabetic patients received diabetes-related consultation services during hospitalization (Ostling et al., 2017). A survey noted that the diabetic patients felt uncertain regarding the post-acute care plan (Wang et al., 2021), reported insufficient self-care knowledge (Horstman et al., 2017; Horwitz et al., 2013), and experienced difficulties in managing their diseases (LaManna et al., 2018), accounting for 10.8% to 26% unplanned readmission rate within 30 days after hospital discharge (McCoy et al., 2017; Ostling et al., 2017). Additionally, as many as 7.3% of diabetes-related hospitalizations resulted in death within 90 days following discharge (Kozioł et al., 2021). Thus, effective diabetic-related DP to enable patient and family managing and continuing the post-acute care program is urgently required.

There is limited existing evidence exploring the DP for diabetic patients. Several studies described mainly the patients' discharge needs and outcomes (Cain et al., 2012; La Manna et al., 2018), the knowledge sharing in DP process and its related factors (Waring et al., 2014), the DP failure and its causes (Pollack et al., 2018), communication on DP practices (King et al., 2013), or the effect of discharge readiness on the 30-day readmission rate (Weiss et al., 2019). In Indonesia, ranked 5th in the world with the highest number of diabetic patients (International Diabetes Federation [IDF], 2021), evidence on diabetic-related DP was also found scarce. Studies that are currently available have examined nurses' perceptions of general DP practices that are perceived as being less optimally practiced and mostly done just before patient discharge, covering the limited information related to discharge medication and the schedule for a follow-up visit (Asmuji et al., 2018; Hardivianty, 2017; Wulandari & Hariyati, 2019). The Indonesian healthcare system is considered as "medicalized," characterized by a medical dominant culture in the Indonesian healthcare setting. This power relation may play a significant role in regulating healthcare services including DP practices for diabetic patients. To capture the comprehensive picture of DP practices in an Indonesian context, it is essential to explore how nurses' everyday activities in providing DP for diabetic patients are regulated by the ruling relations operating in the hospital as an institutional context.

Materials and Methods

Design

This study employed institutional ethnography (IE), an approach investigating textually mediated social organization and exposing the politics and power embedded in people's everyday lives (Smith, 1987, 2006). According to Smith (2006), the everyday nurses' DP practices can be viewed as a form of social activities conducted by the nurse as a social being organized by the social ruling relations, including nurse's local and extra-local contributing factors in a hospital as an institutional world. In the social relation, people and events are tied together in ways that make sense of such abstractions of power, policy, culture, knowledge, capitalism, economy, etc. (Campbell & Gregor, 2004). In order to gain a better understanding of how peoples' activities are organized, Smith (1987, 2006) recommended institutional ethnography (IE) as the analytic approach, which begins with investigating the social determinants of peoples' standpoints on their everyday (actual) experiences and practices as a way of viewing the institutional processes. Thus, this investigation may not directly improve the DP practices or affect the diabetes care and management system in the setting, but it will undoubtedly provide the basis to map out how the DP practices for patients with diabetes happen, the complexities, and the contributing social ruling factors. It may also facilitate nurses to recognize their positions about the ruling relations or exercise their knowledge and skills to seek other approaches to improve the DP practices.

Participants and Setting

An adult medical ward of a tertiary and teaching hospital with almost 1000 beds located in West Java Province, Indonesia, was selected as the research setting. This selected hospital holds two national accreditations from KARS (Komite akreditasi rumah sakit nasional – National hospital accreditation committee) 2017-2020 and teaching hospital accreditation (2016-2021) and one international accreditation from the Joint Commission International (JCI) accreditation (2019 – 2022). This ward has a total of 35 nurses, nine medical specialists, two nutritionists, one pharmacist, and 10-15 medical specialist students. In this ward, most diabetic patients are referred from other hospitals or admitted with comorbid diseases and relative complex conditions. In one shift, normally the nurses are grouped into four nursing teams and each team consists of one primary nurse and two to three associate nurses responsible for providing care to 18 patients.

The participants in this study were recruited purposively based on their experiences involved in the diabetic DP process. To be eligible, the healthcare staff participants must have been working in the ward for more than a year and had experience in taking care, including providing discharge planning for diabetic patients, and accessible for phone call interview. Patient participants were recruited when they were admitted to the ward with diabetes (either noted as primary or secondary diagnosis), able to communicate in Sundanese or Bahasa Indonesia,

Table 1. Healthcare Professional Participants' Characteristics

Participant Code	Age	Ethnic	Marital	Gender	Working Year	Education Level	Training on DP/DM care
P1	36	Sundanese	Married	Male	12	Bachelor	No
P2	40	Javanese	Married	Female	9	Bachelor	No
P3	33	Sundanese	Married	Female	8	Diploma	No
P4	40	Sundanese	Married	Female	10	Bachelor	No
P5	35	Sundanese	Married	Female	6	Bachelor	No
P6	33	Sundanese	Married	Female	6	Bachelor	No
P7	42	Sundanese	Married	Female	15	Diploma	No
P8	33	Batak	Married	Female	8	Bachelor	No
P9	39	Sundanese	Married	Female	16	Specialist	Yes
P10	55	Sundanese	Widow	Female	1	Master	No
P11	38	Sundanese	Married	Male	10	Specialist	No
P12	35	Javanese	Married	Male	1	Bachelor	No
P13	46	Sundanese	Married	Female	1	Master	No
P14	32	Javanese	Married	Female	2	Bachelor	No

Table 2. Diabetic Patient and Family Participants' Characteristics

Participant Code	Age	Marital	Gender	Patient/Family relation	Education Level	Duration of diagnosed with DM or Experience for treating diabetes patient
P15	48	Married	Female	Patient	High school	12 months
P16	56	Married	Female	Wife	High school	2 months
P17	38	Married	Female	Wife	Bachelor	4 years
P18	45	Married	Female	Mother	High school	12 years

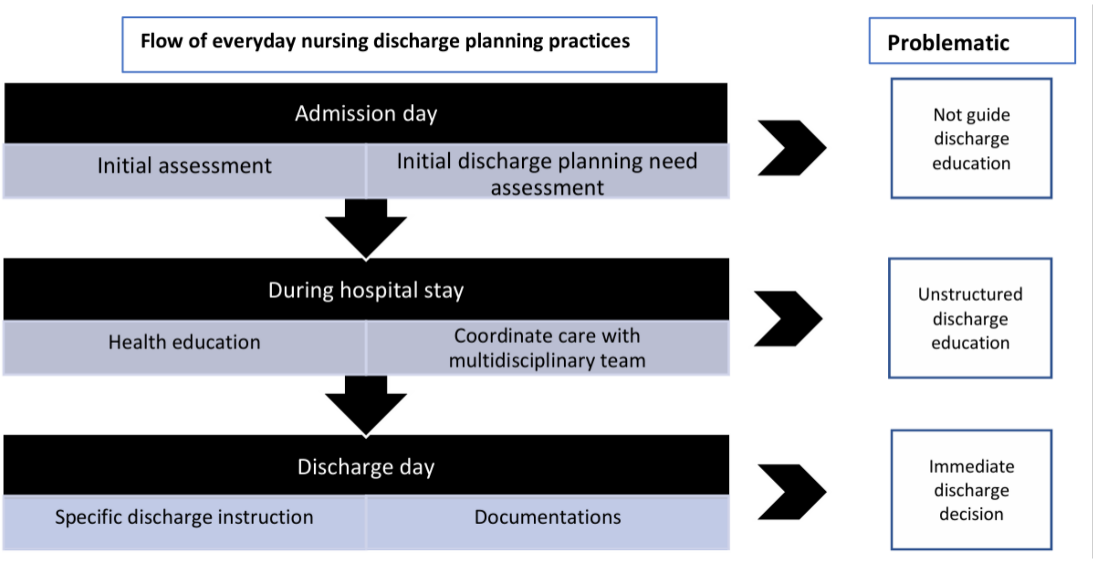

Figure 1. The flow of the everyday and problematic of nursing discharge planning

Table 3. Ruling relations and the hospital accreditation system

Ruling relations	Hospital accreditation system
Hospital	Develop Standard Operational Procedures (SOP) and forms
Head nurses and nurse supervisor	Monitor and evaluate quality of documentation
Registered nurse	Complete documentation

and accessible for phone call interview. The patient's family was recruited when he/she was identified as the one mainly accompanying and taking care of the patients during either acute care or at home.

Following the initial approach facilitated by the head nurse, participant recruitment began with the eligible nurses in the ward as key participants and other healthcare staff and patients and their family as the additional participants. They were given further information of the research purposes and procedures. The participant candidates who agreed to participate to the study were recruited. This recruitment procedure concluded when data saturation was reached, as evidenced by the emergence of less new information and information redundancy (Morse, 2015). After reviewing the interview transcription of nurse participant 10, it was noted that identified codes were reached, and no new aspects or issues emerged. None of the approached potential participants withdrew from or refused to participate in this study. There were 10 nurses (P1 – P10), one doctor (P11), one pharmacist (P12), 2 nutritionists (P13-P14), one diabetic patient (P15) and three patient family members (P16-P18). Table 1 and 2 describe the participants' characteristics.

Among the nurse participants, five of them were nurse associate (P1, P3, P5, P6, P8), three primary nurses (P2, P4, and P7), one clinical case manager (CCM) and head nurse (P9), and one nurse supervisor (P10). In this setting, all nurse categories were responsible for providing direct care, including discharge planning, but the clinical case manager was specifically assigned for patient identified having complex conditions. Additionally, CCM, who was also assigned as the head nurse, was responsible to collaborate with the nurse supervisor in monitoring, supervising, and managing the ward's services including advocating ward nurses to communicate with other HCPs.

Ethical consideration

All the participants were informed that their participation was of a voluntary nature and they could freely stop or continue the interview once they felt discomfort, and freely withdraw from the study before data collection concluded without facing any consequences. After receiving research information in the initial approach, potential participants were given a participant information sheet and consent request. Participants who provide consent to participate in this study were required to provide verbal and written consent. This consent was reconfirmed during telephone discussions to agree on interview times, including the audio recording procedures during interview. Participants were also involved in setting the schedule of the interview session including the agreement for the additional interview session and were assured that all data given would be kept confidential. Moreover, the study also complies to the Declaration of Helsinki and obtained ethical approval both from the Center for Social and Behavioral Sciences Institutional Review Board Ethics Committee, Prince of Songkla University (Approval No: 2019Nst – QI 029 on 15 January 2020) and the hospital ethical boards (Approval No: LB.02.01/X.6.5/350/2020 on January 2020).

Data collection

After the ethical approval and permission to collect the data from the hospital were gained, the first author initially contacted the head nurse who was assigned as the gatekeeper to facilitate the initial approach to the potential participants. Data collection was conducted for eight months (December 2020 to August 2021). The first and the fourth authors were the main data collectors. They have completed a semester-long qualitative research course in a doctoral nursing program and conducted a qualitative data collection exercise prior the research under the supervision of the second and third authors who are skilled and experienced in qualitative study. The first author also received training in qualitative data analysis. Additionally, both data collectors regularly interacted with nurses and/health workers in the research setting, either in their roles as nursing student educator and clinical instructor (first author) or their position as clinical nursing staff in the same hospital (fourth author). Data in this study were collected through participant observation, telephone interviews, and documents review. The data collection started through participant observations on the ward nurses' activities; what they do with the patient and family related to providing care in the ward and discharge preparation, education given, the document used, and the involved HCPs. Short notes were taken soon after each observation and completed later describing the observed discharge planning and its related activities.

The first author conducted the online in-depth telephone interview, starting with ten nurses as key participants then expanded to four accessible HCPs (doctor, pharmacist, and nutritionists), one diabetic patient, and three patient family members. Open-ended questions were used, and all of the participants were encouraged to freely share their experiences related to discharge planning. Initially, the interview was set as a video call; however, most of the participants requested to shift the mode of the interview to audio-call due to various reasons such as they felt that they were not dressed neatly (not wearing a headscarf) or did not want their living conditions to be exposed. The prompt question for nurses and other HCPs was "*Could you please share your experiences providing discharge planning for diabetic patients?*" For patient and family participants, the introductory question was "*Could you please tell me about your last hospitalization experiences and how the HCPs prepare you discharge from the hospital?*" In addition to the audio recorder, the interviewer took field notes to help record critical details throughout the interview, as well as during the transcription process once the interview was over. Key issues emerging during the interview were used to formulate probing questions. Five nurses, one nutritionist and one patient's family participants had two interview sessions. In total, twenty-three interview sessions were done, and the duration ranged from 30 – 60 minutes.

Data analysis

The data analysis was concurrently conducted with the data collection processes. The IE analytical approach was conducted to identify, trace and describe the social relation of the setting (the working of such trans-local ruling practices) that extend beyond the boundaries of informants' experiences (Campbell & Gregor, 2004). The IE analysis started by identifying ruling practices from the perspective of nurses who hold certain roles within the larger ruling regimes in orchestrating the daily practices. The first author conducted data analysis manually starting by listening to the everyday working experiences from the nurses' standpoint in the audio recordings and highlighting the identified institutional trace, generating questions, or remarking on the unexpected points to understand how the institutional power relation was utilized to structure the everyday nurses' practices in providing discharge planning for diabetic patients. The investigation was then geared toward identifying the answers to these problems based on the experiences and viewpoints of doctors, nutritionists, pharmacists, and patients and their family. Texts used in ruling relation to control of the HCPs involved in the everyday nursing practices in providing DP for diabetic patients were also examined. Institutional ethnographers can employ the usage of texts by people, a material form of ruling relations, to analyze the social organization of people's work (Rankin, 2017).

Trustworthiness

To enhance trustworthiness, several techniques were adopted from Lincoln and Guba, (1985). In terms of credibility, we applied various strategies namely; prolonged observation, triangulation, and member checking. As we spent almost eight months in the fieldwork, it helped us with prolonged observation and building a trusting relationship with the participants that would minimize their negative feelings related to data collection processes. It also allowed the researcher to compare (triangulation) and clarify the consistency of data collected in the earlier or later period (Shenton, 2004). Member checking with each participant was conducted in the end of each interview session. All participants confirmed the outlined essential topics. To facilitate peer debriefing, all of the authors conducted regular online meetings to discuss the data obtained, additional investigation, next action plan, and data analysis. Each author reviewed transcriptions and field notes independently to identify issues. During the online discussion session, each author presented their perspectives on their review and emerging issues, and discussed the illustrated map and supporting data. The process of analysis was completed when all authors mutually agreed on emerging issues. Furthermore, the thick and detailed description was applied to promote transferability. To enhance confirmability, the first author wrote a daily reflexive journal during his fieldwork while peer debriefing was used through regular meetings among the research team. Regarding dependability, an audit trail was established.

Results

The findings presented here demonstrate how nurses work on DP for diabetic patients and how it was socially organized by the ruling relations operating in the hospital. The everyday DP practices occurred following the diabetic patient flow of care. Additionally, nurses viewed these practices as problematic since the initial assessment form was too broad, discharge education was unstructured, and documentations were burdensome. The investigation also identified that the hospital accreditation, nurse ward manager, and registered nurse were designated as the ruling relations that govern those DP practices through the hospitals' standards and forms, monitoring, and completeness of documentation principles.

Everyday nursing DP practices were problematic

DP activities were conducted following the diabetic patients' flow of care; the admission day, during hospital stay, and discharge day. Three main DP-related activities were an initial DP need assessment, patient and family education, and discharge education. Through the DP process, nurses encountered challenges in discharge planning practices as reported elsewhere (Kurniawan et al., 2023).

Nurses described that, once a new patient g was admitted to the ward, they performed an initial assessment with the institution's DP needs checklist form. After the initial assessment, the nurse coordinated the other related healthcare providers (HCPs) including a physician in charge, a nutritionist, and a pharmacist about patient admission. Nurses mentioned that the initial assessments took time and affected other routine care. Completing the initial nursing assessment procedures and documenting the assessment results in the forms takes around 30–45 minutes per newly admitted patient. It may take longer when some newly admitted patients come together. Each day, normally there were approximately 5 – 10 newly admitted patients admitted to the unit. Furthermore, nurse participants mentioned that the initial DP needs assessment was useless and some of them reported that they only filled out the form casually as it was mandatory. It was used to identify patients who required specific discharge education. However, nurses stressed that they seldom use it to guide the patients' discharge preparation.

Nurses also considered that the initial assessment form is too broad and does not facilitate identification of the specific discharge education needs for diabetic patients. Additionally, since diabetic patients in this setting are mostly admitted with multiple diagnoses, and diabetes status is sometimes reported as a secondary diagnosis, their discharge education needs are often overlooked. Discharge education needs related to diabetes care are not only shadowed by the patient's primary diagnosis and its treatment but also insulin injection. The diabetes discharge education practices and how it was found as a shadowed area was reported elsewhere.

During hospital stay, nurses provided the diabetic patient and family education at some point in time. The education session mostly was conducted without a specific time or schedule. Health education covers topics including care procedures, such as insulin injection, wound care, range of motion exercise, feeding through tube feeding, and so on. Health information was sometimes provided by the other HCPs including the physician, nutritionist, and pharmacist. Instead of formal and structured education session, the nurses often provided health information simultaneously with other routine care at the bedside. Nurses provided it informally once they found that the patients needed further explanation and misunderstood their disease or when the patients or family caregivers asked some questions.

The discharge decision for diabetic patients was also problematic for nurses. Often the nurse was informed about it only one day before or on the day that the decision was made. Due to the immediate decision, the nurses felt overwhelmed and frustrated because they had to get everything done in time. After receiving information of the discharge decision, the nurses provided additional health information, mainly focusing on discharge instructions. Discharge instructions contents included diabetic home medication, recommended diet, recommended activity, emergency contact number, and the medical appointment. Apart from providing discharge instructions, the nurses worked on DP-related documentations. According to the hospital regulation, all patient documents including the DP-related documents for diabetic patients must be completed before the patient's discharge or at least within 24 hours after the patient's discharge. The nurses stated that the documentation ideally should be recorded gradually during the hospitalization and intensively when the discharge decision was made. However, it was practically mostly done and completed on the discharge day. A nurse mentioned that:

> *"…what usually happens is that the specific discharge plan is done closer to the time of discharge… I mean, the discharge plan should conduct since the initial assessment, but actually, we prepare the discharge planning at some moments before the patient is discharged…"* (P2-I)

Mapping discharge planning to hospital institution

Accreditation-driven DP

The DP practices for all patients including for diabetic patients were performed as part of the ward's routine patient care. It was also the governing bodies' regulation in the form of good hospital service quality. The analysis identified the sense of satisfying the accreditation standard in the nurses' DP everyday practices in this hospital. As the selected setting was a nationally and internationally accredited hospital, it was required to maintain and improve the services in meeting the minimum key performance standards. The DP indications of accreditation standard are also found in the Standard Operational Procedures (SOP) listed in the hospital archives, the documentation forms, and the monitoring procedures applied in the ward local site (Table 3).

In this setting, DP-related tools including design, standard operating procedures, forms, and campaign were initiated following the accreditation processes. The hospital released the DP standard mandating that DP must be started from the admission day and recorded in various forms including the initial assessment form, patient and family education, the discharge resume and the specific discharge instructions form. All these forms and standards were then distributed and explained to all head nurses. All head nurses were assigned to convey the message to their ward members. The nurse supervisor described that:

> *"we were trying to fulfill the requirement of the JCI standard, …DP practices for instant, how it must be performed…well, for example the standard requests that DP must be included in the nursing initial assessment …so, we adjusted the initial assessment forms which the requirement for DP were.... it must be there and should be identified..."*(P10)

Head nurses have a powerful structural position to organize the nursing everyday practices in meeting the accreditation standards. Nurse participants reported that, although DP practice guidelines were available via online, nurses seldom review them. The head nurse's guidance was the reliable sources of information related to DP practices. They felt that there was no need to read it, and they just followed the directions given by the head nurse. As one nurse stated, *"I never open it…. the DP assessment standard… It was just explained by the head nurse...how to fill the forms." (*P4)

The nurse participants reported that they had never been taught about the DP concept during their bachelor degree. Therefore, the head nurse was the main practical guideline and the standard for determining the correctness of the nurses' everyday DP practices.

"…I never heard about DP…during my current bachelor program … I never heard (about DP) Sir… I knew the DP practices from the ward… that I remember the one who explained DP practice was here (the ward)…." (P3)

Head nurses had some monitoring strategies assuring that the standards of practices were applied as expected. They reviewed the list of patients who would be discharged on that day and joined the hand-on shift activities. They reminded the nurse in charge to provide the education and check the document completeness before patient discharge. Furthermore, the nurse participant mentioned that head nurses directed DP practices through the ward's monthly meeting. In the meeting, the head nurse mentioned incorrect and incomplete DP related documentation and explained how to fill the DP-related assessment form or what documents should be filled and any additional form needed.

Furthermore, all of the nurses were mandated to fill out the individual performance index online form based on the activities conducted in each shift. Head nurses used the reported data to determine the achievement of the monthly targeted total hours. The nurse described that:

"In the individual performance index…it is monthly evaluated…we set the work target… in the end of month we evaluate whether or not nurse achieved the target given…. There is a target.. for instant…a nurse should achieve number of minutes for doing an intervention…the achievement can be checked from the daily activities inputted to the online form …" (P1)

The nurse also described that this indexing was indirectly linked to the remuneration system. Once nurses were considered to have not achieved the target, they might not fully receive the monthly remuneration. Head nurses usually warned the nurse to complete the document, otherwise it might influence the achievement of their performance index. Nurses felt that they were monitored and guided to work following the ward expectation. The nurse participant narrated that:

"…. I don't know exactly how they treat that,…. but the one usually talk about it (repeated reminder) is the Mrs N… such as 'this (incomplete document) can affect your performance index achievement'… it is related to our performance index… it can reduce our achievement and so on… so we sometimes (worry about it)…." (P4)

Nurses also stated there was a multi-layered monitoring mechanism. The nurses' work was monitored either by the head nurse or nurse supervisor. Simultaneously, primary nurses were monitored and evaluated by the clinical case manager. With this mechanism, the ward management kept the nurses' work on track and met the required applied standard of practices.

"The discharge practices will be evaluated … during OMRR (open medical record review) and CMRR (closed medical record review) it will be re-checked all …by…what is the name… primary nurse... also by… what is the higher one… manager… case manager will re-check it…" (P4)

Documentation-oriented work

Nurse participants mentioned that filling out all of documents, including discharge planning documents, is the most important criterion to satisfy the quality standard and it was attentively monitored by head nurses, nurse supervisors or hospital management staff. As a result, nurses spent more time on documentations in their daily practices. They stated that the completed document was used as the formal evidence indicating the nurses' work. A nurse participant reported:

"Before discharging a patient from inpatient care, we need to make sure, all documents must be completed." (P1)

The importance of completing the documents sometimes pushed nurse themselves to fill out the forms. Although one complained there are too many forms to be filled, she kept filling out the forms since it is a must. She described that:

"So what can I say…in the end....because it is the must….it's (documentation) did perfunctorily.... Sometimes it's just filled... I mean, it is not totally perfunctory...I filled the form... based on facts…. But, due to so many documents that must be filled, in the end (we take less time when visiting) the patients... and just do it (without thoroughly conducting the assessment)... so far, that is the way I assess the patient... especially when the patient… the new admitted patients are many while the current hospitalized patients also many already." (P6)

The observation found that, on many occasions, the nurses worked on the documentation.

"After around 1.5 hours (09.05 – 10.30) I observed the nurses and others HCPs activities in the nurse station, nurse still working on the documentation. They looked filling the form, moved from one medical record to the other. They also observed filling out the other documents not attached in the medical records (like a note book), checking the computer and printing some documents or patient's barcode and attached it in the patient medical records. The nurse who just finished from doing some patient cares (wound care, prescribing medication, feeding, or other procedures) was observed tidying up the equipment, washing hand, and brought some medical record from its' shelf and take a rest for a while before she wrote something in those medical records. Some of nurses looked chit chat each other and sometimes laughing, doing a joke. During those activities, some internist residents also

checking the medical record, told/clarified the nurse some medications, laboratory test or asked help to send the patient to the other units such as x-ray, echocardiography, endoscopy or operating theater." (Observation note No.5)

Another nurse stated that, regardless of the situations, the document should be completed before it submitted to the medical record. Hospital management provided this 24 hours after discharge for the staff to complete. If an incomplete medical record is submitted to the medical record unit, staff from the medical record unit send the documents back to the ward or invite the healthcare-related staff to complete the documents as soon as possible. Furthermore, the head nurse described that the completeness of documents was done not only to facilitate patient care, but also to arrange for facilitating the hospital quality assurance and minimize the negative consequences potentially occurring due to poor documentation. Additionally, the head nurse explained that, once all the documents are filled in, the nurse can use it as evidence in dealing with the patient's complaint or the hospital regular audit. If the hospital management found any incomplete document, they called the head nurse, the nurses, or the other HCPs involved in those documents. As described by the head nurse:

"… Well, from this process we learned the importance of adhering to the regulation since it always has consequences…for instance, in our hospital there is a medical record audit … if the reviewed medical record is from our unit, all of us who are involved in that patient care will be questioned…. Though at that time the findings were not directly related to us (nurses), from this audit we learned that as long as we adhere to the applied policy, we will be safe…" (P9)

Nurses accepted that they felt discomfort with comments from the head nurse. Though the head nurse never mentioned any names, the documentation misconduct was repeatedly cited during meeting with other nurses or staffs. The nurse participant narrated that:

"*Regarding the punishment, it is more in the form of... that the mistake will always be talked about, Sir. Although she (head nurse) did not mention the name of the person who did it or how the mistake was done... But something that is considered as a mistake…will always be talked about... repeatedly... so it is frustrating."* (P4).

Unfortunately, discharge planning-related documentations are the last part of documents which must be completed at the end of the inpatient period, thus there is a possibility of incompleteness. Furthermore, due to the tendency for abrupt discharge decisions information and the habit of completing all documents at the end of inpatient period, documentation work becomes even more problematic.

Discussion

Discharge planning practices for diabetic patients existed and this current study discovered that the nurses played significant roles in providing DP activities, such as DP-related needs screening and categorization on the admission day, providing patient education during inpatient and at the discharge day, and conducting the DP-related documentation. These nursing roles are congruent with the findings from previous studies conducted either in Indonesia (Wulandari & Hariyati, 2019) or in the other countries which highlighted that nurses are intensively involved and play important roles in providing DP practices (Hayajneh et al., 2020). Our current study added the description of nursing roles since in the patient's DP needs initial assessment, providing education, and discharging the patient, including DP-related documentations.

Although the nurses conducted the DP-related activities following the patient's hospitalization time frame from admission to discharge, they were observed as fragmented practices. There was no connection between the DP-related activities. While the initial step of the DP practices was started from the admission day and adhered to the recommendation from local and ADA (2021) standards, there was no written plan for updating DP needs in the next inpatient time frame. In addition, the DP education activities were conducted without a specific plan in some points of time during the inpatient period and when the patient was near to discharge. These characteristics extend previous study findings conducted in the Indonesian setting and suggest that DP-related activities are frequently observed as focused more on the assessment, and only started once the patients are about to be discharged (Wulandari et al., 2019).

Those everyday nursing practices in providing DP for diabetic patients are found to be linked to the hospital social relations, namely hospital accreditation, hierarchical and medical power relation. The hospital accreditation status is one of the identified hospital services quality standards found in this study. These accreditations indicate that the hospital not only met the accreditation standard but also was monitored by those accreditation agencies. Consequently, the hospital requested for satisfying the patient and hospital safety, accessibility and continuity of care, effective communication and health education, competent staff, health care organization and management, human resources and hospital information management standards, including integration of education into healthcare services (JCI, 2021; KARS, 2018).

One of the crucial aspects that must be prepared to facilitate the accreditation process is the hospital's documents. Almost all processes of accreditation in all of the assessed accreditation standards from the agencies required the documents as evidence. These documents may describe Smith's (2007) statement that, within an institution, "textual technologies" are often utilized for evaluating the performance or outcomes substituting the actualities of what are going on in the setting and what is happening to the involved people. Thus, the completeness of the forms and the other documents in the patients' medical record is a vital aspect, both for facilitating the patient care and in satisfying the accreditation processes and standards. The hospital system also implements the regular audit system and assigns the medical record unit to send back all the medical record documents identified not properly completed. In terms of DP practices, the ward management regularly reminds the nurses to do DP assessment and documentation, pre-discharge education, and conducts regular document review through OMRR during inpatient and CMRR after the patient discharge from the ward. Moreover, the ward management applied daily monitoring run by the nurse or the shift coordinator and brought the DP-practice and documentations issues into the ward's monthly meeting. It is evident that DP practices and their related documentations are not merely activated as part of the everyday patient care activities, but also organized for satisfying the performances standards linked to the hospital accreditation.

One of the impacts of those mandatory documentation-related works is the nurse's burden and documentation-oriented work. On many occasions, the nurse participants were observed working in the nurse station and spending many hours in finishing the documentation work. The burdens of documentation-related work among nurses are also reported in some previous studies. It was reported that the nurses spent working hours to work on documentation, ranging from 7% (Westbrook et al., 2011) to nearly 30% (Yu et al., 2019). Another study reported that the nurses perceived that they invested 50% of their working hours in a shift for conducting documentation and felt frustrated with this particular task (Cooper et al., 2021). Rather than facilitating good practices, these situations might inhibit the effectiveness of patient care and the DP practices.

The HCPs adherence in doing the expected behaviors also represents a power ruling relation. The HCPs adhered to completion all documents since they are "staff" (employee) while the head nurse and vice head nurse who provide the order are as their boss (employer). This position results in unequal power where the employer controls and directs the employee. As the top-level position in the ward organization structure, the head nurses politically hold the formal or legitimate power "ability to influence others due to the formal position in an organization." Politically, it informs who legitimately controls the organization's resources and the rewards distribution that are valued by the others (Groenwald & Eldridge, 2020). Smith (2007) also narrated that, within an institution, hierarchy represents a contract chain between the higher managerial and the subordinate units. With this condition, the nurses perceived that the head nurses' verbal directions are the one and only guideline that must be followed either in conducting DP practices or in determining its appropriateness.

The formal leader holds bestowed powers either to distribute the job and resources to those in support of the leader or to put the pressure on those who are in opposition by disapproving their project (Groenwald & Eldridge, 2020). In this study, although the participants reported that the ward did not have a formal reward and punishment system, the nurse participants experienced some actions potentially representing that system in the informal form. Because of the remuneration system implemented, the ward management repeatedly reminded the nurses to complete all documents. If the documents were found not properly completed, it could be considered as a reduction point of the nurse's performance index. This performance index is evaluated monthly and, when the individual target is not fully achieved, the nurse will not fully receive their monthly remuneration. Another informal "punishment" was also described in the form of the inconvenience of being reprimanded and being told the mistakes in front of the others. With these, the ward managers maintain the running of DP practices as they expected.

Our study also identified that the ward DP practices were regulated by the inter-professional power relation. It is evident that the doctor in charge, the clinical leader, has significant power over the nurse and the other HCPs. As the clinical leader, the doctor in charge holds the formal/legitimate power to control all clinical-related decisions and activities. From the interview data, it is evident that all clinical decisions, including the discharge decision, were independently made by the doctor in charge. As impact, the DP practice identified more as a medical-directed DP practice rather than as a collaborative one. This phenomenon is consistent with the previous findings which suggested that medical dominance in the healthcare setting is common. Not only in the setting where collaborative practices are not yet established, as we found in our study, medical dominance also happened in the healthcare setting where the multidisciplinary approach was established. Rather in applying a collective decision-making process, the medical team leader (consultant) led and directed the team decision (Waring et al., 2014).

Study among non-nursing population less likely agreed that nurses are knowledgeable and more likely agreed that nurses are doctors' assistants (Sommers et al., 2018). Consistent with this finding, the study reported that healthcare professionals provided the patient's history and followed the doctor's orders (Darmayani et al., 2020). Previous studies among Indonesian nurses noted that the nurses experienced lack of autonomy in the practical arena (Asmirajanti et al., 2021; Trisyani & Windsor, 2019). Furthermore, nurses not only felt they are the doctor's subordinate, but also perceived that nursing is a female profession and were unmotivated to gain higher position in the organization, making them less likely speak up and remain more as followers (Wardani & Ryan, 2019). These reasons may explain why the nurse passively waited for the doctor's order in the discharge decision-making processes.

All together, these ruling relations made the nurse and the ward management dependent on those tools and the accountability circuit. These practice patterns that are actually assumed as the foundation of DP practice quality and accountability have been identified as being flawed. It may satisfy the hospital audit, accreditation and ward monitoring, but less likely resulted in good quality services. The completeness of DP-related documents found in this study does not fully represent the service quality and accountability at the standard expected.

Strength and limitation of the study

To our knowledge, this is the first study exploring DP practice for diabetic patients using an institutional ethnography approach at a tertiary Indonesian hospital as an institutional context. Various data collection strategies and regular peer debriefing applied throughout study processes contribute to the study rigor. The investigator's and participants' shared background most likely built t trust and positively influenced the interview process and the access of information (Noble & Smith, 2015). However, the limitation of accessing the doctor and internist resident as additional participants must be acknowledged. While the additional participants potentially improve the completeness of the exploration, it was not possible due to the doctor's time constrain and the gained ethical approval not covering residents as a potential participant. We also found that it was difficult to access more participants from patient and family due to the low hospitalization rate of diabetic patients during the pandemic situation. Moreover, the use of telephone interview in this study potentially holds some limitations including shorter and potentially incomplete responses (Drabble et al., 2016). However, this data collection method is one of the best possible strategies applied in the setting during the study timeframe conducted in the pandemic situation. Further study is recommended to better understand the coordination and collaborative practices among involved HCPs in providing DP practices, including their collaboration with the HCPs in the community setting in maintaining the continuity of care.

Nursing implications

The nurses reported being burdened with the document-oriented works, which might potentially take up more of their time than the patient direct care. The use of technology information for documentation may become a viable option. Previous studies, including a systematic review, identified that electronic medical records effectively improve inter-HCPs communication and time allocation, improve patients' quality of care, clinical outcomes (Hodgson et al., 2021; Manca & Greiver, 2015; Setyadi & Nadjib, 2023), and patient satisfaction (Hidayat et al., 2022).

In terms of power imbalance identified among HCPs, it actually can be minimized by effective communication between them. A study found that effective communication between HCPs is key aspect facilitating the positive roles perceptions, competencies demonstration, and trust development between HCPs can further serve acceptance and balance of power between HCPs (McDonald et al., 2012). Furthermore, maximizing the function of the ward clinical case manager as a means of communication between health professionals was identified as an effective technique for improving health worker relationships (Susilaningsih et al., 2018).

Conclusion

The everyday nursing DP practices for diabetic patients in this institutional setting covered three main activities, namely the DP needs assessment, discharge education, and documentation. Nurses found these DP practices as problematic; initial assessment forms which do not guide the DP education, unstructured discharge education, and documentation burdens due to immediate discharge decision. Furthermore, DP practices are activated as a set of regulated activities satisfying the governing bodies' regulations in the form of good hospital service quality. The practices were regulated by the hospital's SOPs and forms and monitored by the ward management and completeness principles. Consequently, nurses focused more on documentation and less on patient care.

Declaration of Interest

None

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Data Availability

Datasets generated and/or analyzed during the current investigation are accessible from the corresponding author upon reasonable request.

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The psychometric properties of Indonesian Version of WHO Quality of Life 100 in tuberculosis patients

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Abstract

Background: Tuberculosis has an impact not only on physical health but also on psychological well-being and economic and social status, as well as causing stigma, which results in a decreased quality of life. Quality of life assessment can improve nurses' understanding of patients' burdens, disease processes, and needs during treatment, which will help design appropriate tuberculosis intervention programs.
Purpose: This study was to obtain a valid and reliable Indonesian version of the WHOQOL-100 instrument for tuberculosis patients.
Methods: This study is a psychometric study. According to the WHO guidelines, the original WHOQOL-100 instrument was translated using a forward and backward procedure. Two hundred and seventy-four tuberculosis patients treated at PMI Bogor Hospital completed the questionnaire. Construct validity was tested using exploratory factor analysis with principal component analysis and varimax rotation, and reliability using Cronbach's alpha test on the WHOQOL-100 instrument.
Results: WHOQOL-100 Indonesia version has six domains, with 17 facets, and most questions have a loading factor ≥ 0.4. Of the 100 items, 31 were extracted that were related to freedom, physical safety and security, health and social care, participation and opportunities for relaxation activities, physical environment, and transportation. The overall valid question item reliability test results are $\alpha = 0.816$.
Conclusion: This study produced a shorter version of the English version of the WHOQOL-100 instrument, valid and reliable for use in Indonesia.

Keywords: reliability; tuberculosis; validity; WHOQOL-100

Introduction

The assessment of the quality of life among individuals with tuberculosis has become an emerging issue that demands attention. People who are affected by tuberculosis undergo significant changes in various aspects of their lives. Tuberculosis patients often experience stigma and discrimination from those around them due to the nature of the disease (Endria, 2019). Moreover, the prolonged therapy regimen leads to substantial changes across multiple dimensions, including their physical condition, psychological well-being, social life, work, and financial situation (Ashutosh, 2019).

As per the Global Tuberculosis Report of 2023, Indonesia ranked as the second-highest country worldwide in terms of the number of tuberculosis patients (WHO, 2023). Acquiring a comprehensive understanding of the quality of life among tuberculosis patients could prove beneficial for the government in formulating effective, long-term health programs (Hammouda et al., 2023). Such insights could guide the development of targeted interventions and strategies to improve the well-being and outcomes of individuals grappling with tuberculosis.

Various tools have been created to assess the quality of life among individuals with and without health issues. So far, instruments developed by the World Health Organization (WHO) - either the 100-item version (WHOQOL-100) or the briefer version (WHOQOL-BREF) - have been widely utilized in research and clinical contexts. These instruments encompass all dimensions of quality of life, including physical, psychological, social relationships, environment, and spiritual dimensions. Despite WHOQOL-BREF being the concise iteration of WHOQOL-100, it has displayed dependable efficacy with robust psychometric properties across numerous studies. However, specific investigations have indicated superior outcomes in the social dimension when employing the WHOQOL-100 (O'Carroll et al., 2000).

The WHOQOL-100 has been translated into 28 different languages, including Arabic, Cantonese, Croatian, Czech, Danish, Dari, Dutch, Australian English, French, German, Hindi, Hungarian, Italian, Japanese, Kiswahili, Korean, Lithuanian, Norwegian, Polish, Portuguese Brazil, Portuguese Portugal, Russian, Serbian, Sinhala, Spanish Mexico, Spanish Spain, Swedish and Turkish (WHO, 2024). However, as of now, there is no available Indonesian version of this instrument. Developing an Indonesian version of the WHOQOL-100 would undoubtedly prove valuable for research and clinical practice. This adaptation could facilitate a more comprehensive assessment of the quality of life, catering specifically to the Indonesian population and contributing to more accurate and culturally relevant evaluations.

Materials and Methods

This is a psychometric study to evaluate the validity and reliability score of WHOQOL-100. The research was conducted from March 2023 to August 2023 at PMI Bogor Hospital, Indonesia.

Study sample

Two hundred and seventy-four participants diagnosed with tuberculosis who sought treatment at the inpatient and outpatient care at PMI Bogor Hospital from May to June 2023 were included in this study. The convenience sampling method focuses on selecting subjects or sample units that are easy to reach, used without complicated selection procedures (Golzar et al., 2022).

Patients were included in the study if they met the following inclusion criteria: (1) Age ≥ 18 years, (2) Diagnosis of tuberculosis documented in their medical records, (3) Currently undergoing tuberculosis treatment, (4) Proficient in active communication in Indonesian, (5) Literate, and (6) Willing to participate as respondents. Conversely, patients were excluded if they met any of the following criteria: (1) Having medical conditions that impede their understanding and/or completion of the questionnaire, (2) Suffering from cognitive function disorders that hinder their comprehension and/or questionnaire completion, or (3) Experiencing reality impairment disorders that obstruct their understanding and/or questionnaire completion.

The WHOQOL-100 consists of 100 items. Therefore, this study employs 274 participants. This figure is more than 200 participants, qualifying for high-quality factor analysis (Jung & Lee, 2011).

Instrument WHOQOL-100

The WHOQOL Group collaboratively designed the WHOQOL-100 quality of life assessment with 15 international field centers. This comprehensive instrument underwent rigorous testing and validation across 38 different countries to ensure its cross-cultural applicability.

The WHOQOL-100 encompasses six major domains with 25 facets, each consisting of four items, resulting in 100 items for a thorough evaluation of an individual's quality of life. This comprehensive structure allows for a detailed assessment of an individual's quality of life across various dimensions.

The physical domain consists of three facets, including pain-discomfort, energy-fatigue, and sleep-rest. The psychological domain consists of nine facets, positive feelings, thinking, learning, memory and concentration, self-esteem, body image and appearance, and negative feelings. The domain of level of independence consists of four facets including mobility, activities of daily living, dependence on medication and medical aids, and work capacity. The domain of social relationships consists of the facets of personal relationships, social support, and sexual activities. The environmental domain consists of the facets of freedom-safety-physical security, home environment, financial resources, health-social care (accessibility and quality, opportunities to acquire new information and skills, participation and opportunities for leisure/recreational activities, physical environment (pollution/ noise/ traffic/ climate), and transportation. And the domain of spirituality/religion/personal beliefs had a facet of perceived health in general.

Procedure

The research commenced with an initial step of seeking permission from the WHOQOL group via email. Upon obtaining formal authorization to proceed with the study, we initiated the process of translating the WHOQOL-100 instrument from its original language into Indonesian. This translation endeavor was undertaken by two highly qualified translators, each possessing a minimum of a postgraduate education level and proficiency in both the original language and Indonesian. Importantly, these translators worked independently to ensure

Table 1. Characteristics of respondents (n=274)

Characteristic	Mean (SD) N (%)	Mean (SD) N (%)
	Tes and re test	Factor Analysis
Age, mean (SD)	49.44 (15.72)	49.59 (15.69)
Duration of TB treatment in month	6.54 (3.12)	6.53 (3.10)
Gender		
Male	66	197 (71.9)
Female	34	77 (28.1)
Education		
Low education level	17	246 (89.8)
High education level	20	28 (10.2)
Marital status		
Single/widow/widower	24	45 (16.4)
Married	76	229 (83.6)
Occupation		
Laborer	44	133 (48.5)
Entrepreneur	14	44 (16.1)
Employee	20	30 (10.9)
Unemployed	22	67 (24.5)
Monthly income		
< Rp 1.500.000,00	10	18 (6.6)
Rp 1.501.000,00 – Rp 2.500.000,00	6	183 (66.8)
Rp 2.501.000,00 – Rp 3.500.000,00	17	61 (22.3)
> Rp 3.500.000	10	12 (4.4)

Table 2. Cronbach's coefficient alpha values of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

Domain	Cronbach's Alpha Values	
	Original language(100 items)	Indonesian language (68 items)
Overall	0.920	0.920
Physical	0.693	0.693
Psychological	0.594	0.594
Level of Independence	0.229	0.387
Social Relationships	0.694	0.721
Environmental	0.852	0.891
Spiritual	0.764	0.764

the accuracy and reliability of the translation. Subsequently, an expert panel consisting of experts, translators, and researchers collaborated to refine and consolidate the best possible translation of the instrument into Indonesian. During this phase, four representatives from the target population completed the questionnaire and provided feedback on the Indonesian version of the WHOQOL-100. Finally, a back translation process was conducted by one different professional translator. This step involved re-translating the instrument from Indonesian back to its original language to assess its linguistic stability.

The convenience sampling method allows researchers to take samples according to the situation, conditions, time availability, and ease of data collection. The instrument testing phase involved 274 participants. The first stage involved 41 participants, and, two weeks later, continued with 233 samples. The research focused on evaluating the validity and reliability scores of the Indonesian version of the WHOQOL-100 instrument.

Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	**Items**	**Domain Factors**	**Items**	**Factor analysis**
Physical		**Physical**		
Pain & discomfort	1.1	Pain & discomfort	1.1	0.68
	1.2		1.2	0.83
	1.3		1.3	0.80
	1.4		1.4	0.81
Energy & fatigue	2.1	Energy & fatigue	2.1	0.87
	2.2		2.2	0.87
	2.3		2.3	0.63
	2.4		2.4	0.86
Rest & sleep	3.1	Rest & sleep	3.1	0.65
	3.2		3.2	0.82
	3.3		3.3	0.68
	3.4		3.4	0.78
Psychological		**Psychological**		
Positive feelings	4.1	Positive feelings, dignity & learn	6.1	0.68
	4.2		6.2	0.87
	4.3		4.3	0.79
	4.4		5.3	0.84
			4.4	0.85
			7.1	0.71
Thought, learn, memory, & concentration	5.1	Thought, learn, memory, concentration, & negative feeling	5.2	0.86
	5.2		5.4	0.77
	5.3		8.1	0.55
	5.4			
Self esteem	6.1	Self esteem& happy	4.2	0.80
	6.2		6.4	0.79
	6.3		4.1	0.59
	6.4			
Body image & performance	7.1	Body image, performance& self confident	7.2	0.85
	7.2		7.3	0.83
	7.3		6.3	0.58
	7.4		7.4	0.57
Negative feelings	8.1	Negative feelings	8.3	0.93
	8.2		8.4	0.92
	8.3		8.2	0.55
	8.4			
Confidence level		**Confidence level**		
Mobility	9.1	Mobility	9.3	0.90
	9.2		9.4	0.78
	9.3		9.1	0.71
	9.4			

Cont. Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	**Items**	**Domain Factors**	**Items**	**Factor analysis**
Confidence level		**Confidence level**		
Daily acitivity	10.1			
	10.2			
	10.3			
	10.4			
Drug consumption & life support	11.1	Drug consumption & life support	11.2	0.90
	11.2		11.3	0.89
	11.3		11.1	0.83
	11.4		11.4	0.85
Work capacity	12.1	Work capacity& activity	12.4	0.89
	12.2		12.2	0.84
	12.3		12.1	0.83
	12.4		10.3	0.73
			10.1	0.71
			12.3	0.66
			9.2	0.56
			10.4	0.52
			10.2	0.52
Social relationship		**Social relationship**		
Personal relationship	13.1	Personal relationship	13.1	0.72
	13.2		13.3	0.77
	13.3		15.2	0.76
	13.4			
Social support	14.1	Social support	14.2	0.85
	14.2		14.4	0.81
	14.3			
	14.4			
Social activity	15.1	Social activity	15.1	0.87
	15.2		15.3	0.84
	15.3		14.1	0.60
	15.4			
Environmental		**Environmental**		
Freedom & safety	16.1			
	16.2			
	16.3			
	16.4			
Surround environment	17.1	Surround environment and opportunity to gain information	17.1	0.96
	17.2		17.2	0.76
	17.3		17.4	0.94
	17.4		20.2	0.61

Cont. Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	**Items**	**Domain Factors**	**Items**	**Factor analysis**
Environmental		**Environmental**		
Financial	18.1	Financial	18.4	0.95
	18.2			
	18.3			
	18.4			
Healthcare & Social	19.1			
	19.2			
	19.3			
	19.4			
Opportunity to gain information	20.1			
	20.2			
	20.3			
	20.4			
Participation & leisure	21.1			
	21.2			
	21.3			
	21.4			
Physical environment	22.1			
	22.2			
	22.3			
	22.4			
Transpportation	23.1			
	23.2			
	23.3			
	23.4			
Spiritual	24.1	Spiritual	24.1	0.87
	24.2		24.2	0.67
	24.3		24.3	0.87
	24.4		24.4	0.88

Data analysis

The data analysis was performed in SPSS 20 (Sreejesh et al., 2014). The internal consistent reliability of WHOQOL-100 was assessed using Cronbach's alpha test (Kalfoss et al., 2021). Construct validity testing was conducted using exploratory factor analysis (EFA) with the principal component analysis and varimax rotation to accurately measure the intended construct (Sreejesh et al., 2014; Wehner et al., 2020). The process of assessing construct validity through factor analysis follows three steps: (1) defining the analysis variables across six domains, (2) initially deriving factors through the Bartlett test of sphericity and Measure of Sampling Adequacy (MSA) assessment, where variables with an MSA value ≥ 0.5 signal predictability and the need for deeper examination; during this phase, variables are screened based on a factor loading criterion of ≥ 0.4 to. A factor loading ± 0,3 – 0,4 is minimally acceptable, and (3) refining the factors through rotation, consolidating items into final extractions, including those that may overlap with other factors (Samuels, 2017).

Results

Demographic characteristics

The results of this study depict the Indonesian version of the WHOQOL-100 instrument that has gone through the stages following WHO standards for psychometric research.

In this study, the data yielded an average age of respondents of 49.59 years with a standard deviation of 15.686 years. The youngest age was 21 years, and the oldest age was 81 years. The average duration of treatment was 6.53 months with a standard deviation of 3.097 months. The minimum duration of treatment was one month, and the maximum duration of treatment was 12 months. The majority of respondents were male (71.9%), with low education level (78.1%), married (83.6%), laborers (48.5%) with monthly income in the range of Rp 1.501.000,00 to Rp 2.500.000,00 (USD 110 to USD 180) (66.8%) (Table 1).

Internal consistency reliability

The Cronbach's alpha of the Indonesian version WHOQOL-100 total and subscale is provided in Table 2. The level of reliability of a research variable or construct can be seen from the results of the Cronbach alpha statistical test. A variable or construct is said to be reliable if the Cronbach's alpha value is>0.6. From Table 2, it can be seen that the overall physical, psychological and spiritual domains have the same Cronbach's alpha value as the original version, while the domains of the level of independence, social relationships and the environment have a stronger Cronbach's alpha value in the Indonesian version than the original version.

Construct validity

The original WHOQOL-100 questionnaire in English comprises 100 items designed to assess the quality of life. However, in the Indonesian version used in this study different items were applied. The Kaiser-Meyer-Olkin (KMO) measure of adequacy for TB patients was found to be 0.80, referring to Shrestha (2021) who stated that KMO 0.80 is adequate. The exploratory factor analysis (EFA) for TB patients was conducted using principal component analysis followed by varimax rotation. While all six domains displayed favorable factor loadings (>0.4), certain items within the psychological, social relationship, and environmental domains were subsequently removed from the analysis (Table 3).

Among the six domains, three domains in the adapted WHOQOL-100 underwent substantial revisions compared to the original version. In the psychological domain, one question was omitted, leading to the emergence of five distinct factors: positive feelings, thinking and learning, memory and concentration, self-esteem, and body image and appearance, accompanied by an additional negative factor. The domain assessing independence level, unlike its English counterpart with four factors, now comprises three factors: mobility, dependence on medications and medical aids, and work capacity, because rotation of items on the daily life activities faces entails clustering on other facets. In the social relationship domain, which previously consisted of 12 items, after analysis four items were excluded and integrated into three factors—personal relationships, sexual activity, and social support. It is because the four items have factor loading < 0.4, which means that items do not meet the requirements of factor analysis. Within the environmental domain, 26 items were eliminated, because items have factor loading < 0.,4, leaving two factors represented by the remaining five questions in the Indonesian version of WHOQOL-100. Meanwhile, all questions in the physical, spiritual, and general domains retained their validity.

Discussion

This study represents a pioneering effort to assess the psychometric properties of the Indonesian version of WHOQOL-100 with a substantial cohort of tuberculosis patients in Indonesia. Notably, this study has contributed to the establishment of a WHO standard for similar research endeavors. The Indonesian adaptation of WHOQOL-100 demonstrated remarkable reliability. This study uses factor analysis which functions to reduce a number of original variables into a new variable with a smaller number. Furthermore, the research findings underscore that the number of domains aligns with the WHO's original version. Although the number of facets or factors was different, this discovery validates the construct validity of this instrument for measuring the quality of life of individuals living with tuberculosis.

This study has revealed that the construct validity of the Indonesian version of WHOQOL-100 does not entirely align with the original version, particularly in the Confidence Level and Environmental domains. In the Confidence Level domain, the daily activity factors were removed, and a majority of the items were reallocated to the Work Capacity factor because participants perceived that their daily activities are working. It is worth noting that a significant proportion of tuberculosis patients in this study were engaged in manual labor occupations. Being infected with tuberculosis significantly affects their productivity (Alene et al., 2021). Furthermore, the requirement for prolonged daily medication adds to the physical challenges faced by tuberculosis patients (Wang et al., 2020). Consequently, their quality of life appears to be more closely tied to how the disease impacts their work capacity rather than their daily activities.

In the Environmental domain, the study identified two factors out of the original six: home environment and financial resources. Indonesian individuals living with tuberculosis tend to place less emphasis on factors such as freedom and physical safety and instead prioritize spiritual aspects (Suhendra Agung et al., 2021; Suratmini & Berliana Togatorop, 2023). In contrast to this, as per the Indonesian version of WHOQOL-100, they perceive the surrounding environment and financial resources as representative factors contributing to the quality of the Environment domain. The remaining items were found to be closely related to access to information and have rotated and clustered into the home environment factor. This unique observation may be influenced by the distinct cultural context in Indonesia. Indonesian society is characterized by collectivism, placing significant emphasis on collective goals, harmony, cohesion, and cooperation (Van Der Kroef, 1953). This is in contrast to Western cultures, which often lean toward individualism. In Indonesian society, engaging in conversations with peers of the same age is often considered a form of recreation. This cultural aspect is reflected in the study's demographic data, which indicates an average respondent age of 49.59 years, placing them in the early elderly category. With advancing age, opportunities for outdoor activities or recreation tend to decrease. Furthermore, elderly individuals often become recipients of care within their families, leading them to spend more time with their family members and relatives (Silverstein & Giarrusso, 2010).

The items and factors within the social relationships and spiritual domains remained consistent with the English version. Indonesian culture places significant importance on social relationships and spirituality, viewing them as integral aspects of life. In times of illness, individuals often seek solace in their social connections and tend to draw closer to God, whom they regard as the creator of all beings.

The strength of this study is that all types of services at PMI Hospital Bogor were conducted for research respondents, including inpatient and outpatient care. Respondents were used in all different phases of treatment: intensive and advanced phases with pulmonary and extra-pulmonary TB diagnoses. All of this is to ensure the generalizability of the findings or results of the study. The WHOQOL-100 Indonesian version provides new insights into how disease impairs or impacts the subjective well-being of a person. The limitation is that the study was conducted in one hospital, a larger study is needed to provide more representation of respondents with TB in Indonesia.

Conclusion

This study discovered a strong level of internal consistency reliability in the Indonesian adaptation of WHOQOL-100. Despite the divergence in factor structures from the original version, all six dimensions of the WHO's quality of life are still effectively measured through the 68 items of this instrument. Thirty-two items extracted can be covered by other items and proven by the results of the construct validity test with a value of Kaiser Meyer Olkin (KMO)> 0.5. These findings underscore the importance of considering validity concerns when employing the Indonesian version of WHOQOL-100 to evaluate the quality of life among individuals living with tuberculosis.

The study suggests that doing a more comprehensive follow-up study, specifically focusing on ethnic and regional variations, might be beneficial in order to include a more diverse range of people with tuberculosis in Indonesia

Declaration of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data Availability

Data will be made available on request

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Correlation between Neutrophil/ Lymphocyte Ratio (NLR), lipid profile, lesion location and vascular cognitive impairment in acute ischemic stroke patients

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Abstract

Background: Stroke is the leading cause of long-term disability with significant clinical and socioeconomic impact worldwide. Hyperlipidemia and inflammation play major roles in ischemic stroke. This research focuses on the correlation of three factors, namely Neutrophil-Lymphocyte Ratio (NLR), lipid profile, and lesion location, with vascular cognitive impairment (VCI). These factors may serve as potential predictors for VCI.
Purpose: This research aims to study the correlation between NLR, lipid profile, and lesion location with vascular cognitive impairment. In addition, this research aims to explore those potential biomarkers as predictors of vascular cognitive impairment.
Methods: This was a cross-sectional study which included 107 patients diagnosed with ischemic stroke from February 2022 to January 2023 with a history of admission to the hospital within 72 hours. After they signed an informed consent form, every patient had history taking, physical exam, lipid profile, routine blood test, Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment Indonesian Version (MoCA-Ina) on the first hospital day. Statistical tests were done with Spearman correlation method.
Results: The data distribution was not normal for INR and MoCA-INA values ($p<0.05$). Total cholesterol was insignificantly ($p=0.092$) correlated with MoCA-INA score with low correlation value ($r=-0.293$). HDL was significantly ($p=0.035$) correlated with MoCA-INA score with moderate correlation value ($r=0.461$). LDL was significantly ($p=0.028$) correlated with MoCA-INA score with low correlation value ($r=-0.387$). Triglycerides was insignificantly ($p=0.440$) correlated with MoCA-INA score with very weak correlation value ($r=-0.137$). NLR was significantly ($p=0.015$) correlated with MoCA-INA score with moderate correlation value ($r=-0.412$).
Conclusions: Lipid profile is correlated with cognitive impairment in post-stroke patients, with HDL being a protective factor, and LDL as risk factor. NLR was associated with worse cognitive function and LDL was directly proportional to NLR. Lesion location reporting was highly heterogeneous and more uniformed reporting is recommended for future research.

Keywords: cognitive; HDL; LDL; location; NLR; stroke

Introduction

Globally, stroke remains a prominent cause of disability and death, especially in developing countries. This is also true for Asian countries, in which hypertension, followed by diabetes mellitus and smoking are the most common risk factors (Venketasubramanian et al., 2017). These disabilities are preventable with prompt treatment which focuses on rapid reperfusion by thrombolysis and thrombectomy. There are also recent advancements in research regarding biomarkers that may predict the incidence of these disabilities (Campbell et al., 2019). Healthcare settings in low-income and middle-income countries (LMICs), such as Indonesia, present unique challenges regarding prompt stroke treatment. These challenges, of which funding is particularly stark, have contributed to the burden of disease in LMICs such as Indonesia (Gadama et al., 2017; Pandian et al., 2020).This might indicate the reason why Indonesia has the highest age and sex-standardized mortality (193.3/100,000) and disability-adjusted life years lost (3,382.2/100,000) in South East Asia (Venketasubramanian et al., 2022).

Stroke-related disability is not confined to just physical impairments, but also those that are psychiatric in nature. Cerebrovascular diseases such as ischemic stroke are a major cause of cognitive impairment following the years post-stroke, in which 10% develop after the initial stroke, and 30% develop at the end of one year. With vascular dementia being a major cause of dementia, second only to Alzheimer's disease, an understanding of its risk factors proves to be a crucial research objective (Chohan et al., 2019). Having said that, it is noteworthy that not all post-stroke cognitive impairment fulfill the diagnostic criteria for dementia, making vascular cognitive impairment (VCI) a more appropriate term (Lim et al., 2021). It is also important to differentiate between the overlap between Alzheimer's disease (AD) and VCI, of which one third of demented post-stroke patients can be attributed to AD (Vijayan & Reddy, 2016). This research focuses on the predictors of post-stroke VCI, which is not exclusive to vascular dementia.

This research focuses on the correlation of three factors, namely Neutrophil-Lymphocyte Ratio (NLR), lipid profile, and lesion location, with VCI. These factors may serve as potential predictors for VCI. NLR is a simple ratio between the neutrophil and lymphocyte count, in which an increase is present in conditions such as bacterial or fungal infection, myocardial infarction, severe trauma, cancer, atherosclerosis, and acute stroke (Buonacera et al., 2022). A meta-analysis has shown that an elevated NLR is significantly associated with a 1.1-1.3 fold increased risk of poor prognosis in stroke patients (W. Li et al., 2021). Another study further detailed on this, explaining that patients with cerebral small vessel disease (CSVD) with an increased NLR have an increased risk of VCI (Hou et al., 2022). Regarding lipid profile, previous studies have shown that LDL-C and HDL-C are risk factors for atherosclerosis and white matter abnormalities which may cause cognitive impairment, although the latter has shown mixed results (Appleton et al., 2017; Lysandra et al., 2020; Menet et al., 2018).The lesion location also greatly affects the development of post-stroke cognitive impairment (PSCI). A pooled analysis study showed that several brain regions, namely the left frontotemporal lobes, left thalamus, and right parietal lobe, were strongly associated with PSCI (Weaver et al., 2021). Based on these prior papers, this research aims to study the correlation between NLR, lipid profile, and lesion location with vascular cognitive impairment. Hence, these parameters can be explored as potential predictors for vascular cognitive impairment.

Materials and Methods

Participant Recruitment

Subjects who met the inclusion criteria signed an informed consent form and this was followed by history taking, physical examination, lipid profile routine blood test, Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment Indonesian Version (MoCA-Ina) on the first hospital day. Subjects were conscious and cooperative, and could read as well as write. This is a cross-sectional study which employed a total sampling approach. Bias was minimized by training enumerators to standardize the examinations done to each patient.

Inclusion and Exclusion Criteria

The inclusion criteria in this study were all patients diagnosed with ischemic stroke with a history of admission to the hospital within 72 hours of onset and patients who agreed to participate in this study as evidenced by signing the informed consent statement by themselves or by a first-degree relative as stipulated in the research ethics protocol issued by Dr. Moewardi General Hospital Health Research Ethics Committee through ethical clearance number 208/II/HREC/2022 which was approved on 13 February 2022. This is in accordance with the WMA (World Medical Association) declaration of Helsinki.

The researchers excluded patients who had previous symptoms and signs related to neuro-behavioral disorders, aged ≥ 65 years, patients with transient ischemic attack (TIA), recurrent ischemic stroke, second stroke, hemorrhagic stroke, and had severe comorbidities (acute coronary syndrome, diabetes mellitus), hematological disorders (especially abnormalities in liver and kidney function tests), and neoplasms), patients with a history of smoking and alcohol consumption, patients with a previous history of inflammatory diseases such as rheumatoid arthritis and Systemic Lupus Erythematosus (SLE) or a history of steroid and immunomodulatory drugs) and patients with a history of admission to hospital over 72 hours post-onset.

Statistical Tests

Statistical tests in this study were carried out using the Spearman correlation method to determine the results of the correlation between total cholesterol,

Table 1. Descriptive Values and Results of Correlation Analysis between Involved Areas and NLR and MoCA-INA Values

Area	Involvement	Total Population	NLR			MoCA-INA		
			Median (min; max)	Correlation	P-value	Median (min; max)	Correlation	P-value
Frontal Lobe	Yes	11	2.99 (1.89; 17.33)	-0.51	0.600	26.00 (16; 30)	-0.137	0.158
	No	96	3.44 (1.33; 37.84)			28.00 (5; 30)		
Parietal Lobe	Yes	12	3.51 (1.89; 9.68)	-0.001	0.992	28.00 (18; 30)	0.060	0.542
	No	95	3.28 (1.33; 37.84)			27.00 (5; 30)		
Occipital Lobe	Yes	2	4.57 (2.74; 6.39)	0.27	0.784	25.00 (23 ;27)	-0.088	0.368
	No	105	3.39 (1.33; 37.84)			27.00 (5; 30)		
Temporal Lobe	Yes	7	3.61 (1.89; 9.68)	0.047	0.634	24.00 (16; 30)	-0.130	0.183
	No	100	3.33 (1.33; 37.84)			27.00 (5; 30)		
Internal Capsule	Yes	56	3.33 (1.33; 37.84)	-0.006	0.953	27.00 (5; 30)	-0.116	0.234
	No	51	3.41 (1.58; 19.59)			28.00 (16; 30)		
Cortical Capsular	Yes	65	3.49 (1.33; 17.33)	0.52	0.594	27.00 (5; 30)	-0.135	0.164
	No	42	3.19 (1.58; 37.84)			28.00 (9; 30)		

Table 2. LDL and MoCA-INA Confusion Matrix

		Outcome (MoCA-INA): Cognitive Impairment		Total
		Moderate - Severe	Mild	
LDL	High risk	39	15	54
	Low risk	11	42	53
	Total	**50**	**57**	**107**

Table 3. NLR and MoCA-INA Confusion Matrix

		Outcome (MoCA-INA): Cognitive Impairment		Total
		Moderate - Severe	Mild	
NLR	High risk	43	10	53
	Low risk	8	46	54
	Total	**51**	**56**	**107**

Table 4. Correlation of lipid profile with NLR

Variable	r	p
Total Cholesterol – NLR	0.182	0.124
HDL – NLR	-0.354	0.376
LDL – NLR	0.489	0.058
Triglycerides – NLR	0.076	0.413

high density lipid (HDL), low density lipid (LDL), triglyceride, neutrophile lymphocyte ratio (NLR), and lesion location to the MoCA-INA score. In addition, statistical calculations on the effect of total cholesterol, HDL, LDL, and triglyceride on NLR also used Spearman correlation. The use of statistical tests with Spearman correlation was chosen because, based on the results of the calculation of data normality using the Kolmogorov-Smirnov test, abnormal data distribution results were obtained. The results of the Spearman correlation test will be expressed in the correlation coefficient (r) which will measure the strength and direction of the linear relationship between variables. Statistical analysis was done by a separate group that did not examine the patients so as to minimize bias.

Results

A total of 107 patients fulfilled the inclusion and

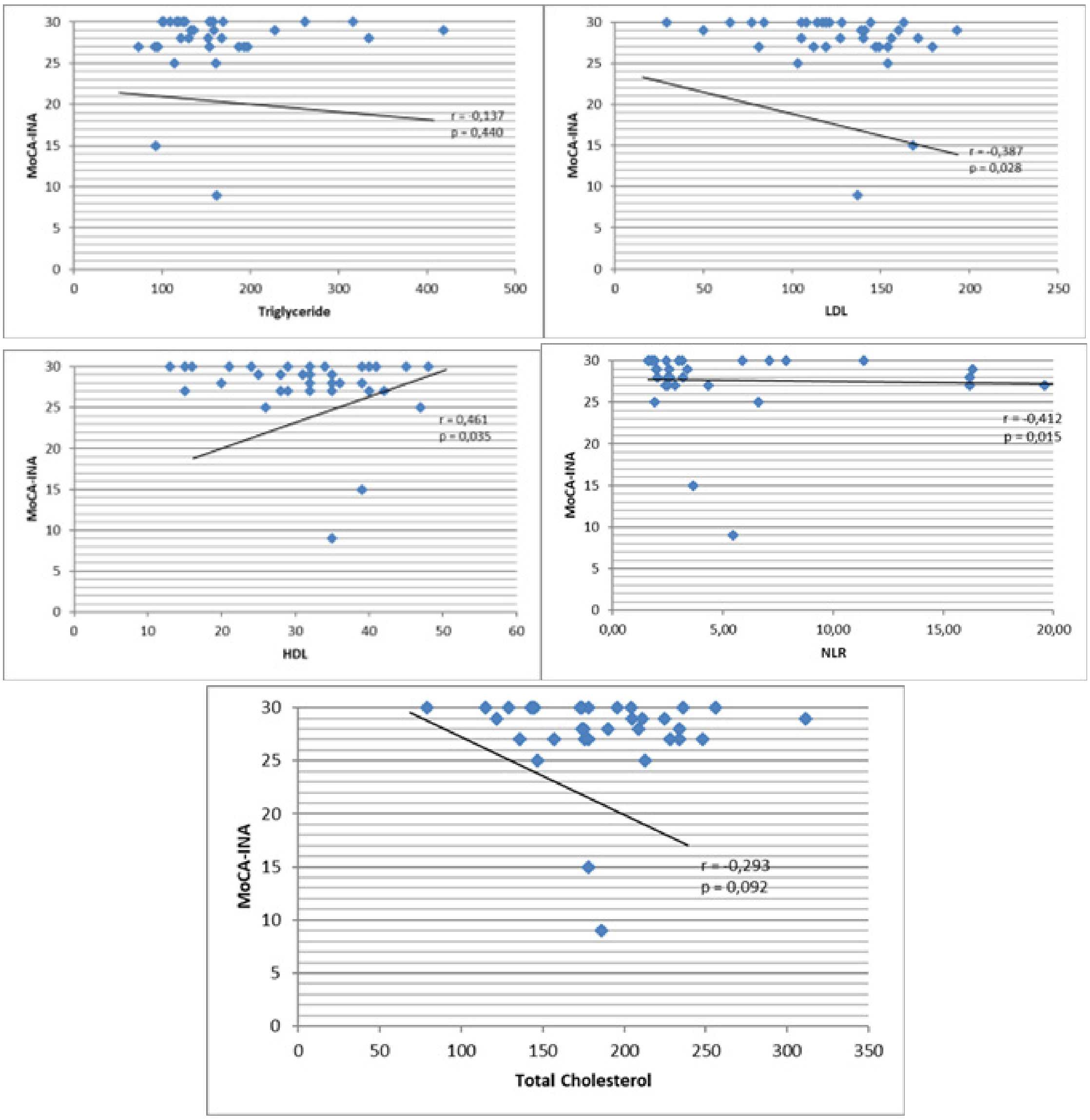

Figure 1. Correlation of total cholesterol, HDL, LDL, triglycerides, and NLR with MoCA-INA

exclusion criteria out of 948 acute ischemic stroke patients. They consisted of 62 men (57.9%) and 45 women (41.2%). The average age of the study subjects was 59.93 ± 9.55 years with an age range of 36 to 83 years. The highest number of research subjects was in the age group of 50-60 years, as many as 40 patients (37.4%). Meanwhile, the lowest number of study subjects was found in the age group between 80-90 years, totaling one person (0.9%). The NLR value of the total study subjects ranged from 1.33 - 37.84 with an average value of 5.01, while the value of the patient's MoCA-INA test ranged from 5 - 30 with an average value of 25.95, as shown in Table 1.

In the normality assessment using One-Sample Kolmogorov-Smirnov, it was found that the data distribution was not normal for INR and MoCA-INA values ($p<0.05$). The correlation assessment between lobe location and INR and MoCA-INA values was calculated using the Spearman correlation statistical method. Based on the statistical calculation results, it was found that the affected area did not give significant results on the NLR value and MoCA-INA score. However, the correlation assessment between the location of the affected area and the MoCA-INA score showed a generally negative trend except in the parietal lobe.

Based on the results of the correlation assessment between total cholesterol and MoCA-INA score (Figure 1.), it was found that an increase in total cholesterol had a negative correlation with the MoCA-INA score. This means that any increase in the total cholesterol value will cause a decrease in the MoCA-INA score. However, the correlation value of this assessment showed a low correlation value ($r = -0.293$) and insignificant results ($p = 0.092$).

Based on the results of the correlation assessment between HDL and MoCA-INA scores

(Figure 1.), it was found that an increase in HDL had a positive correlation with MoCA-INA scores. This means that any increase in HDL value will lead to an increase in MoCA-INA score. In assessing the correlation between HDL and MoCA-INA scores, the results were significant (p = 0.035) with a moderate correlation value (r = 0.461).

Based on the results of the correlation assessment between LDL and MoCA-INA scores (Figure 1.), it was found that an increase in LDL had a negative correlation with MoCA-INA scores. This means that any increase in LDL value will cause a decrease in MoCA-INA score. In assessing the correlation between LDL and MoCA-INA score, the results were significant (p = 0.028) with a low correlation value (r = -0.387).

Based on the results of the correlation assessment between triglycerides and MoCA-INA scores (Figure 1.), it was found that an increase in triglycerides had a negative correlation with MoCA-INA scores. This means that any increase in LDL values will lead to a decrease in MoCA-INA scores. In assessing the correlation of triglycerides with MoCA-INA scores, the results were not significant (p = 0.440) with a very weak correlation value (r = -0.137).

Based on the results of the correlation assessment between NLR and MoCA-INA score (Figure 1.), it was found that an increase in NLR has a negative correlation with the MoCA-INA score. This means that any increase in NLR value will lead to a decrease in MoCA-INA score. In assessing the correlation between NLR and MoCA-INA score, the results were significant (p = 0.015) with a moderate correlation value (r = -0.412).

Table 2 shows data on demographic differences between low-density lipoprotein (LDL) values and the MoCA-INA (Montreal Cognitive Assessment - Indonesia), which is a measurement tool to assess cognitive impairment. Cognitive impairment was divided into two categories, moderate-severe and mild. Meanwhile, LDL values were divided into two categories, namely high risk and low risk. From the table, there are demographic differences between LDL and MoCA-INA values. In general, high LDL values were associated with more severe cognitive impairment (72.2%) when compared to patients with low LDL values (20.75%). In its use as a predictor for worse cognitive events, LDL values had a sensitivity of 72.2%, specificity of 79.2% and accuracy of 75.7%.

Table 3 shows the correlation between NLR (neutrophil-to-lymphocyte ratio) values and MoCA-INA. From the table, there are differences in demographic data between NLR and MoCA-INA values. In general, high NLR values were associated with more severe cognitive impairment (81.1%), compared to low NLR (14.8%). In its use as a predictor for worse cognitive events, the NLR value had a sensitivity of 81.1%, specificity of 85.2% and accuracy of 83.2%.

Table 4 shows the correlation between lipid profiles (total cholesterol, HDL, LDL, and triglycerides) and NLR (neutrophil-to-lymphocyte ratio), which is an indicator of systemic inflammation. The r value indicates the magnitude of the relationship between two variables, while the p value indicates the statistical significance of the relationship. The Z value indicates the result of the difference test between the two correlations tested. From the table, only LDL has a moderately strong positive correlation with NLR (r = 0.489), but this relationship was not statistically significant (p = 0.058). This means that the higher the LDL value, the higher the NLR value, but this relationship cannot be confirmed because it may be due to other factors or coincidence. Total cholesterol, HDL, and triglycerides had no significant correlation with NLR (p > 0.05). The results of the difference test between the four correlations showed that there was no significant difference between the correlations of total cholesterol, HDL, LDL, and triglycerides with NLR values (Z = 0.7632, p > 0.05). This means that the four correlations have the same strength in explaining the relationship with NLR.

The results showed that there was no significant relationship between lipid profile and NLR, except for LDL which had a strong positive correlation but was not significant. This suggests that LDL may have an influence on systemic inflammation as measured by NLR, but this relationship needs to be further investigated using more accurate and sensitive methods. Total cholesterol, HDL, and triglycerides had no influence on NLR. In addition, there was no significant difference between the correlation of total cholesterol with NLR and the correlation of HDL with NLR.

Discussion

The Effect of Lipid Profile on Cognitive Function

Excessive low-density lipoproteins (LDL) have been shown to be involved in the narrowing of blood vessels, which may lead to ischemic stroke. Atherosclerosis, a chronic inflammatory disease characterized by serum lipid metabolism disorder and excessive cholesterol loading macrophages in the blood vessel wall, is the main cause of cerebrovascular diseases, including stroke (Li, J., et al., 2021). High concentrations of LDL cholesterol have been shown to increase the risk of ischemic stroke, while a reduction in LDL cholesterol levels has been associated with a decreased risk of ischemic stroke recurrence (Chen et al., 2020; Yuan et al., 2020). Furthermore, excess blood lipid levels, including LDL cholesterol, have been implicated in the initiation and progression of atherosclerosis, which can lead to a decrease in vessel diameter and elasticity, potentially impacting blood pressure and contributing to hypertension, ultimately leading to stroke (Austin et al., 2015).

The accumulation of LDL on the walls of blood vessels can cause hardening and narrowing of the arteries, leading to atherosclerosis, which, in turn, can block blood flow and trigger stroke (Ali et al., 2022). Macrophage cholesterol accumulation, a critical process in the development of atherosclerotic plaques, is considered a significant factor in heart attacks and strokes (Zhao et al., 2006). Additionally, carotid atherosclerosis has been identified as a major risk factor for stroke, even in the absence of advanced stenosis, highlighting the role of atherosclerosis in stroke risk (Daher et al., 2014; Liu et al., 2017).

The narrowing of blood vessels can significantly reduce brain oxygen levels, leading to adverse effects on brain function and health. Hypertensive disorders, such as hypertension, can promote stroke through increased shear stress, endothelial dysfunction, and large artery stiffness, which can transmit pulsatile flow to the cerebral microcirculation, ultimately impacting oxygen delivery to the brain (Cipolla et al., 2018). Additionally, hypercholesterolemia and immune mechanisms have been implicated in the pathogenesis of atherosclerosis, which can lead to the narrowing of blood vessels and subsequently reduce oxygen supply to the brain. Cerebral small vessel disease, a condition associated with stroke, can manifest as a reduction in brain oxygen levels due to compromised blood supply resulting from vessel abnormalities (Li et al., 2018). Acute ischemic stroke, characterized by decreased blood supply to the brain, leads to reduced oxygen supply and subsequent damage to brain tissue (Rahma et al., 2022). Furthermore, variations in blood oxygenation values have been reported in the presence of pathology, including brain ischemia, highlighting the impact on brain oxygen levels (Christen et al., 2012).

Excessive long-term inflammation of the blood vessel wall may lead to increased endothelial cell permeability and enhanced rates of lipid entry, exacerbating the development of atherosclerosis, which can contribute to reduced brain oxygen levels (Meng et al., 2020). The dramatic stiffening of blood vessels and the effective reduction in diameter can increase the risk of vessel blockage or rupture, leading to ischemic events such as stroke and impacting brain oxygenation (Browning et al., 2018). Small blood vessels within the brain are particularly vulnerable to damage due to high pressure and pulsatile flow, which can compromise oxygen delivery to the brain (Pase et al., 2016). Additionally, the accumulation of lipids in blood vessels can affect blood flow and oxygenation, potentially impacting brain oxygen levels (Wang et al., 2020).

The Effect of NLR on Cognitive Function

Numerous studies have shown that an elevated neutrophil lymphocyte ratio is associated with an increased risk of cognitive decline in various populations (Iyigundogdu et al., 2021). These findings suggest that the inflammatory response, represented by the neutrophil lymphocyte ratio, plays a crucial role in cognitive function and decline. Additionally, the neutrophil lymphocyte ratio has been proposed as a potential biomarker for predicting cognitive decline in post-stroke patients (Cunningham & Hennessy, 2015; Fest et al., 2019). Furthermore, studies have demonstrated that an elevated neutrophil lymphocyte ratio is associated with increased stroke severity, poorer functional outcomes, and higher mortality rates in post-stroke patients, further highlighting the potential importance of this marker in assessing cognitive function and overall prognosis (Chong et al., 2021; Ramos-Cejudo et al., 2021; Wan et al., 2020).

The Correlation between Lipid Profile and NLR

In addition to the impact of lipid profiles on cognitive function, recent research has also explored the association between lipid profile and neutrophil lymphocyte ratio in post-stroke patients (Angkananard et al., 2018; Tok et al., 2014; Wan et al., 2020; Xue et al., 2017). Neutrophil lymphocyte ratio is a marker of systemic inflammation and immune response. It is calculated by dividing the absolute neutrophil count by the absolute lymphocyte count and has been suggested as a potential indicator of inflammation and immune activation in various health conditions (Yu et al., 2023; Zhu et al., 2018; Zuo et al., 2019). Some studies have found a positive correlation between lipid profile and neutrophil lymphocyte ratio in post-stroke patients. These findings suggest that dyslipidemia may not only contribute to cognitive impairment but also promote systemic inflammation, leading to an increase in neutrophil lymphocyte ratio.

Furthermore, studies have shown that elevated neutrophil lymphocyte ratio is associated with poorer cognitive function and increased risk of cognitive decline in various populations, including post-stroke patients (Huang et al., 2023; Leonardo & Fregni, 2023; Lin et al., 2018; McColl et al., 2007). However, it is important to note that the relationship between lipid profile, neutrophil lymphocyte ratio, and cognitive function is complex and multifactorial, and further research is needed to fully understand the underlying mechanisms and potential therapeutic implications (Bi et al., 2021; Gimeno et al., 2008; Wang et al., 2020). Moreover, the association between lipid profile and neutrophil lymphocyte ratio in post-stroke patients adds another layer of complexity to our understanding of the relationship between inflammation, lipid metabolism, and cognitive function. These findings suggest the potential role of lipid profile and neutrophil lymphocyte ratio as biomarkers for assessing cognitive function and inflammatory status in post-stroke patients (Iyigundogdu et al., 2021).

The Effect of Lesion Location on Cognitive Impairment

According to recent studies, several areas of the brain have been associated with post-stroke cognitive impairment. A study identified these areas to be the left angular gyrus, left basal ganglia structures and the white matter around the left basal ganglia (Weaver et al., 2021). Another study identified the anterior thalamic radiation as a crucial area, where a lesion in that area would sever structural connections to the frontal lobe (Lim et al., 2021). Another study identified lesions in the temporal area, or involving multiple sites lead to a higher incidence of cognitive impairment (Utomo & Pinzon, 2023). These variance warrants for a more uniformed description of lesion location in the event of post-stroke cognitive impairment. This would allow a more homogenous data comparison between studies and determine lesion locations that would predict post-stroke cognitive impairment.

Conclusions

In conclusion, our study found that lipid profile is correlated to cognitive function in post-stroke patients, with HDL being a protective factor, and LDL a risk factor. We also found a higher NLR to be a reliable predictor of worse cognitive function. Regarding the correlation between lipid profile and NLR, we found that LDL is directly proportional to NLR, despite not being significant, whereas the other lipid parameters had no effect on NLR. The possible mechanisms underlying these findings have also been discussed, namely the deposition of lipid plaques in the blood vessels, which will, in turn, reduce cerebral perfusion. Regarding lesion location and its impact on cognitive impairment, future research needs to be more uniformed in reporting the areas involved to enable a more thorough analysis. This study is limited in explaining the causality of these factors as it is a cross-sectional study. Future cohort and case control studies are needed to determine the causality of these variables. In nursing practice, these findings may inform the use of lipid profile and NLR to potentially predict cognitive impairment in post stroke patients.

Declaration of Interest

All authors declare that they have no conflict of interests.

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Data Availability

All data generated or analyzed during this study are included in this published article (and its supplementary information files).

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Perceived benefit is the strongest determinant factor of medication adherence in the elderly with hypertension

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Abstract

Background: The level of medication adherence among the elderly with hypertension is decreasing globally, including in Indonesia. Medication adherence is a major factor in treatment effectiveness for hypertensive patients. The Health Belief Model is one of the theories illustrating factors influencing patients' medication adherence.
Purpose: This study aimed to analyze determinant factors of medication adherence among the elderly with hypertension based on the application of the health belief model.
Methods: This is a descriptive-analytic study with a cross-sectional approach. Sampling used a proportional stratified random sampling technique involving 193 patients with hypertension recruited from one of the Regional General Hospitals in Denpasar City Center. Data were obtained using three questionnaires, namely demographic characteristics, the health belief model (HBM), and the Morisky Medication Adherence Scale (MMAS-8). Data were analyzed using binary logistic regression.
Results: The research results showed the majority of respondents (62.7%) were compliant in taking medication. Multivariate test results showed that perceived susceptibility (p <0.001; AOR: 5.163), perceived benefits (p <0.001; AOR: 12.061), self-efficacy (p <0.001; AOR: 3.213), perceived barriers (p <0.001; AOR: 0.133) and cues to action (p <0.001; AOR: 3.480) is related to medication adherence in the elderly with hypertension.
Conclusion: Perceived benefit is the strongest determining factor of medication adherence among the elderly with hypertension. Respondents with high belief in perceived benefits tend to adhere to medication 12.061 times compared to respondents with low belief in perceived benefits. Health workers are advised to increase the elderly's belief in the perceived benefits and perceived susceptibility to increase their medication adherence.

Keywords: elderly; health belief model; hypertension; medication adherence

Introduction

The incidence of hypertension in the world is increasing with increasing age groups. The World Health Organization (WHO) estimates that, by 2021, as many as 1.28 billion adults aged 30-79 years worldwide will suffer from hypertension. Riskesdas in 2019 also stated that more than 63.3 million people live with hypertension in Indonesia and most of them are elderly, numbering 135.4 thousand people (Ministry of Health, 2019). It indicated that hypertension is more prevalent among elderly.

The elderly with hypertension are at risk for complications. According to the WHO (2021), uncontrolled hypertension in patients, especially the elderly, can increase the risk of complications, namely heart disease, stroke, and kidney failure (WHO, 2021). Complications can be minimized by adhering to treatment because hypertension is incurable (WHO, 2021).

The increased risk of complications and even death can be caused by low medication adherence. Low medication adherence minimizes therapeutic effects and resulting in an increased risk for complications, even death (Burnier, 2017). Patients' medication adherence is challenging as hypertension medication is a lifelong action. The tendency of low medication adherence is more commonly found in the elderly with hypertension. Several studies found that only 30.8% (Amry et al., 2021) and 37.5% (Asseggaf & Ulfah, 2022) of the elderly with hypertension adhered to the recommended medication. However, the elderly are classified as compliant with taking medication if the percentage is > 80%. Based on several studies, it can be concluded that compliance with taking medication for elderly people is currently still low.

An increase in medication adherence in the elderly with hypertension can occur when the elderly recognize the benefits of changing lifestyle behaviors and believe that they are vulnerable to complications of hypertension (Notoatmodjo, 2010; Raingruber, 2014). According to the health belief model (HBM), medication adherence among elderly with hypertension is based on the patient's beliefs about the disease and prevention or management behavior. The HBM states that individual behavior is based on beliefs regarding perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy, and cues to action (Rosenstock et al., 1988). Among elderly with hypertension who have self-confidence (Harmili & Huriah, 2019; Shen et al., 2020), a belief in perceived vulnerability and severity can take action to control hypertension by trying to adhere to taking medication (Joho, 2021; Suhat et al., 2022). The elderly then assess the perceived benefits and perceived barriers in medication adherence so that they can encourage medication adherence (Amry et al., 2021; Arindari & Suswitha, 2020; Joho, 2021; Obirikorang et al., 2018). Cues to act can also encourage a person's involvement in health-promoting behavior, thereby increasing adherence to taking medication (Onoruoiza et al., 2015). Based on these studies, it can be concluded that each component of HBM has been proven to influence medication adherence in hypertension patients.

Regardless of those facts, little is documented the assessment of the health belief model variable in determining medication adherence, particularly among the elderly with hypertension. In fact, the HBM factor has proven useful for analyzing an individual's beliefs to potentially predict a patient's healthy actions. Therefore, this study aims to analyze determinant factors of medication adherence among the elderly with hypertension based on the application of the health belief model.

Materials and Methods

Design

This study employed a cross-sectional design that examined the correlation between demographic characteristics (age, gender, education level, income), length of hypertension, perceived susceptibility, perceived severity, perceived benefit, self-efficacy, perceived barrier, and cues to action with medication adherence.

Sample and setting

The sample criteria were determined by the researcher to anticipate bias. The inclusion criteria in this study were elderly aged more than 60 years who had systolic blood pressure ≥150 mmHg and diastolic blood pressure ≥90 mmHg, received antihypertensive treatment for at least six months, elderly with hypertension who visited for treatment at one of the Regional General Hospitals in Denpasar City Center, elderly who can read and write, as well as patients willing to become respondents and sign informed consent. Hypertensive patients with physical limitations (blind, speech impaired, deaf), hypertensive patients whose medical records showed they experienced mental disorders, and hypertensive patients who were uncooperative and withdrew were excluded from this study.

Sampling was conducted using a simple random sampling technique involving 193 respondents. The minimum sample size for the study was calculated using the WHO sample size application. Considering that the estimated proportion in the population is unknown, we applied P1=0.5 (Sastroasmoro & Ismael, 2014). The population proportion that researchers expect is P2=0.67 in accordance with previous research. The power of the test uses 90% with a precision degree of this research of 5%, so the minimum sample size in the research is 175 samples. To anticipate anticipating non-response or missing data, the sample was added by 10%. Therefore, the minimum sample obtained in the research was 193 samples.

Previous researchers found the population by looking at medical record data and found 201 people. Then the random method was used, namely random numbers, by assigning a number to each sample unit; when the same number is found or a number that is greater than the total sample units, it is ignored and random selection continues until the required number of samples is acquired. Anonymity was assured in all processes.

Data collection

The data were obtained using questionnaires. Data were obtained using several questionnaires. Data collection was carried out by the first researcher meeting predetermined hypertension patients by looking at the patient's medical record data to confirm the patient's hypertension status. Then the second researcher explained the objectives, benefits of the research, and guaranteed confidentiality to the respondents. Next, the first and second researchers asked for the research subjects' willingness to become respondents by filling out a statement of consent from research respondents. Data collection was carried out in October-December 2022.

Table 1. Characteristics of the respondents (n=193)

Variable	Medication Adherence					
	Adhere		Non-Adhere		Total	p-value
	n	%	n	%		
Age (years)						0.275
60-69	88	72.7	47	65.3	135	
≥70	33	27.3	25	34.7	58	
Gender						0.027
Male	54	44.6	44	61.1	98	
Female	67	55.4	28	38.9	95	
Education level						<0.001
Low	16	13.2	28	38.9	44	
High	105	86.8	44	61.1	149	
Income						0.198
<UMR	62	51.2	30	41.7	92	
≥UMR	59	48.8	42	58.3	101	
Length of suffering						0.015
< 5 years	59	48.8	48	66.7	107	
≥ 5 years	62	51.2	24	33.3	86	
Perceived susceptibility						<0.001
High	67	55.4	10	13.9	77	
Low	54	44.6	62	86.1	116	
Perceived severity						0.012
High	81	66.9	35	48.6	116	
Low	40	33.1	37	51.4	77	
Perceived benefit						<0.001
High	74	61.2	12	16.7	86	
Low	47	38.8	60	83.3	107	
Self-efficacy						<0.001
High	106	87.6	43	59.7	149	
Low	15	12.4	29	40.3	44	
Perceived barrier						0.001
High	36	29.8	38	52.8	74	
Low	85	70.2	34	47.2	119	
Cues to action						<0.001
High	77	63.6	27	37.5	89	
Low	44	36.4	45	62.5	104	

Variables

The selection of independent variables in this study is based on the health belief model conceptual framework. Independent variables of this study were age, gender, education level, income, length of hypertension, perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy, and cues to action, while the dependent variable was medication adherence among the elderly with hypertension.

Ethical consideration

This study was approved by the Research Ethics Committee of the Institute of Technology and Health Bali, number 04.0518/KEPITEKES-BALI/IX/2022, and the Research Ethics Committee at one of the Regional General Hospitals in Denpasar City Center, number 101/X.10/KEP/RSW/2022.

Instruments

Researchers used three research instruments, namely demographic characteristics of respondents,

Table 2. Logistic regression determinant factors of medication adherence in the elderly with hypertension in Wangaya Regional General Hospital (n=193)

Variable	p-value	Adjusted odds ratio	95% C.I for Odds Ratio	
			Lower	Upper
Education level	<0.001	11.286	3.231	39.422
Length of Suffering	0.006	3.587	1.439	8.942
Perceived susceptibility	0.004	5.163	1.694	15.734
Perceived benefit	<0.001	12.061	3.639	39.969
Self-efficacy	0.028	3.213	1.131	9.123
Perceived barrier	<0.001	0.133	0.050	0.358
Cues to action	0.007	3.480	1.396	8.680

the health belief model (to measure the health beliefs of the elderly with hypertension (Rusmadi et al., 2021), and the Morisky Medication Adherence Scale (MMAS-8) to measure the medication adherence variable (Sinuraya et al., 2018). Demographic characteristics of respondents' instruments included questions about age, gender, education level, and income. We categorized age into a dichotomous variable, 60-69 and, 70 years plus, educational level of no formal school to high school graduates as low educational level, and university graduates as high educational level. For income, we categorized the incomes of those lower than the regional minimum wage as low and equal to or higher than the regional minimum wage as high.

The HBM instrument used in this research is the Indonesian version which has been used in previous research (Rusmadi et al., 2021). This instrument has been tested for validity (r>0.361) and reliability (Cronbach's alpha of 0.927) and was declared valid and reliable. The questionnaire consists of six dimensions (37 question items), namely perceived susceptibility (8 items), perceived severity (3 items), perceived benefits (7 items), perceived barriers (6 items), self-efficacy (6 items), and cues to action (7 items). A Likert scale consists of four option answers ranging from 1 (strongly disagree) to 4 (strongly agree) The results were categorized into high (the confidence value is ≥ the average of the total scores from all questions related to each HBM component) and low (the value is < the average of the total number of answer scores from all questions related to each HBM component (Rusmadi et al., 2021).

The MMAS-8 instrument used in this research is the Indonesian version which has been used in previous research (Sinuraya et al., 2018). This instrument has been tested for validity (r>0.45) and reliability (Cronbach's alpha of 0.764) and has been declared valid and reliable. The questionnaire contains eight questions with the answer "yes" or "no," where the answer "yes" has a score of 0 and the answer "no" has a score of 1. Determining the level of compliance is obtained from the total score entered into the "comply" category (total score 6-8), and "non-compliant" (total score <6) (Sinuraya et al., 2018).

Data Analysis

The chi-square test was applied for bivariate analyses. All statistical analyses were two-tailed with statistical significance defined as $p<0.05$. Logistic regression was conducted to identify determinants-squared factors by entering all variables that showed $p < 0.25$ in bivariate analyses (Bursac et al., 2008). We entered several variables simultaneously in the logistic regression model to obtain the adjusted odds ratio. The output variables in this study are binomial scale data so they meet the logistic regression assumptions. To reduce bias in this research, we carried out a data cleaning process which aims to avoid missing data or errors in data input, then carried out a bivariate and multivariate testing or data analysis process to remove bias or confounding variables.

Results

General Characteristics of the Respondents

Respondents in this study were primarily male (50.8%), aged 60-69 years (69.9%), highly educated (77.2%) and income above the minimum wage (52.3%). The duration of most respondents in this study suffering from hypertension was <5 years (55.4%) (Table 1).

A total of 121 (62.7%) respondents adhered to taking medication. Most of the respondents had low perceptions of several variables, namely perceived susceptibility (60.1%), perceived benefits (55.4%), and perceived barriers (61.7%). In contrast to other health belief variables, it was found that the majority of respondents had high perceptions of severity (60.1%), self-efficacy (77.2%), and cues to act (53.9%) (Table 1).

This research also found the highest score for each factor determining compliance based on the HBM approach as seen from the results of respondents' responses. In responses regarding perceived susceptibility, it was found that the majority of respondents responded that, if they did not comply with the medication given, they agreed that they were susceptible to peripheral vascular disease. In responses regarding perceived severity, it was found that the majority of respondents responded that, if they did not comply with the medication given, they did not agree that it would be fine. In responses regarding perceived benefits, it was found that more respondents felt that the benefits of explaining information obtained from pharmacists or doctors regarding drugs could prevent errors in drug use. In responses regarding self-efficacy, it was found that most agreed that they felt that their confidence in medicine had currently increased. In responses regarding perceived barriers, it was found that the majority of respondents did not agree that they did not understand how to use drugs correctly. In responses regarding cues to action, it was found that the majority of respondents agreed that information and education from pharmacists would be very important to help them undergo treatment.

Determinant Factors of Medication Adherence in Elderly with Hypertension

Factors that significantly related to medication adherence among the elderly with hypertension were gender, education level, length hypertension, perceived susceptibility, perceived severity, perceived benefit, self-efficacy, perceived barrier, and cues to action ($p<0.005$). Age and income were not significantly related to medication adherence in the elderly with hypertension (Table 1).

Logistic regression was performed to assess the impact of several factors on medication adherence in the elderly with hypertension. Independent variables were analyzed with a significance value limit ($p<0.25$) totaling 10 variables (gender, education level, income, length of suffering, perceived susceptibility, perceived severity, perceived benefit, self-efficacy, perceived barrier, and cues to action). Perceived benefits were the strongest predictor with an AOR value of 12.061, which means that respondents who had high perceived benefits were 12.061 times more likely to comply with taking hypertension medication compared to respondents who had low perceived benefits. The level of education also had a strong correlation with medication compliance, which means that respondents with a higher level of education (diploma to doctoral education programs) were 11.286 times more likely to comply with medication compared to those with a low level of education (not attending school until graduating from high school/equivalent). In contrast, respondents with high perceived benefits were less likely to comply with medication adherence with AOR 0.133 (Table 2).

Discussion

This study analyzed the factors correlated to the medication adherence in elderly with hypertension who go to the heart polyclinic at Wangaya Regional General Hospital based on the HBM theory. This study found that there was a positive relationship between education level, length of suffering, and medication adherence. We also found that significant predictors of using the HBM construct were perceived susceptibility, perceived severity, perceived benefit, self-efficacy, perceived barrier, and cues to action. After controlling for all factor variables among the HMB constructs, the strongest predictor was the perceived benefit of using the medicine.

High perceived benefits have a strong influence on elderly people with hypertension who adhere to taking medication due to the earlier actions taken by the elderly for their health depending on the perceived benefits (Notoatmodjo, 2010b). Belief in perceived benefits will change individual beliefs to adhere to taking antihypertensive medication, as seen by the majority of respondents who adhere to taking medication who have high perceived benefits (55.4%). The HBM theory also states that someone who has a high belief in benefits will get rid of various obstacles experienced and have a positive influence on himself (Notoatmodjo, 2010b; Raingruber, 2014).

The possibility that an individual will take action to prevent the disease from worsening depends heavily on considerations about the perceived benefits followed by the magnitude of the threat to health, namely perceived susceptibility (Soesanto, 2022). In line with this research, it proves that what most influences adherence to taking medication in the elderly with hypertension is the elderly's high belief in perceived benefits. Then, this research found that, after the perceived benefits, it was followed by other beliefs that could influence medication adherence, namely perceived susceptibility, cues to act, self-efficacy, and perceived barriers.

Considerations of benefits and the magnitude of threats can also be influenced by cues to act originating from information or advice regarding health problems and individual views about one's ability to adhere hypertension medication (Yanti et al., 2020). In line with this research, this study also found that most of the elderly with hypertension who adhered to taking medication had high cues to act (63.6%) and respondents who received cues to act high were likely to adhere to taking hypertension medication by 3.480 times more than respondents with low cues to act. The elderly with hypertension who have high cues to act in this study can mean that they are actively seeking information related to hypertension medication by consulting a doctor and getting education from health workers so that they know more about the benefits of taking medication. This active activity of gathering information has been proven to encourage elderly people to adhere to taking medication in previous research (G/Tsadik et al., 2020).

Differently, research by Amry et al. (2021) found there was no relationship between cues to action and medication adherence among elderly with hypertension. The level of education factor can be the reason for the lack of interest of the elderly in their research to seek information on social media, peers, and health workers. Most of the education levels of the elderly in the study were low (80.77%), in contrast to this study, where most of their last education levels were tertiary education (77.2%). This study also proves that the level of higher education is at the second highest level after perceived benefits in influencing the compliance of elderly people with hypertension with taking medication based on the results of logistic regression analysis. The level of higher education is proven to be closely related to the level of knowledge and activeness of a person in seeking information (Chasanah & Supratman, 2018; Krisnandari & Rahyanti, 2022; Sutrisno et al., 2018). The HBM theory also states that cues to action can be achieved through encouragement to trigger health-related decision-making processes, both internally and externally, for example, through information from the media and health services about the benefits of adhering to taking medication (Raingruber, 2014).

Perceived benefits of taking hypertension medication are also said to show a significant negative relationship with perceived barriers; this means that the higher the perceived benefits the lower the perceived barriers (Joho, 2021). This study also found the same thing, namely the elderly who were most compliant with taking medication were those who had high perceived benefits (61.2%), but low perceived barriers (70.2%). This indicates that the majority of elderly with hypertension in this study felt more benefits when they adhered to taking medication and most did not experience significant barriers when they adhered to taking medication. This is in line with the HBM theory which states that, even though a person feels a health condition is a threat and believes that certain actions will effectively reduce the threat, beliefs about obstacles can prevent them from taking recommended health actions (Raingruber, 2014). The perceived benefits must outweigh the perceived barriers for behavior change to occur. Therefore, health workers play an important role in knowing the management and ways of dealing with medication problems for the elderly, so that they can reduce medication errors and increase medication adherence in the elderly with hypertension (Suyasa & Sutini, 2021).

Perceived benefits are also influenced by the culture and social demographics of the individual (Hastuti & Mufarokhah, 2019). This study found that the majority of respondents who adhered to taking medication were elderly people who had suffered from hypertension for ≥5 years (51.1%). However, this is not in line with previous research which found that the longer a person suffers from hypertension, the less likely they are to adhere to taking medication (Said, 2022). The difference found in the 2022 study could be because the majority of respondents had hypertension for <5 years so respondents still felt they did not benefit from taking hypertension medication. In contrast to the findings of this study, the majority of elderly people who adhere to taking medication are that those who have suffered from hypertension for ≥5 years have a high perception of benefit, and are also more compliant with taking medication (61.2%). Elderly people who suffer from hypertension for a longer time often benefit from treatment, so they tend to have high self-efficacy regarding their health (Liberty et al., 2018; Raingruber, 2014; Sekunda et al., 2021). This research found that elderly people who adhere to taking medication have high self-efficacy regarding their health (87.6%). A high perception of health is important to increase the elderly's commitment to taking medication and will also influence their quality of life for the better (Kamaryati et al., 2019; Zangiabadi et al., 2022).

Four variables have been released in a multivariate manner in this research, namely age, gender, income, and perceived severity, which can be seen in Table 2. Based on previous research, the factors of age (Fitriananci et al., 2022), gender (Tambuwun et al., 2021), income (Valassi et al., 2019), and perceived severity (Arindari & Suswitha, 2020; Joho, 2021; Suhat et al., 2022) were found to be correlated with medication adherence; however, in this study, these factors were not proven to influence adherence to medication in the elderly with hypertension so these factors became confounding factors in this study. The HBM theory explains that age can influence beliefs about health which can ultimately shape health behavior. However, the age of individuals said to influence the increase in health beliefs are older adults compared to younger adults (National Institutes of Health, 2012; Rosenstock et al., 1994). As age increases, an individual's life experience increases, influencing their mindset to take positive action regarding their health. This may have also resulted in no relationship between age and medication adherence in this study because all respondents in this study were elderly and the majority (53.9%) had high cues to act or high drive to trigger the process of taking recommended health actions.

In this study, gender as shown in Table 2 was not proven to be a predictor variable that had a direct influence on medication adherence in elderly people with hypertension. This is different from the previous HBM theory which states that gender can be a modifying factor that influences HBM so that ultimately individuals can carry out healthy behavior (National Institutes of Health, 2012; Rosenstock et al., 1994). Previous research results also showed a significant relationship between the two and it was found that female respondents were more compliant with taking hypertension medication (Poormuhamad & Jalili, 2017; Yue et al., 2015). In contrast, this study reported that the difference in adherence to taking hypertension medication was not too great between men (44.6%) and women (55.4%). This could be concluded there is no relationship between gender and compliance with taking medication in elderly people with hypertension. Gender influences hypertension control behavior, more so because men tend to be disobedient. Men tend to be aggressive, adventurous, free-spirited, rude, and more willing to take risks, including the risk of not complying with taking medication, compared to women (Amin, 2018).

Based on the HBM theory, the respondent's income is one of the factors that can influence the main forming beliefs of the HBM theory so that individuals can carry out healthy behavior (Rosenstock et al., 1994). In contrast, this study found no significant relationship between income and compliance with taking medication for elderly people with hypertension. This is because most patients currently take advantage of the health insurance program as seen from BPS (Central Statistics Agency) data for 2021 which found that 69.62% of the population in Indonesia had health insurance. This presentation increased by 1.26% compared to the previous year (BPS, 2021). Previous research also reported that medical costs were not considered an obstacle to medication adherence. Most respondents could obtain medication easily at community health centers or referral hospitals by utilizing the government's BPJS program (Arindari & Suswitha, 2020).

Perceived benefits were also found to have no direct effect on elderly medication adherence in this study. This could be because, apart from feeling a high perceived benefit, the individual also needs to have a high perceived susceptibility to change their health behavior. Previous research supports this research which states that beliefs about susceptibility to complications and the perceived seriousness of the disease describe the magnitude of the threat to one's health (Conner & Norman, 2005). The magnitude of the threat a person feels can change health behavior for the better, including medication adherence (Notoatmodjo, 2010; Raingruber, 2014; Rosenstock et al., 1994).

This research has limitations, namely that it uses a cross-sectional approach which lasts for a limited time and only serves to prove the conditions that occurred at the time of the research, allowing for changes in research results in the future. Therefore, it is hoped that this research can become the basis for subsequent research by considering the time period so that it can truly prove that the perceived benefit factor of elderly people influences compliance with taking hypertension medication.

Conclusion

The perceived benefit factor is the determinant factor most related to adherence to medication adherence in elderly people with hypertension. Nurses in hospitals are expected to be able to increase the perceived benefits of the elderly by developing a hypertension management counseling program with the families of the elderly, especially for the elderly with low medication compliance using the health belief model approach to help find the problems faced by the elderly in meeting their medication compliance. Family involvement here is important considering the limitations that elderly people may face in their long-term care. Educational institutions should also add teaching materials related to factors in medication compliance for elderly people with hypertension through the HBM approach. Future researchers can conduct further research using qualitative descriptive methods through in-depth interviews to determine the influence of beliefs about perceived benefits on medication adherence in elderly people with hypertension to obtain coherent research results.

Declaration of Interest

The authors state that there is no conflict of interest.

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Data Availability

The corresponding author will provide the interested parties with access to the datasets created or analyzed upon the reasonable request.

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How hemodialysis patients manage dietary and fluid intake? A descriptive qualitative study

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Abstract

Background: Managing dietary and fluid intake for hemodialysis patients is crucial, but it is also challenging. Non-compliance to diet and fluid intake restriction may increase a patient's morbidity and mortality. Exploring the experiences of hemodialysis patients who successfully manage those regimens may provide new insight to develop more effective strategies.
Purpose: The study aimed to explore the experiences of hemodialysis patients who successfully manage the dietary and fluid intake restrictions.
Methods: A descriptive qualitative study was applied. Semi–structured interviews were conducted with 15 hemodialysis patients purposively recruited from a hemodialysis unit of a public hospital in West Sumatera, Indonesia. Interviews were transcribed verbatim and thematically analyzed to describe the phenomenon of hemodialysis patients. The study was reported following the COREQ guidelines.
Results: Most participants in this study are female, aged between 38 – 63 years and length of hemodialysis 4 months – 6 years. The finding of this study was that the essential themes that explained how hemodialysis patients adhere to fluid and dietary restrictions are 1) strategies for restricting fluid and dietary intake, 2) motivation to restrict fluid and dietary intake, 3) fear of the effects of non-adherence to fluid and dietary restrictions and 4) social support.
Conclusion: Hemodialysis patients who successfully manage the dietary and fluid intake restriction employed various strategies, including maintaining motivation, facing fear of potential complications, and seeking social support. It is important for healthcare professionals to include those aspects when they provide education to the hemodialysis patients. Further study is warranted to explore the long-term impact of these strategies on patient outcomes and the development of educational programs that incorporate psychological and social support components to improve hemodialysis patients' adherence and quality of life.

Keywords: dietary; fluid; hemodialysis; qualitative study; restriction

Introduction

Chronic kidney disease (CKD) is a major health problem worldwide. It is considered to have poor health outcomes among most non-communicable diseases, including cardiovascular disease, hypertension, and diabetes (Luyckx et al., 2018). Globally, around 13% of people suffer from CKD, and the mortality rate has been rising, especially in lower-middle-income countries (GBD Chronic Kidney Disease Collaboration, 2020; Hill et al., 2016). Additionally, the number of patients requiring hemodialysis (HD) has been rising over time. In Indonesia, approximately 98% of patients with CKD use hemodialysis as a renal replacement therapy (Indonesian Renal Registry (IRR), 2018).

Hemodialysis patients are responsible for many aspects of their treatment. These components include adhering to dietary and fluid restrictions, taking prescribed medications, and attending hemodialysis sessions (Lambert et al., 2017; Murali et al., 2019; Okoyo Opiyo et al., 2020). Hemodialysis patients are a unique patient population in terms of treatment adherence, since the treatment complexity affects many aspects of their lives. To optimally manage

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the disease, along with lifetime behavioral and social readjusting, a comprehensive approach is required to harmonize multiple aspects of dialysis treatment, including medication and fluid and dietary intake (Curtin et al., 2005). Additionally, fluid and dietary restrictions have transformed into a foundation of the majority of hemodialysis patients' lives (Clark-Cutaia et al., 2019). Hemodialysis patients are expected to adhere to therapy regimens (Chironda & Bhengu, 2016; Lin et al., 2017; Naderifar et al., 2019). and as such patient adherence is as fundamental a component of effective healthcare as the treatment regimen itself, while the positive clinical outcome in hemodialysis patients primarily relies on rigorous adherence to therapeutic regimens (Howren et al., 2013).

However, some studies found that many hemodialysis patients have non-adherence to those regimens with between 30% to 60% of individuals undergoing hemodialysis failing to follow recommended intake levels for fluids and salt. The proportion of adherence in this patient population is still under 74% (Howren et al., 2016). Failure to comply with dietary and fluid restrictions may lead to higher morbidity and mortality rate due to accumulation of toxic fluids and end products of metabolism in the blood (Chen et al., 2016).

A number of studies have been conducted in exploring the hemodialysis patients' experiences; however, there has been limited study which explored the experiences of patients who successfully managed fluid and dietary intake. Previous study was unable to show the specific strategies practically applied and how to effectively manage fluid and dietary intake among hemodialysis patients. The lesson learned from these successful experiences would benefit other hemodialysis patients to gain new insight related to an alternative strategy for managing the fluid and diet restriction. Additionally, it also helps health professionals, especially hemodialysis nurses and teams, in developing programs or methods to effectively manage the dietary and fluid intake restriction among hemodialysis patients. The study was aimed to explore hemodialysis patients' experiences in how they successfully manage their fluid and dietary intake restriction.

Materials and Methods

Design and participants

Descriptive qualitative research is a study that seeks to understand the phenomenon of the subject of research, behavior, perception, motivation, action, etc., holistically, and the way of describing the result in the form of words (Moleong, 2016). It generates data that describe the 'who, what, and where of events or experiences' from a subjective perspective (Kim et al., 2017). This study used a descriptive qualitative study for exploring the hemodialysis patients' experiences in how they successfully manage their fluid and dietary intake restriction. This study explores what experiences participants have and describes the findings in a way that directly reflects or closely resembles the terminology used in the initial research question (Cleary et al., 2014).

Samples

The sample of participants was drawn from a hemodialysis unit in a public hospital at West Sumatera Province, Indonesia. The sample of this study consisted of 15 hemodialysis patients. Broadly, informants were selected because of their personal experience or knowledge of the topic under study (Cleary et al., 2014). A purposive techniques sampling was used and the participants were recruited based on inclusion criteria. Patients undergoing hemodialysis for at least three months who successfully adhere to fluid and dietary restrictions indicated by the average of one-month inter-dialytic weight gain (IDWG) <2.5% were selected as participants.

Initially the principal investigator, facilitated by the hemodialysis head nurse, approached the eligible patients and informed them the research information, data collection procedures and asked their willingness to participate in this study. The information given also included the information that their participation in this study was voluntary and they could withdraw from this study without any consequences. Those who were willing to participate were then asked to provide written consent. Participant recruitment processes were continued until the data were saturated as indicated by the repetitive information and no new information gained. In this study, data saturation was achieved with 15 participants.

Ethical Consideration

Ethical approval for the study was granted by Public Hospital of Padang with number LB.02.02/5.7/195/16.5.2022. The study conforms to the ethical standards set out in the Declaration of Helsinki (World Medical Association, 2013). The participants provided informed consent before the interview was conducted. The respondents were informed with a written and verbal agreement of recruiting and interviewing, acknowledging their knowledge of the study's goal and potential benefits, and their right to remain anonymous. In this study none of the participants withdrew from the study.

Data Collection

Semi-structured interviews were carried out to explore hemodialysis patients' experiences in restricting fluid and dietary intake. The interview guideline was made based on fluid and dietary restrictions procedures. The interviews were conducted in the hemodialysis unit by the researchers (DPL, EAM, MM), individually and face-to-face, and recordings were made. In this study, each researcher interviewed five participants and conducted one-on-one interviews. Interviews were conducted between July – August 2022. Interviews lasted for around 45

Table 1. Participants Characteristics

Initial	Gender	Age (years)	Hemodialysis Duration	Education
P1	Female	62 years	4 months	Bachelor's degree
P2	Female	50 years	3 years	Elementary School
P3	Male	38 years	9 months	Senior High School
P4	Female	57 years	4 months	Junior High School
P5	Male	51 years	4 years	Bachelor's degree
P6	Female	39 years	7 months	Bachelor's degree
P7	Female	63 years	2 years	Bachelor's degree
P8	Female	44 years	1.5 years	Junior High School
P9	Male	58 years	6 months	Elementary School
P10	Male	54 years	1 year	Bachelor's degree
P11	Male	50 years	6 months	Bachelor's degree
P12	Female	51 years	3 years	Junior High School
P13	Female	62 years	6 years	Senior High School
P14	Female	46 years	3.5 years	Junior High School
P15	Female	40 years	3 years	Senior High School

– 60 minutes for each participant. Three participants (P4, P9, P12) conducted two interview sessions.

The interview guide was developed collaboratively by the research team including suggestions from the literature, pilot test and being refined following a staged process (Kallio et al., 2016). In this study, the interview guideline was developed by the research team based on the concept of fluid and dietary recommendation for hemodialysis patients from Daugirdas et al. (2015). Questions were intended as a guide for the interviewer, and additional probing questions were developed based on the participants' responses during the interview processes to further explore and gain greater depth of description about participants' experiences. The main questions posed to explore the phenomenon under study was "Could you tell me your experience as a hemodialysis patient?" After the participants answered the trigger question the researcher followed up by specific questions regarding their experience in managing their fluid and dietary intake.

This manuscript has been prepared in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007).

Data Analysis

All interviews were anonymized and later transcribed verbatim. The verbatim transcripts were reviewed for accuracy by two of the researchers, and printed transcript documents were used for the data analysis. Data were analyzed using thematic and qualitative content analysis. First, thematic analysis, using Clarke and Braun's (2013) six-step process, was conducted to systematically identifying and organizing patterns across our data. Each transcript, which consisted of words and phrases was read and data were formulated into coding separately by the research team (DPL & EAM). Nineteen codes were aggregated into clusters or rudimentary themes. Similarly, focus and scope were analyzed based on theory of fluid and dietary management. The discussion was conducted by the research team to consider and confirm themes and sub-themes.

Trustworthiness

The Lincoln and Guba (1986) strategies were used to ensure trustworthiness including credibility, transferability and dependability. Credibility relates to how accurately findings reflect the truth and are based on the assertions of participants (Korstjens & Moser, 2018; Lincoln & Guba, 1986). To strengthen our study's credibility, the researchers set up pre-interview meetings and made contact with individuals in advance, familiarity with the environment was also validated. Additionally, the researchers (DPL, MH, EAM) conducted peer debriefing by reviewing the findings with HM who had more advanced training and experience in qualitative study.

Transferability pertains to how accurately the findings can be transferred to other settings (Korstjens & Moser, 2018). To increase transferability, we provided sufficient description of the study context; participants' inclusion criteria, and research setting. Also, by verifying that other participant groups understood the study's findings completely. The findings of this study have been read by five hemodialysis patients who were not participants in the study but met the inclusion criteria and understood what was described in the results section. In this study, the researcher developed

Table 2. Identified themes and sub-themes

Themes	Sub-themes
Strategies in restricting fluid and dietary	Calculating/measuring the fluid intake
	Following written dietary guideline
	Reducing thirst
	Development habit on restricting of fluid and diet
Motivation in maintaining fluid and diet	Performing religious practice motivation
	Taking care of family motivation
Fear to side effects of non-adherence in restricting fluid and dietary	Fear of non-adherence-related physical symptoms
Effect of social support in restricting fluid and dietary prescriptions	Family-related social support
	Peer-related social support
	Health care professional-related social support

the interview guide, reviewed by the qualitative researcher (HM), conducted pilot testing and revised the interview guide based on the pilot results.

Dependability and confirmability relate to the extent to which the research and reporting process are systematic, transparent and accurate (Korstjens & Moser, 2018). In order to maintain and clarify the veracity of the information provided by the participants, this study also used repeat questions with the expectation of the same response. Additionally, the study findings were shared with the involved participants. The participants in the research were then shown the fundamentals of the research findings and documents and all of them agreed on the shared contents.

Results

Participants' Characteristics

A total of 15 participants was involved in this study. Table 1 presents the characteristics of the participants. The participants were in the age range of 38–62 years, with the average age being 51 years. Most of the participants were female. The participants had been on hemodialysis for more than three months. Table 1, shows the participants' characteristics.

In this descriptive qualitative study the researcher describes personal experience based on the descriptions of participants. The experience described is the participant's personal experience relating to the phenomenon. This description of the experience focuses on what is stated by the participants. The researcher makes significant statements according to the statements expressed by participants. Data analysis revealed four themes which encompassed sub-themes that further organized and expressed the thematic content. Quotes attributed to specific participants are identified.

Theme 1. Strategies for restricting fluid and dietary intake

Sub-theme: Calculating/measuring the fluid intake

The participants reported strategies in restricting fluid and dietary intake so that they successfully complied with the activity restriction. The ability to account for the water consumption helped them in measuring fluid intake. Most participants explained why they become successful in dealing with restricting of fluid because they regularly calculated and maintained the amount of water intake based on the recommendations. In this study, most participants communicated some techniques that they used to measure their fluid intake.

"*I restricted my drink volume to only a 600 ml bottle of mineral water. One bottle of mineral water is equal to three glasses of water. I controlled my drinking consumption to only three glasses of water every twenty-four hours.*" (P1)

"*I measured fluid intake. I had a small glass with a volume approximately equal to 150 cc of mineral water in case I get thirsty. In a day, I drink 2–2.5 glasses of water, never exceeding the limit.*" (P10)

Sub-theme: Following written dietary guidelines

In this study, the participants explained that they followed written guidelines for their dietary intake using a diary or personal and healthcare professional notes also help the participants to comply with the dietary restrictions. Participants reported not only counting the water consumption but also making a personal note that helped them doing activity dietary restrictions. Some participants in this study reported written notes help them in managing fluid and dietary restriction.

"*I took notes of my own. I will consult if I forget what I can consume and at what dosage it is safe to be consumed.*" (P4)

"*I kept notes from my doctor which contain specific information about suitable diets for me. My diets were directed by the instructions in the notes. In the end, we were the ones who control our own eating and limit our drink, such as when consuming watery fruits…"* (P5)

Sub-theme: Reducing thirst

Reducing thirst becomes one of the activities applied by participants when they are feeling thirsty. Many strategies to reduce thirst were performed by participants including reducing perspiration, gurgling with water, sucking ice, and doing distraction. It is also a significant for many participants to manage water intake and many participants showed some efforts to reduce their desire to drink much water, as can be seen from statements reported by participants.

"*I turned on my air conditioner when I get thirsty. That's one of the methods that I used. Reducing perspiration will reduce the thirst.*" (P6)

"*If I got really thirsty, I will just damp my tongue a little bit or gargle with water and suck a chunk of ice. That's my usual method to cope with my thirst.*" (P11)

Sub-theme: Developed new habits on restricting of fluid

Also, in this study participants developed some habits to reduce fluid intake with several strategies of their own and most participants reported the techniques accommodating them to comply with fluid restriction by changing drinking habits during meal. In this study, it statements from participants explained how they succeeded with their own strategies of managing fluid intake.

"*While having my meal, I will avoid drinking water. However, after completing my meal, I will have about two sips of water, or I will take my medicines and then drink water right afterwards.*" (P7)

"*After completing a meal, I will drink water around half a glass of water and take my medicines after completing my meal. With this, I only drink a small amount of water each day.*" (P12)

Theme 2. Motivation to restrict fluid and dietary intake

Sub-theme: Performing religious practices motivation

The urge to stay healthy and maintain the ability to perform regular spiritual activities constituted the spiritual motivation. Majority participants stated being healthy helped them to do religious activities. Participants revealed that their healthier condition made it easier to carry out worship or religious activities. Statements related to these aspects are illustrated below

"*I just want to be healthy. If I am healthy, it would be easy for me to perform worship.*" (P4)

"*..I have to maintain my health by adhering to the recommended fluids and diet because it affects my health, I still want to pray (worship) a lot.*" (P8)

Most participants also revealed that they still wanted to carry out their religious activities to the fullest. They explained that their usual religious activities were fasting, worshiping at the mosque and praying at home. The participants felt that they must adhere to a liquid diet so that they can maintain their current physical health in order to be able to perform the aforementioned rituals. The following are the participants' statements.

When my condition is healthy it is easy for me to do activities including worship, I can pray at the mosque every day." (P15)

"*I wish I could maintain my health so I don't have to pay anything to the hospital and so I could perform fasting, go to the mosque, or offer a prayer at home.*" (P11)

Sub-theme: Taking care of family motivation

On other hand, the intention to take care of children and other family members constituted the other sub-theme, a family-oriented one. It was figured out that family motivated hemodialysis patients to adhere to fluid and dietary restrictions. Participants expressed the desire to continue to survive so that they could care for their children so they could continue to grow and develop. Participants also expressed their desire to continue to be present in caring for their young children. There is a sense of concern that if they do not take care of their health, it will have an impact on their desire so that participants feel they have to continue to struggle to maintain their health condition so that they can continue to accompany their child into adulthood

"*…I will be able to take care of my children if I am healthy. I have a child who isn't married yet* ." (P8)

"*…My child is only a little boy. I won't leave him… because as father, I must be by his side. He still needs me.*" (P12)

Theme 3. Fear of side effects of non-adherence in restricting fluid and dietary intake

Sub-theme: Fear of non-adherence-related physical symptoms

The participants knew of their bodies and the symptoms which they had experienced when they drank too much fluid or did not adhere to their diet. Most of them identified the complication as the effect of non-adherence to fluid and dietary restrictions including swelling, difficulty breathing, and cramps. Participants revealed that their healthier condition made it easier to carry out worship or religious activities. Statements from these participants are illustrated below.

"*I got scared when seeing swelling on other people's legs. If I don't comply with my fluid and dietary restrictions, I may end up in the same situation as them.*"

"If we do not obey the rules, it may harmful and cause other health problems. I experienced a weight gain from the point of the dialysis process, I might experience leg cramps."

In this study, the unpleasant experience became a lesson for the participants. The fear of the impact they have experienced ultimately has a positive impact on the patient's daily life. Many participants learned from the experiences that they had. Based on their experiences, the participants were able to improve their ability to control and monitor their fluid intake and dietary intake. Following are some of the statements expressed by the participants.

"*I was afraid when my body swelled and I couldn't breathe, it was very terrible, I don't want it to happen again, so I try every day to comply with recommendations to restricts fluids and follow the recommended diet.*"

"*I don't want it to happen again. I'm afraid of shortness of breath. At the time, I couldn't breathe, I thought I died, now I have to follow recommendation.*"

Theme 4. Effect of social support in restricting fluid and dietary prescriptions

Sub-theme: Family-related social supports

Social support was another element that affected patients' adherence to fluid and dietary restrictions. The family support was an essential for participants in their life because it helped them doing fluid and dietary intake by giving a reminder for the participants about their fluid consumption. In addition, this study also identified that family support took the form of preparing diet to be consumed by the participants. It can be seen by some statements from participants,

"*My children keep on reminding me to restrict my water intake and diet.*" (P5)

"*My family members give me full support. For instance, they rarely cook dishes I am prohibited from eating. Most of the time they only cook dishes allowed for my health at home.*" (P9)

Sub-theme: Peer-related social support

In this study, peer support has an important role for patients to maintain fluid and dietary intake. Most participants learned how to be successful in managing fluid and dietary restriction through sharing their experience and knowledge. The participants stated getting much information helped them to increase their capacity to adhere to fluid and dietary restriction.

"*We often discussed how to restrict fluids and go on a diet, I learned positive things from other patients who have successfully restricted fluids and diets and imitate what they do,*"

"*Sometimes I got information and new things when discussing with others and that really helps me.*"

Sub-theme: Health professional-related social supports

Health professional' support took the form of providing patients with an explanation and assistance in controlling their fluid and dietary intake. Based on the analysis, support from health professionals was a principal component of hemodialysis patients' successful management of fluid and dietary intake. Most participants stated:

"*The nutritionist informed me of which kind of food I am allowed to eat, which one I should avoid, and which one should be prohibited entirely. I have been informed of other things such as the menu items.*" (P7)

"*While consulting my doctor, I am told to reduce the amount of drink that I take. As to fruits, the doctor told me which one is prohibited for my health, the one I must not consume.*" (P10)

"*The nurse told me to reduce my water consumption and gave me an instruction on how to adjust my drinking habit.*" (P12)

Discussion

This study explored how hemodialysis patients successfully manage fluid and dietary restrictions. The success of hemodialysis patients in restricting their fluid and dietary intake was associated with four identified themes: strategies for restricting fluid and dietary intake, motivation to restrict fluid and dietary intake, fear of the effects of non-adherence to fluid and dietary restrictions, and social support effects on hemodialysis patients reflected the experiences of hemodialysis patients in their successful management of fluid and dietary intake.

The study showed that there are some strategies for restricting intake dietary, which are measuring of fluid intake, following written dietary intake guidelines, reducing thirst, and developing new habits on restricting of fluid and dietary intake. Hemodialysis patients used these as a way to control their food and fluid consumption. In line with previous study, hemodialysis patients have their own ways to manage diet and fluid restriction (Özkan & Taylan, 2022). The study showed all the participants considered coping with diet and thirst as a daily challenge for patients on hemodialysis, and some developed their own strategies to manage the situation.

In this study, knowing the amount and variety of food and fluid they were allowed to consume helped them modify their fluid intake. The participants poured liquids from the bottle into the cups provided and measured the amount, as it was their strategy to adhere to fluid restrictions. Consistent with a study conducted by Bulantekin Duzalan et al. (2021), hemodialysis patients have become accustomed to changing eating and drinking habits to improve adherence, such as measuring fluid intake using a cup. Measuring fluid intake is an important behavior performed by participants to achieve success in adhering to fluid restrictions.

In addition, reducing thirst is one the strategies done by participants in managing fluid intake. This study revealed that most participants employed various methods to alleviate thirst, such as reducing perspiration, gargling with water, chewing ice, and engaging in distracting activities. Thirst or dry mouth is among the most frequently occurring symptoms in hemodialysis patients. Managing thirst poses the greatest challenge for patients compared to dietary restrictions and other micronutrient concerns (Nerbass et al., 2017). Thirst-reducing activities are one of the keys to a patient's success in controlling fluid intake.

In this study, the participants developed a new habit of restricting of fluid during a meal. Most of them showed setting the amount of water consumption by dividing the amount of water during meal and taking medication. A previous qualitative study conducted by Mailani et al. (2021) showed that most participants revealed some strategies for managing fluids and diet, including setting a drinking schedule. In this study, it was also shown that the participants developed their patterns of fluid and dietary restriction. The study showed that the participants developed a habit or pattern to regulate the amount of fluid consumption. It seems to be an important thing that helps them in fluid restriction and to successfully manage their daily fluid intake.

The strategies were built by participants to restrict fluid and dietary intake by taking personal and healthcare professional notes. The participants likely took notes either based on their own observations and experiences (personal notes) or guidance from healthcare professionals. These notes could include details such as recommended fluid and food limits, reminders, or tracking their intake over time. These dietary plans instruct patients to regulate fruits, vegetables, legumes, dairy products, and whole grains due to the possibility of developing phosphorus and potassium-related problems (Biruete et al., 2017). These activities help them to manage fluid and dietary restriction.

This study figured out that motivation was a crucial part of hemodialysis patients' success in managing fluid and dietary intake. This motivation took two general forms: spiritual and family-oriented motivation. In this study, the participants were motivated to adhere to fluid and dietary restriction because they wanted to perform more religious practices. The urge to practice religious activities such as fasting in the holy month, praying, or performing worship motivated them to be strict and disciplined with their fluid and dietary intake.

Also, as for the second form of motivation, the desire to keep abreast with their children's growth and development and be around their families motivated them to adhere to the restrictions. The results of this study align with research conducted by Bulantekin Duzalan et al. (2021) which highlighted family-oriented motivation as a strategy used by participants to navigate life with a chronic illness. This support aids patients in managing their daily activities. Furthermore, in our study, participants expressed a desire to be there for their families, motivating them to maintain their health and well-being in the future through adherence to fluid and dietary restrictions.

In this study, family-oriented motivation appears to be an internal motivation that drives hemodialysis patients to adhere to fluid and dietary restrictions.

This study also revealed that hemodialysis patients had a fear of complications and a concern about physical appearance if they did not comply with the restrictions; they might suffer from edema, leg cramps, shortness of breath, and other symptoms that would affect their health condition. This awareness contributed to their autonomy and control in managing fluid and dietary intake. Fear of health complications that might arise if the recommended fluid and dietary intake was not observed appeared to be a motivating factor for their adherence (Okoyo Opiyo et al., 2020).

The support obtained from family, friends, and dialysis staff is a significant factor in promoting acceptance and adherence (Stevenson et al., 2018). The family support played a significant role in the success of fluid and dietary intake. Hemodialysis patients received a constant reminder from their children to restrict their fluid and dietary intake. Their families also provided safe and consumable diets for them. The family is a primary and natural unit of society. Most people consider their families to be of the most importance because they were born into them, spend a lot of time in their lives with them, and regard them highly (Afolabi et al., 2013). The study conducted by Sukartini et al.(2022) showed that participants' experience in managing fluid and dietary intake is also influenced by family support, whereas family monitors the patient's intake. In addition, the family gives patients confidence to restrict their fluid and dietary intake.

In this study, family support was illustrated as instrumental and emotional support, involving monitoring and limiting the food and drink they consume. According to several other studies on the family's role in controlling and preparing food, limiting fluid intake, and managing medication, the support given by the family will enhance the self-care and adherence related to the fluid and dietary restrictions of hemodialysis patients (Clark-Cutaia et al., 2019; Griva et al., 2013). This study also provided information that family support helped the participants manage fluid and dietary intake. Families assisted by providing food and monitoring and limiting fluid intake for them

Family support could assist with the adherence to fluid and dietary restrictions of hemodialysis patients (Griva et al., 2013). Family members provide direct assistance in the preparation of diets, as well as ready help, advice, and reminders to monitor the adherence to fluid and dietary restrictions (Özkan & Taylan, 2022). The control over hemodialysis patients' dietary intake requires family involvement. Family members are excellent diet controllers. Hemodialysis patients may obtain varied diets if family members are involved and if the family members have an awareness of suitable diets for them. Consequently, the effectiveness of family participation in assisting patients would allow them to receive quality long-term care (Stevenson et al., 2018).

In addition, peer support has an important role for patients to maintain fluid and dietary intake. According to a prior study, peer support shared information about how to restrict fluid intake while acknowledging the assistance and attention received from friends in the hemodialysis unit (Mailani et al., 2021). Through exchanging experiences and expertise, most participants acquired the necessary skills to effectively manage fluid and dietary intake.

Moreover, this study also explained that the patients also conveyed support from health professionals in the form of information about diets, the allowable amount of fluid intake, and how to adjust their fluid intake habits. The dietary guidelines for dialysis patients include high calorie and protein intake as well as careful regulation of the intake of fluid and certain micronutrients, such as phosphorus, potassium, sodium, and calcium (Avesani et al., 2019; Chan, 2021). Previous studies showed that the presence of social support increases the adherence to fluid and dietary restrictions of hemodialysis patients (Lambert et al., 2017; Oquendo et al., 2017; Varghese, 2018). It is crucial that healthcare professionals interact intensively with hemodialysis patients and be knowledgeable about motivational techniques that can be applied when needed (Ok & Kutlu, 2021; Pereira et al., 2021; Yangöz et al., 2021).

The new insight from this study benefits other hemodialysis patients particularly in terms of the various options of strategies for managing their dietary and fluid restrictions. Additionally, nurses and other healthcare professionals may take the shared strategies as part of the information provided to the hemodialysis patients and family during the education sessions.

Compared to the previous studies among hemodialysis patients, this study specifically explored the successful experiences in managing the dietary and fluid intake restriction. However, semi-structured interview and the setting of interviews in this study should be considered as the limitation. The interview process in this study was conducted during patients undergoing hemodialysis. Although the researcher attempted to minimize the damage, practically it is challenging and sometimes led the participants to lose focus when answering the questions. It may lead to unclear or incomplete information.

Conclusion

With health information from healthcare professionals, patients developed their own strategies for managing fluid and dietary intake. They were motivated by the urge to stay healthy and maintain the ability to perform routine religious activities and the desire to be around their families. Besides, they had a fear of the worst possible condition that might arise. Lastly, support from family and health professionals helped them manage their fluid and dietary intake well. Therefore, this study recommends that providing comprehensive education on the importance of dietary and fluid intake management by healthcare professionals has become essential for hemodialysis patients. Additionally, the educational materials should address patients' specific concerns and preferences. In addition, family members' and caregivers' participation are crucial aspects in helping hemodialysis patients in managing fluid and diet restriction. They should encourage open communication and provide resources to actively participate in dietary and fluid intake management, thereby fostering a supportive environment at home.

Declaration of Interest

The authors declare that they have no conflicts of interest.

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Authors' Contribution

All the authors contributed to the conception and design of the study. Data collection: DPL, MM, and EAM collected the data and DPL, HM, MM performed data analysis. All author contributed to the drafting of the manuscript, revised it critically for important intellectual content and approved the final version for submission

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Mindfulness-Based Asmaul Husna and changes in general adaptive function response among schizophrenia: A Quasi-experimental study

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Abstract

Background: Poor functional capacity is one of the factors that increase the risk of recurrence of positive and negative symptoms in schizophrenia. Mindfulness is a treatment potentially help patients become fully accepting of their conditions and conscious of it, allowing them to regulate unpleasant emotions and increase awareness of positive emotions.
Purpose: This study aimed to investigate effect of mindfulness-based Asmaul Husna on the overall adaptive functioning of individuals with schizophrenia.
Methods: This quasi-experiment times series study involved 36 participants selected with simple random sampling. The inclusion criteria of participants were adult Muslim with schizophrenia who had a PANSS-EC score <10, mild symptoms, risk of violent behavior. Participants with severe symptoms and complications from other diseases were excluded. Mindfulness-based Asmaul Husna consisted of Musyahadah-witnessing, tassawur-imagination, tafakkur-contemplation, tadabbur-reflection, and muhasabah-self-introspection was given to each participant over five days. A modified-Global Assessment Functioning (m-GAF) scale used to measure participants' general adaptive functional responses before and after intervention including follow-up at the first and second month after the intervention.
Results: There was a significant increase of the m-GAF score ($p < 0.001$) and a chi-square value of 177.2 after the implementation of mindfulness-based Asmaul Husna intervention. The highest mean score difference was observed at the first and second follow-ups, conducted one and two months after the interventions. The effect size calculated using Kendall's Wa indicates a significant effect (0.821).
Conclusion: The study suggests there is a positive effect of the mindfulness-based Asmaul Husna intervention on adaptive functioning of people with schizophrenia.

Keywords: Asmaul Husna; mindfulness; m-GAF; schizophrenia

Introduction

Around 24 million people in the world, or one in 300 people (0.32%), globally suffer from schizophrenia. For adults, this rate is one in 222 (0.4%) (WHO, 2022). In Indonesia, the estimated prevalence of people who have schizophrenia is 1.8 per 1,000 population; schizophrenia usually occurs in adulthood or productive age between 18 and 35 years (Ministry of Health Republic Indonesia, 2019).

People with schizophrenia have positive symptoms that can be easily identified and that are not seen in healthy people (Kanchanatawan et al., 2018). These include hallucinations, delusions, and abnormal motor behavior with fluctuating degrees of severity (Ueda et al., 2018). Negative symptoms are hard to identify and are associated with a high morbidity rate. The most common negative symptoms included avolition, alogia, anhedonia, and diminished emotional expression (Van Den Oord et al., 2006).

Cognitive symptoms are the last classification, including disorders of speech, thinking, and/or attention, that ultimately affect a person's ability to communicate (Keepers et al., 2021) and impair the individual's communication skills by disturbing his speech and attention (Rasool et al., 2020), all of these symptoms will worsen the general adaptive functioning response.

The primary challenge encountered by individuals diagnosed with schizophrenia is their diminished capacity to perform Activities of Daily Living (ADL). Poor functional capacity is one of the factors that increase the risk of recurrence of positive and negative symptoms in schizophrenia. Caring for schizophrenic patients requires nurses who have a high capacity for understanding, empathy, and non-stigmatization of mental illness (Irfan et al., 2018).

Beyond these signs, nurses must be able to identify patients who are anxious, hopeless, confused, and who may even be contemplating suicide. Nurses must be able to recognize that people with schizophrenia have difficulty distinguishing between reality, delusions, and hallucinations because everything seems true to them. Because of all these factors, efforts from nurses are needed to understand schizophrenia and provide appropriate holistic interventions to prevent recurrence or violent behavior (Arafa et al., 2017).

Health behavior theory is used to understand and predict health behavior, and a number of behavior modification approaches have grown in popularity (Salmoirago-Blotcher et al., 2013). A growing body of research shows that mindfulness-based treatments can enhance physical and mental health outcomes by reducing unhealthy behaviors, encouraging the self-management of chronic illnesses, and altering unhealthy habits (Schuman-Olivier et al., 2020a).

Mindfulness can stimulate the anterior cingulated cortex, insula, hippocampus, temporoparietal intersection, and front-limbic network so that changes in brain structures occur that are relevant to the regulation and control of emotions, feelings, and behavior (Shonin & Van Gordon, 2016). Previous research has demonstrated the effectiveness of mindfulness interventions. Mindfulness-based psychoeducation groups are associated with reduced psychotic symptoms and re-hospitalizations, as well as improved functioning and understanding of the condition and its treatment (Chien et al., 2017). Mindfulness-based stress reduction (MBSR) has been found to increase hope, psychological well-being, and functional recovery in patients with schizophrenia (Özdemir & Kavak Budak, 2022).

Another type of mindfulness is Islamic spiritual mindfulness, which refers to a spiritual state in which a person is aware of Allah's (name of God for Muslims) awareness over their soul, their innermost thoughts and feelings, and their actions, and this also increases self-efficacy (Dwidiyanti et al., 2021). Islamic spiritual means aqidah or a person's belief in Allah as their God; happiness and peace will be felt when they practice good activities and believe in Allah. When believers face psychological problems or difficult situations, remembering Allah gives them peace, and aqidah influences their spiritual well-being (Hasan & Tanjung, 2018).

The systematic reviews and meta-analysis of mindfulness interventions for schizophrenia show that mindfulness affects the reduction of both positive and negative symptoms overall, with small to moderate effects in pretest-posttest comparisons (Hodann-Caudevilla et al., 2020). Most of the mindfulness techniques that have been developed are based on Buddhist cultural values (Frisk, 2012). It is hoped that all of these outcomes can improve the ability of individuals with schizophrenia to carry out daily functions through adaptive functional capacity (Schuman-Olivier et al., 2020b).

Meanwhile, Isgandarova has developed mindfulness-based muraqaba as meditation, an Islamic-oriented cognitive behavioral therapy tool, but said that although muraqaba might not be effective for all mental health issues, she suggests a possible value of muraqaba for treating symptomatic anxiety, depression, and pain (Isgandarova, 2019a). However, her studies have not explained how is the effect of this mindfulness on the general response of adaptive functioning in schizophrenic patients with positive symptoms, especially mindfulness with spiritual approaches. The application of mindfulness with Islamic values needs more in-depth research, especially in Indonesia, the country with the largest Muslim population in the world (Ministry of Health Republic Indonesia, 2014) and which believes in the existence of God; mental health includes spiritual health (Mastuki, 2020).

In this research, mindfulness-based Asmaul Husna (the name of Allah), according to an Islamic perspective, mindfulness comes from the term muraqaba, which means "to look at and observe" (Isgandarova, 2019b). Knowing that Allah is constantly watching over us is the basis of muraqaba, which makes us more concerned about our actions, thoughts, feelings, and moods and that is the realization of the highest quality of character, spiritual perfection. According to a correct interpretation of the beautiful names that accurately reflect Allah's flawless knowledge, muraqaba is essentially the fulfillment of worshiping Him. Ibn Al-Qayyim closes his chapter on muraqaba by stating that the name of Allah (Asmaul Husna) as the Watcher (Al-Raqib), the Guardian (Al-Hafith), the Knowing (Al-'Alim), the Hearing (Al-Sami'), and the Seeing (Al-Basir) should be the focus of the muraqaba. Therefore, whoever learns these names and is committed to living up to them will obtain muraqaba (Parrott, 2017).

Mindfulness with integrated Islamic spirituality is practiced with a high level of awareness because Muslims believe that Allah (God) is the source of all problems and that only He has the power to solve them. According to this study, mindfulness-based on Asmaul Husna (Mimasna) refers to awareness of the soul, thoughts, and actions based on awareness of the presence of Allah through His names and their meanings. Therefore, the purpose of this study was to find out how mindfulness-based on Asmaul Husna (Mimasna) affects the general response of adaptive functioning among Muslims with schizophrenia in controlling the risk of violent behavior. This

Table 1. Mindfulness-based on Asmaul Husna (Mimasna) Intervention procedures

Steps	Activities	Day	Time
Musyahadah (witnessing)	ablution dhuha prayer sholawat for the prophet Muhammad, peace be upon him Guide participant to say Asmaul Husna," yaa Raqib, yaa Al-Hafith), yaa 'Alim), yaa Sami', yaa Al-Basir", accompanied by sayings, "O Lord, giver of healing, heal my body, my soul and my mind" guide the participants to identify wandering thoughts, situations encountered when these thoughts and feelings occur guide participants to recognize their mistakes or sins guide participants for say istighfar 3 times	Day-1	30minute
Tassawur (imagination)	ablution dhuha prayer sholawat for the prophet Muhammad peace be upon him say istighfar 3 times say Asmaul Husna: Allah is the creator (yaa..khaliq) while doing body scanning, to help patients imagine the integrity of their body and being grateful for a healthy body and soul guide for deep breathing and say, "…Alhamdulillah..."	Day-2	30minute
Tafakkur (contemplation)	ablution dhuha prayer sholawat for the prophet Muhammad peace be upon him focuses on Allah's creation, namely the universe, galaxy-solar-system-planet-our-earth guide for deep breathing and say, "…Allahu akbar..." guide participants to believe that Allah is the power and helper	Day-3	30minute
Tadabbur (reflection)	Ablution dhuha prayer sholawat for the prophet Muhammad peace be upon him guide the informant to read the story of forgiveness, discuss the sentence that made the most impression, and the positive attitude of the story guide to identify daily activities that are empowering or disempowering	Day-4	45minute
Muhasabah (self-introspection)	Ablution dhuha prayer sholawat for the prophet Muhammad, peace be upon him guide the participants to read Quran, Surah An-Naas, Al-Ikhlas and al-Falaq three times each with hands placed in front of their face, then rub all over the body Assist the participants in identifying potential obstacles to implementing the positive behavioral commitments discussed on days 3 and 4. Assist the participants make steps that they must take if they have difficulty committing positive behavior to reduce the risk of violence (note: involve the participants' social support) Encourage the participants to independently practice the muraqabah Asmaul Husna technique again, similarly to how it was done on the first to third days. Closed the session and make sure the termination phase is correct, namely reflecting on the mindfulness carried out and making adjustments for future repetition.	Day-5	45minute

Table 2 Correlation between characteristics of the participants with m-GAF score

Characteristics	f (%)	m-GAF[c] (p-value)
Age[a]		
25 to 44 years (young age)	16 (44.4%)	0.844
>44-60 years (middle age)	19 (52.8%)	
60-75 years (elderly)	1 (2.8%)	
Gender		
male	25 (69.4%)	0.879
female	11 (30.6%)	
length of stay		
< 1 years	8 (22.2%)	0.268
>1 to 3 years	17 (47.2%)	
>3 years	11 (30.6%)	
Nursing diagnosis[b]		
Hallucination	14 (38.9%)	0.038
Risk of violence	22 (61.1%)	
Mental disorder diagnoses		
Hebephrenic schizophrenia	1 (2.8%)	0.085
Paranoid schizophrenia	25 (69.4%)	
Unspecified schizophrenia	10 (27.8%)	
Employment history		
Worked	15(41.7%)	0.755
Never worked	21(58.3%)	
Education history		
Elementary	7(19.4%)	0.980
Junior high school	15(41.7%)	
Senior high school	6(16.7%)	
College	8(22.2%)	
M-GAF Score		
Some Serious Symptoms	1(3%)	
Moderate Symptom	11(31%)	
Some Persistent Mild Symptoms	15(42%)	
Some Transient Mild Symptoms	9(25%)	

Table 3. Friedman Test for mindfulness based on asmaul husna (Mimasna) to m-GAF

m-GAF	N	Mean	SD	Min	Max	Mean Rank	χ^2	p
skor_1st day (baseline)	36	65.11	7.222	50	76	1.22		
skor_2nd day	36	67.08	6.725	55	78	2.03		
skor_3rd day	36	69.08	6.389	58	80	3.22	177.2	<0.001
skor_4th day	36	71.22	6.410	60	80	4.38		
skor_5th day	36	72.42	6.570	60	82	5.49		
skor_1st follow-up*	36	72.86	6.081	60	81	5.83		
skor_2nd follow-up**	36	72.94	6.463	60	83	5.83		

*1 month ** 2 month df 6;CI: 95% (2 table 12.592) Kendall's Wa (0.821)

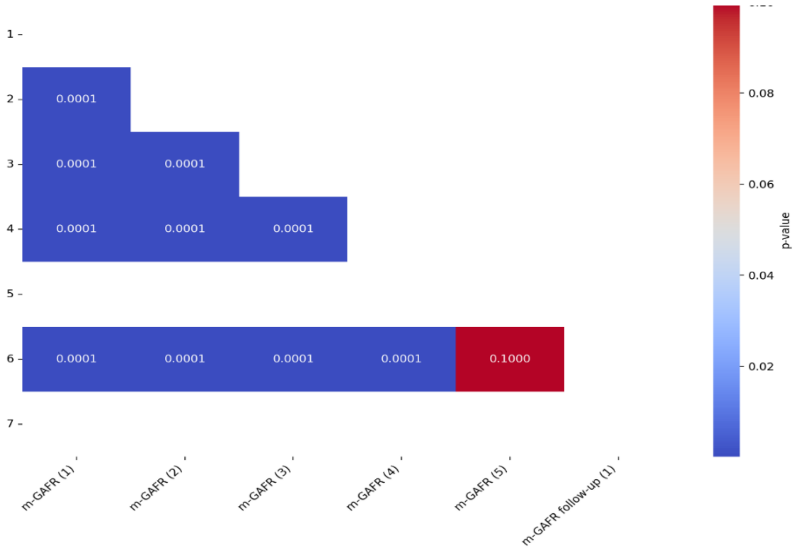

Figure 1. Pairwise Comparisons (Durbin-Conover)

research is expected to make a contribution to nurses in increasing general adaptive responses by controlling aggressive behavior among Muslims with schizophrenia.

Materials and Methods

Design

This research was conducted with a quantitative approach. The type of research used was a quasi-experiment times series design, which took place on May - July 2023.

Setting and sample

This study was conducted in a mental disorder rehabilitation center in West Java, Indonesia. This center was established in 2000, with 45-50 inpatients/year; 90% of patients were Muslims and diagnosed with schizophrenia. Mindfulness therapy has never been done in this center.

The inclusion criteria for this study were adult Muslims with schizophrenia who had a PANSS-EC (Positive and Negative Syndrome Scale - Excited Component) score <10, mild symptoms, and risk of violent behavior. Mild symptoms suggest that the disorder affects the individual but is not significantly debilitated by it. They may still be capable of managing daily responsibilities with some support and are often more responsive to treatment than those with moderate or severe symptoms (Harvey & Rosenthal, 2018; Müller & Riedmüller, 2017).

Participants with severe symptoms and complications from other diseases were excluded. The number of samples was calculated using G-Power version 3.1.92. The F test was used with an error probability of 0.05, power (1-β) of 0.95, and effect size (f^2) of 0.25; the estimated minimum sample size was 25 participants, and to anticipate dropping out the number of participants was increased to 40 % (Adhikari, 2021; Diggle & Taylor-Robinson, 2019) and the total sample was 36 participants. The participants were recruited through simple random sampling. The eligible patients were randomized using computer software. Facilitated by the ward nurse, the researchers approached the selected patients, provided research information, and asked their willingness to participate in this study. Patients who were willing to participate were then asked to sign the informed consent form.

Variable

The independent variable is mindfulness-based asmaul husna, and the dependent variable is changes in general adaptive function response.

Instruments and data collections

The assessment was based on observation while nurses were with the participants. A modified General Adaptive Scale (GAS), namely the Modified Global Assessment of Functioning (m-GAF) scale, was used with an ICC value of 0.81 (Hall, 1995; Mossbarger, 2005) by incorporating more criteria and new scoring guidelines into the structure of the original GAF instrument, which is an instrument for measuring general adaptive function responses and was used as an instrument in this research. These are the scoring guidelines for m-GAF: 01-10 (in persistent danger of severely hurting self or others); 11-20 (in some danger of hurting self or others); 21-30 (inability to function in almost all areas); 31-40 (major impairment in several areas of functioning); 41-50 (some serious symptoms or impairment in functioning); 51-60 (moderate symptom); 61-70 (some persistent mild symptoms); 71-80 (some transient mild symptoms); 81-90 (absent or minimal symptoms); Data collection was carried out by measuring m-GAF scores before the intervention (first day) and after each intervention (days 2, 3, 4 and 5) then follow-up was measured in the first and second month after the Mimasna intervention.

Intervention

Mindfulness-based intervention procedures based on Asmaul Husna (Mimasna) were adopted and modified from Isgandarova's (2019). The expert judgment (psychologists) was applied to validate the content and steps of the Mimasna procedures. The intervention consisted of Musyahadah (witnessing), Tassawur(imagination), Tafakkur (contemplation), Tadabbur (reflection), and Muhasabah (self-introspection). At each step, the patients were requested to pronounce Asmaul Husna (Allah's name and characteristics) and pray for healing based on their current state. The detailed description of activities can be seen in Table 1 below.

A team of six trained researchers executed the intervention. Participants were divided into six groups, with a maximum of six participants in each group. This approach promotes rich, focused intervention and manageable discussions, providing high-quality qualitative data. The assessment of the m-GAF was conducted by six nurses serving in the mental rehabilitation center.

Data analysis

The Shapiro-Wilk test is used to determine the distribution of the data; the results showed (p <0,001) that the data distribution is not normal, so the statistical test used is the Friedman test, with effect size using Kendall's Wa test with value 0.1 - <0.3 is a minimum effect, 0.3 to <0.5 is a moderate effect, and ≥ 0.50 is a significant effect (Houser, 2018).

Ethical consideration

The study was carried out under an ethics permit issued by the Ethics Committee of Universitas' Aisyiyah Bandung (407/KEP. 01/UNISA-BANDUNG/V/2023). Patients who agreed to participate signed consent forms and were assured of anonymity and confidentiality to protect their privacy and ensure their willingness to participate in the study. Participants were informed that they could leave the study and that their autonomy would be protected as soon as the informed consent form was signed. Justice was ensured by applying random sampling, distributing the same interventions to all participants, providing assistance as needed, and providing mementos. Participants received gifts as compensation for their time and contribution to this study.

Results

The study participants' characteristics, including age, gender, and length of stay, are detailed in Table 2, along with their correlation to the m-GAF scores. The majority were middle-aged men, with an average age of 44 years. They had been at the mental disorder rehabilitation center for 1 to 3 years, with nursing diagnoses of hallucinations and a prevalence of paranoid schizophrenia. Many participants in the study had not worked and had completed junior high school. According to the m-GAF questionnaire, most fell into the adaptive function category with persistent mild symptoms, meaning ongoing impairments in daily activities, social interactions, or occupational functioning.

The only characteristic significantly related to the m-GAF score was the nursing diagnosis (p-value 0.038).

Table 3 below shows that the Mimasna intervention affected the increase in the m-GAF score with a p-value <0.001 and χ2177.2 (> 12.59); the difference mean score was highest on the first and second follow-up or two months after interventions. The effect size using Kendall's Washows large effect (0.821)

Meanwhile, table 4 below shows a p-value less than 0.05, which typically indicates a statistically significant difference. In this study, the values < .001 suggest very strong evidence against the null hypothesis, indicating significant differences between the groups compared. This heatmap visually represents the p-values for pairwise comparisons, with color intensity indicating the significance level. Cooler colors indicate higher significance (lower p-values), whereas warmer colors indicate lower significance (higher p-values). The diagonal is excluded as it would compare each group with itself.

Discussion

The study discovered that the mindfulness-based Asmaul Husna (Mimasna) intervention notably enhanced the modified Global Assessment of Functioning (m-GAF) scores in people with schizophrenia. This indicates that Mimasna effectively improves the functional abilities of participants, possibly by promoting mindfulness and spiritual well-being. The combination of mindfulness techniques with the recitation of Asmaul Husna may help stabilize the mind, reduce symptoms like hallucinations, and improve emotional regulation.

The effectiveness of the intervention was observed across participants who were predominantly middle-aged men with a history of severe psychiatric symptoms, including paranoia and hallucinations. Despite their challenging characteristics, such as long-term institutionalization and unemployment, the participants showed marked improvements in their functional outcomes. This indicates that Mimasna may be particularly beneficial for individuals with deep-rooted psychological and emotional challenges related to schizophrenia.

Additionally, the study highlighted a correlation between nursing diagnoses and improvements in m-GAF scores after the intervention, suggesting that Mimasna can address both persistent and transient symptoms of schizophrenia. These findings align with previous research on mindfulness interventions and their positive impact on mental health, emphasizing the potential of Mimasna as a therapeutic tool for enhancing the overall well-being of individuals with schizophrenia (Budiarto et al., 2022; Suart et al., 2016).

Another study has shown that, after mindfulness intervention, the intervention group had more excellent mean scores in both hope and recovery (Yulina Astuti et al., 2020). Similarly, another study reported that mindfulness-based stress reduction training was more successful in raising the level of hope, psychological well-being, and functional recovery in people with schizophrenia (Özdemir & Kavak Budak, 2022).

A survey by Khoury found that pre-post analyses indicated that mindfulness therapies moderately reduced negative symptoms (Khoury et al., 2013). Likewise, another study reported that specific evaluations of positive and negative symptoms, hallucinatory distress, or functioning/disability were not shown to be significantly affected (Louise et al., 2018). This difference may occur due to various interventions provided and differences in the involved participants' characteristics.

In this study, mindfulness-based Asmaul Husna guides participants to awareness (musyahadahor-witnessing), attention (tassawur-imagination), present-focus (tafakkur-contemplation and tadabbur-reflection), and acceptance (muhasabah/self-introspection, for better thoughts, feeling and behavior). The former supports adaptive self-regulation and desired health outcomes, which can be explained by mindfulness and de-automatization. It demonstrates how four aspects of mindfulness, awareness, attention, present focus, and acceptance, could trigger four major mental processes to improve self-regulation (Kang et al., 2012).

Observing one's innermost self (al-sir) to become aware of what is concealed by every thought and word is known as muraqabah (Parrott, 2017); Parrott's statement is in line with the definition of mindfulness known so far, namely the awareness that comes by paying attention to the present moment in a nonjudgmental manner (Schuman-Olivier et al., 2020a).

Participants in this research are instructed to believe that prayer, effort, and resignation are forms of the healing process under the fundamental notion of mindfulness with an Islamic spiritual approach. This spiritual belief will develop mindfulness and equanimity, which is a dispositional disposition or state of mind that is dispassionate toward all experiences and objects, regardless of how those objects may be interpreted as pleasant, painful, or neutral (Schuman-Olivier et al., 2020a).

According to Ibn al-Qayyim, maintaining internal muraqabah entails controlling one's thoughts, intentions, and actions: the truth of a pure heart (al-qalb al-Salim). Building one's intellect and body through contemplative practice is essential for overcoming destructive emotions or character flaws that haunt people (Munsoor & Sa'ari, 2017); mindfulness can deepen spirituality, which acts as a protective barrier against feelings of isolation or be overtaken by adversity (Shonin & Van Gordon, 2016).

In this study, on the fourth day of mindfulness activities, there was a bibliotherapy session where participants were guided through reading to draw conclusions about positive behavior obtained from reading with the theme of forgiveness. In this session, participants were also guided to identify daily activities that are beneficial or not for their social function.

The benefits of this session are based on the benefits of bibliotherapy as healing (Canty, 2017) and mindfulness, which enables deliberate introspection, promotes reconsideration, decreases automatic inference processing, improves cognitive control, facilitates metacognitive insight, and prevents thought suppression and distortion (Cao et al., 2022).

Mindfulness can enhance the prefrontal cortex, respiratory sinus arrhythmia (RSA), and anterior cingulate cortex (ACC), resulting in mental recovery (Cao et al., 2022; Chen et al., 2015; Smith et al., 2018). The cingulated anterior cortex, insula, hippocampus, temporoparietal intersection, and front-limbic tissue are particularly associated with changes in brain structure that are related to increasing self-efficacy and self-regulation needed by schizophrenic patients to regulate and control emotions, feelings, and behavior (Shonin & Van Gordon, 2016); thus, the general response of the adaptive function of people with mental disorders improved.

Implications

The implications of the results of this research for nursing practice show that mindfulness interventions for individuals with schizophrenia are very important in providing holistic care. Mindfulness interventions can play an important role in the treatment of individuals with schizophrenia, especially in reducing negative and positive symptoms so that functional capacity increases. This is important to prevent relapse and improve the quality of life of individuals with schizophrenia.

Additionally, nursing educators should emphasize the importance of tailoring mindfulness interventions to the specific needs and abilities of individuals with schizophrenia. This personalized treatment approach is essential, as not all patients will respond the same to mindfulness techniques. Nurses must have experience in assessing each patient's readiness and capacity to engage in mindfulness practices. In addition, nurses are also required to be able to collaborate with mental health professionals to integrate mindfulness into a comprehensive treatment plan (Siagian et al., 2021). Ultimately, mindfulness interventions can be a valuable tool in the nursing toolkit in providing effective and compassionate care to individuals with schizophrenia.

Strength and Limitation

The study's strength lies in its robust and valuable nature. It was conducted with rigorous ethical considerations, had a well-defined sample and setting, and a carefully structured and validated intervention, including the training for intervention providers conducted before the study. Robust data analysis and significant findings demonstrated the effectiveness of the mindfulness-based Asmaul Husna intervention.

However, this study also holds some limitations, such as the absence of a control group and reliance on self-reported measures, which introduce potential biases and make it difficult to attribute changes solely to the intervention. Additionally, the cultural specificity of the Asmaul Husna intervention and the limited scope of outcome measures suggest that further research is needed to validate and extend these findings to broader populations.

Conclusion

The study found that a mindfulness-based Asmaul Husna program could help improve overall functioning. Future research with a more rigorous research design and a focus on the long-term effects of this intervention is warranted, including identifying its specific components and effectiveness compared to other mindfulness-based interventions. Expanding the research to include a comparative analysis could offer a broader understanding of its unique benefits and contribute to integrating culturally sensitive interventions into mental health care for Muslim patients with schizophrenia.

Declaration of Interest

The authors declare that they have no competing interests that could influence the interpretation of the results or the presentation of the information in this manuscript.

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Data Availability

The data and materials supporting the findings of this study are available upon request. Please contact [inggriane.puspita@unisa-bandung.ac.id] for access.

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Peer-Group support based on the chronic care model for improving HIV patients' caring ability

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Abstract

Background: The caring ability of HIV patients toward a condition is still relatively low, especially during a pandemic, which makes the patient's immune condition more susceptible to decline.
Purpose: This study aims to develop peer-group support based on a chronic care model (CCM) to improve the caring ability of HIV patients.
Methods: An explanatory study with a cross-sectional approach was employed. A total of 375 respondents were recruited with convenience sampling. The exposure included individual characteristic factors, health system factors, support system factors, environmental factors, and peer group support based on the chronic care model. Meanwhile, the outcome was an improvement in the patients' caring ability. Statistical analyses were performed using SPSS version 21 and SEM-PLS.
Results: Outer model analysis showed valid (λ >0.5 and T-value >1.96) and reliable (Cronbach's alpha > 0.6), all hypotheses showed significant effect to dependent variable exclude individual characteristic factors to peer group support based on chronic care model ($p<0.05$). Model development is reasonably fit as indicated by the research data (RMS Theta = 0.080 < 0.102; NFI value 0.901 > 0.9; Standardized Root Mean Square = 0.079 < 0.10). The model had predictive relevance and can be applied in other research settings (Q2 = 0.230; 0.518).
Conclusion: The development of the model shows that the variables are pretty good in forming a peer group support model based on the chronic care model to improve the ability of PLWH.

Keywords: ability; chronic care model; human immunodeficiency virus; peer group support

Introduction

The rate of adherence to antiretroviral treatment (ARV) in HIV AIDS patients shows that it is still not 100% (Iacob et al., 2017). In Indonesia, adherence to ART is still a major problem; this is evidenced by the level of Lost follow-up (LFU) for treatment, and ART is still relatively high, namely 21.87%. East Java occupies the first position in Indonesia with the highest HIV incidence in 2017, with as many as 214,819 people who are eligible for ARVs and only 180,843 people receiving ARVs. Among 180,843 people who had received ARV therapy, 39,542 people (21.87%) lost their LFU (21.87%), and 3,501 (1.93%) stopped taking ARVs (Ministry of Health, 2021). This decrease in ART adherence ultimately makes patients prone to opportunistic infection and have a poor quality of life due to stigma and hopelessness (Ekstrand et al., 2018).

This condition causes the amount of virus in the patient's body to increase (Vaillant & Naik, 2022). Additionally, this non-adherence leads to an increased viral load and a decreased CD4 cell count, causing a gradual decline in the body's immunity (Vidya Vijayan et al., 2017). The decrease in immunity that occurs will have an impact on worsening the disease (Balasubramaniam et al., 2019), the emergence of many opportunistic infections (Shenoy et al., 2017), and the patient's quality of life getting worse (Meng et al., 2023). The quality of life of people living with HIV (PLWH) must be carefully considered because sufferers must constantly comply with treatment therapy (Ahmed et al., 2018). Peer Group Support is effective for shaping positive behavior and new values in individuals who are members; support from peer groups has been proven to increase patient enthusiasm in the treatment process (Mark et al., 2019). Many approaches have been implemented to improve ARV adherence, but few effectively shape positive patients' behavior and increase their treatment adherence. The peer group support approach has not been integrated with patient care in hospitals, so it is necessary to research developing peer group support models to increase ARV compliance and immunity, decrease opportunistic infection, and improve patient quality of life.

The chronic care model (CCM) identifies critical elements of a health care system that drive high-quality chronic disease care, including community, health systems, self-management support, delivery system design, decision support, and clinical information systems (Cluesman et al., 2023). The integration of handling and the role of peer group support with elements in CCM is critical to strengthening fellow sufferers and assisting health workers in providing integrated care between the hospital and the community. This study aimed to develop a peer group support model based on the CCM to improve the caring ability of HIV patients.

Materials and Methods

Design

We designed explanatory research with a cross-sectional approach conducted between June and August 2022 in the Educational and General Hospital and AIDS Commission in Indonesia. The study described the development of a peer group support model based on the CCM in PLWH.

Samples

This study was conducted in two highest case areas of HIV in East Java, Indonesia. The specific population criteria were: (1) HIV patient with positive diagnosis using three methods (oncoprobe, intake, and vikia); (2) Age between 17 – 55 years old; (3) Cooperative and literate; (4) Patient with no mental illness, no drug users and no visual or hearing impairment. We determined the sample size using the rule of thumb, and 375 PLWH were recruited for this study. Data were recruited using convenience sampling and adjusted to PLWH, who came to health services to carry out routine checks.

Variables and Measurements

The independent variables in this study were individual characteristic factors, health system factors, support system factors, environmental factors, and peer group support based on the chronic care model. Meanwhile, the dependent variable was an improvement in patients' caring ability.

Individual characteristic factors

To investigate the individual characteristic factors, which consist of age, educational background, knowledge, attitude, assessment of disease, and coping mechanism. Age and educational background are measured with a demographical questionnaire, while knowledge and skills are measured with modify questionnaire. Assessment of disease interviewed by The Illness Perception Questionnaire (IPQ) (Basu & Poole, 2016) and The Brief 28-item COPE Inventory was used to know the coping mechanism (Baumstarck et al., 2017). The disease and coping mechanism assessment was measured using a 4-point Likert scale to evaluate participants. Each item was graded on a scale of 1 to 4, with one being the poorest and 4 being the best condition for favorable questions, and unfavorable questions showed otherwise. The Indonesian questionnaire version has been shown to be valid and reliable (r table = 0.257; r count = 0.270 – 1.000; Cronbach's alpha = 0.832-0.913).

Health system factors

Health system factors were formed by indicator access, healthcare collaboration, policy, and health facility availability. Access was measured with a health access and utilization survey (Harris et al., 2011), healthcare collaborative assessed through the Perception of Interprofessional Collaboration Model Questionnaire (PINCOM-Q) (Légaré et al., 2011), policy interviewed with Policymaking assessment questionnaire (O'Faircheallaigh, 2010), and health facility availability measured using Healthcare resource use questionnaire (Ilhan et al., 2009). Before being used, all questionnaires were tested for validity and reliability (r table = 0.257; r count = 0.271-0.876; Cronbach's alpha = 0.738-0.891). Each indicator in every question was determined by a 4-point Likert scale (one referring to the poorest condition and four referring to the best value; the negative question was interpreted otherwise).

Support system factors

The support system for PLWH was sourced from peer support measured with a peer support questionnaire (Dennis, 2013), family support was evaluated with a family support questionnaire (Bouman et al., 2018), social support was also measured with The Social Support Questionnaire (Srivastava & Kaul, 2014), decision making measured using decision-

Table 1. Characteristic Respondents (n=375)

Indicators	n	%
Age		
17-25 years	28	7.5
26-35 years	140	37.3
36-45 years	134	35.7
46-55 years	73	19.5
Gender		
Male	196	52.3
Female	179	47.7
Marital Status		
Single	116	30.9
Married	166	44.3
Divorced	79	21.1
Death Divorce	14	3.7
Ethnics		
Javanese	332	88.5
Madurese	36	9.6
Dayak	2	0.5
Chinese	5	1.3
Religion		
Islam	349	93.1
Catholic	2	0.5
Christian	24	6.4
Occupation		
Self-employed	37	9.9
Private	150	40.0
Trader	27	7.2
Laborer	12	3.2
IRT	123	32.8
Other	26	6.9
Past Illness		
No Past Illness	238	63.5
Hypertension	74	19.7
Diabetes	9	2.4
tuberculosis	28	7.5
Hepatitis	24	6.4
Other diseases	2	0.5
Family Disease History		
No Family Disease History	358	95.5
HIV	2	0.5
Hypertension	4	1.1
Diabetes	4	1.1
Hepatitis	7	1.9

Cont. Table 1. Characteristic Respondents (n=375)

Indicators	n	%
Educational Background		
No school	7	1.9
Elementary School	43	11.5
Junior High School	78	20.8
Senior High School	209	55.7
College	38	10.1
Income		
Less than minimum regional income*	322	85.9
More than and equal minimum regional income*	53	14.1

* Minimum regional income = 290 USD

Table 2. Description of Research Variable

Variable	Indicator	Low n (%)	Moderate n (%)	Good n (%)
Individual Characteristic Factors	Knowledge	185 (49.3)	168 (44.8)	22 (5.9)
	Attitude	101 (27.0)	140 (37.3)	134 (35.7)
	Assessment of Disease	346 (92.3)	19 (5.1)	10 (2.7)
	Coping Mechanism	66 (17.6)	255 (68.0)	54 (14.4)
Health System Factor	Access	4 (1.1)	30 (8.0)	341 (90.9)
	Health Worker Collaboration	5 (1.3)	35 (9.3)	335 (89.3)
	Policy	8 (2.1)	33 (8.8)	334 (89.1)
	Availability of Health Facilities	19 (5.1)	68 (18.1)	288 (76.8)
Support System Factor	Family support	24 (6.4)	77 (20.5)	274 (73.1)
	Peer Support	10 (2.7)	65 (17.3)	300 (80.0)
	Social Support	130 (34.7)	82 (21.9)	163 (43.5)
	Decision-making	16 (4.3)	291 (77.6)	68 (18.1)
	Information Availability	21 (5.6)	243 (64.8)	111 (29.6)
	Resource Benefits	38 (10.1)	287 (76.5)	50 (13.3)
Environmental factor	Social Relations	122 (32.5)	241 (64.3)	12 (3.2)
	Group Activities	135 (36.0)	201 (53.6)	39 (10.4)
	Environmental Situation	12 (3.2)	108 (28.8)	255 (68.0)
Peer Group Support based on chronic care model	information support	25 (6.7)	43 (11.5)	307 (81.9)
	emotional support	31 (8.3)	17 (4.5)	327 (87.2)
	mutual support	17 (4.5)	162 (43.2)	196 (52.3)
	Informed	25 (6.7)	43 (11.5)	307 (81.9)
	Activated patient	27 (7.2)	152 (40.5)	196 (52.3)
	Prepared	121 (28.8)	165 (44.0)	89 (23.7)
	Practice	29 (7.7)	126 (33.6)	220 (58.7)
Patient Ability Improvement	Daily Activities	34 (9.1)	278 (74.1)	63 (16.8)
Improvement	Confidence	14 (3.7)	234 (62.4)	127 (33.9)
	Coping Ability	36 (9.6)	274 (73.1)	65 (17.3)
	Social interactions	32 (8.5)	256 (68.3)	87 (23.2)
	Religious activities	27 (7.2)	271 (72.3)	77 (20.5)
	Confidence	46 (12.3)	213 (56.8)	116 (30.9)
	Social Support Acceptance	59 (15.7)	214 (57.1)	116 (27.2)
	Self-care	17 (4.5)	27 (7.2)	331 (88.3)
	Enhancement of Feeling	16 (4.3)	214 (57.1)	145 (38.7)

making questionnaire (Leykin & DeRubeis, 2010), information availability known by Questionnaires can provide valuable information (Whiteley et al., 2006), and human resources questionnaire was used to measure resource benefits (Obeidat, 2012). Overall, the variables were measured using a questionnaire in the Indonesian version, and the validity and reliability tests were carried out first (r table = 0.257; r count = 0.267-0.962; Cronbach's alpha = 0.788-899). A 4-point Likert scale was used to measure every question in the questionnaire and interpreted to low, moderate, and good categories.

Environmental factors

The measured environmental factors include social interaction, group activity, and environmental situation. Typical social interaction in PLWH was identified through the social interaction questionnaire (Srivastava & Kaul, 2014), group activity adopted from the questionnaire used by Sarver et al. (2021), and the environmental questionnaire used to measure the environmental situations (Dennis, 2013). Each question consists of a 4-point scale to evaluate environmental factors influencing the daily life of PLWH. All questionnaires have been tested for validity and reliability with valid (r table = 0.257; r count = 0.272-1.000) and reliable (Cronbach's alpha = 0.788-0.962)

Peer group support based on the chronic care model

The latent variable is a combination of the model development carried out in this study, which consists of informational, emotional, and mutual support indicators measured using a peer group support questionnaire (Cabral et al., 2018). The chronic care model indicators consisting of informed, activated patient, prepared, and practice were measured using the Patient Assessment of Care for Chronic Conditions (Schmittdiel et al., 2008). Firstly, the questionnaire was modified and tested for validity and reliability before being used in research. The value for favorable questions is if strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1. For unfavorable questions, it was the opposite. Overall, the variables were measured using a questionnaire in the Indonesian version, and the validity and reliability tests were carried out first (r table = 0.257; r count = 0.272-1.000; Cronbach's alpha = 0.902-0.903).

Improvement of the patient's caring ability

PLWH, in the condition that they have the virus in their bodies, still have to be self-reliant. Improvement in the patient's caring ability was measured using the Activities of Daily Living (ADL) Questionnaire (Mlinac & Feng, 2016). The questionnaire consists of 9 dimensions: daily activities, beliefs, coping skills, social interaction, worship activities, self-confidence, acceptance of social support, self-care, and improving the patient's feelings. A total of 44 questions were assessed using a 4-point Likert Scale with a value of 1 = strongly disagree, 4 = strongly agree, and the negative question was the opposite.

Data Analysis

Statistical analyses were conducted using SPSS version 21 and Structural Equation Model-Partial Least Square (SEM-PLS). Descriptive statistics such as numbers, percentages, mean, and standard deviation were used to represent the descriptive characteristics of the respondents. Model development was analyzed using SEM-PLS to identify the outer and inner models. Results were expressed using a level significance of $p < 0.05$.

Ethical Consideration

The Health Ethics Commission of Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia, with No: 2092-KEPK/2022 approved ethical considerations for this study. Prospective respondents were first given a complete explanation of the research goal and procedures, including information that their participation in this study was voluntary. Then, those willing to participate were given an informed consent form and asked to sign as a willingness without coercion.

Results

Characteristics of Respondents and Research Variables

A total of 375 people living with HIV (PLWH) aged 17 – 55 years old preceding the survey were interviewed. Table 1 shows that more than half of the PLHW were males (52.3%). The highest proportion of respondents was in the aged group of 26 – 35 years (37.3%). Approximately 44.9% were married, 88.5% were from Javanese ethnics and more than half respondents showed Moeslem. The majority of PLHW showed in senior high school educational level (55.7%), 40.0% working in private sectors, like industry, daycare, private lesson, shopkeeper, cashier etc. with the monthly income majority 85.9% less than minimum regional income (290 USD). Regarding the health status, the highest proportion in comorbidity of illness were hypertension (19.7%), and followed by tuberculosis (7,5%) and hepatitis (6,4%). Mainly in the family, it showed that the most common previous diseases were HIV, hypertension, diabetes mellitus, and hepatitis.

Table 2 shows the latent variable in model development: individual characteristic factors, health system factors, support system factors, environmental factors, peer group support based on the chronic care model, and improvement of patient's ability. Individual characteristics factors in PLHW showed more than half of respondents had a low assessment of disease (92.3%), 49.3% had a low knowledge, with the attitude and coping mechanism showing moderate category (37.3%; 68.0%, respectively). Health system factors majority had a result with good category, such as access

Table 3. Research Fit Model Testing

	Saturated Model	Estimated Model
SRMR	0.079	0.071
d_ULS	12.900	12.400
d_G	4.400	3.800
Chi-Square	6001.7	7214.6
NFI	0.901	0.907
rms Theta		0.070

Table 4. Hypothesis Test

Variable	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Latent Variable 1 -> Latent Variable 5	0.1	0.6	0.01
Latent Variable 1 -> Latent Variable 6	0.5	2.9	0.34
Latent Variable 2 -> Latent Variable 5	0.5	4.8	< 0.001
Latent Variable 2 -> Latent Variable 6	0.4	2.9	0.01
Latent Variable 3 -> Latent Variable 5	0.5	1.9	0.05
Latent Variable 3 -> Latent Variable 6	0.5	5.6	< 0.001
Latent Variable 4 -> Latent Variable 5	0.7	12.2	< 0.001
Latent Variable 4 -> Latent Variable 6	0.7	5.3	< 0.001
Latent Variable 5 -> Latent Variable 6	0.6	3.7	< 0.001

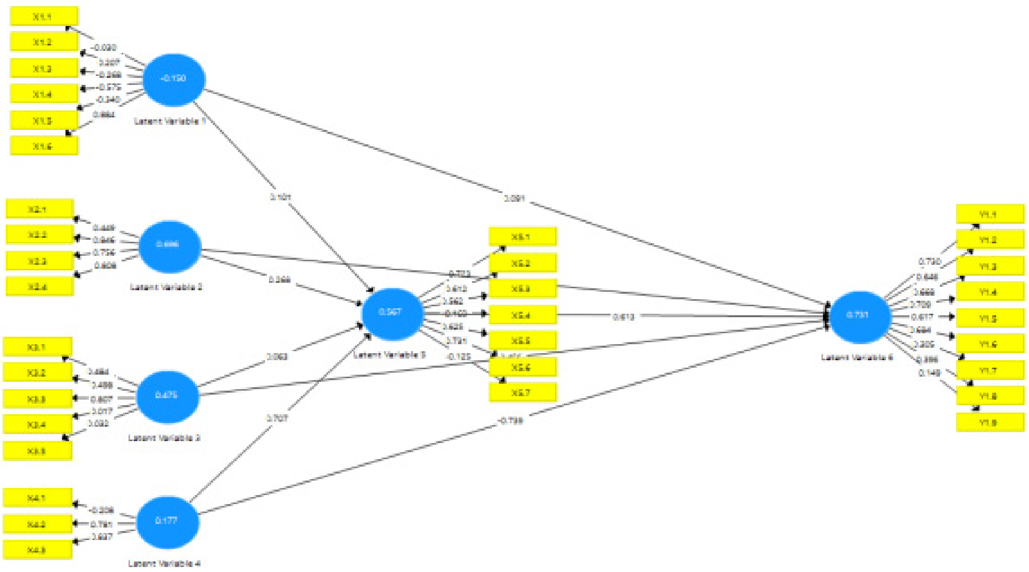

Figure 1. Outer Model Analysis. Latent variable 1: Individual Characteristic Factors; Latent variable 2: Health System Factor; Latent variable 3: Support System Factor; Latent variable 4: Environmental factor; Latent variable 5: Peer Group Support based on chronic care model; Latent variable 6: Patient Ability Improvement; X1.1: Knowledge; X1.2: Attitude; X1.3: Assessment of Disease; X1.4: Coping Mechanism; X2.1: Access; X2.2: Health Worker Collaboration; X2.3: Policy; X2.4: Availability of Health Facilities; X3.1 Family support; X3.2 Peer Support; X3.3 Social Support; X3.4 Decision-making; X3.5 Information Availability; X3.6 Resource Benefits; X4.1 Social Relations; X4.2 Group Activities; X4.3 Environmental Situation; X5.1 information support; X5.2 emotional support; X5.3 mutual support; X5.4: Informed; X5.5 Activated patient; X5.6 Prepared; X5.7 Practice; Y1.1 Daily Activities; Y1.2 Confidence; Y1.3 Coping Ability; Y1.4 Social interactions; Y1.5 Religious activities; Y1.6 Confidence; Y1.7 Social Support Acceptance; Y1.8 Self-care; Y1.9 Enhancement of Feeling

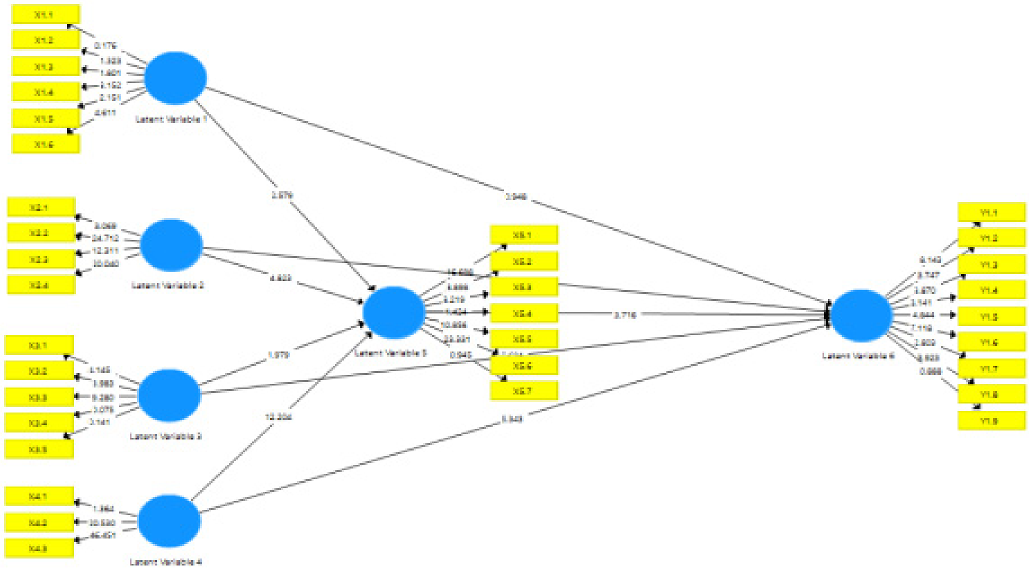

Figure 2. Inner Model Analysis. Latent variable 1: Individual Characteristic Factors; Latent variable 2: Health System Factor; Latent variable 3: Support System Factor; Latent variable 4: Environmental factor; Latent variable 5: Peer Group Support based on chronic care model; Latent variable 6: Patient Ability Improvement; X1.1: Knowledge; X1.2: Attitude; X1.3: Assessment of Disease; X1.4: Coping Mechanism; X2.1: Access; X2.2: Health Worker Collaboration; X2.3: Policy; X2.4: Availability of Health Facilities; X3.1 Family support; X3.2 Peer Support; X3.3 Social Support; X3.4 Decision-making; X3.5 Information Availability; X3.6 Resource Benefits; X4.1 Social Relations; X4.2 Group Activities; X4.3 Environmental Situation; X5.1 information support; X5.2 emotional support; X5.3 mutual support; X5.4: Informed; X5.5 Activated patient; X5.6 Prepared; X5.7 Practice; Y1.1 Daily Activities; Y1.2 Confidence; Y1.3 Coping Ability; Y1.4 Social interactions; Y1.5 Religious activities; Y1.6 Confidence; Y1.7 Social Support Acceptance; Y1.8 Self-care; Y1.9 Enhancement of Feeling

(90.9%), healthcare collaborative (89.3%), policy (89.1%), and health facility availability (76.8%) showed in good category. From support system factors, the highest support came from peer support (80.0%), followed by family support (73.1%) and social support (43.5%). Decision-making of the PLHW showed 77.6% in the moderate category, the same as with information availability and resource benefits (64.8% and 76.5%, respectively). The majority of indicators in environmental factors were in the moderate category, social interaction (64.3%), and group activity (53.6%), but environmental situations showed different results (68.0% in the good category). Peer group support based on the chronic care model showed information support in the good category (81.9%), as well as 87.2% emotional support and 52.3% mutual support in the good category. Informed (81.9%), activated patient (52.3%), and practice (58.7%) had good category; however, prepared identified in the moderate category (44.0%).

Model Developmental Finding

The model developmental analysis measured the outer model (construct validity, discriminant validity, reliability test) and inner model (determination coefficient, predictive relevance, model fit, and hypothesis test). Construct validity showed all loading factors (λ) >0.5 and T-value >1.96, discriminant validity depicted with Fornell-lacker criterion square root of each construct was greater than the correlation value with other constructs in the model. The reliability test in every variable met the requirements of Cronbach's alpha > 0.6 (Figure 1). The determination coefficient (R2) of the model showed individual characteristics variables, health system factors, support system factors, and environmental factors able to explain peer group support based on the chronic care model of 80.0% and improvement of patient's ability as well as 40.0% (Figure 2). All variables show Q2 > 0 (Q2 = 0.230; 0.518), which indicates that the model is said to have predictive relevance and can be applied in other research settings. Table 3 shows that the model is quite fit and in accordance with the research data (RMS Theta = 0.070 < 0.102; NFI value 0.907 > 0.9; Standardized Root Mean Square = 0.071 < 0.10). In hypothesis test, all hypothesis showed significant effect to dependent variable exclude individual characteristic factors to peer group support based on chronic care model (Table 4).

Discussion

Peer group support refers to the practical, social, and emotional support of a group of people with the same condition or illness (Cabral et al., 2018). Peer group support can reduce health behavior problems, reduce depression, and have a role in improving the ability of HIV patients to carry out daily activities, self-confidence and self-confidence, coping skills, social interactions, acceptance of social support, self-care and improvement of care (Øgård-Repål et al., 2021). Research by Berg et al. (2021) states that the approach to peer support groups is effective in terms of increasing retention in care, adherence, stigma, and mental health. Since 1980, peer support groups have supported each other, shared knowledge, and supported in care. With the support of peer groups, patients with HIV will feel like they have a group that is ready to listen to complaints and various strategies to deal with problems and help improve adherence to treatment (Misutarno et al., 2022). Group members have the opportunity to help each other when there is a problem so as to create a new, friendly relationship. The friendship formed can increase the patient's enthusiasm in managing his illness, for example a friend in a group proposes to do physical exercise together, it will also increase the desire of other members to take part in the exercise. Information and suggestions obtained from fellow members of the peer group are able to come up with problem-solving strategies that are beneficial to other members (Mark et al., 2019).

Peer group support based on the chronic care model is an intervention that describes a comprehensive approach to assisting and caring for groups of patients with HIV and supporting improved functional and clinical outcomes (Van Hout et al., 2020). The chronic care model highlights the importance of self-management support despite the existence of peer groups. However, self-management is critical, as it is emphasized by providing patients with knowledge, confidence, and skills for self-management of their condition. Self-management is a dynamic, interactive, and everyday process in which individuals are involved in managing chronic disease (Vainauskienė & Vaitkienė, 2021). Self-management is an individual's ability, in relation to family, community, and healthcare professionals, to manage symptoms of medication, lifestyle changes, and psychosocial, cultural, and spiritual consequences of health conditions (Mutumba et al., 2019). Self-management is concerned with the tasks a person must perform to live with a chronic condition (Boucher et al., 2019). The chronic care model describes self-management support as collaborative assistance of patients and families to gain ability and independence for their chronic illness, improve self-management compliance, and regularly assess problems and complications that arise (O'Connell et al., 2018). Self-management programs aim to enable patients to manage their condition, monitor symptoms, adjust medications, and determine when additional medical care is needed. Self-management support, based on patient empowerment, is a key function of the chronic nursing model. Patients must be knowledgeable about their chronic condition and have the skills and confidence necessary to manage it. Patients with relevant knowledge and skills can self-manage their chronic condition (Areri et al., 2020).

Based on the overall results of the study, it can be seen that in developing a peer group support model based on choric care models to increase the ability of HIV patients, the best path is the path from environmental factors (X4) through peer group support (X5) to increase the patient's ability (Y1). Meanwhile, the most substantial direct effect was shown in the fact that the support system factor (X3) directly increases the patient's caring ability (Y1). It was shown that environmental factors, namely group activities, have a higher value than social relationships and environmental situations in improving the patient's ability. Meanwhile, the support system factor, namely social support, is an indicator that has a higher value than family support, peer support, decision-making, information availability, and resource benefits so that the patient's caring ability to go through the two indicators of the two latent variables can be improved.

Environmental factors consist of social relations, group activities, and environmental situations. The patient's environment is one of the strongest motivations because the environment has a large enough role in shaping patients with HIV to continue to struggle and be enthusiastic in daily activities. Patients with HIV really need groups, because of the ability of a person (individual) in the process of cognitive activity accompanied by behavioral activities in choosing ways to adapt appropriately to stressful life situations and conditions, which arise from the individual's relationship with the environment (Willis et al., 2019). The statement, in principle, provides clarity that in carrying out his life, a person must behave towards himself and the environment in which he lives and is located.

Conclusions

The development of the peer group support model based on the chronic care model shows that all indicators are valid and reliable in measuring the latent variables of each model and overall shows that the independent variables affect the dependent variable. The coefficient of determination shows that individual characteristics variables, health system factors, support system factors, and environmental factors can explain peer group support based on the chronic care model of 80.0% and improvement of the patient's ability by 40.0%. Predictive relevance indicates that the model fits and can be applied in other research settings. The implications of this research suggest that the chronic care model, when integrated with peer support mechanisms, can be highly effective in enhancing patient outcomes, especially in chronic disease management. However, given that 20.0% and 60.0% of the variance remained unexplained for peer support and patient improvement, further research should explore additional factors that might influence these outcomes, such as cultural, psychological, or socio-economic variables. Additionally, longitudinal studies could be conducted to evaluate the long-term impact of peer support in chronic care, and comparative studies across diverse healthcare systems could further validate the generalizability of this model.

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Declaration of Interests

The authors declare that they have no competing interests.

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Relationship between eHealth literacy and health promoting behaviors among nursing students

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Abstract

Background: Utilizing health literacy is important in establishing knowledgeable health advancements and practices, which can become deterrents to promoting a healthy lifestyle. Technological advancements improve health information availability and accessibility, potentially affecting the users' proficiency and their capability in applying the accessed health information. However, obtaining health information through information technology for health promotion requires e-health literacy.
Purpose: This study aimed to determine the relationship between eHealth literacy and health-promoting lifestyle behaviors among nursing students.
Methods: A descriptive-correlational study was applied to 131 nursing students recruited through a purposive sampling method from a nursing school in the Philippine. The researchers adopted the original English version of the e-Health Literacy Scale and Health-Promoting Lifestyle Profile II (HPLP) to collect the data. The gathered data were analyzed using descriptive analysis, frequency, percentage, mean, and standard deviation, and the correlation using Pearson's r correlation.
Results: A total of 131 nursing students were employed in the study, with a mean age of 20.14 (±1.22). Participants were female (71.8%) and were Level 1 students (44.3%). The mean of the total sum score for eHealth literacy was 31.24 (±4.30), while the overall item mean was 3.92 (±0.54). On the other hand, the health-promoting behavior has a mean score of 2.43 (±0.43), while its subscales have a mean score of 2.46 (±0.45) for nutrition, 2.45 (±0.62) for physical activity, and 2.39 (±0.47) for health responsibility. EHealth literacy was found to have a significant relationship with the students' health-promoting behavior ($r=0.245$, $p=0.005$). Hence, students with a high level of eHealth literacy are more inclined to perform healthy behaviors.
Conclusion: The results of this study showed that developing strategies to improve the e-health literacy of nursing students may contribute to maintaining their health-promoting behaviors. Identified intervention strategies based on eHealth literacy are needed to encourage healthy practices, which may reduce the risks of illnesses due to unhealthy lifestyle behaviors among nursing students.

Keywords: eHealth literacy; health-promoting behaviors; nursing students

Introduction

Health is one of the utmost concerns among Filipinos, as they greatly value health and well-being. Individuals are becoming more aware that aspects of this modern lifestyle may damage health. It is becoming more challenging, especially for them, to make healthy choices because of their field of work, living, and socio-economic environment (Vergeiri & Delos Santos, 2012). Thus, desiring good public health and having a healthy lifestyle are core requirements for maintaining a person's behavior. According to Wei et al.

(2011), the main determinant of health status is a health-promoting lifestyle. A health-promoting lifestyle can be identified as positive activities or views to maintain or improve health and well-being, such as self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management (Chiang et al., 2017). With the continuous growth of digital media, it can help people attain effective outcomes especially in accessing important health information and with that adopting lifestyle changes (Levin & Bertschi, 2018).

In this age of technological advancements, rapid growth in the use of electronic resources transpired in all kinds of fields. While e-health literacy has only been recent, its impact on society has been positive and beneficial. With the use of electrical resources, especially nowadays, e-health literacy comes in vast forms and has progressed throughout the years. As it progresses, more and more individuals adopt and learn the capabilities of the resources available to them. The use of e-health literature resources is common, especially during this generation. Since university students are in a dynamic period of growth and development, they may encounter challenging life conditions and different lifestyles in their university environment. They will all go through a routine like changes in study style, unhealthy eating, inadequate rest, and exercise. Hence, the use of e-health literacy and its parts over the internet per se aids individuals achieve their goals by living a healthy lifestyle.

For many people, having access to health services and handling health information in an applicable way is a complicated task (Norgaard et al., 2015). Access to health information is now more readily available than ever thanks to the internet, yet there are issues with the inconsistent quality of this information. It has become diverse and are now replete with inaccurate and misleading information, particularly since the COVID-19 outbreak (Abdulai et al., 2021). Thus, people need to be informed and understand their health by providing a better tool for their health. This is where e-health literacy comes in. It is defined as seeking, finding, comprehending, and evaluating health-related information from electronic sources as a result of technological advancements and using that information to treat and resolve any health issues (Çetin & Gümüs, 2023).

E-health literacy is still in its progressive form, and the world ought to witness its gradual developments throughout the years. The technology that enables the profession to access essential information for the practice demands acquiring the ability to find and assert viable information in the electronic environment in such a way that the sourced-out information can be applied to solving health conditions (Norman & Skinner, 2006, as cited in Levein-Zamir & Bertschi, 2018), thereby increasing access to e-Health information. However, access to e-health information not only requires people to have an Internet connection but also challenges the person's mindfulness in identifying verified health information against the unproven claims scattered throughout the Internet (Stellefson et al., 2011). E-health Literacy can obtain accurate health information when it is used wisely by people who use the internet as their source of significant data. Online health information can be difficult, which is why those with advanced e-health Literacy skills may efficiently use more effective and feasible online plans and other high-quality health information methods (Quinn et al., 2017). Moreover, e-health literacy is a relatively new concept that is characterized as the capacity of individuals to utilize developing data and communication advances to make strides or empower health and healthcare (Neter, n.d.).

Health promotion is one of the components of many facets of health development. eHealth literacy can assist people in obtaining more accurate health information when they use the internet responsibly as a source of pertinent data (Ossebaard & van Gemert-Pijnen, 2016). This will demonstrate behaviors that promote health. Further, it is also one of the determinants in social, political, and economic aspects of health development on individuals in which they interact in their respective communities that include social services, government, health services, and education. (Whitehead, 2004, as cited in Hosseini Shokouh et al., 2017).

Nurses play an important role in influencing individuals to maintain good health by practicing healthy lifestyles. They must be on the front line in providing and promoting health promotion initiatives (Geok et al., 2015). Also, good educational outcomes are linked to students' health state and knowledge, which is why educational settings are essential (Ahlstrand et al., 2022).

Even though different studies were made globally regarding the relationship of these variables with each other, in the Philippines, there is a dearth of research in the context of the relationship between e-health literacy and health-promoting lifestyle behaviors and how it affects the views and perspectives of nursing students about health-promoting lifestyle. As e-health literacy requires competency in information technology, however, the study of Fajardo (2023) found that Filipino students only have 'beginning' competency levels in author-checking, fact-checking, and bias-checking. This is important to note that the Philippines is considered as the "social media capital of the world" due to their remarkably high daily usage of roughly three hours. Facebook, Instagram, and TikTok have become the most popular platforms among Filipino internet users on a monthly basis (Statista Research Department, 2023). Thus, this study aims to determine the relationship between eHealth literacy and health-promoting lifestyle behaviors among the participants.

Materials and Methods

Research Design

This study was conducted using a descriptive cross-sectional research design to determine the eHealth literacy and health-promoting behaviors among nursing students and the relationship between these variables. An online questionnaire was used to determine the participants' behavior, personal routines, and current lifestyle. The study employed three measures to capture the demographic profile of the participants as well as the instrument to assess the participants' knowledge of eHealth and health-promoting behaviors.

Setting and Participants

In the study, a total of 154 nursing students answered the survey. However, only 131 completed the questionnaire (completed response rate=85.06%). The participants were from a College of Nursing and were selected through a purposive sampling method. It included participants who were either male or female, ranging in age from 18 to 22 years old, and those who agreed to participate in the study. Students who are not regularly enrolled were excluded in the study.

A priori power analysis was conducted using G*Power 3.1 to test the relationship between two variables using a two-tailed test. A medium effect size of d= .30 (Cohen, 1988), and an alpha of 0.05 was used. The result showed that a total sample of 128 participants was required to achieve a power of 0.95.

The researchers conducted an online survey using Google Forms documents. The researchers also provided informed consent and instructions regarding the content of the survey.

Measurement and Instrumentation

The study utilized three instruments in collecting the data to understand the relationship between eHealth literacy and health-promoting lifestyle behaviors among the participants. No translation was done, and the English version of the instrument was used, as English is the medium of instruction in the Philippines. The e-Health Literacy Scale and Health-Promoting Lifestyle Profile II (HPLP) were used to collect the data.

Demographic Profile Form: The personal characteristics of the participants will be collected, which include age, gender, and year level.

eHealth Literacy Scale: Norman and Skinner developed this tool (van der Vaart, 2011). The initial eHealth Literacy Scale had eight questions to assert the participant's understanding of eHealth further, and two supplementary items were added afterward. This test measures a person's comprehension and ability to optimize his or her literacy when using the internet. The degree of recurrence of a variable in a question is categorized and organized in ascending or descending order using the ordinal scale. The questionnaire has two sets of qualifiers, the first of which is scored as follows: 1=not important, 2=not useful, 3=unsure, 4=useful, and 5=very useful. As to the highest, the second set comprises 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree. This tool's Cronbach's Alpha resulted in an internal consistency of α = 0.93.

Health-Promoting Behaviors: Lim et al. (2016) updated the HPLP-II questionnaire, which currently has 26 items, from the previous HPLP-II questionnaire, which contained 52 items. The questionnaire analyzes an individual's behavior, personal routines, and current lifestyle using a 4-point Likert scale ranging from 1 (never) to 4 (routinely). It has three subscales, each having an internal consistency of 0.79 to 0.87, that were utilized to determine its factor structure: nutrition (N) (9 items), physical activity (PA) (8 items), and health responsibility (HR) (9 items). As a behavioral endpoint of cardiovascular disease (CVD) prevention, the N, PA, and HR scales were used in the current study. Cronbach's Alpha is 0.89 for this tool overall.

Data Collection Procedure

The study involves primary data collection using a self-administered questionnaire. In gathering the data needed, a letter of request to conduct the study was forwarded to the College Dean. After authorization and ethical clearance had been approved, the researchers proceeded to collect the students' data. The data were collected using Google forms and no face-to-face interaction occurred during the data collection. Overall, the instrument was administered for a period of two weeks and the participants took 10-15 minutes to complete the questionnaire.

Research Ethics Approach

The study conformed to the ethical standards of conducting research involving human participants. The ethical clearance was granted by the San Beda University- Research Ethics Board (SBU-REB) with Protocol No. 2020-021.

Data Analysis

The gathered data were analyzed using frequency, percentage, mean, standard deviation, and Pearson's R correlation. A Kolmogorov-Smirnov test was conducted and was revealed to be not significant (>0.05).

Results

Table 2 shows the health-promoting behavior and eHealth literacy among the participants. The mean of the total sum score for eHealth literacy was 31.24 (±4.30), while the overall item mean was 3.92 (±0.54). The highest item mean score was 4.10 (±0.60) for item "I know how to use the Internet to answer my questions about health," while the item "I feel confident in using information from the Internet to make health decisions" had the lowest mean

Table 1. Demographic Profile of participants (n = 131)

Profile	Frequency (f)	Percentage (%)	Mean (SD)
Age (Years)			20.14 (±1.22)
Sex			
Male	37	28.2%	
Female	94	71.8%	
Year Level			
Level 1	58	44.3%	
Level 2	47	35.9%	
Level 3	18	13.7%	
Level 4	8	6.1%	

Table 2. Health Promoting Behaviors and eHealth literacy among the participants (n=131)

	Mean	Standard Deviation
E-health Literacy		
Mean of total sum score (range, 8-40)	31.34	4.30
Item mean	3.92	0.54
1. I know what health resources are available on the Internet	3.96	0.76
2. I know where to find helpful health resources on the Internet	3.92	0.75
3. I know how to find helpful health resources on the Internet	3.99	0.67
4. I know how to use the Internet to answer my questions about health	4.10	0.60
5. I know how to use the health information I find on the Internet to help me	4.06	0.62
6. I have the skills I need to evaluate the health resources I find on the Internet	3.87	0.68
7. I can tell high -quality health resources from low- quality health resources on the Internet	3.82	0.75
8. I feel confident in using information from the Internet to make health decisions	3.61	0.86
Health promoting behaviors		
Mean of total sum score (range, 1-4)	2.43	0.43
Nutrition	2.46	0.45
Physical Activity	2.45	0.62
Health Responsibility	2.39	0.47

Table 3. Relationship of eHealth literacy on health-promoting behavior

	r coefficient	p value	Interpretation
Health Promoting Behaviors	**0.245	0.005	Significant
Nutrition	*0.216	0.013	Significant
Health Responsibility	**0.324	0.000	Significant
Physical Activity	0.112	0.203	Not Significant

*correlation is significant at 0.05 level
**correlation is significant at 0.01 level

score (M=3.61; SD=±0.86). On the other hand, the health-promoting behavior has a mean score of 2.43 (±0.43) while its subscales have a mean score of 2.46 (±0.45) for nutrition, 2.45 (±0.62) for physical activity, and 2.39 (±0.47) for health responsibility.

The relationship between eHealth literacy and health-promoting behavior among the participants was determined using Pearson's r correlation as shown in Table 3. Results revealed that eHealth literacy has a significant positive relationship with health-promoting behaviors (r=0.245, p=0.005) and its subscales, namely nutrition (r=0.216, p=0.013) and health responsibility (r=0.324, p=0.000). On the other hand, no significant relationship was noted between eHealth literacy and physical activity (r=0.112, p=0.203).

Discussion

This study was conducted to determine the relationship between e-health literacy and health-promoting behaviors among nursing students. One of the findings of this study was that nursing students are adept at utilizing technology in seeking vital information that could help their concerns as the participants were shown to have a high level of e-health literacy. The use of the internet has become normal for the participants' age group since this is where questions about health concerns, nutrition, and physical activity arise (Tanaka et al., 2020). The participants felt confident in the information obtained on the internet. Obtaining data and information, according to Kim and Oh (2021) is the most prevalent purpose for utilizing the internet, accounting for 89.1 percent of all usage. As a result, it is assumed that college students make use of the internet to acquire information, from basic to advanced. As Park et al. (2017) elucidated how students have high levels of internet literacy as they can access health information and utilize it properly, including their demands for what health resources are available, and where to find them as they already knew where to go for in online health information.

The findings also indicated a substantial association between e-Health literacy and actions that promote health and the fields of nutrition and health responsibility. With that said, it does convey that the internet aids the "consumer" of health information to utilize its tools to learn more about nutrition and to attain more knowledge about health responsibility (Sharma et al., 2019). According to Hsu et al. (2014), college students who reported a high level of e-health literacy were shown to engage more in increased exercise, a low-fat, low-sugar diet, the consumption of fruits and vegetables, and sound sleep. Partially corroborated by other research, eHealth literacy among college students has been found to be significantly correlated with health behaviors, including safe sex, physical activity, nutrition, and positive social relationships, with the highest correlation with maintaining positive social relationships (Britt et al., 2017). When combined, these findings imply that eHealth literacy among college students can be crucial for managing mental and emotional health, including stress management and maintaining healthy interpersonal relationships, in addition to managing physical health, which includes physical activity and diet. This finding has also been supported by other national and international studies, which demonstrate that people with higher eHealth literacy levels have greater health concerns, seek out health information more frequently, and have more positive attitudes toward Internet health information (Park et al., 2013).

Despite this, our study was not able to show the relationship between e-health literacy and physical activity. This was similar the study of Cho et al. (2018). This difference may be due to the personal characteristics of a person. Among the subscales of health-promoting behaviors, physical activity is a practical factor that is influenced by personal situations.

Since e-health information is interactive and engaging, its ability to deliver facts to mass audiences can improve the quality of healthcare and health promotion (Oducado & Moralista, 2020). A personal digital healthcare system provides people with knowledge and comprehension of their health due to technological improvements. The point of the study was also to look for possible executable programs and secondary channels of connection among eHealth literacy and health-promoting behaviors among nursing students by social media usage for health information, as well as online health information behaviors. Individuals may gain control over their health and promote a healthy lifestyle through eHealth literacy.

One of the factors in several elements of health development is health promotion. When individuals utilize the internet wisely as a source of relevant data, then e-health literacy can help them get more accurate health information (Ossebaard & van Gemert-Pijnen, 2016), which would exhibit health-promoting behaviors. The accessibility and reliability of the vast information across the world wide web could provide varying facts and opinions about the participants' health concerns regarding nutrition and health responsibility, thereafter, being equipped with the capacity to decipher credible information, eHealth literacy, will positively empower them to adapt to a fitness-promoting lifestyle. eHealth literacy, exercise hours, subjective health status, and health concerns strongly correlated with health-promoting activities. Interventions for health-promoting behaviors, such as strengthening competencies relevant to critical eHealth literacy and increasing exercise hours, must be created to enable nursing students' health-promoting habits. This then supports the positive relationship of a high-level e-Health literacy being in line with health-promoting behaviors.

The internet's accessibility to a wide range of health-related information has made it a more popular source of health information, particularly among those in their 20s. In line with this, e-health literacy has been a determinant for users in general in the realm of social media. Their reach has made it possible to further the spread of important information with regard to health on a myriad of different social media platforms.

Strengths and limitations of the study

One of the strengths of the current study was there was no bias in the selection process because every student was invited to participate. When respondents to a survey are the kind of people who like to complete surveys, self-report bias may arise, which can affect and restrict the findings. However, some restrictions must be taken into account. When doing statistical analyses and making suitable population-level generalizations, power calculation is frequently advised. This study only included students enrolled in one university, therefore, it is only possible to generalize the results to this population. Also, another limitation is that correlational studies cannot establish a cause-and-effect relationship.

Conclusion

The study revealed a significant relationship between eHealth literacy and health-promoting behaviors. Thus, nursing students with a high level of eHealth literacy have the edge in making healthy behaviors. Moreover, identified intervention strategies based on eHealth literacy are needed to encourage healthy practices, which may reduce risks of illnesses due to unhealthy lifestyle behaviors among nursing students. Also, future research can be done to include students from other professions.

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Declaration of Interests

The authors declare that they have no competing interests.

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The correlation between islamic mindfulness with nursing student professional attitude and caring behavior

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Abstract

Background: Various stressors during the clinical practices may affect the psychological status of students which potentially impact on their professional attitudes and caring behavior. Prospective nursing students practices on clinical setting is necessary as the basis for strategy development in building students' caring behavior. The role as care giver that believed can impact to professional attitude and caring behavior is Islamic mindfulness.
Purpose: The aim of the study was to identify the correlation between Islamic Mindfulness with professional attitude and caring behavior among nursing students.
Methods: Cross-sectional design was carried out in this study. A total of 97 Moeslim students of nursing clinical Practices program were recruited from Islamic State University of Jakarta and Makassar Indonesia during November to December 2022 by total sampling. Instruments of Islamic Mindfulness questionnaire, Caring Asessment Tool and Professional attitude for Nurses students were used. Data collected by online. Bivariate analysis was performed to test the correlation between Islamic mindfulness with professional attitude and caring behavior among nursing students.
Results: The mean score of Islamic mindfulness was 38.27 (SD=5.60), Professional attitude was 67.09 (SD=9.56) and Caring behavior was 84.96 (SD=15.14). Islamic mindfulness had very week-positive correlation with professional attitudes but not significant (r=0.148; p-value= 0.073). Islamic mindfulness had a weak-positive and significant correlation with caring behavior (r=0.363; p-value= 0.0001).
Conclusion: Islamic mindfulness had a significant correlation to caring behavior. It is important to Nursing students features Islamic mindfulness to strengthen the caring behavior.

Keywords: caring behavior; islamic mindfulness; nursing clinical practices; professional attitude

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Introduction

Nursing students must develop a comprehensive skill set that encompasses both technical proficiency and the expression of a caring, professional attitude toward patients and their families. This dual focus is essential because nursing is not solely about performing clinical tasks or applying medical knowledge; it also involves demonstrating empathy, compassion, and a genuine commitment to patient well-being. A caring attitude reflects the core values of nursing, such as human dignity and altruism, and is integral to building trust and rapport with patients. A professional attitude ensures that students adhere to ethical standards and maintain a respectful and effective communication style with patients, families, and colleagues. By mastering these aspects, nursing students can provide holistic care that addresses both the physical and emotional needs of those they serve, embodying the true essence of the nursing profession. Caring is the core of nursing (Li et al., 2016). This is in accordance with the statement of The American Nurses

Association (ANA) (2017) that nursing is inseparable from the concept of care and caring.

The nursing profession is fundamentally grounded in professional ethics and a set of core values that guide practice and behavior. These core values include altruism, autonomy, human dignity, integrity, and justice, which are critical to ensuring the quality and standards of care provided by nurses. The code of ethics for nursing serves as a framework that outlines these values, clarifying the expectations for professional practice, the quality of care, and adherence to professional norms. The internalization of these professional values is central to the nursing profession, as they become ingrained in practitioners' behaviors and standards of practice. This process of internalization often begins during nursing education, where values are taught, reinforced, and shaped through both direct and indirect methods. As nursing students progress through their education, they undergo a socialization process that can modify or reinforce their initial set of values. The deliberate incorporation of professional values into nursing education is crucial to cultivating competent, ethical nurses who will uphold these standards in their practice, thereby ensuring the future of the nursing profession (Poorchangizi et al., 2019).

At this time, in the midst of a technologically advanced and fast-paced clinical environment, caring remains a vital component of nursing practice. Despite the increasing reliance on technology and the rapid pace of healthcare settings, the essence of caring continues to be highly relevant. Caring is base to understanding of human nature and is at the core of the nurse-patient relationship. The concept of caring was first introduced by Watson in 1978 (Alligood, 2017). Caring is a value and attitude that must be the will of a nurse, the intention and commitment of which is manifested in concrete actions. The caring concept basically applied to nursing as an activity and an attitude aspect. Aspects of activity of caring, for example observing the effects of medication, being technically competent with a clinical procedure, instructing a patient about aspects of care, active listening to a patient, explaining the clinical procedure to a patient and being with a patient during the clinical procedure. Attitude aspect of caring including fulfillment of the patient's psychological need for comfort, therapeutic touching, giving privacy for patients, smiling and being kindness. Together, these activities and attitudes create a holistic approach to nursing care that addresses the full spectrum of patient needs—both physical and emotional—ensuring a comprehensive and compassionate care experience (Ayyub et al., 2015). The caring aspect is a complex specialty, involving some factors such cognitive, moral and emotional. Fundamental moral values such as respect to patients and their families by paying attention, and recognition of their existence. While it is clear that liking or affection for patients may be present indirectly in carrying out nursing care, it is possible that affection and gratitude can also be generated by the nurse-patient relationship, where certain benefits of understanding can also be obtained by nurses. Caring is the intentional and caring presence of the nurse with others who is recognized as a caring person who lives a caring life and grows in caring (Akansel et al., 2021). To enhance the professional practice of nursing, it is essential to grasp the significance of caring from a nurse's perspective. Furthermore, nurses are recognized as fulfilling a dual role—both as caregivers providing support and compassion to their patients, and as care recipients, who also need support, empathy, and understanding from their colleagues and the healthcare system. Understanding these dynamics is vital to fostering a culture of caring that enhances both patient outcomes and the well-being of nurses themselves (Tung et al., 2018).

Nurses provide quality professional services for a better patient outcome. All nursing activities are verified through nurses caring behavior. Nurses caring behavior can influence patient satisfaction and perceived quality of nursing care (Oluma & Abadiga, 2020). Caring behavior and professional behaviors are two variables that influence each other. Nursing students are prepared to be a professional nurse, mostly play their role during clinical practice as care providers. As a care provider, nursing students face challenges with the environment in which they practice. Students are required to practice skills, integrate theoretical knowledge and work with other health teams (Subke et al., 2020). Students take care of patients in doing nursing care. Unfortunately, the role of role models in providing caring practice has not been maximally displayed. In providing nursing care, students are required to display a caring attitude and professional attitude, while on the other hand students are vulnerable to stress, particularly during nursing clinical practices education programs. Nursing students often face a range of stressors that can affect their emotional and mental health, including high clinical workload, pressure to achieve academically grade, financial difficulties, inadequate support during clinical placements and exposure to patient suffering and death (McVeigh et al., 2021). Nursing Student experienced moderate-to-high levels of stress during their nursing education and clinical practices (Labrague, 2024; Zheng et al., 2022).

In the last 10 years, mindfulness has become popular as an intervention to reduce stress and increase self-confidence, including in the health workers (DeMauro et al., 2019) and nursing students (Chen et al., 2021; McVeigh et al., 2021; Wiguna et al., 2018). Mindfulness enhances the quality of care provided by healthcare professionals by fostering key qualities such as receptivity, motivation, and responsiveness toward others. It does this through several mechanisms, including therapeutic presence, active listening, a non-judgment, compassion, self-care, emotional awareness, and effectively managing emotional responses to maintain professionalism and provide steady. By cultivating these qualities, mindfulness supports healthcare professionals in delivering more compassionate and effective care to their patients (DeMauro et al., 2019).

In Islam, mindfulness is known as muraqabah or some say mindfulness as "Ihsan" which is a strong feeling of feeling watched by the Almighty (Arroisi & Dzunnurrain, 2023). Islamic Mindfulness presents Allah SWT and involves Allah SWT in every activity (Dwidiyanti et al., 2019). Some studies in Indonesia found a correlation beteen Islamic mindfulness and academic activity (Munif et al., 2019) and Santoso et al. (2022) had found the effect of Islamic mindfulness in reducing stress in final year students and during online learning consecutively. Literature review by Wiguna et al. (2018) yielded effect of mindfulness toward reducing anxiety of nursing students in supporting academic learning.

The role of Islamic mindfulness in classroom learning has been studied. Study by Munif et al. (2019) found that Islamic mindfulness had impacted on low level of stress among undergraduate nursing students. Similarly, Dwidiyanti et al. (2021) also found that Islamic mindfulness, namely DAHAGA, had impact on low level of stress of bachelor nursing students during COVID-19. Islamic mindfulness believed has an important role in improving students' performance, however no study has been conducted among nursing students. Thus this study may important to clarify whether or not Islamic mindfulness has positive impact on nursing performance, particularly their professional attitude and caring behavior. The purpose of the study was to identify the correlation between Islamic mindfulness with professional attitude and caring behavior among nursing students.

Material and Methods

Design

Study design was cross-sectional study.

Sample and Setting

The sample was all nursing students of clinical practice program from two state islamic university in Indonesia, totally 139 students. The inclusion criteria included nursing students, active students either first semester or second semester. Exclusion criteria was leave status. Total sampling technique was performed. The research was carried out in November - December 2022. From total 139 students,105 students participated in the study and sent back the questionnaires. Of the 105, found 8 data outliers and incompleted. Finally, the total data analyzed amounted to 97.

Instruments

The instruments used were the respondent's personal data (age and gender), the Islamic mindfulness questionnaire, the Caring Assessment tool (CAT) version V and The Instrument of Professional Attitude for Student Nurses (IPASN).

The IMQ was used to measure Islamic mindfulness. We developed IMQ from 10 item-short version of Mindfulness Philadelphia Scale by Zeng et al. (2015), and 6 item which is relevant to Islamic mindfulness and nursing practice. The example is I realized that my speech, behavior and attitude were seen by the Almighty, I try to distract when I feel unpleasant emotions, I will still take action as much as possible even if it is not supervised by others. The total of 16 items of Islamic mindfulness on a scale of 0 – 3 (0= never to 3= always). The range score of 0 – 48. First, we developed 18 item IMQ. The content validity was conducted to three experts from islamic studies, english language, and nursing. The results of item-level Content Validity Indeks (i-CVI) was 0.91 and scale-level Content Validity Indeks was 0.83. From judgment experts there were 2 item not relevant, and 1 item should be modified. Finally we developed 16 items of islamic mindfullness scale. After content validity, we conducted construct validity. The construct validity test was applied involved 45 nursing students outside of samples of true study to test for validity and reliability. The result was all 16 items valid and the reliability was an alpha value of Cronbach = 0.783.

The CAT version V is to measure Caring of Nursing Student. The CAT has been developed by Duffy et al. (2014). The CAT version V consists of 27 items with a scale of 1-5 (1 = never to 5 = always). The score range of 27 – 135. The example is I pay attention to the client/patient when the client/patient talks to me, I help the client/patient see some good aspects of the client/patient's situation, I help clients/patients not to worry too much. Validity test results, all items are declared valid with reliability values (Cronbach alpha = 0.908).

The Instrument of Professional Attitude for Student Nurses (IPASN) is used to measure the professional attitude of nursing students enrolled nursing clinical practices. The questionnaire was developed by Hisar et al. (2010). The questionnaire consists of eight factors, including an increase in the burden of scientific information (6 items), collaboration (5 items), community service (3 items), codes of ethics and theory (3 items), competence and continuing education (3 items), participation in professional organizations and professional development (3 items), autonomy (3 items) and work in an organization or committee (2 items). The total item was 28 items. Likert scale in the range 1 – 5 (1= I do not agree at all; 2= I do not agree; 3= I am not certain; 4= I partly agree; 5= I completely agree). The score range is 28 – 140. Furthermore, Çelik et al. (2012) did test of fit the scale by using confirmatory factor analytic test.s The result showed that the IPASN has been suitable to use in different country outside Turkey. The reliability value is obtained by Cronbach's alpha value = 0.778.

However, CAT-version V and IPASN had never been used in Indonesian people. After obtaining permission from the instrument developers, the

Principal Investigator carried out the translation process. The original questionnaires, English version was translated into Bahasa Indonesian and then we conducted the content validity index (CVI) by 3 experts from area of nursing, clinician and english language expertise. The CVI of the IMQ, CAT-version V and IPASN were 0.80, 0.83, and 0.82, respectively.

Data Collection

Data collection performed after gaining ethical approval and formal permission from the study site. Questionnaires of Indonesian version were set into a google form. Researchers then distributed the google-form questionnaires to all nursing students clinical practice programs.

Researchers were assisted by one research assistants at UIN Jakarta and one assistant at UIN Makasar. Researchers were contacted respondents through their phone number by Whatsapp. To filled all the questionnaire each participant approximately spent 15-20 minutes. G-form was set to one respond only and the data was automatically recorded when the participants submit the answer in Google form.

Data Analysis

Descriptive analysis is used to describe the characteristics of data demography and each research variable. Bivariate analysis was performed to analyze the correlation between Islamic mindfulness with professional attitude and caring behaviors among nursing students.

Ethical Consideration

Prior data collection, informed consent was obtained. The researcher in advance conveyed the study's purpose and procedures to prospective respondents. Those who agreed to participate provided a digital signature to indicate their consent. Participants were informed that their involvement was entirely voluntary, and they could choose to participate, not participate, or withdraw from the study at any time without any consequences for their academic progress. Ethical approval was obtained from the Health Research Ethics Commission of Faculty of Health Sciences Universitas Islam Negeri Jakarta, Number Un.01/ F.10/ KP.01.1/ KE. SP/09.08.012/2022.

Result

Characteristics of respondents.

Table 1 shows the characteristics of respondents in this study dominated by female nursing students (89.7%), with the average of age of the respondents is 22.85 years old.

Table 2 showed Mean score of Islamic mindfulness was 38.27 (SD= 5.60), Professional Attitude was 67.09 (SD= 9.56), and Caring behavior was 84.96 (SD= 15.14).

Correlation between Islamic mindfulness with Professional Attitude and Caring Behavior

The results showed that Islamic mindfulness had a low positive correlation with professional attitudes (r=0.148) but this correlation was not significant (p-value= 0.073). Furthermore, Islamic mindfulness had a positive and significant correlation with caring behavior (r=0.363; p-value= 0.0001). (Table 3)

Discussion

The results of the study exhibited that Islamic mindfulness had positive and significant correlation with caring behavior (r=0.363; p-value=0.0001). This finding is in line with DeMauro et al. (2019) that mindfulness supported response of caring professionals of health workers. Mindfulness enhances the ability of caring professionals to support others by fostering qualities such as therapeutic presence, attentive listening, nonjudgmental attitudes, emotional awareness, and emotion stability. These mechanisms help professionals

Table 1. Characteristics of Respondents (N=97)

Variable	n	%
Gender		
Male	10	10.3
Female	87	89.7
Age (years old)		
Minimum - Maximum = 21 – 27; Mean = 22.85 (SD= 0.96)		

Table 2. The description of Islamic mindfulness, Professional Attitude, and Caring Behavior (N= 97)

Variable	(Min – Max)	Mean	(Standard Deviation/SD)
Islamic Mindfulness	27 - 48	38.27	5.60
Professional Attitude	43 - 92	67.09	9.56
Caring Behavior	48 - 108	84.96	15.14

Table 3. The correlation Islamic mindfulness, Professional Attitude, and Caring behavior (N=97)

		Islamic Mindfulness	Professional Attitude	Caring behavior
Islamic Mindfulness	Correlation Coefficient	1.000	.148	0.363***
	Sig. (2-tailed)	.	.073	0.0001
Professional Attitude	Correlation Coefficient		1.000	
	Sig. (2-tailed)			
Caring behavior	Correlation Coefficient			1.000
	Sig. (2-tailed)			.

remain fully present, empathetic, and responsive to the needs of those they care for, thereby improving the overall quality of care (DeMauro et al., 2019).

Furthermore, Maryatun et al. (2023) found Islamic mindfulness had a good effect to nursing students's spiritual and emotional intellegence. Kaur et al. (2013) found the relation between spiritual intelligence, emotional intelligence, psychological ownership and nurses' caring behavior. A nurse who has intelligence other than academic intelligence, namely emotional and spiritual intelligence, as well as psychological possession related to mindfulness in nursing care behavior.

Caring behavior had associated also to patients' satisfaction (Calong & Soriano, 2018; Ellina et al., 2019; Gurusinga, 2020; Suprajitno et al., 2020). Furthermore, Subke et al. (2020) yieded that caring practices was supported by conducive practices environment. Nurse profession students experienced both literacy and illiteracy caring practice. It showed that Islamic mindfulness as an important role to support caring behaviors in nursing students.

The finding also found that Islamic mindfulness and professional attitudes had a weak correlation (r = 0.147) and no significant relationship (p-value = 0.068). The correlation coefficient is positive, meaning that the higher the student's Islamic mindfulness score, the student's professional attitude score will increase. It might that in this study, Professional attitude measure by eight dimensions, namely an increase in the burden of scientific information, collaboration, community service, codes of ethics and theory, competence and continuing education, participation in professional organizations and professional development, autonomy and work in an organization or committee did not relate with islamic mindfulness. Professional attitude built by knowledge of nursing ethics, nursing sciences and nursing art. Professional attitude also depends on their interested on nursing. This statement was in line with Shohani, Abedi, and Rasouli (2018) study that 65.8% of nursing students who interested in the nursing profession tend to have good professional attitude. In the other hand, Poorchangizi et al. (2019) argued thats professional value is at a very important level. The values that are felt to be important by students are maintaining patient confidentiality and maintaining patient privacy rights. Grades that are considered less important by students are participating in policy decisions that affect the public and participating in peer review.

The finding also yielded that professional attitude had a week relation to caring behavior (r = 0.108). This finding is consistent with prior study by Sümen et al. (2022) that there was a positive weak correlation between Professional Attitude of Nursing Student and Caring Behaviors. In contrast, Ayaz-Alkaya and Terzi (2022) found that there was a relationship between professional attitude and peer caring behavior. The professional attitude could be increased by improve peer caring behavior. Additionally, a professional attitude was found to be more prevalent among female nursing students compared to their male counterparts. This positive attitude was also higher among students whose income met or exceeded their expenses, who chose nursing school willingly, studied nursing with enjoyment, were eager to work as nurses, and had plans to advance their careers in nursing.

Indeed, caring behavior and professional attitude like two side of nurse behavior in taking care of patient. It is needed a novel approach, such as internship and mentorship, role model from clinical instructor to strengthen caring behaviour and professional attitude among nursing students. In islamic higher education or moeslim nursing students need to be reinforced Islamic mindfulness.

This study has some limitations. First, a cross-sectional research design where researchers collect data variables of dependent and independent at one time. Second. The research only involved nursing students from two state islamic university in Indonesia limits the possibility of generalization of the results. The last limitation was male nursing students fewer than female students.

Conclusion

Islamic mindfulness has a positive significant correlation to caring behavior, but it is not significant correlation to Professional attitude. It indicates that the students with higher Islamic mindfulness score will have the higher caring behaviors. Improving Islamic mindfulness among the nurse profession students is important to increase caring behavior. Further research is necessary to asses influence of islamic mindfulness training to caring behavior and professional attitude among nursing student which study in non-islamic university.

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Declaration of interest

We declare no conflict of interest.

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Review Article

Self-Care among Breast Cancer Survivors: A Concept Analysis

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Abstract

Background: Breast cancer survivors have an excellent prognosis and a high survival rate, thus each survivor requires self-care abilities throughout their complex therapy. The concept of self-care is not a new concept in the nursing field, but it is necessary to analyze it as there are still inconsistencies in its use and unclear definitions, especially in the context of breast cancer survivors.

Purpose: The purpose of this study was to describe the concept of self-care among breast cancer survivors by employing the Walker and Avant's analysis method.

Methods: The Walker and Avant's concept analysis method comprises of eight systematic steps. The literature search was conducted through electronic databases, such as ScienceDirect, MEDLINE, EBSCO, ProQuest and SAGE, with the search constraints ranging from 2003 to 2023.

Results: The literature search identified 115 articles in the fields of medicine, nursing, sociology, psychology, economics, anthropology, pharmacy, computer science and midwifery. Following the analysis, 30 articles were selected for this study. The concept of self-care was defined as: 1) survivor activity; 2) survivor awareness; 3) self-management; 4) prevention of morbidity and recurrence; 5) improved health. Meanwhile, the concept's antecedents included self-efficacy, self-care agency and social support, and the consequences included symptom control, improved coping, improved well-being, and improved quality of life.

Conclusion: Understanding the attributes of self-care among breast cancer survivors along with their antecedents and consequences could facilitate its development in nursing practices. The self-care concept is utilized for self-care assessment and implementation of appropriate interventions in the context of breast cancer survivors who have completed the therapy.

Keywords: breast cancer; concept analysis; self-care; survivors

Introduction

Breast cancer is a non-communicable disease which has the highest mortality rate among women (Siegel et al., 2023; Sung et al., 2021), its global prevalence having progressively increased during the last 20 years (Sung et al., 2021). In Indonesia, the prevalence of breast cancer cases reaches 42.1 per 100,000 population, the highest incidence at 16.7% and an average mortality rate of 17 per 100,000 population (Ministry of Health, 2019; WHO, 2020). Technological developments in early detection and multimodality therapy innovations have helped to increase the number of survivors of early stage of breast cancer, which has the highest survival rate among other types of cancer, reaching 90% (Kapoor et al., 2020; Nuraini et al., 2024; Soldato et al., 2023).

From diagnosis to completion of therapy, breast cancer survivors face a range of physical issues related to the disease and therapy, and psychological distress – including the risk of recurrence and the presence of new cancers, all of which have an impact on their quality of life. Thus, the survivors need to receive optimal survivorship care (American Cancer Society, 2020). Currently, the guidelines for survivorship care focus on the management of long-term side effects of therapy, identification of recurrence and promotion of a healthy lifestyle (Rodriguez & Foxhall, 2019). This category involves a number of survivors' self-care activities to ensure that the survivors take the responsibility for their care and therapy. These self-care activities are essential in the care of breast cancer survivors as they help reduce concerns about the therapy side effects and improve the quality of life (Okten & Ozer, 2022; Tulu et al., 2021).

In addition, self-care is a key concept and a universal term in the healthcare system, with definitions expanding across disciplines, especially in the nursing field. Although it is not new, there is no precise definition in the literature, particularly in relation to breast cancer survivors' self-care. There are several terms describing self-care in the literature, such as self-treatment, self-monitoring, self-health and self-management. Thus, the concept of self-care demands further investigations, because understanding the concept of self-care among the breast cancer survivors could help to clarify its definitions' constraints. Analyzing the concept of self-care is necessary so as to clarify and define its meaning , so that, when it is utilized, it can be clearly described, explained and/or predicted (Tulu et al., 2021; Walker & Avant, 2014).

This present study employed a concept analysis to clarify the concept of self-care among breast cancer survivors and develop an operational definition. A clear definition of self-care can help healthcare professionals and survivors set goals of care together. It is also required in the development of science, especially in the therapy of breast cancer survivors (Alqahtani & Alqahtani, 2022; Martínez et al., 2021; Tulu et al., 2021).

Methods

This study employed the Walker and Avant's concept analysis method, which consists of eight systematic steps, namely: 1) selecting a concept; 2) determining the purpose of concept analysis; 3) identifying the use of concepts found in various literature; 4) determining the attributes of definitions; 5) determining case models; 6) determining borderline cases and contrary cases; 7) identifying antecedents and consequences; and 8) determining empirical referents (Walker & Avant, 2014). The literature was retrieved from several electronic databases, including ScienceDirect, MEDLINE/PubMed, EBSCO, ProQuest and SAGE, from January 2003 to December 2023. Keywords used in the search were determined based on Medical Subject Headings (MeSH), namely "self-care," "breast cancer survivor," and "definition." In addition, the literature search employed several criteria, whereby the articles must be (1) written in English; 2) available in open access publishing; 3) published in 2003-2023; and 4) a full text. The authors excluded several studies since they did not address the antecedents, attributes, and consequences or suitable definition of this concept.

Results

Identifying the Use of the Concept

The concept of self-care was identified through a literature review on the concept application in various disciplines from several electronic databases. This present study limited the literature search to English language articles and not only to one discipline, as it might influence bias in understanding the concept (Walker & Avant, 2014). Based on the literature review, this study obtained several definitions of self-care among breast cancer survivors from various disciplines, including nursing, medicine, anthropology, midwifery, health economics, social/sociology, pharmacy, biology, computer science and information systems, and psychology (Table 1).

Attributes of Definitions

The attributes of definitions were determined by identifying attribute clusters that appeared most frequently in various definitions and were related to all analyzed concepts (Rodgers et al., 2018; Walker & Avant, 2014). Based on the previous literature search (Table 1) and identification of keywords on each concept attribute (Table 2), there were five attributes of definitions of self-care among breast cancer survivors, including: 1) survivor activity; 2) survivor awareness; 3) self-management; 4) prevention of morbidity and recurrence; 5) improved health (Table 3). Furthermore, based on these five attributes, an operational definition that could be concluded was that self-care among the breast cancer survivors referred to activities practiced in relation to self-management, prevention of recurrence, and improved health.

Case Model

In this concept analysis step, this study developed a sample case model illustrating all attributes of definitions (Walker & Avant, 2014). An example of a case model is as follows:

Mrs. A was 42 years old and a breast cancer survivor. She had completed operative therapy, chemotherapy and radiotherapy, and had finally returned home. She realized that the completion of therapy at the hospital was not the end of the treatment process. She continued her therapy at home in a proper manner (self-awareness). She studied the information guide regarding proper diet, recommended physical activity, recurrence symptoms, long-term therapy side effects, and recommended revisit schedule (survivor activity). She began exercising in the morning, consuming healthy food, engaging in appropriate activities, taking rest, and ensuring to take the medication prescribed (self-management). Every day, she recorded her symptoms / concerns (self-management), and exercised her right arm to prevent lymphedema (prevention of morbidity and recurrence). Furthermore, she also drank fruit juices as recommended, and got enough rest during the day and night to maintain and improve her health

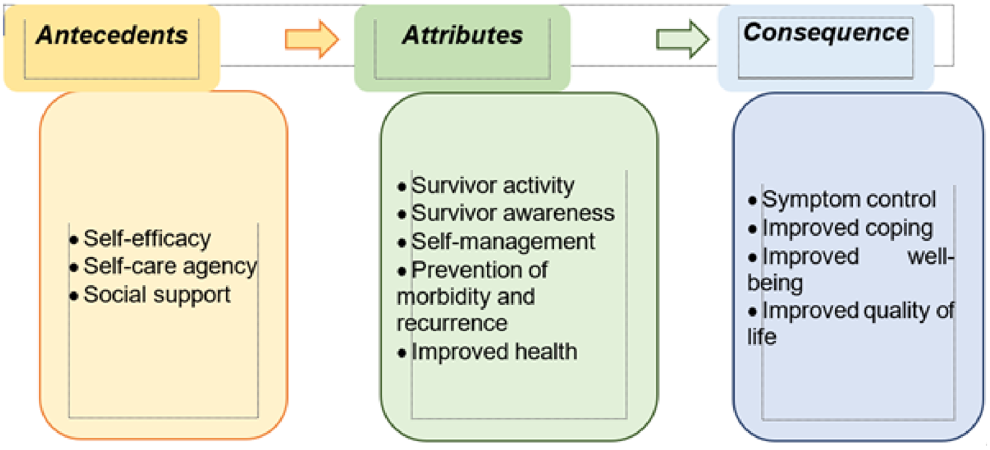

Figure 1. Antecedents, Attributes and Consequences of Self-Care

(improved health).

Borderline Case and Contrary Case

The borderline case only partially describes the attributes of definitions of self-care, while the contrary case is the opposite case of the attributes of definitions of the concept analyzed (Walker & Avant, 2014). The following are borderline and contrary cases of the concept of self-care:

Borderline Case

Mrs. C was 37 years old and a breast cancer survivor. She had completed the therapy and received information on the necessary self-care from Nurse B. She was aware of the importance of rest and physical activity, but, because she did not have relatives to accompany her at home, she felt burdened in performing chores alone (self-awareness). Furthermore, she always took the recommended medication during outpatient care, specifically painkillers and vitamins (self-management), but she never exercised every day or even every week, and she continued to consume fast food and soft drinks while sleeping late. Outpatient and scheduled laboratory tests showed poor results and required further investigation due to the possibility of recurrence. She understood the importance of self-care at home, which she had previously overlooked.

Contrary Case

Mrs. B was 51 years old and a breast cancer survivor. She also had completed the therapy. She had been informed about the home care, including the side effects after therapy, symptom management, activity and rest, nutritional intake and re-visit schedules, but she ignored them because she believed she had recovered and did not understand the importance of self-care after completing the therapy. In the following days, she stopped taking the prescribed vitamins, slept poorly, and even ignored healthy food recommendations as she returned to consuming fast food. She also failed to attend scheduled outpatient visits and always avoided Nurse A's calls to remind her of her outpatient schedule and laboratory tests.

Antecedents and Consequences

Antecedents refers to events or incidents that must occur before the concept's occurrence or manifestation (Walker & Avant, 2014). Based on the results of the literature review, several antecedents in the self-care included the self-efficacy, self-care agency and social support (Chin et al., 2021; Hunt, 2016; Wright, 2020; Yahaya et al., 2022). Self-efficacy was one of the antecedents derived from individual patients/survivors, namely their confidence in their ability to carry out self-care in accordance with specific goals influenced by individual knowledge, motivation, skills and values (El-Osta et al., 2019; Richard & Shea, 2011). Self-efficacy among the cancer survivors is the result of a long journey of disease and therapy and which serves as a self-regulation mechanism (Semiz & Aksut, 2022; Seo & Lim, 2016). It is important since it can have an impact on achieving the treatment goals. Individuals with high self-efficacy will have the confidence to engage in various activities, including the self-care activities, to achieve their health care goals (Chirico et al., 2017; Melin et al., 2023).

Further, the self-care agency is also related to the individuals' ability to perform the self-care activities and physical condition, and demonstrate a level of independence, based on the availability of assistance (Narasimhan et al., 2019; Sist et al., 2022). The self-care agency, in the context of breast cancer survivors, is related to estimative self-care activities, including the process of seeking knowledge about necessary self-care activities and a description of their ability to do it. These lead to adequate self-care agency and improved self-care skills (Loh, 2018; Martínez et al., 2021).

Meanwhile, the social support is also related to cultural context, earned support and actual social support (Smirnov, 2018). The social support reflects the antecedents that promote the self-care activities, especially in the case of post-therapy breast cancer survivors whose complexity increases the need

Table 1. Definitions of self-care in various disciplines

Authors	Disciplines	Definitions
(El-Osta et al., 2019)	Medicine	Activities that include an individual's capacity and ability to increase health-related knowledge and literacy, perform physical activities, consume healthy food, prevent risks, maintain personal hygiene and other self-care activities, and achieve self-care behaviors in various contexts (including daily lifestyle, acute conditions, chronic conditions and during trauma).
(Weltermann et al., 2015)	Medicine	Individuals, families and communities' abilities to engage in health-promoting activities, prevent illness, maintain good health and cope with illness and disability. This broad concept includes nutrition, lifestyle and medication management/ therapeutic self-management.
(Bayliss et al., 2003)	Medicine	Individuals' abilities and awareness to self-manage their own health and illness.
(Dehkordi et al., 2016)	Medicine	Individuals' needs and abilities to maintain and improve their health, accelerate their recovery, prevent complications, and plan their therapy.
(Dehkordi, 2016)	Medicine	Patients' engagement and ability to self-observe, recognize symptoms, understand their health condition, and take care to maintain / improve their health.
(Armer et al., 2008)	Nursing	Individual breast cancer survivor activities which include symptom reporting and management, and general self-care in relation to the disease and its therapies.
(Brown et al., 2015)	Medicine	The breast cancer survivors engage in healthcare activities to manage the long-term and late effects of therapy, such as lymphedema.
(Hunt, 2016)	Nursing	Individuals' ability to maintain their health and well-being in daily life, including promoting health, consuming proper nutrition, and conducting physical activities as well as practicing self-care activities.
(Wilkinson & Whitehead, 2009)	Nursing	Individuals' ability to act and make decisions that are influenced by their knowledge, skills, values, motivation, self-efficacy and control.
(Richard & Shea, 2011)	Medicine	Individuals' ability to practice the self-care activities in order to achieve, maintain or improve their health and quality of life, including decision-making skills as influenced by efficacy, self-control and lifestyle.
(Mccormack, 2003)	Nursing	Individuals' ability (autonomy) and awareness to maintain their health, achieve well-being, prevent illness and promote health, including the decision-making skills as influenced by their knowledge, skills, locus of control, and efficacy.
(Fu et al., 2016)	Nursing	Individual activities to prevent and reduce the recurrence and other symptoms in order to maintain a high quality of life.
(Sist et al., 2022)	Nursing	Individual actions to improve and maintain their health through symptom monitoring (self-care maintenance), with information support from the health professionals in improving psychomotor self-care abilities (self-care support), or their ability to manage symptoms (self-management), and side effects of certain treatments.
(The Institute for Research and Innovation in Social Services, 2020)	Social science/sociology	Daily mental, physical and emotional care activities that benefit individuals in order to achieve overall well-being.
(Narasimhan et al., 2019)	Psychology	A set of activities and individuals' ability to practice the self-management and self-assessment based on self-awareness.

Authors	Disciplines	Definitions
(Riegel et al., 2021)	Nursing	Individuals' process of maintaining their own health by engaging in a range of disease management and health promotion activities that may be unique to their illness in order to achieve physical and emotional stability.
(Omisakin & Ncama, 2011)	Nursing	Individual responsibility and activity for healthy behavior / lifestyle based on self-initiation, including their ability to access sources of assistance / support to maintain and improve their health, coping, and quality of life.
(The Australian Psychological Society, 2017)	Psychology	Individuals' activities based on their specific self-values to achieve well-being, including professional, psychological, spiritual, and lifestyle.
(Eijck et al., 2020)	Health economics	Individuals' activities to maintain their health and take responsibility for themselves to support the healthcare system resilience.
(Smirnov, 2018)	Anthropology	Individuals' skills and abilities to develop and manage themselves and their life.
(International Pharmaceutical Federation, 2022)	Pharmacy	Individuals' activities in maintaining their health and improving their wellbeing, which include seven pillars: health knowledge and literacy, mental awareness and well-being, physical activity, healthy eating, risk prevention, personal hygiene and wise use of services/products.
(World Health Organization, 2022)	Medicine	Individuals, families and communities' ability to promote health, prevent illness, maintain health and deal with illness and disability, with or without the support from the health professional services, including the self-management, self-awareness and self-assessment.
(Mills et al., 2018)	Nursing	Individuals' conscious activity or behavior to engage in the self-care practice to maintain and improve their health and well-being.
(Bo et al., 2023)	Neurology and rehabilitation medicine	Long-term, self-empowering, self-management activities and recurrence prevention behaviors to maintain or improve the health.
(Ludman et al., 2013)	Medicine	Individuals' ability to practice disease self-management activities independently or with the assistance of healthcare professionals in order to achieve the well-being.
(Wright, 2020)	Midwifery	Individuals' ability to promote health, prevent illness, maintain health and cope with illness and disability independently, with or without the assistance of healthcare professionals.
(Ridner et al., 2016)	Nursing	Breast cancer survivor activities in the management of side effects, such as lymphedema and various physical and psychological symptoms.
(Kapoor et al., 2020)	Computer science and information systems	Individual care activities in the disease management involving the use of various information resources and technology (literacy).
(Chin et al., 2021)	Nursing	Individual activities in the self-management of therapy side effects, and symptom monitoring in order to maintain and/or improve the health and quality of life.
(Yahaya et al., 2022)	Nursing	Individuals' conscious decisions to engage in the self-care practice to improve their health, well-being and quality of life.

for social support in the form of emotional and informational support, thereby influencing the self-care abilities (Nasution et al., 2023; Rauh, 2021).

Furthermore, the consequences reflect the purpose of the concept in relation to physical and psychological aspects (Walker & Avant, 2014). Several consequences of the concept of self-care include symptom control, improved coping, improved well-being and improved quality of life (Ludman et al., 2013; Mills et al., 2018; World Health Organization, 2022). The goal is that the survivors' self-care would progress to the point that they could

Table 2. Keywords clusters of self care attributes

Keywords cluster	Sources	Attributes
Individual activity Individual abilities Activities of breast cancer survivors Activity/behaviour Individual skills Individual capacity	(Armer et al., 2008; Bayliss et al., 2003; Bo et al., 2023; Brown et al., 2015; Chin et al., 2021; Dehkordi, 2016; Dehkordi et al., 2016; Eijck et al., 2020; El-Osta et al., 2019; Fu et al., 2016; Hunt, 2016; International Pharmaceutical Federation, 2022; Kapoor et al., 2020; Ludman et al., 2013; Mccormack, 2003; Mills et al., 2018; Narasimhan et al., 2019; Omisakin & Ncama, 2011; Richard & Shea, 2011; Ridner et al., 2016; Riegel et al., 2018; Sist et al., 2022; Smirnov, 2018; The Australian Psychological Society, 2017; The Institute for Research and Innovation in Social Services, 2020; Weltermann et al., 2015; Wilkinson & Whitehead, 2009; World Health Organization, 2022; Wright, 2020; Yahaya et al., 2022)	Survivor activity
Individual awareness Awareness/recognition of symptoms Self-awareness Self-initiation	(Bayliss et al., 2003; Dehkordi, 2016; Mccormack, 2003; Narasimhan et al., 2019; Omisakin & Ncama, 2011; World Health Organization, 2022; Yahaya et al., 2022)	Survivor awareness
Self-care behaviour Medication/care management Planning health care/therapeutic efforts Managing long term and late effects Nutritional consumption Physical activity Symptom management Psychological care Self/disease management Maintaining health	(Armer et al., 2008; Bayliss et al., 2003; Chin et al., 2021; Dehkordi et al., 2016; El-Osta et al., 2019; Hunt, 2016; Kapoor et al., 2020; Ludman et al., 2013; Narasimhan et al., 2019; Omisakin & Ncama, 2011; Richard & Shea, 2011; Ridner et al., 2016; Riegel et al., 2021; Sist et al., 2022; The Institute for Research and Innovation in Social Services, 2020; Weltermann et al., 2015; Yahaya et al., 2022)	Self-management
Prevent morbidity Prevent the risk of recurrence Prevent complications Prevent and reduce recurrence Preventing the risk of morbidity	(Bo et al., 2023; Dehkordi et al., 2016; El-Osta et al., 2019; Mccormack, 2003; Weltermann et al., 2015; World Health Organization, 2022; Wright, 2020)	Prevention of morbidity and recurrence
Improving health Increase health knowledge and literacy Beneficial to the whole self	(Chin et al., 2021; Dehkordi, 2016; Dehkordi et al., 2016; El-Osta et al., 2019; Mccormack, 2003; Mills et al., 2018; Omisakin & Ncama, 2011; Richard & Shea, 2011; Sist et al., 2022; The Institute for Research and Innovation in Social Services, 2020; Weltermann et al., 2015; Wright, 2020)	Improved health

manage the disease-related symptoms as well as the therapy side effects (Rakhshani et al., 2022; World Health Organization, 2022). Furthermore, the survivors' ability to cope would also increase as they dealt with the disease, and faced the risks of recurrence, thereby affecting their well-being and quality of life (Ludman et al., 2013; Wright, 2020). Figure 1 presents the attributes, antecedents and consequences of the concept of self-care.

Empirical Referents

Empirical references can be defined as categories of actual phenomena whose existence might indicate the appearance of the concept by measuring the attributes. The empirical references help to clarify the concept and its measurements (Walker & Avant, 2014). The self-care The Self Care Inventory instrument (Luciani et al., 2022) and Self-Care for Chronic Disease Inventory (Arapi et al., 2023; De Maria et al., 2021) documented the use of individual activity attributes in the self-care concept. These instruments comprised of activities for the other attributes of preventing morbidity, and maintaining and promoting health (Arapi et al., 2023; De Maria et al., 2021).

Furthermore, the use of the self-management attribute could be found in the Self-efficacy in Managing Symptoms Scale for Patients with Advanced Cancer instrument (Chan et al., 2017) and the self-awareness attribute could be found in the

Table 3. Attributes of Definitions

Attribute Concept	Definition
Survivor activity	Actions carried out by the breast cancer survivors independently or with the help of caregivers (Bo et al., 2023; Fleischer & Howell, 2017).
Survivor awareness	The recognition of breast cancer survivors in learning about the risk, its importance and intention to act (Veluswamy et al., 2014; Singer et al., 2023).
Self-management	The process of breast cancer survivors in actively participating in their basic health maintenance activities and cancer-related care (Jia & Hu, 2022; Otter et al., 2022).
Prevention of morbidity and recurrence	The breast cancer survivors' actions to prevent adverse effects on their health physically and psychologically, such as discomfort, pain, and the prevention of metastasis or new cancer occurrence (Foster & Niedzwiedz, 2021; Singer et al., 2023; Veluswamy et al., 2014; Courtney et al., 2022; Fillon, 2022).
Improved health	The breast cancer survivors' increased overall cancer-related quality of life as a result of their efforts to embrace a healthy lifestyle and others (Koshy et al., 2023; Lamore et al., 2019; Yang et al., 2022)

Self Awareness Questionnaire instrument (Keeran, 2019). There were no all-encompassing attributes in one single instrument designed specifically for cancer survivors who had completed therapy. Thus, modifying current instruments with contextual alterations was strongly advised. Other concepts with similar attributes to the concept of self-care did not specifically describe the relevant attributes. For example, the concept of self-resilience in the Brief Resilient Coping Scale (BRCS) instrument did not include the self-care activities but focused on coping with the disease experienced (Mihic-Gongora et al., 2022; Rivers & Sanford, 2021). On the other hand, although the concept of self-management had comparable attributes, in the analysis, it had been included in the attributes, so that it could not then be considered as an empirical reference. For these reasons, it was recommended to modify the existing instruments or develop new instruments that incorporated all attributes of the concept of self-care in the context of breast cancer survivors who had completed the therapy.

Discussion

This study finds that the first attribute was the survivor activity. This attribute explained self-care was defined an activity or a set of activities carried out by the survivors, which could basically help them in maintaining their control and stability, enhancing self-development and increasing self-worth (Fleischer & Howell, 2017). Breast cancer survivors certainly experienced changes in activity levels that were mainly influenced by the physical side effects of therapy, psychological conditions, social support, spirituality and financial stress (Bo et al., 2023; Fleischer & Howell, 2017). In addition, this study finds that the second attribute of self-care was survivor awareness. It was included in the contemplation stage of the transtheoretical model in the formation of behavior in individuals. The contemplation stage was characterized by a knowledge of risks, an understanding of the importance of healthy living and self-care, and an intention to act (Veluswamy et al., 2014). According to Singer et al. (2023), most breast cancer survivors were aware of how to maintain their health .

Furthermore, this study finds that the third attribute was self-management, which included meeting the fundamental needs, such as nutritious consumption, physical activity, health maintenance activities and cancer-related care. The cancer-related care included symptom monitoring, management of side effects and late effects, advanced care plans and psychological care. Self-management was a subset of self-care attributes that focused on the consequences of health conditions, including the functional, physical, emotional and psychosocial issues (Jia & Hu, 2022; Otter et al., 2022). The breast cancer survivors played the most significant role by actively participating, although in practice it was supported by the health professionals through education or coaching and empowerment (Cravo et al., 2022; Otter et al., 2022). Those breast cancer survivors practicing a good self-management experienced a decrease in the incidence of lymphedema, cancer-related fatigue, cardiotoxity, peripheral neurotoxicity and psychological distress (Bo et al., 2023).

Additionally, this study finds the fourth attribute of self-care among the breast cancer survivors was the prevention of morbidity and recurrence. Physical morbidity was a side effect of cancer therapy and shared etiological factors with the cancer and comorbid conditions, such as hypertension, painful conditions (particularly in the shoulder), asthma, dyspepsia, fatigue, osteoporosis, diabetes, migraine, eczema and irritable bowel syndrome (Basu et al., 2020; Foster & Niedzwiedz, 2021). Multimorbidity conditions among breast cancer survivors did not only affect their physical conditions, but also psychological conditions, including depression and distress (Foster & Niedzwiedz, 2021; Singer et al., 2023; Veluswamy et al., 2014). The distress was associated with perceived loss of femininity, fear of rejection and separation from husband, and fear of recurrence (Saxena et al., 2018). There were approximately 5-10% of breast cancer survivors who were at risk of metastasis and more than 20% experienced the recurrence over a 10-32-year time span and were affected by lymph node involvement (Courtney et al., 2022; Fillon, 2022; Kumilau et al., 2022).

Meanwhile, this study finds that the fifth attribute of self-care was improved health. Those breast cancer survivors with self-care skills were able to improve their quality of life through their knowledge and ability to prioritize and improve their health (Koshy et al., 2023). This might include decreased frequency of re-hospitalization, improved lifestyle, diet (phytoestrogen reduction), more activities, and improved well-being – both physically and psychologically (Moore, 2020). Several studies confirmed that improved health as an attribute could improve the quality of life of breast cancer survivors, represented by them returning to work and improving social roles (Lamore et al., 2019; Yang et al., 2022).

Conclusions

There were five attributes comprising the concept analysis of self-care among breast cancer survivors, namely survivor activity, survivor awareness, self-management, prevention of pain and recurrence, and improved health. The operational definition of self-care among breast cancer survivors refers to an activity in which the survivors demonstrate self-health management, prevention of recurrence, and health improvement. The antecedents of this concept analysis included self-efficacy, self-care agency and social support. Furthermore, the consequences consisted of symptom control, improved coping, improved well-being and improved quality of life. The results of this study have theoretical and practical implications for the nursing literature and clinical practice in that, after completing the therapy, breast cancer survivors have specific needs that the nurses can address in their nursing care toward the end of the therapy and after the therapy itself. Furthermore, the results of this study also recommend modifying the existing instruments or developing new instruments that incorporate all attributes comprehensively.

Declaration of conflict of interest

The authors did not have any conflict of interest

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Review Article

Instrument used to assess interprofessional education and collaborative practice in health professional students: A COSMIN systematic and psychometric review

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Abstract

Background: Interprofessional education and collaborative practice (IPE/IPC) are essential for preparing students to work together and respect the unique qualities and abilities of professionals. However, IPE/IPC and its related concepts are highly abstract phenomena and complicated to assess and measure. In consequence, a critical appraisal is needed to evaluate the quality of the instruments.
Purpose: This study aimed to critically appraise, compare and summarize the quality of measurement properties of all self-report collaboration questionnaires for health professional students and to provide evidence concerning the psychometric properties of the measurement.
Methods: A psychometric review was employed, and the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) approach was applied to assess the methodological quality of the nature of the measurements. Data search using keywords: health professional students, interprofessional, collaboration, teamwork, collaborative, through MEDLINE, EMBASE, and EBSCO-hosted Education Resource Information Centre databases.
Results: Seven instruments from 10 reviewed studies were identified. Among them, four instruments targeted attitudes toward collaboration. One instrument focused on students' collaborative learning readiness and had been tested in Hong Kong using English, in Iran using Persian, and in Indonesia using Bahasa Indonesia. One instrument measured perception about IPE, and two studies measured IPE/IPC competencies related to patient-centered, team-based, and collaborative care. The methodological quality assessment indicated that several instruments were less rigorously developed and validated than COSMIN and Quality Criteria of Measurement Properties recommend.
Conclusion: The findings of this psychometric review are that the Interprofessional Attitudes Scale is an instrument with adequate content validation and very good structural validity, internal consistency, cross-cultural validity, reliability, measurement error, and criterion validity. It is recommended that the Interprofessional Attitudes Scale be used to measure the interprofessional attitudes of health professional students.

Keywords: collaborative practice; interprofessional education; instrumen;, psychometric review; validity

Introduction

The process of establishing and sustaining productive interprofessional working relationships between healthcare students and professionals, patients and families, and communities to promote optimal health outcomes is referred to as interprofessional collaborative practice (IPC) (World Health

Organization [WHO], 2010). Integrating IPC and coordinated health professional activities can result in optimal patient outcomes, which may be achieved through the implementation of interprofessional education (IPE) on an organized, systematic basis (Hojat & Herman, 1985). It is, therefore, crucial to equip students with the necessary skills and knowledge from an early stage of their education to enable them to work effectively in a collaborative environment, recognizing the value of diverse professional expertise in the sharing of information, problem-solving and the completion of learning activities and final projects (Schmitz et al., 2017; Tibi, 2015).

Consequently, IPE and IPC competencies should be assessed starting from school education and continuing throughout the nursing career (Kajander-Unkuri et al., 2014). However, both IPE and IPC are very abstract and complex phenomena to assess and measure (Hojat et al., 2014). Clear and unambiguous operational definitions of the concepts are essential to guide the development of valid IPE and IPC assessment instruments (Hojat et al., 2014). Although numerous concept analyses have been conducted to define IPE and IPC, there is limited consensus on their definitions and associated measures (Dominguez et al., 2015).

Nevertheless, a variety of instruments have been developed to measure IPE and IPC outcomes. However, the lack of rigorous evaluation of the effectiveness of IPE curricula makes it challenging for educators to ensure that students are adequately prepared to work with collaborative practices. Furthermore, in order to provide credible data for the testing of IPE effectiveness, instruments must be developed with strong psychometric properties, including validity and reliability. Appropriate scale and score construction permit the differentiation of test takers and facilitate the interpretation of test scores in a valid manner (Oates & Davidson, 2015). Furthermore, high methodological quality and a thorough systematic review will produce the

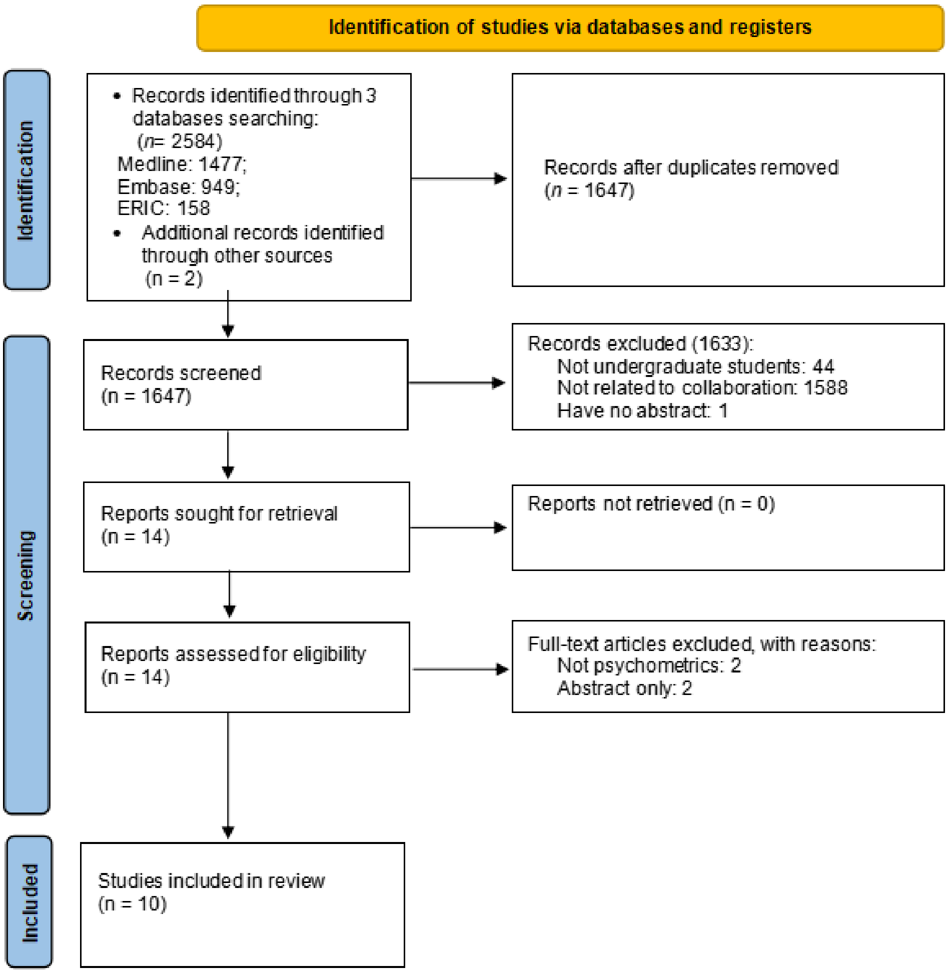

Figure 1.The PRISMA flowchart of studies selection

most appropriate measurement tool, one of which is by conducting a critical assessment to assess the quality of the instrument (Mokkink et al., 2010).

Oates and Davidson (2015) state that to critically assess IPE instruments, the Quality Assessment Scale for Interprofessional Learning (QuAILS) can be used, which is a standard checklist explicitly developed for review. Nine instruments in QuAILS measure attitudes toward collaborative learning, student perceptions, and student readiness for collaborative learning. In addition, the instrument also assesses the interprofessional socialization process and key aspects of interprofessional. Therefore, QuAILS meets the criteria set by the Educational and Psychological Testing standards for the design and development of educational tests (Oates & Davidson, 2015).

In contrast, the authors identified several areas that need to be improved, such as information on item design quality criteria and types of validity evidence that cannot be assessed using QuAILS. Therefore, it is important to "repeat" the review for IPE/IPC instruments, especially using the COSMIN framework. The objective of this study was to undertake a critical assessment, comparison, and synthesis of the quality of measurement properties of all self-report outcomes of interprofessional education (IPE) or interprofessional collaboration (IPC) measurements for health professional students. Furthermore, the study aimed to provide evidence regarding the psychometric properties of the measurements using the COnsensus-based Standards for the Selection of health Measurement INstruments (COSMIN) approach.

Methods

Design

A psychometric review was employed by applying the COSMIN approach to assess the study's methodological quality on the nature of the (Mokkink et al., 2010; Terwee et al., 2012). Firstly, the formulation of the research purpose, selection of databases and keywords, specification of inclusion and exclusion criteria, identification of databases to be searched, and the selection and extraction of data were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). (Moher et al., 2009). Next, the psychometric properties of the instruments were qualitatively assessed using the Quality Criteria for Measurement Properties (Terwee et al., 2012). Then, data were analyzed and synthesized, and important findings were reported with summaries, charts, and figures.

Search methods

Two researchers (AA & YC) independently searched for articles published between 2000 and 2023 and met the inclusion criteria set together. The article search used the keywords health professions students, interprofessional, collaboration, teamwork, and collaborative through the MEDLINE, Embase, and ERIC databases. AA & YC also carried out a manual search of the references in the included studies and retrieved and organized the hits from all the searches using RefWork®.

Inclusion and exclusion criteria

Inclusion criteria for this review included empirical research that (i) involved health professional students, (ii) focused on collaboration, interprofessional education, and collaborative practice, (iii) were all self-reporting, and (iv) assessed measurement properties.

Selection process

The literature search identified 2584 articles and two potential articles from the reference list. The first and third authors independently screened each publication's title and abstract, assessed full texts for eligibility, and, finally, decided on inclusion. The two reviewers (AA and LL) reached a consensus through discussion. Duplicates were identified and removed by AA and LL through a manual search of the databases searched in RefWorks© and between databases. After removing duplicates, the authors excluded 1633 articles after reading the titles and abstracts. Of these, 44 articles did not measure undergraduate students, 1588 articles were unrelated to interprofessional education and collaborative practice, and one article lacked an abstract. Two independent reviewers (AA and LL) assessed fourteen full-text articles for eligibility, and four articles were excluded because two of the studies did not deal with psychometrics. Two were abstracts only. Finally, the authors included ten studies in the qualitative synthesis. Figure 1 shows a PRISMA flowchart of the search process.

Data extraction

Two authors (AA and AN) performed data extraction for all included studies and resolved the differences through discussion between the authors. Seven different tools were found in the ten included studies. The study is characterised by the following features: the instrument used, the construct under investigation, the target population, the period of recall, the number of items included in each subscale, and the response options available (Table 1). After that, AA and AN also extracted the population's characteristics, including instrument, sample size, age, gender, psychometric administration (country, native language), response rate, and available translation (Table 2).

Quality appraisal

In order to ascertain the type of measurement property examined and to evaluate the methodological quality of the studies, the researchers employed the COSMIN checklist, which employs a 4-point scale (Mokkink et al., 2018). COSMIN is a methodology to critically appraise and assess the content validity for interprofessional education and collaborative

Table 1. Meaning of hope in children

Instrument	Construct	Target population	Recall period	Subscale(s) /(no.of items)	Respons options
The Scale of Attitude toward Physician-Pharmacist Collaboration (SATP2C) (Hojat et al.2012)	Attitudes toward collaborative relationships	263 3rd year students at medical college	N/A	16 items ☐Responsibility and accountability ☐Shared authority Interdisiplinary education.	4-point Likert scale. (1=strongly disagree, 4=strongly agree)
The student Perceptions of Interprofessional Clinical Education (SPICE-R)	Perceptions regarding IPE	277 1st year students in a variety of health professional degree programs	N/A	SPICE-R: 10 items ☐Outcomes ☐Teamwork ☐Roles responsibilities ATHCTS-R: 21 items ☐Team value ☐Team efficiency Shared leadership	5-point Likert scale. (1=strongly disagree, 5=strongly agree)
(Dominguez et al.,2014)	Attitudes toward interprofessional healthcare teams	490 students from some programs	N/A	14 items The quality of care (11 items). The time constraints (3 items)	5-point Likert scale. (1=strongly disagree, 5=strongly agree)
ATHCTS-R	The degree of readiness of students to engage in interprofessional learning activities.	469 students in two universities	N/A	18 items (item 18 was deleted) ☐Teamwork and collaboration ☐Positive Professional Identity ☐Negative professional identity Roles and responsibilities	5-point Likert scale. (1=strongly disagree, 5=strongly agree)
		200 final-year students	N/A	19 items ☐Teamwork and collaboration (9 items) ☐Negative Professional identity (3 items) ☐Positive Professional identity (4 items) ☐Roles and responsibilities (3 items)	5-point Likert scale. (1=strongly disagree, 5=strongly agree)
		800 1st, 2nd, and 3rd year students.	N/A	18 items (item 17 was omitted) ☐Teamwork and collaboration ☐Professional identity ☐Roles and responsibilities	5-point Likert scale. (1=strongly disagree, 5=strongly agree)

Cont. Table 1. Meaning of hope in children

Instrument	Construct	Target population	Recall period	Subscale(s) /(no.of items)	Respons options
The Interprofessional Attitude Scale (IPAS) (Noris et al., 2015)	The attitude related to core competencies of Interprofessional Collaborative Practice (IPEC)	1.549 students	N/A	27 items ☐Teamwork, Roles, and responsibilities (TRR) ☐Patient-centered (PC) ☐Diversity and ethics (DE) ☐Interprofessional Biases (IB) Community-centeredness (CC)	5-point Likert scale. (1=strongly disagree, 5=strongly agree)
The Jefferson Scale of Attitude s Toward Interprofessional Collaboration (JeffSATIC) (Hojat et al., 2014).	Attitudes toward interprofessional collaboration.	1976 health profession students in three universities: Philadelphia, USA. Chicago, USA. Victoria, Australia.		20 items ☐working relationships accountability.	7-point Likert scale. (1=strongly disagree, 7=strongly agree)
The International Collaborative Competency Attainment Survey (ICCAS) (Archibald, et al.,2014; Schmitz, et al.,2017)	The new IPE/IPC competencies	584 students from 15 interprofessional education programs in Canada and New Zealand.	Pre- and post-program.	20 items ☐Communication ☐Collaboration ☐Roles and responsibilities ☐A collaborative patient/family-centered approach ☐Conflict management/resolution. ☐Team functioning.	7-point Likert scale. (1=strongly disagree, 2= moderately disagree, 3= slightly disagree, 4 = neutral, 5= slightly agree, 6= moderately agree, 7=strongly agree; na=not applicable)
	Behaviors associated with patient-centered, team-based, collaborative care.	1.023 health profession students from six schools at the Academic Health Center.	Preand post-learning activities.	20 items ☐Communication ☐Collaboration ☐Roles and responsibilities ☐A collaborative patient/family-centered approach ☐Conflict management/resolution. ☐Team functioning.	5-point Likert scale. (1=poor, 2= fair, 3= good, 4 = very good, 5= excellent). Addition: 5-point Likert scale. (1=much better now, 2=somewhat better now, 3=about the same, 4=somewhat worse now, 5= much worse now). + interviews.

Table 2. Characteristics of Population

Instrument	Population				Instrument administration		Response rate	Available translation
	n	Age means (SD, Range)	Gender (% Female)	Characteristics	Country	Original language		
SATP2C	210	N/A	50	Medical students after the third-year clinical rotations	USA	English	80%	English
SPICE-R ATHCTS-R	221	Mean 24.4 SD 4.43	68	Nursing, optometry, pharmacy, physical therapy, and health administration students	USA	English	80%	English
ATHCTS	288	Mean 30.3 SD 9.8	81.65	Students from the law, nursing, medicine, pharmacy, social work, and dental schools.	USA	English	4.5%	English
RIPLS	469	Mean 20.95 SD 1.26	55.9	Two Hongkong university students from 5 healthcare professions: biomedical sciences, Chinese medicine, medicine, nursing, and pharmacy.	Hong-kong	Chinese	N/A	English
	200	N/A	N/A	Medical students	Iran	Persian	N/A	Persian
	755	N/A	73.8	Medicine, nursing, pharmacy, and public health students	Indonesia	Bahasa Indonesia	94.4%	Bahasa Indonesia
IPAS	678	N/A (%)	60.3	Students of the college of health: nutrition & physical therapy, college of nursing: undergraduate &graduate nursing, college of pharmacy, school of medicine: medical laboratory science, medical doctor program, physician assistant program, public health program.	USA	English	45%	English
JeffSATIC	1976	Mean 24.6 SD 4.3	63	Students from Jefferson Univ: Medical, nursing, pharmacy, occupational therapy, and physical therapy.	USA	English	N/A	English
		Mean 24.0 SD 2.9	50	Students from Midwestern: Pharmacy, medical. Medical science, and dentistry.				
		Mean 23.6 SD 6.2	63	Students from Monash: paramedic, occupational therapy, nutrition, physical therapy, and nursing.				
ICCAS	584	N/A	N/A	Undergraduate, postgraduate, and continuing professional development students from medicine, paramedicine, police, early childhood education, library, PT/OT assistant, support work, social work, nursing, massage therapy, dental hygiene, pharmacy, dietetics, kinesiology, spiritual care, dentistry, physiotherapy, occupational therapy, and health sciences.	Canada	English French	N/A	English
	785	Mean 21.9-26.4 SD 2.8-3.3	66.1	Health profession students from medicine, pharmacy, nursing, dentistry, veterinarian medicine, public health, occupational therapy, clinical laboratory science, social work, dietetics, and counseling psychology.	USA	English	77%	English

Table 3a. Result of Studies on Measurement Properties

Instrument	Country	n	Structural validity		Internal consistency (Cronbach's.α)		Cross-cultural validity/measurement invariance		Reliability (ICC/ Weight Kappa)		Pooled or summary result (overall rating)
			Rating	Result	Rating	Result	Rating	Result	Rating	Result	
SATP2C	USA	210	(?)	Not reported	(+)	0.90	(+)	No statistical difference between men & women (p > .05)	(?)	ICC= 0.82, 0.78, 0.68 Weight Kappa not reported	2(+). 2(?)
SPICE-R ATHCTS-R	USA	221	(+)	CFI 0.95, RMSEA 0.077	(+)	0.86	(?)	No multiple group performed	(+)	Weight Kappa ≥ 0.70	3(+), 1(?)
ATHCTS	USA	288	(+)	CFI 0.95, TLI 0.94, RMSEA 0.067, SRMR 0.04	(+)	0.92	(+)	p < .05 p < .01	(+)	ICC = 0.86	4(+)
RIPLS	Hong-kong	469	(+)	CFI 0.94, TLI 0.93, RMSEA 0.062	(+)	0.71 - 0.91	(?)	No multiple group performed	(?)	Weight Kappa not reported	2(+), 2(?)
	Iran	200	(+)	CFI 0.97, RMSEA 0.06	(+)	0.89, 0.60, 0.86, and 0.28	(?)	No multiple group performed	(?)	Weight Kappa not reported	2(+), 2(?)
	Indonesia	755	(+)	CFI 0.94, TLI 0.93, RMSEA 0.063, SRMR 0.043	(+)	0.71	(+)	No important differences between group factors (age & language)	(+)	ICC = 0.87	4(+)
IPAS	USA	678	(+)	RMSEA 0.062.	(+)	0.61 - 0.92	(+)	No statistically significant differences	(?)	Weight Kappa not reported	3(+), 1(?)
JeffSATIC	USA	1976	(+)	IRT: χ2 > 0.01	(+)	0.84 - 0.90	(-)	the differences were statistically no significant (p < .05)	(?)	Weight Kappa not reported	2(+), 1(-), 1(?)
ICCAS	Canada	584	(?)	No info	(+)	0.98. 0.94, and 0.96	(?)	No multiple group performed	(?)	Weight Kappa not reported	1(+), 3(?)
	USA	785	(?)	No info	(+)	0.96	(?)	No multiple groups performed	(?)	Weight Kappa not reported	1(+), 3(?)

practice instruments in health professional students available in 2018 (Mokkink et al., 2018). AA and YC evaluated the sufficiency and quality of the measurement properties separately, encompassing nine distinct domains. These included content validity, structural validity, internal consistency, cross-cultural validity, reliability, measurement error, criterion validity, hypothesis testing, and responsiveness (Table 3a & Table 3b).

Firstly, two authors (AA & YC) independently appraised the ten boxes of risk of bias with the criteria as very good, adequate, doubtful, and inadequate. All changes were discussed, and researchers reached a full agreement. After that, LL & AN summarized them as sufficient (+), insufficient (-), or indeterminate (?). Then, all researchers (AA. YC, LL, and AN) discussed grading the quality of each instrument using the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach for systematic review, and we graded the quality of evidence as substantial, moderate, low, or very low evidence.

Interpretability

Given the heterogeneity of the data, the primary author (AA) presented a descriptive and narrative synthesis of the data and subsequently tabulated the COSMIN quality ratings per study (Tables 4a and 4b) to illustrate the methodological quality of each study on measurement properties.

The COSMIN checklist comprises nine boxes (A–J), each containing methodological criteria for assessing a specific measurement property. The measurement properties assessed were as follows: A) internal consistency, B) reliability (test-retest, inter-rater, and intra-rater), C) measurement error, D) content validity, E) structural validity, F) hypotheses testing, G) cross-cultural validity, H) criterion validity and I) responsiveness.

Each box comprises five to 18 items (Mokkink et al., 2010). Each item was scored on a 4-point Likert scale (excellent, good, fair, poor). A methodological quality score was obtained for each measurement property based on the lowest rating of any box ('worst-score counts') (Terwee et al., 2012).

Results

From the ten (out of 3578) studies, we obtained seven IPE/IPC-related instruments: one instrument measured collaboration among interprofessional healthcare students, four instruments measured attitude toward collaboration (Hojat et al., 2012; Kim & Ko, 2014; Norris et al., 2015), one measured perception of interprofessional clinical education (Dominguez et al., 2015), three studies have reported on the development of an instrument designed to assess students' preparedness for interprofessional learning (Ataollahi et al., 2019; Ganotice & Chan, 2018; Tyastuti et al., 2014), and an instrument measuring collaborative competence was reported in two studies. (Archibald et al., 2014; Schmitz et al., 2017).

Measures of the Attitudes Toward Collaborative Relationship

The Scale of Attitude toward Physician-Pharmacist Collaboration (SATP2C) was developed in 2011. It is a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). The authors developed 16 items, which were grouped into three subscales: responsibility and accountability, shared authority, and interdisciplinary education. A higher score indicates a more positive attitude toward the collaborative relationship between physicians and pharmacists (Hojat et al., 2012).

Furthermore, to gauge attitudes towards the collaboration of physicians and nurses, it is possible to utilize the scale developed for this purpose by Hojat et al. (2012), the Jefferson Scale of Attitudes towards Interprofessional Collaboration (JeffSATIC). The scale comprises 15 items answered on a four-point Likert scale (1 = strongly disagree, 4 = strongly agree). In 2014, Hojat et al. enhanced the scale, expanding it to 20 items and subdividing it into two subscales: working relationships and accountability (Hojat et al., 2014). They measured 1976 health profession students at two universities in the USA (Philadelphia and Chicago) and one in Australia (Victoria). The students scored on a seven-point Likert scale. It was found that the higher the scores, the more positive the attitudes towards interprofessional health students. So, this scale measures more than just the attitudes of collaboration between two professional students, likely SATP2C, but more professions.

In contrast, the original scale of the Attitudes toward Health Care Teams (ATHCTS) was developed in 1999 to measure the general attitudes of geriatric healthcare team

Note: n = number of participant, CFI = Comparative Fit Index, RMSEA = Root mean Square Error of Approximation, TLI = Tucker – Lewis Index, IRT = Item Response Theory, ICC = Interclass Correlation Coeficient.

Quality Criteria for Measurement Properties Ratings: (+) A positive rating indicates strong properties according to quality criteria using design and method; (?) An intermediate rating indicates some but not all aspects of psychometric are positive, or doubtful design or method: (-) A negative rating indicates that psychometric properties do not meet criteria despite adequate design and method.

Table 3b. Result of Studies on Measurement Properties

Instrument	Country	n	Structural validity		Internal consistency (Cronbach's.α)		Cross-cultural validity/measurement invariance		Reliability (ICC/ Weight Kappa)		Pooled or summary result (overall rating)
			Rating	Result	Rating	Result	Rating	Result	Rating	Result	
SATP2C	USA	210	(?)	MIC not defined	(+)	r=0.70	(+)	the result in line with 2 Hypo's (2+)	(?)	No hypothesis defined	2(+), 2(?)
SPICE-R ATHCTS-R	USA	221	(?)	MIC (-)	(?)	Not all info	(+)	the result in line with 3 Hypo's (3+)	(?)	No hypothesis defined	1(+), 3(?)
ATHCTS	USA	288	(?)	MIC (-)	(-)	r=0.38	(+)	the result in line with 2 Hypo's (2+)	(?)	No hypothesis defined	1(+), 2(?), 1(-)
RIPLS	Hong-kong	469	(?)	MIC (-)	(?)	r=0.13-0.68 Not all info	(+)	the result in line with 3 Hypo's (3+), Result not in line with 1 hypo's (1-)	(?)	No hypothesis defined Comparison between sub-group	1(+), 3(?)
	Iran	200	(?)	MIC (-)	(?)	Not all info	(+)	the result in line with 2 Hypo's (2+), Result not in line with 2 hypo's (2-)	(?)	No hypothesis defined. Comparison between sub-group	1(+), 3(?)
	Indonesia	755	(?)	MIC not defined	(+)	>0.70	(+)	the result in line with 3 Hypo's (3+)	(?)	No hypothesis defined	2(+), 2(?)
IPAS	USA	678	(?)	MIC not defined	(?)	Not all info	(+)	the result in line with 4 Hypo's (4+), Result not in line with 1 hypo's (1-)	(+)	The result is in accordance with the hypothesis	2(+), 2(?)
JeffSATIC	USA	1976	(?)	MIC not defined	(?)	Not all info	(+)	the result in line with 2 Hypo's (2+)	(?)	No hypothesis defined	1(+), 3(?)
ICCAS	Canada	584	(?)	MIC not defined	(?)	Not all info	(+)	the result in line with 2 Hypo's (2+)	(?)	No hypothesis defined	1(+), 3(?)
	USA	785	(?)	MIC not defined	(?)	Not all info	(+)	the result inline with 2 Hypo's (2+)	(?)	No hypothesis defined	1(+), 3(?)

Note: n = number of participant, MIC = minimal important change, hypo = hypothesis

Quality Criteria for Measurement Properties Ratings: (+) A positive rating indicates strong properties according to quality criteria using design and method; (?) An intermediate rating indicates some but not all aspects of psychometric are positive, or doubtful design or method: (-) A negative rating indicates that psychometric properties do not meet criteria despite adequate design and method.

Table 4a. Quality of the Evidence for Measurement Properties of the Instruments

Scale	SATP2C		SPICE-R		ATHCTS		IPAS		JeffSATIC	
	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid
Content validity:	?	Low	?	moderate	?	moderate	+	moderate	+	moderate
Relevance	?	Low	?	Low	?	moderate	+	high	+	moderate
Comprehensiveness	?	Low	+	high	+	high	+	high	+	moderate
Comprehensibility	-	very low	?	Low	?	low	?	low	+	moderate
Structural validity	?	Low	+	high	+	high	+	high	+	high
Internal consistency	+	moderate	+	high	+	high	+	high	+	high
Cross-cultural validity	+	moderate	?	low	+	high	+	high	?	moderate
Reliability	?	Low	+	high	+	high	?	low	?	moderate
Measurement error	?	Low	?	low	?	moderate	?	low	?	Low
Criterion validity	+	moderate	?	low	?	moderate	?	low	?	Low
Construct validity	-	very low	+	high	+	high	+	high	+	moderate
Responsiveness	?	low	?	low	+	moderate	+	high	?	Low

Note: COSMIN Rating definitions: “+” = sufficient, “?“=indeterminate, “ – “= insufficient

members who work at Veteran Affairs Medical Centers (Heinemann et al., 1999). Subsequently, Curran et al. (2007) adapted the instrument to assess attitudes toward interprofessional healthcare teams among 1179 undergraduate health science students in Canada. The authors developed 14 items, comprising two subscales: quality of care and time constraints. Participants responded on a five-point Likert scale, ranging from one (strongly disagree) to five (strongly agree). In addition, Hayashi et al. (2012) used the ATHCTS to measure attitudes toward teamwork among 285 undergraduate students in Japan. They were still using 14 items; however, they divided it into three subscales: quality of care delivery, team efficiency, and patient-centered care.

Moreover, in 2014, Kim and Ko used the adapted ATHCTS with 14 items and two subscales, quality of care and time restriction, to measure attitudes toward teamwork among 288 graduate professional students in the USA. They scored on a five-point Likert scale (1= = strongly disagree, 5=strongly agree). A higher score on the scale indicates a more positive attitude towards interprofessional healthcare teams.

Furthermore, Norris et al. (2015) combined 16 items of the extended RIPLS (the Readiness Interprofessional Learning Scale) with 16 new items from the Interprofessional Education Competency (IPEC) Report. The questionnaire was developed with the objective of assessing interprofessional attitudes among a total of 1,549 undergraduate and graduate students enrolled in healthcare professions at the University of Utah Health Sciences Center. After the result of the EFA (Exploratory Factor Analysis), they named their tool the Interprofessional Attitudes Scale (IPAS). The instrument comprises 27 items, which are grouped into five subscales: teamwork, roles, and responsibility (TRR), patient-centredness (PC), interprofessional biases (IB), diversity and ethics (DE), and community-centredness (CC). Each item is rated on a five-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement.

Measure of the Interprofessional Education and Practice Perceptions

Originally, Fike et al. (2013) developed the Student Perceptions of Interprofessional Clinical Education (SPICE) instrument to assess perceptions of medical and pharmacy students regarding

Table 4b. Quality of the Evidence for Measurement Properties of the Instruments

Scale	RIPLS, HK		RIPLS,P		RIPLS,I		ICCAS		ICCAS-R	
	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid	Rating	Qual.evid
Content validity	?	low	?	low	+	moderate	?	low	?	low
Relevance	?	low	?	low	+	high	?	low	?	low
Comprehensive-ness	?	low	?	low	+	high	?	low	?	low
Comprehensibility	?	low	?	low	?	low	?	low	?	low
Structural validity	+	high	+	high	+	high	?	Low	?	Low
Internal consistency	+	high	+	high	+	high	+	high	+	high
Cross-cultural validity	?	low	?	low	+	high	?	Low	?	Low
Reliability	?	low	?	low	+	high	?	Low	?	Low
Measurement error	?	low	?	low	?	low	?	Low	?	Low
Criterion validity	?	low	?	low	+	high	?	Low	?	Low
Construct validity	+	high	+	high	+	high	+	high	+	high
Responsiveness	?	low	?	low	?	low	?	Low	?	Low

Note: COSMIN Rating definitions: "+" = sufficient, "?"=indeterminate, "–" = insufficient

interprofessional education (IPE). The scale comprises ten Likert-type items, with response options ranging from strongly disagree (1) to strongly agree (5). It is comprised of three subscales: interprofessional teamwork and team-based practice, roles/responsibilities for collaboration practice, and patient outcomes from collaboration practice.

The SPICE-Revised is the designation for the modification of SPICE. The 10-item SPICE-R scale was employed to assess perceptions of IPE and IPCP (interprofessional clinical practice) among 277 first-year students enrolled in a range of health professional degree programs, including the Bachelor of Science in Nursing, Master of Health Administration, Doctor of Optometry, and Doctor of Physical Therapy. Participants responded on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Measure of the Readiness for Interprofessional Learning

The Readiness for Interprofessional Learning Scale (RIPLS) was developed in 1998 by Parsell and Bligh. They validated the measurement to 914 respondents. The scale consisted of 19 items and the authors grouped them into two subscales: teamwork and collaboration (TWC) and professional identity (PI). Then, in 1999, Parsell and Bligh conducted the second study and yielded three subscales, including the TWC subscale (items 1-9), PI (items 10-16), and roles and responsibilities (RR) as the third subscale (item 17-19).

The RIPLS has been validated and adapted into different languages, including Swedish (2008), Japanese (2012), Indonesian (2014), French (2015), Danish (2016), and Persian (2019). They used the RIPLS self-report questionnaire to estimate the degree of students' readiness to engage in interprofessional learning activities before they graduate and work at any health service.

In Indonesia, Tyastuti et al. (2014) translated and cross-culturally adapted the original version of the RIPLS into the Indonesian language. They tested its reliability and validity on 755 first to third-year students from four health departments of the Faculty of Medicine and Health Sciences. The students answered 18 items on a five-point Likert scale (1 = strongly disagree, 5=strongly agree). Higher scores indicate more readiness for interprofessional learning. The authors omitted item 17 (the function of nurses and therapists is mainly to support doctors) due to the absence of a therapist student participant in their study and the polysemy of the term “therapist” in Indonesian society.

Nevertheless, Ganotice and Chan (2018) conducted construct validation of the English version of RIPLS to 469 Chinese undergraduate students from two Hong Kong universities. They validated the 19-item English version with four subscales: teamwork and collaboration, negative professional identity, positive professional identity, and roles and responsibilities. The students answered all items on a five-point Likert scale, with higher scores reflecting a more significant endorsement of the readiness for interprofessional learning.

Further, in Iran, Ataollahi et al. (2019) translated and assessed the validity and reliability of the Persian version of the RIPLS. They measured 200 final-year medical students in Iran and used 19 items rated on a five-point Likert scale with the same subscales used by Ganotice and Chan (2018).

Measures of the International Collaborative Competency

The Interprofessional Collaboration Competency Attainment Survey (ICCAS) is used to measure the self-reported competencies of the IPE care program. The ICCAS was developed based on IPC competencies. These competencies are communication, collaboration, roles and responsibilities, a collaborative patient/family-centered approach, conflict management/resolution, and team functioning. So, using ICCAS, we can ask the learners to self-reflect on the changes in the level of competencies through an IPE intervention.

Archibald et al. (2014) conducted a study to assess the validity and reliability of the ICCAS. They developed a list of 20 items that corresponded to the six competencies, each item answered on a seven-point Likert scale (strongly disagree=1 to strongly agree=7), and an option to rate an item as ‘not applicable. Then, 584 respondents from 15 interprofessional education programs in Canada and New Zealand participated in answering those 20 items.

In 2017, Schmitz et al. (2017) replicated a validation of the ICCAS. They wanted to find the extent of the ICCAS appropriate for their population and curriculum. They examined its validity to 783 students who enrolled in the Fundamentals in Interprofessional Communication and Collaboration (FIPPC) course. Before they distributed the ICCAS to the students, they made two changes to the instrument. Firstly, they changed the rating scale from a seven-point Likert type ‘agree-disagree’ format to a five-point, unbalanced, qualitative scale: poor (1), fair (2), good (3), very good (4), and excellent (5). Secondly, they added an item to assess the changes in the student’s overall abilities during the FIPCC course. They used this result to assess the concurrent validity of ICCAS items. Before the administration, they conducted cognitive interviews with several students to ensure that they understood their changes.

Discussion

This review has two aims: firstly, to systematically review and identify instruments available to measure IPE and IPC in health professional students, and secondly, to critically evaluate available instruments and provide recommendations about the most appropriate IPE/IPC instruments. With these aims, we analyzed the measurement properties and the use of various questionnaires assessing collaboration in interprofessional education and practice.

In almost all instruments developed to measure IPE, the attitudes, and perceptions measured are related to teamwork, roles, responsibilities and accountability, quality of care, and time constraints (Dominguez et al., 2015; Hojat et al., 2012; Kim & Ko, 2014). In contrast, IPAS measures teamwork, responsibilities, and relationships with patients and the community, including diversity and ethics (Norris et al., 2015).

In this case, IPAS measures diversity and ethical factors that play an important role in the process of collaborating with other professionals. Compared to other instruments, based on the assessment using COSMIN, the IPAS instrument has excellent structural validity, internal consistency, cross-cultural validity, reliability, collateral errors, and criterion validity. Both of them asked patients and experts for content validity and adequate relevance. This showed that the IPAS instrument has a very small risk of bias. These results are consistent with an international Delphi study conducted to develop the Consensus-Based Standards for the Selection of Health Measurement Instruments (COSMIN) initiative aimed at facilitating the selection of high-quality patient-reported outcome measures (PROMs) for research and clinical practice. High-quality systematic reviews can provide a comprehensive picture of the measurement properties of PROMs and support evidence-based recommendations in the selection of the most appropriate PROMs for a given purpose (Mokkink et al., 2010).

The instrument to measure student readiness (RIPLS) has been translated into Chinese (Ganotice & Chan, 2018), Persian (Ataollahi et al., 2019), and Indonesian (Tyastuti et al., 2014). From the evaluation results using COSMIN, the evaluation results related to content validation by experts on the Chinese and Persian readiness instruments were doubtful. However, this does not mean that the Chinese language version of the instrument was not relevant in terms of content. When reviewing using COSMIN, the reviewer only reviews according to the report written in the article being assessed.

Five items are assessed related to the relevance of the questions asked of patients and experts, including their analysis. For example, the first item asks: Was an appropriate method used to ask patients whether each item is relevant to their experience with the condition? Then, the next item question asks: Was each item tested in an appropriate number of patients? For qualitative studies? For quantitative (survey) studies? And so on. The reviewer will provide a checklist of whether it is very good, adequate, doubtful, inadequate, or NA (Mokkink et al., 2010). Therefore, the results highly depend on how researchers report their research methods in the articles they write.

Methodological quality assessments indicated that some instruments were less rigorously developed and validated than those recommended by COSMIN and the Criteria for Quality of Measurement Properties (Mokkink et al., 2010; Terwee et al., 2007). Incomplete reporting of the item selection process and description of sample characteristics may limit content validity (Terwee et al., 2007). Some authors did not conduct confirmatory factor analysis (CFA) to explore the dimensionality of the questionnaire. Authors often reported the results of CFA and reliability analyses from previously published studies rather than analyzing both in their sample. This practice may need to be revised as a measurement model, given that factor loadings and reliability depend on sample data, measures, and missing items (Mokkink et al., 2010). Sometimes, authors analyze the reliability of IPE/IPC scores using correlations, so they cannot consider or assess systematic errors and concordance. It is essential to exercise caution when evaluating construct validity and sensitivity without testing specific hypotheses, as this can potentially lead to misleading conclusions. It is not uncommon for authors to propose alternative explanations for low correlations or small differences in means rather than concluding that the questionnaire may not be valid for its intended purpose (Mokkink et al., 2010; Terwee et al., 2007).

So, of the ten instruments reviewed using COSMIN, the Interprofessional Attitudes Scale (IPAS) was the most appropriate instrument to measure interprofessional competence compared to the other instruments. The IPAS can be used by health sciences educational institutions and other institutions to train people to work together in interprofessional teams.

Furthermore, the findings of this psychometric review offer a methodology for the selection and development of the most appropriate instrument for the assessment of IPE/IPC, based on the instrument's intended purpose, psychometric properties, and utility. Firstly, the authors should consider the use of a measurement model, which is reflective and formative, when developing a new instrument. A measurement model was defined as the construct of interest. Second, authors should adequately validate questionnaires for assessing IPE/IPC and correctly establish their reliability to ensure methodological quality. In this sense, translation and cross-cultural adaptation of questionnaires should be correctly validated. This effort is an attempt to provide the invariance of the construct.

Lastly, in instances where authors translated an instrument for measuring attitudes, perceptions, levels of readiness, or competencies related to IPE/IPC, they did not perform the requisite multi-group factor analysis to test construct invariance. Consequently, there is an elevated risk of biased results when comparing scores (Mokkink et al., 2010).

Strength and limitation

The COSMIN guidelines offer a number of advantages for the systematic review of patient-reported outcome measures (PROMs). They facilitate the selection of high-quality PROMs for research and clinical practice by providing a methodology for combining the methodological quality of studies on the nature of the measurement with the quality of the PROMs.

A systematic review of patient-reported outcome measures (PROMs) comprises ten sequential steps. The initial four steps pertain to the preparation and implementation of the literature search and the selection of pertinent studies. The subsequent six steps focus on evaluating the quality of eligible studies, measurement properties, and interpretability and feasibility aspects. Finally, steps nine and ten entail the formulation of recommendations and the reporting of the systematic review. Given the considerable number of items assessed, there is a risk of bias in the conclusions drawn since not all reports on PROM development adhere to the COSMIN guidelines. It is therefore recommended that researchers engaged in the development or translation of PROMs should make use of the COSMIN checklist to ensure the production of high-quality PROMs.

Conclusions

In general, from the review results, the authors found ten instruments (PROMs) that can be used to measure IPE and IPC in health professional students, namely the scale of attitudes toward physician–pharmacist collaboration (SATP2C), Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education(SPICE), Attitudes toward interprofessional health care teams scale (ATHCTS), Readiness for Interprofessional Learning Scale (RIPLS) Chinese, Persian, and Indonesian versions, the Interprofessional Attitudes Scale (IPAS), the Jefferson Scale of Attitudes Toward Interprofessional Collaboration (JeffSATIC), and the interprofessional collaborative competency attainment survey (ICCAS).

Based on the evaluation results using the COSMIN guide, the Interprofessional Attitudes Scale (IPAS) is a PROM with adequate content validation and structural validity, internal consistency, cross-cultural validity, reliability, measurement error, and criterion validity, which are very good. It is recommended that IPAS be used to measure the interprofessional attitudes of health professional students.

Declaration of Interest

The authors have disclosed that they have no significant relationships with, or financial interest in, any commercial companies pertaining to this article.

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Data Availability

The dataset in this study was accessible from the corresponding author upon reasonable request.

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