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JKP welcomes studies from various study designs (original research, review article, case study, editorial, perspective, and letter to editor) to accommodate nursing research with rigorous methods for international readers. This journal has been publishing peer-review journals since 2013. This journal offers benefits for authors (1) A nursing journal with a high reputation; (2) indexed in major databases such as Science and Technology Index (SINTA) rank 2, and Directory of Open Access Journal (DOAJ); (3) and rapid decision for sustainability editorial process.

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Neonatal developmental care practice: Current nursing implementation

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Abstract

The intervention standard of Synactive Development Theory, followed by the Neonatal Integrative Developmental Care Model, has long been recommended as a strategy to lessen the impact of hospitalization on newborns in the NICU. However, it has yet to be widely applied, particularly in developing countries. At least three elements contribute to these developmental care (DC) practices: professional efficacy, nurses' perceptions of developmental care, and a task-oriented organizational culture. Therefore, to improve the DC implementation, it is critical not only to focus on increasing the capacity of personal staff but also to ensure that organizational culture supports DC implementation, with the care unit's managerial staff playing an important role.

Keywords: developmental care; neonatal; nursing practice

A Neonates, a period of transition from intra to extra uterine, is a vulnerable population due to their unique physiological characteristics, developmental needs, and dependency on caregivers for survival. Providing appropriate medical care, nutrition, and environmental support is essential for ensuring the health and wellbeing of neonates during this critical period. Problems in the neonatal period can be linked to those characteristics. Prematurity and low birth weight are two conditions that can lead to neonatal death.

A study shows that developing countries continue to have high rates of prematurity and low birth weight (LBW), especially in countries in East Asia, West Asia, Latin America, North America, and Northern Europe ([Idueta et al., 2023](#)). Both LBW and prematurity require intensive care in hospitals. The good news is that newborn deaths are decreasing, which can be attributed to interventions and health technology advancements. The survival rate of neonates treated in the NICU neonatal intensive care unit (NICU) has improved. However, the quality of life of these survivors remains a challenge because they experience various issues due to prolonged treatment and an unsupportive environment for neonatal development. More than half of preterm infants show disabilities, including attention deficit, behavior problems, emotional issues, and school failure.

Synactive Development Theory, initially developed by [Als](#), serves as a framework for observing the detailed behavior of babies in the NICU. Detailed behavioral observation of the infant in the NICU becomes the professional's guide to continuously provide individually adapted, developmentally supportive care ([Als, 2009](#)). This approach aims to minimize the long-term impacts of the NICU hospitalization. Then [Altimier and Phillips \(2016\)](#) developed The Neonatal Integrative Developmental Care Model, which provides seven basic parameters for neuroprotective family-centered developmental care of preterm newborns and is a framework for clinical practice in numerous NICUs worldwide. The seven neuroprotective basic parameters are depicted as overlapping lotus petals as 1) healing environment, 2) partnering with families, 3) positioning and handling, 4) safeguarding sleep, 5) eliminating stress and pain, 6) protecting skin, and 7) optimizing or maximizing nutrition ([see Fig. 1](#)). Currently, Neonatal Integrative Developmental Care is the core standard of care so that neonates do not

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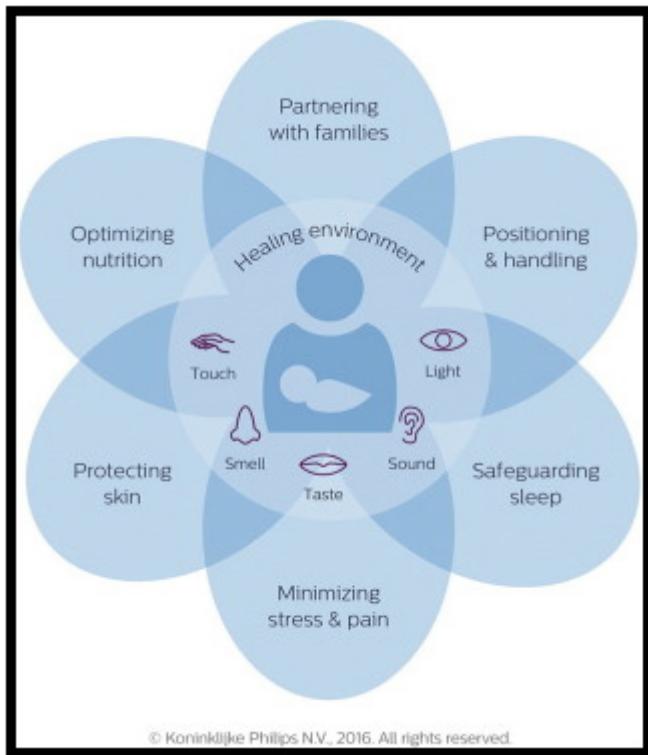


Figure 1. The Neonatal Integrative Developmental Care Model (Altimier & Phillips, 2016)

have problems after a long period of care.

Developmental care refers to nursing care typically provided by NICU nurses to maintain babies' physiological stability and enhance their neurological development (Mosqueda et al., 2013; Burke, 2018). Since its introduction in 2009, the implementation of developmental care (DC) has varied significantly in quantity and quality. Some DC applications fully encompass all elements, whereas others only partially do. Single interventions, such as massage or Kangaroo Care only, are termed DC; however, DC programs incorporating multiple interventions are more frequently employed to include all variables impacting the outcomes (Burke, 2018). Furthermore, the facilities and resource availability vary between locations. In low-resource settings, the DC implementation rates are lower than in developed countries (Heys et al., 2023). Nurses in developed countries with comprehensive healthcare facilities and continuing education are more likely to have positive attitudes and perspectives toward DC implementation. This implementation is often based on their attitudes and perceptions, which are reinforced by institutional policy. In contrast, developing countries encounter numerous obstacles while attempting to implement DC.

The obstacles and challenges faced in implementing DC in developing countries include limited nursing capacity, including awareness, knowledge, and attitudes (Hong & Son, 2020; Kassab & Hamadneh, 2021). Park and Kim (2019) identified three major elements influencing the implementation of DC in hospitals: professional

efficacy, nurses' perceptions of DC, and task-oriented organizational culture. High professional efficacy and a strong sense of optimism regarding their abilities and motivation to work may positively impact the nurses' professional performance. Nurses' perception of the significance of DC could lead to better implementation of DC. Despite being aware of its importance, many NICU nurses did not engage in DC practices (Kim & Shin, 2014). Finally, organizational culture, defined as the norms and expectations of members' behavior and roles within an organization, plays a crucial role. Interestingly, a task-oriented organizational culture was associated with DC practice among NICU nurses (Park & Kim, 2019). Developing an organizational culture that supports nurses' well-being, tackles workplace issues, and improves healthcare delivery requires competent nursing management and effective hospital administration. (Aydogdu, 2024). These factors highlight that the implementation of DC in hospitals is influenced by both individual and organizational elements, especially the work culture in the ward.

Strategies targeting both individual nurses and managerial aspects are required to enhance the nurses' DC implementation. Service managers play a crucial role in improving DC services by fostering a positive culture that supports staff in incorporating DC principles into daily nursing practices. Strategy development should be tailored to address the specific conditions of each hospital or region. Hence, implementation research is necessary to bolster individual capacity and

cultivate a conducive work culture in the NICU room, particularly concerning neonatal care in general.

DC implementation remains a challenge, especially in developing countries. Therefore, it requires all elements in education and research to seek appropriate strategies in implementing all DC principles, even under various conditions where resources and facilities are limited. Strengthening resources involves individual nurses personally and the management system's capabilities and managerial capacity of healthcare services.

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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Supportive-educative needs of patients with coronary heart disease: An investigation of clinical nurses

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Abstract

Background: The rising prevalence of coronary heart disease (CHD) has highlighted the need for supportive-educative efforts, particularly in nursing. These initiatives are crucial for improving self-care management in CHD patients, enhancing their quality of life. Clinical nurses are key in this role, leveraging their direct patient interaction and expertise to provide tailored education and support.

Purpose: This study aimed to investigate the supportive-educative needs of CHD patients from the perspective of clinical nurses.

Methods: A descriptive qualitative study was conducted for this research. Participants included 30 clinical nurses responsible for caring for CHD patients in both inpatient wards and outpatient polyclinics. Interview guidelines were utilized to collect data through in-depth interviews, triangulation, and the obtained interview data were analyzed using the thematic analysis approach.

Results: We identified four themes related to the supportive-educative needs of CHD patients: 1) engaging and informative media; 2) culturally sensitive approaches; 3) nurses' attitudes; and 4) family empowerment.

Conclusion: Supportive education, tailored to the needs of CHD patients, is vital for effective disease management. This study's findings highlight the importance of incorporating four key elements into supportive education: engaging and informative media to enhance learning, culturally sensitive approaches to address diverse patient needs, the positive impact of nurses' empathetic attitudes, and the empowerment of families in the care process. Integrating these aspects can significantly aid CHD patients in developing self-care skills that positively influence their quality of life.

Keywords: coronary heart disease; education; supportive; nurse

Introduction

Coronary heart disease (CHD) is characterized by impaired blood vessels that cannot deliver enough oxygen to the heart muscle ([NHS, 2023](#)). The prevalence of CHD has been increasing annually, as reported by the World Health Organization ([WHO, 2021](#)). Moreover, the rate of CHD recurrence has risen and patients' quality of life has declined ([Komalasari et al., 2019; Peters et al., 2021](#)). In addition to lifestyle factors, patients' level of knowledge regarding self-care management of CHD is a critical factor ([Ammouri et al., 2016](#)). Lack of awareness and understanding have a direct impact on disease severity ([Suarningsih & Suindrayasa, 2020](#)). Numerous efforts have

Arifin, H. (2024)

been made to enhance knowledge and self-care in the context of CHD management (Jamaludin et al., 2019; Reid et al., 2013), but the outcomes have yet to reach their full potential. Therefore, in this study we seek to address this issue by identifying patients' supportive-educative needs from a nurse's perspective.

The research literature predominantly emphasizes education as a means of fostering individuals' self-management in the context of diseases (Coster & Norman, 2009). Nevertheless, it is crucial to recognize that education alone may not be enough, as support plays a vital role in developing self-care agency. Moreover, it is important to avoid overshadowing support with an excessive focus on education. According to Orem (2001), supportive-educative systems encompass various forms of assistance, including support, guidance, creating a nurturing environment, and teaching. These systems aim to enhance knowledge, skills, and understanding, and to promote well-being and self-care (Nuraeni et al., 2018; Rehana et al., 2022). Supportive education can be applied in various contexts, including healthcare, where it is often used to empower patients and their families in managing health conditions, making informed decisions, and adopting healthy behaviors (Armer et al., 2009). In the context of nursing, supportive education may involve providing information, counseling, guidance, and resources to individuals or their families to improve health outcomes and promote self-care (Orem, 2001).

The growing prevalence of coronary heart disease (CHD) in the population has heightened public awareness, particularly among nurses. This has underscored the critical need for supportive-educative initiatives. Such support is essential because it significantly enhances self-care management in patients, thereby improving their quality of life. Clinical nurses are pivotal in delivering this support due to their direct and continuous patient interaction, their expertise in patient care, and their ability to personalize education based on individual patient needs. Previous studies have highlighted the

positive impact of supportive education on various aspects, including self-care abilities (Armer et al., 2009), activities of daily living (Purnamawati et al., 2020), and even sexual disorders among patients with heart problems (Rehana et al., 2022). The current study fills a gap in that it is the first to adopt a qualitative approach to explore the supportive-educative needs of patients with CHD. In addition, we identify the impact of culture and beliefs on the supportive-educative needs of CHD patients. Furthermore, there is a dearth of research examining nurses' perspectives regarding the supportive-educative needs of patients with CHD. Therefore, we examined nurses working in hospital cardiac units to gain insights into their perceptions of the supportive-educative needs of patients with CHD.

Materials and Methods

Design

In this study, we chose a descriptive qualitative approach in order to delve into the information in detail. This approach is considered effective in exploring the specific needs of CHD patients concerning supportive education from the perspective of nurses. The researchers involved in this study have backgrounds in medical surgical nursing and experience in qualitative research. Moreover, there is no prior relationship between the researchers and the participants, ensuring the naturalness of the data obtained. In designing this study, we adhered to the Standards for Reporting Qualitative Research (SRQR) guidelines (O'Brien et al., 2014).

Sample and setting

The study was carried out at a government hospital in Palembang, Indonesia, between April and June 2023. Clinical nurses who work in hospitals and had a minimum of one year experience treating patients with CHD and at least a Diploma III in nursing education were selected to participate in this study. The participants were chosen using purposive sampling from inpatient rooms and outpatient

Table 1. Characteristics of Participants (n = 30)

| Characteristics | Mean ± SD |
|--|------------|
| Age (Mean ± SD) | 35.6 ± 5.4 |
| Gender n (%) | |
| Male | 7 (23.3) |
| Female | 23 (76.7) |
| Education Level n (%) | |
| Diploma in nursing | 17 (56.7) |
| Nurse professional | 13 (43.3) |
| Length of Work in Hospital (Mean ± SD) | 11.3 ± 5.9 |
| Length of Work in Cardiac Unit (Mean ± SD) | 5.8 ± 4.1 |

Table 2. Distribution of themes and sub-themes

| Themes | Sub-Themes | Quotes |
|------------------------------------|--|--|
| Engaging and informative media | Importance of using interesting media | <p>Q1: "Based on my observation, I've noticed that many patients have difficulty understanding and show reluctance in reading the provided leaflets if they are not engaging or interesting." (N1)</p> <p>Q2: "We have found that including more pictures in the educational materials generates greater interest among patients and makes it easier for us, as nurses, to explain to both patients and their families..." (N7)</p> |
| | Easy-to-understand language | <p>Q3: "On occasions, I, as a nurse, take time to carefully select language that patients, particularly elderly ones, can easily comprehend. It is crucial to provide explanations that are easily understandable..." (N5).</p> <p>Q4: "In my view, the use of simple and understandable language is of utmost importance... employing the local language is not an issue; what matters most is ensuring that the patient comprehends and can grasp the information." (N10).</p> |
| Culturally sensitive approaches | Challenges for nurses related to cultural beliefs | <p>Q5: "At times, it can be extremely challenging to alter a patient's conflicting beliefs that contradict medical knowledge. For instance, some patients believe that consuming chicken hearts can cure their illness. Yet from a health perspective, excessive consumption of chicken offal can raise cholesterol levels. Dealing with such situations can be very difficult, as patients may feel frustrated by their conflicting beliefs." (N19)</p> <p>Q6: "Older adult patients residing in rural areas often have difficulties accessing updated health-related information. They tend to place more trust in traditional healers or shamans than in healthcare professionals." (N22)</p> |
| Respect for diversity | | <p>Q7: "Understanding various cultural backgrounds and beliefs is essential for us as nurses, as it equips us with valuable knowledge that we can use to share information with other patients in the future." (N25)</p> <p>Q8: "I acknowledge the patient's belief. As long as it does not pose any danger, we can consider accommodating their beliefs." (N17)</p> |
| Inclusion of traditional practices | | <p>Q9: "There was a patient who shared a belief received from a local traditional healer, suggesting it could aid in recovery from the illness. I advised that if it does not pose any harm, the patient could proceed with caution and under monitoring." (N15)</p> <p>Q10: "The patient mentioned that local cultural beliefs discourage coronary heart disease (CHD) patients from bathing in the river at night based on the belief that a demon might consume their heart. I corrected the information, explaining that bathing in the river at night could lead to hypothermia and cause the patient to experience shortness of breath." (N21)</p> <p>Q11: "I once encountered a patient who shared a story about a local traditional healer who prohibited heart disease patients from sleeping on their backs, instead suggesting that they sleep in a sitting position and consume a significant amount of chicken." (N3)</p> |
| Nurse attitudes | Importance of positive and engaging attitudes among nurses | <p>Q12: "During health education sessions or at time of discharge, patients prefer information that is not overly serious. They appreciate a lighthearted approach and enjoy humor." (N20)</p> <p>Q13: "Patients are more receptive and happy to listen when nurses smile, are young, attractive, and intelligent." (N8)</p> |

| Themes | Sub-Themes | Quotes |
|--------------------|---|--|
| Family empowerment | Involvement of family members in health education and support | <p>Q14: "Involving families in health education is of utmost importance since it is the family members who will be responsible for caring for the patients at home. Therefore, as nurses, we must include family members as part of the support system to aid in the patient's recovery." (N10)</p> <p>Q15: "Certainly, we will also engage family members. We provide extensive education to the patient's family about the illness. This can be particularly challenging when the patient is elderly." (N19)</p> |
| | Challenges in engaging families from remote villages | <p>Q16: "At times, it can also be challenging to engage the families of patients from remote villages. The patients and their families may not fully understand the information provided, so we need to take a slower approach in delivering the information." (N11)</p> <p>Q17: "I sometimes feel sympathy for the families of patients who live far away from the hospital. They have to make multiple trips back and forth. Therefore, in the outpatient polyclinic section, we have established a consultation service for the patient's family to address their concerns." (N9)</p> |

Q: quotes; N: nurse

polyclinics specializing in heart conditions. The heads of the respective departments recruited the participants. No participants were unable to complete the research process.

Ethical consideration

This study obtained ethical approval from the Institutional Review Board of Politeknik Kesehatan Palembang, Indonesia (511/KEPK/Adm2/XII/2023). The participants were given a direct explanation of the study and provided their written informed consent. They were told that their participation was voluntary and they were free to withdraw from the research at any time, without providing a reason and without any impact on their health. Moreover, participants had the right to decline answering any questions they deemed inappropriate during the interview. Throughout the interview process, the researcher ensured the privacy of the participants. To maintain confidentiality, the interview data were completely anonymized during transcription, with participants identified by numbers (e.g., N1, N2). The study carried no inherent risk of physical or mental harm to the participants.

Data collection

For the data collection process, in-depth interviews were conducted using an interview guideline. The interview questions were developed collaboratively by three experts, including a medical surgical nurse, an expert in qualitative research, and a nurse who worked in the cardiac unit. Prior to the actual interviews, a pilot study was conducted by interviewing three clinical nurses to test the proposed questions. Minor adjustments to the wording of some questions were made based on the feedback from the pilot study to enhance clarity. The pilot study also provided an opportunity for

the interviewers to familiarize themselves with the interview procedure. This research was carried out over a period of three months by four researchers, without the help of any assistants.

The interview process began by introducing the research to the participants, followed by obtaining their consent and permission to audio-record the interviews. Prior to the interviews, two women and one man who served as interviewers conducted a pre-interview session to align their perceptions about the questions that would be posed to the participants. All three interviewers possess experience in qualitative research. The interviews consisted of questions that addressed the need for supportive education and focused on how to identify problems in order to maximize supportive education efforts for CHD patients from the perspective of nurses. During the interview, participants were asked a series of questions such as 1) In your opinion, who plays a crucial role in providing supportive education to patients with CHD, and why? and 2) In your opinion, what are the challenges faced by CHD patients in accessing supportive education, and how can these challenges be overcome? Each participant was interviewed for approximately 40 minutes. In addition to audio-recording the sessions, the interviewers took notes of their observations. After each interview, the interviewers repeated the participants' responses to ensure response accuracy. To enrich the data, the interview data were triangulated with field work observations (Heath, 2015). In this study, structured observation was implemented, and participants were aware that they were being observed. Participant recruitment ended when data saturation was reached, meaning that collecting additional data was unlikely to provide new insights or information. Data saturation was determined by the researchers, who met and considered the results of the preliminary data analysis. Another

triangulation method entails involving more than one researcher. In this study, four researchers were involved in every step of the data analyses.

Data analysis

In this study, the data were analyzed using NVivo 12 software (QSR International) for coding and organizing the data obtained from participant quotes and observations. The interview findings were analyzed by a thematic approach involving several stages: 1) becoming acquainted with the data; 2) creating initial codes; 3) identifying themes; 4) reviewing and refining the themes; 5) defining and labeling the themes; and 6) generating the final report (Braun et al., 2006). During the data collection and analyses, peer debriefing meetings were held to support the process.

Results

Participants in this study included 30 clinical nurses, with a mean age of 35.6 (± 5.4). Additionally, more than two-thirds of the participants were women. The majority of participants had an educational background of Diploma in nursing, followed by professional nurses. The participating nurses had worked in the hospital for an average of 11.3 (± 5.9) years and in the cardiac units for an average of 5.8 (± 4.1) years (Table 1).

Four themes and eight sub-themes emerged from analyzing the data of the 30 nurses who participated in this research. The first theme, which focused on engaging and informative media, encompassed the sub-themes of using interesting media and employing easy-to-understand language. The second theme revolved around culturally sensitive approaches, including sub-themes such as the challenges nurses face related to cultural beliefs, the importance of respecting diversity, and the incorporation of traditional practices. The third theme centered on the nurses' attitude, highlighting the significance of a positive and engaging demeanor. Lastly, the fourth theme explored family empowerment, encompassing the sub-themes of involving family members in health education and support as well as the challenges encountered when engaging families from remote villages. For further information and specific details, please refer to Table 2.

Theme 1: Engaging and informative media

This theme highlights the importance of using attractive media and employing easy-to-understand language. Nurses emphasized the significance of using visually appealing leaflets as educational materials, of considering factors such as readability and ease of understanding, and of including attractive pictures. Adopting such an approach can enhance patient interest in reading and facilitate comprehension of the educational content (See Q1-2). Nurses face a challenge in translating medical language into easily understandable terms. Nurses

acknowledged the importance of using language that patients can grasp, particularly considering that many patients are elderly and may have difficulty comprehending complex medical terminology (See Q3-4).

Theme 2: Culturally sensitive approaches

We discovered that nurses need to adopt culturally sensitive approaches when providing supportive education. The first comprises the challenges nurses face related to cultural beliefs. The participating nurses expressed the difficulties they face in bridging the gap between local beliefs and healthcare practices (See Q5-6). The nurses acknowledged that the patients they cared for came from various regions with their own unique beliefs. Therefore, mutual respect is crucial when delivering health information to patients with coronary heart disease (CHD). They also emphasized the importance of maintaining trust without compromising patient health (See Q7-8). The nurses indicated that cultural practices and beliefs that do not worsen the patient's health condition can be considered an intervention approach. Additionally, correcting misinformation and addressing incorrect beliefs is an essential task for nurses (See Q9-10).

Theme 3: Nurse attitudes

In the third theme, we discovered that positive behavior exhibited by nurses is crucial in achieving effective supportive education. The findings showed that nurses who have an attractive appearance and provide information in a less serious and more humorous manner can significantly engage patients in health education (See Q12-13).

Theme 4: Family empowerment

The fourth theme was family empowerment. The results indicated that involving family members in health education as a supportive effort is crucial. The nurses indicated that family members who interact with patients at the hospital assume the role of monitoring the patient's health condition. Therefore, it is necessary to provide accurate and comprehensive health information to family members (see Q14-15). Moreover, this theme also poses challenges for families residing in remote villages. Given the limited understanding and skills of this population group, nurses must patiently and slowly provide information regarding the patient's health. In fact, nurses also offer consultation services for family members who live far from the hospital (see Q16-17).

Discussion

The supportive-educative system discussed by Orem (2001) emphasizes the importance of support, guidance, and education to enhance knowledge and promote effective self-care management. In this study, the participating nurses indicated that meeting the supportive-educative needs of CHD

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patients necessitated the use of engaging and informative media, culturally sensitive approaches, positive nurse attitudes, and family empowerment. Engaging and informative media

The nurses identified engaging and informative media as a crucial supportive-educative need for CHD patients. Within the supportive-educative framework, conveying information effectively is vital. The participants in this study emphasized the importance of using interesting and informative media during health education sessions or when providing discharge instructions. This perception aligns with previous research indicating that informative media can enhance patients' knowledge, subsequently influencing their self-care management of heart conditions (Leutuay et al., 2021). The use of engaging media involves interactive communication between patients and nurses (Alalwan, 2022). One approach to creating appealing media is the use of technology-based patient education, as evidenced by studies on the effectiveness of leaflets with captivating visuals and information, videos, and engaging educational applications (Halldorsdottir et al., 2020; Riegel et al., 2017). Furthermore, incorporating telehealth nursing in the future can provide patients and their families with real-time access to CHD management information, regardless of their location and at any time.

Interesting and informative media play a crucial role in enhancing learning, particularly in the context of patient education. By capturing attention through engaging content, these media types increase patient engagement, leading to better absorption and retention of information (Occa & Morgan, 2022). They are particularly effective in breaking down complex medical concepts into more understandable formats, such as through visual aids like diagrams, videos, and infographics, which can clarify challenging concepts. This is important because people tend to remember visual information more readily than text (Mbanda et al., 2021). Furthermore, diverse media formats cater to different learning styles, ensuring that information is accessible to all patients, regardless of their preferred learning method. The use of interesting and informative media in patient education not only makes the learning process more engaging and understandable but also significantly contributes to better health outcomes by empowering patients with essential knowledge in an accessible and memorable format.

Culturally sensitive approaches

This study reveals that culture and beliefs are fundamental factors influencing individuals' supportive-educative needs. The participating nurses highlighted the significance of incorporating cultural considerations to facilitate effective supportive education. Culture and beliefs are deeply rooted in society and play a crucial role in shaping individuals' perspectives (Kindig et al., 2004; Latif,

2020). By employing a cultural and belief-based approach, nurses can optimize interventions aimed at enhancing self-care management among patients with CHD through supportive education (Liu et al., 2022). Nevertheless, nurses encounter challenges when cultural and belief systems do not align with the healthcare domain. Therefore, adopting culturally sensitive approaches becomes essential for addressing patients' health factors while respecting their cultural context (Hart & Mareno, 2014; Kailanen et al., 2019). According to Leininger's (2002) culture care theory, nursing is a profession characterized by both scientific and humanistic aspects. It revolves around understanding and addressing human care phenomena and engaging in caring activities to assist, support, facilitate, or empower patients in maintaining or restoring their health in culturally significant ways. Previous studies have indicated that a cultural approach can enhance the quality of life for patients with heart problems (Osokpo & Riegel, 2021; Urizar & Sears, 2006). Hence, integrating a cultural approach into supportive education can be a valuable consideration.

Culturally sensitive approaches in healthcare education are essential for enhancing learning, especially in diverse patient populations. By recognizing and respecting the cultural differences of patients, these approaches make educational content more relevant and resonant. Patients are more likely to engage with and understand information that reflects their cultural values, beliefs, and practices (Brooks et al., 2019). This sensitivity helps in building trust and rapport between healthcare providers and patients, which is crucial for effective communication and education. When patients feel understood and respected, they are more open to receiving and applying health information. Additionally, culturally sensitive education helps in overcoming language barriers and ensures that health messages are not lost or misunderstood due to cultural nuances (Andrusis & Brach, 2007; Brooks et al., 2019). It also aids in addressing specific health beliefs and practices unique to different cultures, which can significantly impact a patient's approach to healthcare and adherence to treatment plans. By incorporating cultural perspectives, healthcare education becomes not only more accessible but also more effective, leading to better health outcomes and patient satisfaction. In essence, culturally sensitive approaches in patient education acknowledge the uniqueness of each patient, fostering an inclusive environment where all individuals feel valued and understood.

Nurse attitudes

Proper or polite conduct is an essential aspect of supportive education. In this study, nurses disclosed that CHD patients expressed a preference for nurses who exhibited polite conduct. Patients favored nurses with a pleasant, humorous, and engaging personality, as this type of conduct facilitated

acceptance and rapport with the nurses (Ghaffari et al., 2015; Tanay et al., 2014). Consequently, patients were more receptive to the educational process led by these nurses, leading to increased knowledge among CHD patients (Ghaffari et al., 2015). The support provided by nurses who exhibited proper conduct positively influenced patients' mental well-being and expedited their recovery process (Ghaffari et al., 2015). The attitude of nurses significantly influences the learning experience of patients. A positive and engaging approach by nurses fosters a trusting environment, encouraging patients to be more receptive to information and guidance (Iwanow et al., 2021). This supportive system reduces patient anxiety, facilitates open communication, and enhances the overall effectiveness of patient education. Consequently, a nurse's empathetic and enthusiastic demeanor not only improves the retention of health information but also strengthens the nurse-patient relationship, leading to better healthcare outcomes and increased patient satisfaction.

Family empowerment

The family serves as a valuable source of support for patients, primarily due to the emotional closeness shared by family members (Liang et al., 2022). Consequently, family empowerment can have a positive impact on the healing process of CHD patients (Kitko et al., 2020). Supportive education provided by the patient's family can enhance self-care capabilities among individuals with CHD (Dunbar et al., 2008). In this study, nurses highlighted that strengthening the role of the family can aid in the educational process, particularly when patients are at home, and can also facilitate family monitoring of the patient's well-being. Previous studies have consistently indicated that family support yields positive outcomes in improving the quality of life for CHD patients (Kitko et al., 2020; Liang et al., 2022). As emphasized by Orem (2001), family strengthening is a crucial form of support that extends beyond mere knowledge enhancement.

Family empowerment is a key factor in enhancing learning, particularly in healthcare settings. When families are educated and involved in a patient's care, they can provide crucial support, reinforce learning, and help with treatment adherence (Mousaei et al., 2023; Rostamianasab et al., 2023). This is even more significant in the context of engaging families from remote villages, where access to healthcare and education may be limited. Empowering these families involves overcoming challenges such as geographical isolation, limited resources, and potential cultural and language barriers (Ho et al., 2022). By addressing these issues and providing accessible, relevant education, healthcare providers can ensure that family members are equipped to effectively support their loved ones. This holistic approach not only improves patient outcomes but also strengthens the overall health literacy and resilience of remote communities. Therefore, to

enhance supportive education, families should be actively involved in patients' healing by monitoring their condition and providing support and affection that nurses alone may not be able to provide.

Strengths and limitations

This study offers new insights regarding the supportive-educational needs of nurses and CHD patients. The strengths of this study include: 1) its originality, as it explores nurses' perceptions of supportive educative needs in CHD patients; 2) a qualitative study with a relatively large number of participants who have direct experience in treating patients with CHD; and 3) the novelty of the findings, particularly in recognizing the significance of considering patients' culture and traditional beliefs as part of their supportive-educative needs. Nevertheless, this study also has limitations in that it was conducted solely in one hospital and one specific area, resulting in a localized representation of cultural information and beliefs. Conducting research across multiple regions would provide a broader understanding of the diverse cultural contexts and beliefs related to supportive-educative needs.

Conclusion

Exploring the supportive-educative needs of CHD patients is crucial to ensure they receive appropriate support. This study offers valuable insights for both nurses and CHD patients. The findings highlight the significance of utilizing effective media, considering cultural factors, understanding the role of nurses, and involving the patient's family as a vital source of support. These results can be applied by nurses in designing nursing interventions and considering the factors that contribute to the supportive-educative needs of CHD patients. Furthermore, it is important to conduct further research to evaluate the effectiveness of these findings through intervention methods.

Declaration of Interest

None

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Food taboo, dietary diversity and prevalence of chronic energy deficiency in pregnant women living in rural area Indonesia

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Abstract

Background: Chronic energy deficiency is strongly associated with poor pregnancy outcomes. Food taboo and dietary diversity are suspected as main risk factors of those problems among pregnant women living in rural area. Limited studies have elaborated the inferential relationship of those factors in pregnancy, warranting further investigation.

Purpose: To describe food taboo and dietary diversity and to examine its association with chronic energy deficiency in pregnant women living in rural area.

Methods: This cross-sectional study involved 178 pregnant women aged 15–45 years. Food taboo and dietary diversity scores were drawn from single 24 hours food recall questionnaire while the perceived reason of food taboo was assessed by focus group discussion. Chronic energy deficiency was determined by mid-upper arm circumference by standard tape. Food taboo and dietary diversity score interaction was generated and binary logistic regression analysis with $\alpha = 5\%$ and 95% confidence interval was performed to provide adjusted associations with maternal characteristics, including parity, gestational age, and socioeconomic status as potential confounders.

Results: Almost half of respondents had food taboo (43.8%) and low dietary diversity score (43%) while one of fifth (19.7%) of respondents were chronic energy deficient. Those with food taboo and low dietary diversity were two times more likely to suffer from chronic energy deficiency. However, only pregnancy related factor (parity) was associated significantly with the outcome.

Conclusion: Although the relationship between food taboo and chronic energy deficiency was not statistically significant, pregnant mothers with food taboo should be encouraged to have a cultural-specific health and nutrition education.

Keywords: chronic energy deficiency; dietary diversity; food taboo; pregnancy

Introduction

In Southeast Sulawesi, one fifth (23%) of pregnant women suffer from chronic energy deficiency (CED) which is indicated by mid upper arm circumference (MUAC) <23.5 cm. This prevalence was close to the national figure (24.2%) ([KEMENKES, 2013](#)).

Established evidence reported that pregnant women with CED are at higher risk of poor pregnancy outcomes ([Abraham et al., 2015; Miele et al., 2021; Najafi et al., 2019](#)). Physiologically, pre-pregnancy's nutritional status may contribute to availability of nutrients in supporting the development and growth of fetal during pregnancy ([Miele et al., 2021; Najafi et al., 2019](#)).

Several risk factors underpin the development of CED during pregnancy

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including high family size and low educational level ([Wubie et al., 2020](#)) but in rural areas food taboo and low dietary diversity are reported to be significant modifiable factors ([Biza Zepro, 2015; Iradukunda, 2020; Tsegaye et al., 2021](#)) to alleviate the adverse effect of CED.

Food taboo is a perceived belief in prohibiting certain food either according to cultural, health or individual beliefs ([Meyer-Rochow, 2009](#)). Study reported that food taboo may be associated with inadequate amount, frequency, and quality of nutrient ([Martínez Pérez & Pascual García, 2013; Zerfu et al., 2016](#)). On the other hand, dietary diversity, which is a useful tool to estimate the quality of diet, is also associated with CED. A number of studies reported that pregnant women in developing countries had poor dietary quality due to monotonous diet ([Lander et al., 2019](#)). Those pregnant women with higher dietary diversity were more likely to have a better intake of the macro- and micro-nutrient composition compared with their counterparts. Hereby it may contribute to birth outcome ([Kemunto, 2013; Kheirouri & Alizadeh, 2021](#)).

The current study is located in East Kolaka District, a new established district in Southeast Sulawesi Province. To our knowledge, there are no data of chronic energy deficiency prevalence and its risk factor in pregnant women in this rural area. There are available studies in other regions, for example, in Sundanese pregnant women it was also reported that one third of participants usually (often+very often) avoid some kind of fruits such as pineapple, avocado and eggplant as taboo ([Koeryaman et al., 2019](#)). However, globally no study has elaborated the inferential statistical relationship of food taboo and maternal nutritional status. Most studies observed the qualitative aspect of food taboo and descriptively explain the perception or reason to avoid those foods ([Gadegbeku et al., 2013; Iradukunda, 2020; Ramulondi et al., 2021; Tsegaye et al., 2021; Vasilevski & Carolan-Olah, 2016; Zerfu et al., 2016](#)). Available study in Indonesia only associated food taboo with the socioeconomic profile of Sundanese pregnant women ([Koeryaman et al., 2019](#)). Therefore in this study, we aimed at describing the local food taboo and dietary diversity score (DDS); and, finally, aimed at examining the association of those factors with CED in pregnant women in rural area of East Kolaka.

Materials and Methods

Design

This cross-sectional study utilized data from a community based project entitled Situational Analysis of Nutritional Status and Associated Factors in Infant age of 2 years and Pregnant Women in East Kolaka Region, Southeast Sulawesi Province.

Sample and setting

Initial screening through registered book of Integrated Health Unit (Posyandu) and through

home visit with the help of local midwives and cadre in thirty villages found 204 population of pregnant women at first to third trimester. The pregnant women were included in this study if they were residing in East Kolaka, not suffering from serious illness (e.g. bedrest, hospitalized) and voluntarily willing to be a respondent. Pregnant women who moved to another area or died were excluded from data collection. Sample size was calculated based on the formula by Daniel (1999) with 95% confidence interval, precision of 5%, and expected CED proportion of 20% in East Kolaka District. Minimum sample size was 112 pregnant women. After adjusting for the design effect, the minimum final sample was 168. This study was carried out in 30 villages out of 122 available villages surrounded by cocoa plantation located at East Kolaka, Southeast Sulawesi, in Indonesia during April 2014. Generally, Southeast Sulawesi Province, particularly East Kolaka, has physical landforms features such as a chain of mountains and hills. Due to its fertile soil, the agricultural and plantation sector becomes the main economic driver to society, which mainly works as farmers while those located in coastal area work mostly as fishermen. This geographical relief creates isolated villages in most areas as common society settlements, which required strenuous effort to reach respondents. However, Kolaka district is one of most densely populated regions dominated by reproductive age with high literacy rate (93.91%). Resident dependency ratio was 58.58% while ratio of male and female residents was almost equal (1.0). In this study area, maternal mortality rate (MMR) is 238 per 100.000 and infant mortality rate (IMR) 11.6 per 1.000, both still below national level (MMR 359, IMR 32 per 1000).

Variable

Main dependent variable

In this study, the main dependent variable is chronic energy deficiency (CED). CED was determined by measurement of middle upper arm circumference (MUAC). Those with MUAC measurement below 23.5 cm are classified as CED ([KEMENKES, 2013](#)).

Main independent variables

Dietary diversity score

Dietary diversity score (DDS) was generated from single 24-hour food recall (24FR). The DDS was grouped into low diversity (≤ 4 food group) or high (> 4 food group) ([Kennedy et al., 2011](#)).

Food taboo

Food taboos (number of food items, frequency) were drawn from single 24FR and by focus group discussion (FGD). Those with one or more food item to be avoided by any reason were grouped as having food taboo (yes) otherwise not-having taboo (no).

Characteristic of pregnant women

Data on age, marital status, parity, number of

Table 1. Food taboo based on food group during pregnancy (N=178)

| Responds | n | % |
|--------------------------------------|----|------|
| Present of food taboo | 78 | 43.8 |
| Number of food taboo (>2 food items) | 29 | 16.3 |
| Food groups † | | |
| Fruit | 55 | 48.7 |
| Vegetables | 21 | 18.6 |
| Animal protein | 16 | 14.2 |
| Beverages | 8 | 7.1 |
| Others | 13 | 11.5 |

†n=113

Table 2. Perception of food taboo during pregnancy from fruit and vegetables groups

| Fruits | n | Reason† |
|-------------------|----|---|
| Pineapple | 21 | stillbirth, stomach burn, itchy, wounded baby, dry, baby feel hot, not good for baby |
| Young pineapple | 8 | |
| Banana | 2 | difficulties delivering baby, sticky and prohibited by family, stillbirth |
| Raw banana | 1 | |
| Jackfruit | 4 | stomach burn, difficulties delivering baby, sticky and prohibited by family, prohibited by family |
| Young jackfruit | 1 | |
| Thorny palm fruit | 3 | difficulties delivering baby, sticky |
| Papaya | 3 | sticky and prohibited by family, not good for baby's health, stomach burn |
| Durian | 8 | stomach burn, the smell, still birth, not good for baby's health |
| Mango | 2 | baby will have a pusillanimous face, stomach burn |
| Ripe mango | 1 | |
| Melon | 1 | slimy |
| Total | 55 | |
| Vegetables | | |
| Moringa leaves | 10 | difficulties delivering baby, slimy, prohibited by family, no answer, don't know |
| Banana flower | 7 | small baby, stillbirth, custom, uncontrolled birth weight, cardiovascular impairment baby |
| Tuber leaves | 1 | big baby |
| Kela leaves | 1 | itchy |
| Pumpkin leaves | 1 | umbilical cord entangled |
| Eggplant | 1 | don't know |
| Total | 21 | |

†reasons are ordered from the most frequent comment, n=78

children, religion, ethnicity, educational level, occupation, households expenditure and gestational age were collected using a structured questionnaire referring to the categories determined by the National Basic Health Survey ([KEMENKES, 2013](#)). Maternal age was grouped into High Risk group (Age <20 and >35 y) and No-High Risk (Age 20-35 y), Parity was grouped into High Risk (≥ 2 times) and Non-High Risk (<2 times), Birth spacing was grouped into High Risk (<2 year) and Non-High Risk (≥ 2 year). Household total expenditure was grouped

into below regional minimum salary (RMS) \leq Rp. 1.400.000 and above RMS $>$ Rp. 1.400.000

Instruments

Chronic energy deficiency is determined by the MUAC standard tape (SECA® tape, SECA 201, UK) to nearest 0.1 cm. Dietary diversity score was generated from individual dietary diversity questionnaire (IDDQ) which consisted of nine food groups. This questionnaire was drawn from 24-hour food recall (24 FR) in which food intakes data

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Table 3. Perception of food taboo during pregnancy from animal protein groups

| Animal Protein | n | Reason * |
|----------------|----|--|
| Shrimp | 4 | come in come out fetus, difficulties delivering baby, custom |
| Crab | 4 | Stillbirth, custom, prohibited by family, difficulties delivering baby |
| Squid | 2 | difficulties delivering baby, prohibited by family |
| Fish | | |
| Snakehead fish | 1 | don't know |
| Tilapia fish | 1 | stripped face |
| Stringray fish | 1 | custom |
| Milk fish | 1 | nausea after eating |
| Pork | 1 | dizzy |
| Meat | 1 | stomach burn |
| Total | 16 | |

†reasons are ordered from the most frequent comment, n=78

Table 4. Perception of food taboo during pregnancy from animal protein groups

| Food groups | n | % | CED Status | | | |
|---|-----|---------|------------|--------|---------|---------|
| | | | CED | | Non CED | |
| | n | % | n | % | n | % |
| Legumes and tubers | 173 | (97.2) | 34 | (19.7) | 139 | (80.3) |
| Green leafes | 100 | (56.2) | 23 | (23.0) | 77 | (77.0) |
| Vegetable and source of vitamin A/rich of Vitamin A | 38 | (21.3) | 5 | (13.2) | 33 | (86.8) |
| Other vegetables and fruits | 98 | (55.1) | 17 | (17.3) | 81 | (82.7) |
| Animal's organ | 0 | (0) | 0 | (0) | 0 | (0) |
| Meat and fish | 146 | (82.0) | 27 | (18.5) | 119 | (81.5) |
| Egg | 46 | (25.8) | 9 | (19.6) | 37 | (80.4) |
| Seeds | 48 | (27.0) | 10 | (20.8) | 38 | (79.2) |
| Milk and other products from the milk | 38 | (21.3) | 5 | (13.2) | 33 | (86.8) |
| Total score of DD (min-max) | | 4 (1-8) | | 4(2-6) | | 4 (1-8) |

were sorted based on nine given food items in the IDDQ (Kennedy et al., 2011). Food taboo items were collected via 24FR questionnaire by adding extra questions regarding food being avoided. Reasons for food taboo were also generated from FGD (focus groups discussion) (Gadegbeku et al., 2013).

Intervention

No intervention was performed prior data collection.

Data collection

Dietary diversity

Participants were asked to freely recall all foods (including snacks) and drinks consumed during the previous 24 hours (single 24FR). The trained personnel circled the foods in the appropriate food groupings and used standardized probes to collect more detail. If a food was listed by an interviewer but not on the original IDDQ, the interviewer consulted with the researcher and added the food name under the appropriate food group, allowing for further adaptation of the tool if required. Dietary Diversity

Score was grouped into low diversity (≤ 4 food group) or high (> 4 food group) (Kennedy et al., 2011).

Food taboo

Taboos and opinions on preferred food/diet during pregnancy were asked after the recall (24FR). All taboos and opinions on preferred food were tabulated into groups based on findings. In addition, FGDs were conducted in six pregnant women (excluded from sample) for digging up pregnant women's perceptions about food taboo and any kind of food taboo they experienced. Verbatim record was conducted, and a team consisting of one moderator, and two note takers conducted the FGD among a homogeneity socio-demographic background. FGDs were conducted in one of the respondents' houses in the community. Food taboo was analyzed descriptively related to frequency of the food items and food group as well as the reasons of avoiding the foods (Gadegbeku et al., 2013).

Chronic energy deficiency

Trained personal asked the respondent if they

Table 5. Characteristic of pregnant women in study area (N=178)

| Variables | CED status | | | | Crude OR | 95%CI | P-value* | | | |
|---------------------------|------------|--------|-----------------|--------|----------|-------------|----------|--|--|--|
| | CED (n=35) | | Non CED (n=143) | | | | | | | |
| | n | †(%) | n | †(%) | | | | | | |
| Working status | | | | | | | | | | |
| Working | 7 | (3.9) | 48 | (27.0) | 0.495 | 0.227-1.079 | 0.071§ | | | |
| Not working | 28 | (15.7) | 95 | (53.4) | | | | | | |
| Gestational Age | | | | | | | | | | |
| Trimester II&III | 31 | (17.4) | 127 | (71.3) | 0.976 | 0.305-3.127 | 0.584‡ | | | |
| Trimester I | 4 | (2.2) | 16 | (9.0) | | | | | | |
| Number of HH member | | | | | | | | | | |
| >4 member | 25 | (14.0) | 86 | (48.3) | 0.604 | 0.245-1.485 | 0.257 | | | |
| ≤4 member | 10 | (5.60) | 57 | (32.0) | | | | | | |
| Age of PW | | | | | | | | | | |
| <27 y | 23 | (12.9) | 63 | (35.4) | 2.434 | 1.125-5.268 | 0.042‡§ | | | |
| ≥27 y | 12 | (6.7) | 80 | (44.9) | | | | | | |
| Educational level | | | | | | | | | | |
| ≤6 y school | 13 | (7.3) | 66 | (37.1) | 0.689 | 0.266-1.784 | 0.428 | | | |
| >6 y school | 22 | (12.4) | 77 | (43.3) | | | | | | |
| Parity | | | | | | | | | | |
| ≥2 times | 13 | (7.3) | 103 | (57.9) | 0.229 | 0.101-0.520 | 0.001§ | | | |
| <2 times | 22 | (12.4) | 40 | (22.5) | | | | | | |
| Household economic status | | | | | | | | | | |
| ≤RMS | 18 | (10.1) | 51 | (28.7) | 1.910 | 1.049-3.479 | 0.034§ | | | |
| >RMS | 17 | (9.6) | 92 | (51.7) | | | | | | |
| Dietary Diversity (DD) | | | | | | | | | | |
| ≤4 group (Low DD) | 28 | (15.7) | 95 | (53.4) | 2.021 | 0.892-4.579 | 0.085§ | | | |
| >4 group (High DD) | 7 | (3.9) | 48 | (27.0) | | | | | | |
| Food Taboo | | | | | | | | | | |
| Yes | 18 | (10.1) | 60 | (33.7) | 1.465 | 0.692-3.099 | 0.304 | | | |
| No | 17 | (9.6) | 83 | (46.6) | | | | | | |
| Number of Food Taboo | | | | | | | | | | |
| > 1 food | 9 | (5.1) | 20 | (11.2) | 2.129 | 0.806-5.622 | 0.117§ | | | |
| ≤ 1 food | 26 | (14.6) | 123 | (69.1) | | | | | | |

†percentage are presented by table, ‡fisher exact test, §included in binary logistic for P≤0.250, OR (odd ratio) only applicable for 2x2 table. All statistical ran by complex sample analysis except fisher exact test, *significant at level 0.05 (2-tailed)

were usually right-handed or not. Pregnant women were kindly asked to fold their clothes on the mid-upper arm. Respondents were asked to pose ninety degrees on the arm so the personnel; were able to put a mark in the middle of the mid-upper arm. Upon being marked, the respondent's arm was gently requested to be in a relaxed straight position (**KEMENKES, 2013**). A WHO standard MUAC (mid-upper arm circumference) tape was used to measure the circumferences. Two measurements were performed and the average of the measurements was inputted for further statistical analysis.

Data analysis

Pilot study was performed to pretest questionnaire for data collection. Thirty samples with similar characteristics, out of the main sample, were questioned to ensure similar understandability (wording, the sentencing, the meaning) to cover local language barriers. All data were collected by trained enumerators. Data quality was assured by daily check by supervisors on each occasion of data collection. Upon analysis, double entry was conducted for 30% of questionnaires.

SPSS 20.0 software was used to perform

Table 6. Multivariate analysis of CED status and its factors

| Variables | B | S.E | p-value | OR | 95% CI |
|----------------------------------|--------|-------|---------|-------|--------------|
| Constant | -2.310 | 0.751 | 0.002 | 0.099 | - |
| Working Status, yes | 0.882 | 0.505 | 0.081 | 2.416 | 0.897-6.504 |
| PW age, <27 y.o | 0.030 | 0.506 | 0.953 | 1.031 | 0.382-2.780 |
| Parity, ≥ 2 times | 1.683 | 0.526 | 0.001 | 5.379 | 1.921-15.067 |
| Household economic status, ≤ RMS | -0.396 | 0.417 | 0.342 | 0.673 | 0.297-1.523 |
| DDS, <4 food groups | -1.066 | 0.717 | 0.137 | 0.344 | 0.085-1.404 |
| Food Taboo, yes | -0.240 | 0.486 | 0.621 | 0.786 | 0.303-2.039 |
| Food Taboo x DDS | 0.820 | 0.980 | 0.402 | 2.271 | 0.333-15.488 |

n=178, Nagelkerke R-square = 0.195

all statistical analyses. Demographic data are presented as frequency distribution and percentage. Differences in proportions of categorical variables were compared using a chi-square test. In case the assumption is not achieved, Fisher exact test was used. Complex sample was used to analyze all data. A multivariable logistical regression was used to evaluate the association between CED category and risk factors. All potential factors that substantially associated with CED and or had p-value below 0.250 were included in the binary logistic analysis. An interaction between food taboo and DDS (food taboo x DDS) was generated to reveal combined effect of the variables with CED. Significance level of 0.05 was used for all statistical tests, and ORs are presented with the 95% confidence intervals (CIs).

Ethical consideration

The current study obtained ethical approval from Ethics Committee of the Faculty of Medicine, Universitas Indonesia 210/H2/F1/ETIK/2014. All participants agreed to be voluntarily involved and had signed a written informed consent.

Results

Almost half of pregnant women had food taboo in which fruit and vegetables groups were frequently reported (Table 1). Some fruits, such as pineapple, banana, and jackfruit, were perceived to cause stillbirth, stomach burn and made the delivery become difficult (Table 2). Animal protein, particularly from fish, was also reported to be prohibited by family and perceived to cause some pregnancy problems (Table 3).

The majority (69.1%) of the mothers had low dietary diversity (Table 5) though total dietary diversity score between CED and normal pregnant women was comparable (Table 4). Legumes-tuber and meat-fish were commonly consumed while vegetables, eggs and milk were the least. Food taboo and dietary diversity did not associate with prevalence of CED. Only parity, household economic status and pregnant women's age associated with CED in unadjusted analysis (Table 5). However,

after adjustment, those mothers with food taboo and DDS <4 were two times (odd risk (OR)=2.27, 95%CI = 0.33-15.48) more likely to have higher risk of CED than their counterpart. Parity (OR=5.38, CI=1.92-15.06, p=0.001) was a significant risk factor of CED (Table 6). Those with multiparity (more than 2) had five times greater risk of getting CED than their counterpart.

Discussion

Our findings have identified a number of food taboos in pregnant women with mostly not working (housewife) and at second phase of pregnancy, which were dominated from fruits and vegetables food groups. We also found a majority of pregnant women were at low DD and their dietary pattern mainly consisted of staple food, meat and fish and lack of fruit and vegetables food groups. Numerous studies showed vegetable and fruits groups mostly reported as being tabooed (Sharifah Zahhura et al., 2012; Zerfu et al., 2016) with almost similar reasons.

In other region of Indonesia, Sundanese pregnant women also reported avoiding some kind of fruits such as pineapple, avocado and eggplant (Koeryaman et al., 2019). Study in Malaysia also reported some fruit such as jackfruit to cause sticky delivery problems (Sharifah Zahhura et al., 2012). Green leafy vegetables were also reported as dominant food to be prohibited during pregnancy in a rural area of Arsi, Central Ethiopia (Zerfu et al., 2016) and in a rural area province of South Africa (Ramulondi et al., 2021). Although diet based on staple and animal protein food may supply adequate protein and improve pregnancy outcome (Maslova et al., 2014) this diet is low in micro-nutrients such vitamins and minerals that mainly come from vegetables and fruits. Lack of micro-nutrients is associated significantly with poor pregnancy outcome (Blumfield et al., 2013).

There were many reasons for pregnant women in the study area to avoid this kind of food. However, most reasons were related to health and cultural consent. When mothers avoided the food to prevent pregnancy problem and infant malformation, this

reason can be perceived as health consent though perceived taboo is clinically not associated with those perceived impacts, while cultural consent generally comes from family and shaman with unclear explanation. In contrast, a study in South Africa reported that more than half of women aged 18-90 years old ($n=140$) recommended specific leafy vegetables to be consumed during pregnancy due to health reasons. They mentioned that the vegetables may provide vitamins, build bone and improve growth of the fetus (Ramulondi et al., 2021).

The reason of food taboo may vary from cultural, religious, health, magical thinking, ethics, sympathy and comparison (logical thinking) (Gadegbeku et al., 2013). Nevertheless, in contrast to most of the adverse impacts of food taboo to mother and infant health and nutrition status, food taboo also can lead to protection of indigenous resources and to maintain the identity of those people residing in the area and protection toward unhealthy diet (Iradukunda, 2020). However, if food taboo is not only perceived by the mother but also their husband or spouses and the grandparent (mother in-law), this condition can also be a clue of poor nutrition or health promotion in the study area (Tsegaye et al., 2021) and needs a more cultural-based nutrition education program (Iradukunda, 2020).

In inferential analysis, our study found that food taboo and DDS alone did not associate with prevalence of CED. Interestingly, when food taboo and DDS are combined (Food taboo * DDS), we found that those mothers with food taboo and DDS <4 were two times more likely to have higher risk of CED than their counterpart. To our knowledge, no study has observed the inferential statistical relationship of food taboo and maternal nutritional status. Most studies observed the qualitative aspect of food taboo and descriptively explain the perception or reason to avoid those foods (Gadegbeku et al., 2013; Iradukunda, 2020; Ramulondi et al., 2021; Tsegaye et al., 2021; Vasilevski & Carolan-Olah, 2016; Zerfu et al., 2016). Definition and type of food differed across cultural and sites so that the association may be interpreted specifically to the study area (Iradukunda, 2020; Meyer-Rochow, 2009), making this kind of study limited. Moreover, our study pinned its novelty by interacting food taboo and DDS. It is plausible to note that those pregnant women's food taboos had low DDS. Our finding confirms the notion although is not statistically significant.

Most studies associated DDS with CED, such as a study in Ethiopia that found that DDS is a significant risk factor of CED in which mothers with low DDS are five times (95%CI: 2.89, 10.52) more likely to become CED (Legesse et al., 2019). Other study that involved pregnant women in four low-middle income countries found that most pregnant women are at inadequate dietary diversity. Those with inadequacy were at poor micro-nutrients such as folate, vitamin Bs (B1, B2, B6, B12), and choline (Lander et al., 2019).

Another interesting finding was that we found parity that associated with CED prevalence. Pregnant mothers with parity more than two times are at higher risk of CED. Pregnant women with CED were more likely to have LBW than their counterpart (Wubie et al., 2020) while LBW is the determinant of stunting and poor health in adulthood.

Most studies supported that multipara or high parity is the risk factor of CED and poor pregnancy. Multipara is associated with two-fold higher risk of poor pregnancy than nulliparous (Sintia et al., 2021). Other study also showed that the greater parity will associate with being 2.7 times more likely of becoming CED (Lipoeto et al., 2020) and higher risk of neonatal adiposity (Gaillard et al., 2014). Biologically, multipara mothers may be associated with poor nutrients pools and high inflammatory markers (Wessells et al., 2017). Existence of food taboos may worsen this situation in which pregnant women would have low food choice to consume during pregnancy (Zerfu et al., 2016) and this may cause anemia (Vasilevski & Carolan-Olah, 2016) thereby resulting in poor pregnancy outcome such as LBW infant.

Our study also indicated that working pregnant mothers are at higher risk of CED. Similar to our finding, a study in women of reproductive age in Ethiopia found that number of times to fetch the water was associated with more than two times higher risk of CED, defined by using BMI (Abraham et al., 2015). Working during pregnancy particularly those with high physical activity or bringing weights (take water, harvesting) may cause mothers to expend more energy for their daily physical routine and minimize nutrients shared to the fetus. Consequently, it may induce various poor pregnancy outcome such as such as small gestational age (SGA), miscarriage and preterm birth delivery (PTD) (Suzumori et al., 2020).

There were many reasons of mothers to continue work during pregnancy. Some may work to contribute to family income while others work to gain self-actualization (Neupane et al., 2016). Pregnant women, particularly in rural area, and those mothers with more than two children were more likely to continue to work during pregnancy (Neupane et al., 2014) to contribute to familial income.

However, the Centers for Disease Control and Prevention (CDC) and The American College of Obstetricians and Gynecologists (ACOG) recommended that those pregnant women without any obstetric or medical problems to do moderate-intensity aerobic physical activity (ACOG, 2020; Piercy et al., 2018). This physical activity would be like brisk walking and recreational physical activity that may help to improve mother's mood and reduce depression (Kołomańska et al., 2019).

Conclusion

The current study found that pregnant women in the study area were at low diet quality score (low DDS)

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and had perceived food taboos that related to health and cultural consent. Although DD and food taboo did not associate with prevalence of CED, birth history factor significantly becomes a risk factor of CED prevalence. Health workers are encouraged to provide an intensive and cultural-specific health and nutrition education that promotes healthy lifestyle and tackles food taboo during pregnancy. In addition, community health workers should encourage routine prenatal care for those working pregnant women. Health workers are encouraged to provide an intensive and cultural-specific health and nutrition education that promotes healthy lifestyle and tackles food taboo during pregnancy.

Declaration of Interest

All authors declare have none conflict of interest.

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Data Availability

Upon reasonable request, data can be provided by writing to corresponding author.

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The comfort level in breast cancer patients' based on patients' characteristics during the COVID-19 pandemic

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Abstract

Background: Comfort is an important factor in determining the successful outcomes of palliative care in breast cancer patients. During the COVID-19 pandemic, the comfort of cancer patients was disrupted due to restrictions on the number of visits, due to being categorized as a high-risk group for COVID-19. Patients were concerned about coming to the hospital for treatment because they were afraid of being infected, which served as an obstacle in treating breast cancer patients.

Purpose: This study aims to describe patients' comfort levels during the COVID-19 pandemic and to investigate the relationship between patients' characteristics and comfort levels.

Methods: This study involved 108 respondents with breast cancer at the National Cancer Center Hospital in 2021, using a cross-sectional research method. The study was conducted using a consecutive sampling technique, including breast cancer patients who were actively undergoing treatment in the hospital. The research instrument was the Comfort Assessment Breast Cancer Instrument (CABI), using a scale of 1-4, with lower score indicating higher level of comfort. The data were analyzed using the Kruskal-Wallis test.

Results: The results showed that respondents' level of comfort was comfortable. The best comfort aspect was the environmental aspect, and the worst aspect was the physical aspect. In addition, there were two variables related to comfort: type of treatment ($p = 0.000$; $\alpha = 0.05$) and type of service in the hospital (outpatient and inpatient) ($p = 0.000$; $\alpha = 0.05$). The best comfort level was found in chemotherapy treatment and outpatient rooms. Patients felt comfortable with a neat, clean, conducive hospital environment and the implementation of health protocols, believing that these aspects could effectively prevent the spread of COVID-19.

Conclusions: The results of this study suggested that dimension of patients' comfort are influenced by multiple aspects. Nursing services are recommended to optimize and improve controllable variables to maintain a higher level of comfort. Interventions that maintain or improve comfort will optimize patients' health conditions.

Keywords: breast cancer; comfort; COVID-19; level of comfort

Introduction

Breast cancer is one of the cancer types with the highest incidence worldwide. The number of new breast cancer cases in 2020 reached 11.7% of all cancer types (Sung et al., 2021). Meanwhile, breast cancer cases in Indonesia have reached 16.6% of the total population (Globocan, 2020). In 2018, Dharmais Cancer Hospital, a national cancer centre hospital in Jakarta, reported that the most common cancer diagnose is breast cancer at 19.18% (Ministry of Health, 2019). The number of breast cancer cases in Indonesia is also expected to rise. This could mean the increase of cancer burden in Indonesia. Therefore, all aspects that can improve the health

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condition of breast cancer patients and promote recovery should be considered. One such aspect is the comfort aspect.

According to Kolcaba's theoretical comfort approach, comfort is defined as "the immediate state of experience of solving problems and thus having comfort by being strengthened through answering the human needs for relief, ease, and transcendence in a physical, psychospiritual, environmental, and sociocultural context" (Lin et al., 2023). Patients' comfort level will affect their adherence to medical recommendations and oncological treatment regimens and improve their health conditions. A study conducted in Indonesia before the COVID-19 pandemic discovered that the mean level of comfort with breast cancer was of $1.82 + 0.43$ of the scale 1-4, with lower score indicating a higher level of comfort (Nuraini et al., 2018).

Corona Virus Disease-19 (COVID-19) is an infectious respiratory disease that first appeared in Wuhan, China, and spread to the whole world (WHO, 2020). This unprecedented health crisis, for which no healthcare system is fully prepared, has led to changes in patient care management worldwide (Curigliano et al., 2020). During the COVID-19 pandemic, the cancer patients' treatments and activities were disrupted due to restrictions on the number of visits, as cancer patients are included to a high-risk group for COVID-19. Cancer has been determined as a factor that aggravates the patient's condition if affected by COVID-19. In addition, a study conducted during the COVID-19 pandemic has discovered COVID-19 as a new stressor that can cause concern and discomfort for breast cancer patients (Liang et al., 2020).

In Indonesia, the Dharmais Cancer Hospital, as a national cancer center, has also implemented management changes, such as closing the outpatient clinic for early cancer detection and undergoing cancer treatment since March 2020 (Dharmais, 2020a) and delaying doctor consultations (Dharmais, 2020b). Cancer services reopened in June 2020 by implementing a strict screening protocol and advising breast cancer patients to visit the hospital for a checkup (Dharmais, 2020c).

Some patients might be unsure whether going to the hospital is risky for their health (Curigliano et al., 2020). Patients experience dilemmas and worries during the pandemic about visiting the hospital. The patient feels the need to continue treatment, but is also worried about being infected with COVID-19. The main dilemma for continuing treatment during a pandemic is that the incidence and mortality of cancer patients exposed to COVID-19 are higher than those of other patients (Liang et al., 2020).

The changes in management as a response to the COVID-19 pandemic affected the patients' schedule in treatments and consultations as well as activities, which may lead to discomfort and negatively impact recovery. As one of the vital aspects in patients' care, an adequate level of comfort is needed. This comfort can affect the quality of life and resilience of

cancer patients. Nurses are responsible for making patients comfortable despite their illness. However, research on the comfort of breast cancer patients during the COVID-19 pandemic in Indonesia is still limited.

The COVID-19 pandemic period is declared to have ended, but the learning process during the pandemic must not be forgotten. With the trend of global health following the changing lifestyle and global climate, it is not improbable for other pandemics to occur in the future. In this case, nurses as healthcare providers, must always be ready to face any pandemic disaster, especially a contagious disease pandemic. For these reasons, the researchers identified the need in examining the comfort of breast cancer patients during the COVID-19 pandemic and the factors that influence it to expand on the body of knowledge in relation to pandemics.

Materials and Methods

Design

This study used a cross-sectional design and was conducted from April to May 2021. The population in this study was cancer patients at the National Cancer Center Hospital. The researchers used the proportion estimation formula to determine the number of sample, resulting in 108 breast cancer patients as respondents.

$$n = \frac{(Z\alpha/2)^2 p.q}{d^2}$$

Proportion Estimation Formula (Sastroasmoro and Ismael, 2014)

Sample and setting

The respondents were selected from the population who satisfied the criteria of inclusion namely breast cancer patients who were actively undergoing treatment at the National Cancer Center Hospital, were fully conscious, and were able to comprehend and communicate in Indonesian Language as well as willing to complete an informed consent form. Patients with comorbid conditions were excluded from the sample population to keep the research focused on the level of comfort during a pandemic and not on COVID-19 exposure. Research samples used a consecutive sampling method. Data were collected directly using the demographic data form and the Comfort Assessment Breast Cancer Instrument (CABC).

Variables

The demographic data form was used to collect the characteristics of patients as follow: age; level of education; marital status; occupation; monthly income; cancer stage; time of diagnosis; health insurance; social support; and type of care. Patients'

Table 1. Respondents' Characteristics (n = 108)

| Characteristic | Frequency (n) | Percentage (%) |
|--|---------------|----------------|
| Age | | |
| Early adults (26-35 years old) | 13 | 12.0 |
| Late adults (36-45 years old) | 29 | 26.2 |
| Early elderly (46-55 years old) | 40 | 37.0 |
| Elderly (56-65 years old) | 17 | 15.7 |
| Late elderly (> 65 years old) | 9 | 8.3 |
| Level of Education | | |
| Higher education (Diploma, Bachelor, Master, Doctoral Degree) | 36 | 33.3 |
| High education (High school, Islamic high school, Vocational high school) | 52 | 48.1 |
| Lower education (Elementary school, Islamic elementary school, Junior high school, Islamic junior high school) | 20 | 18.5 |
| Marital status | | |
| Married | 98 | 90.7 |
| Have not married yet/ unmarried | 10 | 9.3 |
| Occupation | | |
| Employed | 29 | 26.9 |
| Unemployed | 79 | 73.1 |
| Monthly income | | |
| < IDR 4,416,186 (283 USD) | 69 | 63.9 |
| > IDR 4,416,186 (283 USD) | 39 | 36.1 |
| Cancer stage | | |
| Stage 1 | 7 | 6.5 |
| Stage 2 | 30 | 27.8 |
| Stage 3 | 52 | 48.1 |
| Stage 4 | 19 | 17.6 |
| Diagnosis duration | | |
| < 1 year | 50 | 46.3 |
| 1 until 3 years | 38 | 35.2 |
| > 3 years | 20 | 18.5 |
| Treatment undertaken | | |
| Surgery (pre/post) | 33 | 30.6 |
| Chemotherapy | 61 | 56.5 |
| Mixed therapy (>1 therapy) | 14 | 13.0 |
| Health insurance | | |
| BPJS Kesehatan | 104 | 96.3 |
| Private insurance | 2 | 1.9 |
| Do not have an insurance | 2 | 1.9 |
| Social support | | |
| Yes | 107 | 99.1 |
| No | 1 | 0.9 |
| Room | | |
| Outpatients | 48 | 44.4 |
| Inpatients | 60 | 55.6 |

Table 2. Respondents' Comfort (n = 108)

| Comfort Variable | Mean (scale 1-4) | Std Deviation | Median (scale 1-4) | Min-Max | 95% Confidence interval |
|------------------|---------------------|---------------|-----------------------|----------|-------------------------|
| Physical | 2.47 | 0.74 | 2.5 | 1-4 | 2.33 |
| Psycho-spiritual | 1.84 | 0.53 | 1.69 | 1-3.31 | 1.73-1.94 |
| Socio-cultural | 2.06 | 0.67 | 2 | 1-4 | 1.94-2.19 |
| Financial | 2.08 | 0.97 | 2 | 1-4 | 1.89-2.26 |
| Environment | 1.78 | 0.84 | 1.67 | 1-4 | 1.62-1.94 |
| General Comfort | 2.04 | 0.58 | 1.99 | 1.17-3.7 | 1.93-2.16 |

exposure to COVID-19 was not included in the demographic form as COVID-19 patients were inaccessible during isolation.

Instruments

The CACI was developed by the main author in 2018 and has been tested for validity and reliability with Cronbach's α of 0.93 and 0.88, respectively (Nuraini et al., 2019; Gonzalez-Baz et al., 2023). Reliability and validity in our samples (true samples): 0.94 and 0.437-0.747. The CACI consists of 32 items, consisting of eight items for the assessment of physical comfort, 13 psychospiritual items, five sociocultural items, three financial items, and three environmental items; each domain used a scale of 1-4.

Data collection

The score value interpretation was low score represents higher level of comfort, meaning the score of 1 represents the highest level of comfort and the score of 4 represents the lowest level of comfort. Data were collected on a paper-based form, and researchers directly collected data by asking respondents to fill out the form.

Ethical clearance

This study has passed the ethical clearance from Dharmais Cancer Hospital, no. 035/KEPK/IV/2021, dated April 19, 2021.

Data analysis

This study also investigated the relationship between respondents' characteristics and comfort levels. Data obtained were then analyzed by JASP 0.14.1.0 for univariate and bivariate data. Researchers used the Kruskal-Wallis test method for testing data. After the data were collected and tested for normality, the results were not normal, as the p value of Kolmogorov Smirnov showed 0.00 (< 0.05).

Results

The study identified characteristics of respondents consisting of age, level of education, marital status, occupation, monthly income, cancer stage, duration of diagnosis, treatment undertaken, health insurance, social support, and type of care (outpatient or inpatient). The description of the characteristics of

the respondents is explained in Table 1. A total of 108 respondents were involved in this study. Most respondents were aged between 46 and 65 years, representing 61% of the sample; most respondents graduated from high school (88 respondents, or 81.5%) with 33.33% graduated from higher level of education (Diploma, Bachelor, Master, Doctoral Degree); and most respondents were married (98 respondents or 90.7%). In this study, 79 respondents (73.1%) were unemployed, and the monthly family income of each respondent (69 respondents, or 63.9%) was mainly below Jakarta's regional minimum wage, or < IDR 4,416,186.00, or 283 USD.

The most represented cancer stage was stage 3, experienced by 52 respondents (48.1%) with most respondents diagnosed within less than a year (50 respondents, 46.3%). The majority of respondents (61) underwent chemotherapy treatment amounting to (56.5%), and BPJS insurance (National Social Security Agency) was most widely used by respondents for 103 respondents (96.3%). Almost all respondents (106 respondents, or 99.1%) received social support from their family. Forty-eight respondents (44.4%) underwent treatment in the outpatient room, and 60 (55.6%) underwent treatment in the inpatient room.

The total of respondents' comfort level is considered uncomfortable (mean: 2.04 + 0.58). The five aspects of comfort show that the best comfort level was found in the environmental aspect (mean: 1.78 + 0.84) and the least comfortable domain was found in the physical aspect (mean: 2.47 + 0.74). Aspects of comfort are described in Table 2.

The comfort normality test using the Kolmogorov-Smirnov test has revealed a significance of <0.05 ($p=0.011$). The result of normality test for each domain show only physical domain with p value 0.2, and another domain <0.05. The value indicated that the data were not normally distributed, thus the Kruskal-Wallis test was used as the bivariate. Table 3 shows the relationships between characteristics and comfort variables. There are two variables that have a significant difference from the comfort variables ($p = 0.000$; $\alpha = 0.05$). The variables of type of treatment and type of service in the hospital (outpatient and inpatient) have a significant relationship with patient comfort. The highest aspect influencing comfort is patients who are on chemotherapy treatment. Patients undergoing outpatient treatment have the

Table 3. Relationships between Respondents' Characteristics and Comfort (n = 108)

| Characteristic | N | Mean Rank | p-values |
|--|-----|-----------|----------|
| Age | | | |
| Early adults (26-35 years old) | 13 | 58 | 0.156 |
| Late adults (36-45 years old) | 29 | 59.55 | |
| Early elderly (46-55 years old) | 40 | 46.78 | |
| Elderly (56-65 years old) | 17 | 51.59 | |
| Late elderly (> 65 years old) | 9 | 73 | |
| Level of education | | | |
| Higher education (Diploma, Bachelor, Master, Doctoral Degree) | 36 | 54.33 | 0.978 |
| High education (High school, Islamic high school, Vocational high school) | 52 | 55.06 | |
| Lower education (Elementary school, Islamic elementary school, Junior high school, Islamic junior high school) | 20 | 53.35 | |
| Marital status | | | |
| Married | 98 | 54.76 | 0.791 |
| Have not married yet/ unmarried | 10 | 52 | |
| Occupation | | | |
| Employed | 29 | 59.79 | 0.287 |
| Unemployed | 79 | 52.56 | |
| Monthly income | | | |
| < IDR 4,416,186 (283 USD) | 69 | 53.72 | 0.732 |
| > IDR 4,416,186 (283 USD) | 39 | 55.87 | |
| Cancer stage | | | |
| Stage 1 | 7 | 42 | 0.373 |
| Stage 2 | 30 | 57.77 | |
| Stage 3 | 52 | 51.44 | |
| Stage 4 | 19 | 62.32 | |
| Diagnosis duration | | | |
| < 1 year | 50 | 52.98 | 0.796 |
| 1 until 3 years | 38 | 57.26 | |
| > 3 years | 20 | 53.05 | |
| Treatment | | | |
| Surgery (pre/post) | 33 | 63.97 | 0.000* |
| Chemotherapy | 61 | 43.89 | |
| Mixed therapy (>1 therapy) | 14 | 78.43 | |
| Health insurance | | | |
| BPJS Kesehatan | 104 | 55.73 | 0.109 |
| Private insurance | 2 | 27.5 | |
| Do not have an insurance | 2 | 17.5 | |
| Social support | | | |
| Yes | 107 | 54.12 | 0.194 |
| No | 1 | 95 | |
| Room | | | |
| Outpatients | 48 | 35.9 | 0.000* |
| Inpatients | 60 | 69.38 | |

* indicates a significant difference in α 0.05. The smaller the rank, the more comfortable

highest comfort value, by four times, compared to inpatient treatment. Meanwhile, the variables of age, level of education, marital status, occupation, monthly income, cancer stage, diagnosis period, health insurance, and social support are not significantly different from comfort ($p > 0.05$).

Discussion

Univariate (Comfort Variables)

This study has revealed that patient comfort is still lacking, with a mean value of 2.04 ± 0.58 (score 1-4). The higher value represented lower level of comfort for the respondents. In comparison with previous related study by Nuraini et al. (2018), which discovered that mean value of 1.82 ± 0.43 , the results indicated an increase in discomfort.

Physical discomfort had the highest mean score (2.47 ± 0.74). This is in accordance with previous research, which shows that physical discomfort, especially pain, is the discomfort that most often occurs in breast cancer patients, and the pain felt is in the moderate group (Gayatri et al., 2021; Miller et al., 2021). Nurses can provide non-pharmacological interventions that can help reduce pain in patients with breast cancer (Krishnasamy Yuvaraj et al., 2023).

Finances were the second highest discomfort factor (2.08 ± 0.97). Cancer treatment in Indonesia is covered by the national health insurance. However, there were terms and conditions for the coverage that meant some treatments and other related costs were not covered. Therefore, while the national health insurance covered the cancer treatment, it was still a problem to meet other needs, such as nutrition, transportation costs, and other costs. As the majority of Indonesian households come from middle to lower income level, the diagnosis of cancer leads to poor financial and economic conditions. It causes financial problems that cancer patients cannot avoid and can cause delays in treatment (Martina et al., 2022; Sakafu et al., 2022).

Socio-cultural factor was the third highest ranking as a discomfort factor (2.06 ± 0.67). Culture considerably influences Indonesian people's participation in therapy and seeking primary healthcare. While there are no statistical data, many people in Indonesia still believe in unproven traditional treatments. This has resulted in the phenomenon of severe cancer patients who undergo treatment late because they prefer alternative treatment instead of modern medicine (Martina et al., 2022; Sakafu et al., 2022). Therefore, health education to follow appropriate therapy is of importance for the Indonesian people.

In contrast, respondents showed higher level of comfort in the psychological-spiritual element (1.84 ± 0.53). The researchers reasoned that it is contributed to Indonesians having a good spirituality and strong belief in religion, with the majority being Muslims (Komariah et al., 2020; Martina et al., 2022). The cancer diagnosis is seen as a form of ordeal

or test from God. This spirituality can be developed further to improve the patient's ability to deal with the illness. Psychological strength and spirituality can make patients live comfortably because they are confident that everything that happens to them is from the will of the Creator. Patients believe if they accept everything sincerely, they will have a better life after their passing (Komariah et al., 2020).

The last discomfort was environmental discomfort (1.78 ± 0.84). This result explains that the quality of health services is good and can make patients comfortable even if they are physically ill. The pandemic situation was expected to lower the level of comfort in relation to the environmental condition as many environmental restrictions were applied to prevent the spread of COVID-19 to the greatest extent. Environmental comfort is very necessary for cancer patients. This environmental comfort can be included in transcendence-type comfort according to Kolcaba's theory (Gonzalez-Baz et al., 2023). Nurses can help increase environmental comfort by providing distraction using virtual reality technology (Gautama et al., 2023).

Univariate Test (Characteristics of Respondents)

The gender was not used as a variable as all the respondents were female. In Indonesia in particular, breast cancer cases in men are rarely found, with no statistical data.

The study shows that most of the respondents are 46–64 years old. The results of this study are similar to Narisuardi and Manuaba (2020), who investigated Sanglah Central General Hospital (RSUP) in Denpasar, Bali, and discovered the highest age proportion of breast cancer survivors is 41–50 years old. According to Laconi et al. (2020) the incidence of most cancers increases with age because of mutations which accumulate in body tissues throughout life, and some of these mutations contribute to cancers.

Furthermore, the majority of the respondents earned higher education, starting from high school until a doctoral degree. Narisuardi and Manuaba (2020) discovered that most breast cancer patients earned a high school degree and a bachelor's degree. The researchers include high school graduates at a higher education level because the data indicate that the majority of Indonesian citizens earned secondary education or high school (Central Bureau of Statistics, 2019). Higher education contributes to proper information receipt and adequate comprehension. Proper education according to educational background is something that nurses need to pay attention to when providing information. The data of this study were in line with Ministry of Health (2019) findings' postulating that women with higher education tend to find the breast cancer earlier because they have better accessibility to cancer screening and diagnosis than other groups (Ministry of Health, 2019).

Most respondents of this study were married. Previous research also shows that the number

of married respondents is greater than single respondents ([Susilowati and Alfiyanti, 2021](#)). Respondents who are married have a partner who might be able to provide comfort. Most of the respondents were unemployed, which aligns with most similar studies in Indonesia. Many married women in Indonesia prefer to not work to better care for their family or quit their job for family-related reasons. It contrasts with the results of studies of women with breast cancer in other countries who showed higher number of working women ([Dumas et al., 2019; Park et al, 2020](#)). The cancer diagnosis also contributed to the number of unemployed women. The reason for being sick with breast cancer is what makes respondents who originally had jobs choose to quit their jobs and focus on the treatment they are undergoing. Treatment-related factors such as mastectomy and the combination of chemotherapy and hormone therapy affected them to leave their work ([Taguchi et al., 2019](#)). Being out of work can be financially uncomfortable. Cancer patients require enormous costs for therapy and daily living expenses. The income generated from work can help in the treatment process for breast cancer patients ([Mudaranthakam et al., 2023](#)).

In addition, the study found that the most common cancer stages suffered by the respondents are stages III–IV. Previous study also discovered that most of the respondents suffer from stage III cancer because of delayed treatment during the pandemic ([Akhtar et al., 2023; Narisuari and Manuaba, 2020](#)). [Kumar and Dey \(2020\)](#) stated other factors that might delay treatment including financial issues, social containment and travel restrictions during the pandemic, imposing difficulties for patients to attend the hospital for treatment. Furthermore, some patients came from rural area for treatment, driving them to look for accommodation and food facilities. Amidst the lockdown, arranging for food and shelter was another big hurdle faced by these patients.

On the other hand, with the increase in surge of COVID-19 patients, hospitals were forced to allocate resources and oncology surgeries to be delayed. In the first half of 2021, due to the rising trend of the COVID-19 pandemic, there had been an acute shortage of ventilators as well as PPE, causing further surgical delays. Also, a shortage of staff members dealing with oncology treatment and intervention led to unwanted delays. Late-stage cancer conditions certainly caused greater discomfort than early stages and the prognosis for the treatment results was certainly worse ([Kumar and Dey, 2020](#)).

Most of the respondents had been diagnosed for less than three years. This shows that the majority of respondents were new cases of breast cancer, in line with the number of new cases of breast cancer which reached 68,858 cases (16.6%) out of a total of 396,914 new cases of cancer in Indonesia ([Globocan, 2020](#)). Baseline Health Research (BHR) data show an increase in cancer prevalence in Indonesia from 1.4% in 2013 to 1.49% in 2018

([Prihantono et al., 2023](#)).

The results also showed that the majority of respondents were undergoing chemotherapy treatment. [Anwar et al. \(2020\)](#) investigated Dr. Sardjito Central General Hospital, Yogyakarta, and indicated that most of the respondents undergo chemotherapy. The use of chemotherapy treatment was covered by national health insurance, resulting in most of the respondents having registered national health insurance, namely BPJS Kesehatan. This finding was in line with reports that cancer was the second-highest disease that costs BPJS Kesehatan after heart disease. BPJS Kesehatan reported that the cost burden caused by cancer in 2018 was IDR 2.7 trillion ([Kusuma and Nodia, 2019](#)). BPJS Kesehatan remained helpful for patients who cannot afford it because it guarantees almost all medical expenses.

Almost all respondents in this study have received social support. This condition is supported by [Aruan and Isfandiari \(2015\)](#), who proved a relationship between social support and motivation to recover from breast cancer, thus, patients are encouraged to get treatment immediately. The strengths of Indonesian culture include supporting sick family members and friends. However, lengthy illness could cause family fatigue. Therefore, nurses also need to pay attention to the comfort of family members in addition to patient comfort.

Bivariate Test (Characteristics and Comfort Variable)

The results showed that there were no significant differences in the variables of age, level of education, marital status, occupation, monthly income, cancer stage, diagnosis duration, health insurance, and social support to gain comfort. In contrast to previous research, social support did not show a relationship as only one respondent did not receive it. This was a limitation of this research. Cancer patients not only struggle with their disease physically and psychologically but also struggle with social restrictions. Patients with lower education levels and income status, retired or unemployed, and/or having larger household sizes experienced more psychosocial burden ([Okyere Asante et al., 2023](#)).

However, there was a significant difference between the variables of treatment and room and the variable of comfort ($p < 0.05$). The highest comfort value was found in chemotherapy treatment and outpatient rooms. These two characteristics were related because chemotherapy is the most widely used outpatient treatment. The results of this study were supported by the literature, which postulated that patients undergoing chemotherapy are considered to have controlled cancer with good performance status thus reducing the costs and limiting the risk of hospital-acquired infections ([Kimura et al., 2016](#)). Such a condition certainly increases the comfort of chemotherapy outpatients.

[Tan et al. \(2016\)](#) reported that outpatients could

significantly adjust their psychological conditions because they received social support from families who live with them. Thus, these outpatients showed a better comfort level than inpatients did. During the COVID-19 pandemic, the Dharmais Cancer Hospital still recommended patients visit the hospital for medical check-ups, especially when they were scheduled to undergo chemotherapy, radiotherapy, or surgery. The Dharmais Cancer Hospital emphasized that delaying cancer treatment would worsen the patient's condition (Dharmais, 2020d). This study discovered that most patients firmly trust the hospital's new policies. Moreover, their anxiety levels decreased because they and the hospital staff wear PPE. They felt comfortable in a more conducive, clean, and tidy room. Such conditions certainly improve the quality of chemotherapy services.

The results of this study were supported by Prajoko and Supit (2020), who investigated at Dr. Kariadi Hospital, Semarang and discovered that, despite changes in hospital and treatment policies, more than half of the respondents still perceived that the quality of general healthcare and chemotherapy services remained consistent or even better during the COVID-19 pandemic. Most patients have continued to do standard chemotherapy since the pandemic. They argued that more PPE worn by hospital staff could further improve the quality of services. Moreover, most patients possessed adequate knowledge and appropriate practices about COVID-19 prevention measures.

On the other hand, most of the inpatients underwent surgery and therapies and showed higher discomfort scores in contrast. Some inpatients might have been newly diagnosed or underwent treatment for the first time. Thus, they experienced physical and mental health crises over understanding gender identity when being diagnosed with breast cancer. The surgical procedures and various treatments, such as radiotherapy and chemotherapy, were perceived as complex and challenging for patients and their families. Such a condition negatively impacted the comfort of inpatients (Gina and Sigiyo, 2019).

This study has limitations in sample size because the data collection was carried out during the COVID-19 pandemic. However, the sample size still meets the minimum requirements. A more comprehensive survey is required to provide accurate statistical data to the number of breast cancer patients and their prevalence to serve as a base to calculating a bigger sample size for studies. As this study simply described how the comfort conditions of breast cancer patients during the COVID-19 pandemic and what factors influence it, future research is required to make a model for proper managerial scheme in ensuring a high level of comfort for breast cancer patients during a pandemic or similar situation.

Conclusions

The characteristics of respondents, such as age, gender, level of education, marital status, occupation, monthly income, cancer stages, duration of diagnosis, health insurance, and social support, are not related to comfort levels. However, the treatment and type of care are related to comfort. Chemotherapy treatment and patients undergoing treatment at outpatient rooms showed greater level of comfort than in other groups.

Patients felt comfortable in a neat, clean, and conducive hospital environment and perceived that implementing health protocols prevented the spread of COVID-19. This study recommends that nursing services optimize all possible aspects of comfort. Nurses could assist patients to relieve the physical symptoms when patients experience physical discomfort. In addition, nurses could work with patients and families to determine patients' comfort during the treatment, especially for those in pre- or post-surgery inpatient rooms. Nurses could conduct activities such as providing moral support, relaxing interventions, facilitating patients to perform religious activities, and creating a calm environment. Interventions that can maintain or improve the comfort aspect will optimize patients' health conditions.

Declaration of Interest

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

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Data Availability

Data is available from breast cancer patients who were undergoing treatment at Dharmais Cancer Hospital and were willing to fill out an informed consent form, and data is stored using the Excel software.

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Factors impacting decreased basic immunization coverage in infants (Risk of dangerous diseases)

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Abstract

Background: The data reveal a consistent decrease in the overall immunization coverage for babies in Kota Pariaman over a span of four years. Specifically, the coverage rates were recorded as 81.8% in 2018, 78.6% in 2019, 55.7% in 2020, and 66.7% in 2021.

Purpose: The aim of this study is to identify the factors that contribute to the decrease in the achievement of complete basic immunization among children in Kota Pariaman.

Methods: The present study used the quantitative research method with a cross-sectional design. The study sample comprised of mothers with infants aged 12 months residing in Pariaman City. A purposive sampling method was employed to choose a total of 154 participants. The research was carried out between March 2022 and October 2022. Univariate analysis describes variable frequency, bivariate examines relationships using chi-square ($p < 0.05$) and multivariate employs logistic regression, identifying influential variables.

Results: Key findings include a lack of knowledge (40.3%), non-supportive attitudes of mothers (56.5%), mistrust by mothers (42.9%), limited access to health resources (52.6%), and inadequate family support (48.1%). There was significant support from healthcare workers (94.2%) and moderate backing from community leaders (56.5%). Significantly, a noteworthy association was observed between knowledge ($p < 0.05$), attitudes ($p < 0.05$), and family support ($p < 0.05$), and the successful attainment of fundamental vaccinations.

Conclusion: Factors leading to the decreased rate of complete basic immunization for infants in Kota Pariaman include attitude, family support, and knowledge. As a remedy, local governments and health workers are urged to proactively provide health education on the significance of full basic immunization for infants. This preventive measure is paramount in safeguarding against severe acute illnesses, benefiting both the child and the broader community.

Keywords: children; complete basic immunization; knowledge; attitude; family support; attendant support

Introduction

Immunization in children is an essential public health strategy to reduce morbidity and mortality in children worldwide. Complete basic immunization plays a crucial role in protecting infants from various dangerous diseases. However, immunization rates have seen a global decline. According to the WHO (2020) 68 countries are facing challenges in providing vaccination services to nearly 80 million infants. Prominent declines have been documented in several regions, including New York, California, Ohio, Virginia, the United Kingdom, and Indonesia (Bamforth, 2020; Bramer, 2020; Fernandez, 2020; Frellick, 2020; Saxena et al., 2020).

Despite the widespread recognition of the advantages associated with immunization, the efficacy of immunization programs can be influenced by several challenges and circumstances. Based on prior research,

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several factors are known to influence incomplete immunization in children." [Noh et al. \(2018\)](#) noted that the coverage of basic immunization in Pakistan remains low. [Balgovind and Mohammadnezhad \(2022\)](#) highlighted that the decision to immunize is a complex process. The perceptions, knowledge, attitudes, and behaviors (KAB) of parents regarding immunization significantly influence this decision. Moreover, healthcare professionals are often considered the most trusted source of immunization information. The utilization of immunization services is influenced by various factors, as demonstrated by the findings of [Kitamura et al. \(2013\)](#). These factors include family occupation, maternal age, and the receipt of vaccination date notices from village officials. [Tsawe et al. \(2015\)](#) conducted a study which revealed that many characteristics, such as the educational level of mothers, their media exposure, and their socioeconomic standing, had an important effect on their use of child and maternal health services.

Numerous scholarly inquiries have been conducted to examine the determinants that impact immunization rates. However, there is a lack of understanding regarding the intricate relationship between all of these variables, especially in relation to the current COVID-19 pandemic, and how they collectively impact vaccination rates within specific areas like Pariaman City. Compounded by the COVID-19 pandemic, the challenges in immunization efforts have become increasingly complex. [Harahap \(2019\)](#) showed that the pandemic disrupted the provision of basic immunization for infants in Pelalawan, Indonesia. Therefore, research focusing on the pandemic's impact on immunization coverage becomes highly relevant.

The objective of this study is to ascertain the determinants contributing to the suboptimal attainment of comprehensive basic immunization among newborns residing in Pariaman City, while taking into account the influence of the ongoing pandemic and other elements previously documented in scholarly investigations. Therefore, it is anticipated that the findings of this research will offer specific suggestions to improve immunization rates in Pariaman City and other areas with comparable obstacles.

Materials and Methods

Design

The present study used a cross-sectional survey design.

Sample and setting

The study focused on a specific sample that met pre-established inclusion and exclusion criteria. Inclusion criteria required participants to demonstrate a willingness to engage, effective communication skills, have children aged 12 months as of July 2022, possess either a Maternal and Child Health book or a recorded immunization status within the community health center's immunization cohort, and cohabitatem with family members (spouse, parent, or in-law). Exclusion criteria were applied to individuals who were absent for three consecutive visits or too preoccupied to participate. Three consecutive absences compromise data consistency, indicate potential lack of participant commitment, and strain research resources. The sampling process was conducted at seven community health centers in Pariaman City. The study included a total sample size of 154 mothers with 12-month-old infants. The study had a total of 253 participants, and the sample size was obtained using the Slovin algorithm with a margin of error of 0.05%..

Data collection

The research was centered on a specific group of participants, namely mothers with children aged 12 months, residing in Pariaman City. The total number of individuals in this community was 253. A total of 154 mothers with infants of identical age were chosen as a representative sample, employing the Slovin formula with a 0.05% margin of error.

The data gathering process utilized a validated and trustworthy questionnaire as the measurement instrument. The assessment of validity was conducted using Pearson correlation. Each variable's validity was confirmed if the calculated Pearson correlation coefficient (r) exceeded the tabulated value of 0.2787. The assessment of reliability was conducted with Cronbach's alpha, where values equal to or greater than 0.6 were indicative of satisfactory dependability.

The process of data analysis encompassed the utilization of univariate, bivariate, and multivariate methodologies.

The researchers used the univariate analysis

| Variabel | Validity | Reliability |
|-----------------------------------|-------------|-------------|
| Knowledge | 0.32-0.647 | 0.694 |
| Attitude | 0.294-0.522 | 0.652 |
| Belief | 0.649-0.857 | 0.780 |
| Affordability of Health Resources | 0.384-0.633 | 0.666 |
| Family Support | 0.374-0.84 | 0.748 |
| Health Worker Support | 0.298-0.691 | 0.698 |
| Community Leaders Support | 0.396-0.906 | 0.774 |

Table 1. Presents A Frequency Distribution of The Predisposing Factors And Characteristics Of The Respondents

| Characteristics of respondents | | F | % |
|--------------------------------|-------------|-----|------|
| Age | < 30 years | 66 | 42.9 |
| | > 30 years | 88 | 57.1 |
| Education | Tall | 59 | 38.3 |
| | Low | 95 | 61.7 |
| Work | Work | 45 | 29.2 |
| | Not Working | 109 | 70.8 |

Table 2. Displays the frequency distribution of predisposing variables, likely factors, and reinforcing factors within the operating region of the Pariaman City Health Center. The sample size for this study is 154.

| Influencing factors | | F | % |
|----------------------|-----------------------------------|---------------|-----|
| Predisposing Factors | Knowledge | Good | 92 |
| | | Less | 62 |
| | Attitude | Favorable | 67 |
| | | Un Favorable | 87 |
| | Belief | Good | 88 |
| | | Less | 66 |
| Possible Factors | Vulnerability of health resources | Affordable | 73 |
| | | Unaffordable | 81 |
| Reinforcing Factors | Family Support | Support | 80 |
| | | Not Supported | 74 |
| | Health Officer Support | Good | 145 |
| | | Less | 9 |
| | Community Leader Support | Support | 87 |
| | | Not Supported | 67 |

method to look at the frequency distribution of each variable being studied.

A bivariate analysis was performed to evaluate the relationship between the independent and dependent variables. The chi-square test was employed with a confidence level of 95% ($\alpha = 0.05$).

Multivariate analysis is a statistical methodology that entails the investigation of three or more variables with the objective of identifying the independent variable that exerts the most significant influence on the dependent variable. Logistic regression was selected as the analytical method in this study because of the categorical character of the variables under investigation.

Study Setting: The investigation was carried out within a sample of seven community health facilities located in Pariaman City.

Study Period: The investigation was carried out for a duration of six months, spanning from March 2022 to October 2022.

Etiological Investigation: The main aim of this study was to identify the factors that influence the attainment of sufficient immunization coverage in children

The statistical analysis employed in this study consisted of bivariate analysis, which encompassed the use of chi-square tests, and multivariate analysis, which involved the application of logistic regression. The application of hypothesis testing was employed in the context of bivariate analysis in order to assess the relationship between independent and dependent variables.

In the context of statistical analysis, the test known as the chi-square test was employed for the purpose of doing bivariate analysis, whilst logistic regression was applied for the purpose of conducting multivariate analysis.

Confidence Level: The study utilized a confidence level of 95% ($\alpha = 0.05$).

Variables

Independent Variables:

a) Maternal Knowledge about Immunization: Knowledge pertains to the depth of comprehension and consciousness regarding the significance of complete basic immunization. This encompasses awareness of the recommended vaccines, their

Table 3. Relationship of Predisposing Factors, Probable Factors and Reinforcing Factors with Complete Basic Immunization

| Variable | Sub Variables | Complete Basic Immunization | | | | Total | P Value | | |
|------------------------|-----------------------------------|-----------------------------|------|------------|------|-------|---------|--|--|
| | | Complete | | Incomplete | | | | | |
| | | f | % | f | % | | | | |
| Contributing variables | Knowledge | | | | | | | | |
| | Good | 33 | 35.9 | 59 | 64.1 | 92 | 100 | | |
| | Less | 8 | 12.9 | 54 | 87.1 | 62 | 100 | | |
| | Attitude | | | | | | | | |
| | Favorable | 34 | 50.7 | 33 | 49.3 | 67 | 100 | | |
| | Unfavorable | 7 | 8 | 80 | 92 | 87 | 100 | | |
| | Belief | | | | | | | | |
| | Good | 27 | 30.7 | 61 | 69.3 | 88 | 100 | | |
| | Less | 14 | 21.2 | 52 | 78.8 | 66 | 100 | | |
| Potential causes | Affordability of health resources | | | | | | | | |
| | Favorable | 25 | 34.2 | 48 | 65.8 | 73 | 100 | | |
| | Unfavorable | 16 | 19.8 | 65 | 80.2 | 81 | 100 | | |
| Strengthening Elements | Family Support | | | | | | | | |
| | Support | 33 | 41.3 | 47 | 58.8 | 80 | 100 | | |
| | Not Supported | 8 | 10.8 | 66 | 89.2 | 74 | 100 | | |
| | Health Officer Support | | | | | | | | |
| | Good | 37 | 25.5 | 108 | 74.5 | 145 | 100 | | |
| | Less | 4 | 44.4 | 5 | 55.6 | 9 | 100 | | |
| | Community Leader Support | | | | | | | | |
| | Support | 27 | 31 | 60 | 69 | 87 | 100 | | |
| | Not Supported | 14 | 20.9 | 53 | 79.1 | 67 | 100 | | |

Table 4. Bivariate Analysis at the time of selection

| Step Selection | Variable | Sig |
|----------------|-----------------------------------|-------|
| | Knowledge | 0.003 |
| | Attitude | 0.000 |
| | Belief | 0.258 |
| | Affordability of health resources | 0.064 |
| | Family support | 0.000 |
| | Health Officer Support | 0.391 |
| | Community Leader Support | 0.220 |

Table 5. Multivariate Test Results with Logistic Regression at Stage one

| Step 1 | Variable | Sig | Exp (B) |
|--------|-----------------------------------|-------|---------|
| | Knowledge | 0.007 | 4.257 |
| | Attitude | 0.000 | 8.635 |
| | Affordability of health resources | 0.098 | 2.271 |
| | Family support | 0.001 | 5.958 |
| | Community Leader Support | 0.945 | 1.035 |

prescribed schedules, and an understanding of the potential advantages and disadvantages associated with immunization. b) Maternal Attitudes toward Immunization: Maternal attitudes toward immunization are influenced by personal experiences, cultural norms, and trust in the healthcare system. The presence of positive attitudes is associated with a higher likelihood of adhering to vaccination schedules, whereas the presence of negative attitudes may lead to hesitancy or rejection, thereby reflecting the emotional and cognitive position of mothers toward vaccines. c) Maternal Beliefs in Immunization: Belief encompasses the personal convictions, faith, or trust that individuals have in the effectiveness and safety of complete basic immunization. It includes cultural or religious beliefs that may influence immunization decisions. d) Affordability of Health Resources: Affordability of health resources pertains to the financial accessibility of immunization services and vaccines. It considers whether individuals can easily access and afford the costs associated with vaccination. e) Family Support: Family support represents the degree to which a person's family members (e.g., parents, spouse, in-laws) encourage and facilitate complete basic immunization. It reflects the presence of a supportive family environment. f) Healthcare Worker Support: Health worker support relates to the role of healthcare professionals (e.g., doctors, nurses) in promoting and providing information on complete basic immunization. It includes the assistance and guidance offered by healthcare workers. g) Community Leader Support: Community leader support refers to the endorsement and advocacy of community leaders (e.g., local authorities, influential figures) for immunization services. Their support can influence community perceptions and decisions.

Dependent Variable:

Fulfillment of Basic Immunization in Infants: The dependent variable measures the extent to which infants receive the recommended vaccines within the established schedule. It reflects the successful completion of basic immunization as per healthcare

guidelines.

Ethical consideration

The present communication originates from the Ethics Committee of RSUP Dr. M. Djamil Padang, bearing the reference number LB.02.02/5.7/272/202.

Instruments

The research instrument underwent rigorous validity and reliability testing procedures. The validation process involved 50 respondents and was conducted at the Sungai Limau Community Health Center in Padang Pariaman Regency, selected for its resemblance to the Pariaman City Community Health Center's working area. Validity was assessed using the Pearson correlation technique, where the criterion for validity was met when the calculated correlation (Pearson's r) exceeded the table correlation value (0.2787). Conversely, if the calculated correlation was below this threshold, it was deemed invalid. Reliability testing was performed using Cronbach's alpha, and variables with a Cronbach's alpha value of ≥ 0.6 were considered reliable. Variables that did not meet this criterion were categorized as unreliable ([Swarjana, 2022](#)). The subsequent section presents the outcomes of the questionnaire's validity and reliability evaluations.

Results

The acquired results are derived from the conducted investigation.

The age of respondents (mothers) ≥ 30 years was 57.1%, 61.7% of respondents had low education and 70.8%. Mother doesn't work.

Univariate Analysis

The research results offer an examination of the elements that contribute to the likelihood of women working in the Pariaman City Health Center, including predisposing, probable, and strengthening factors. These findings are summarized in [Table 2](#).

Factors affecting low coverage of infant complete

Table 6. Multivariate Test Results with Logistic Regression in the Second Stage

| Step 2 | Variable | Sig | Exp (B) |
|--------|-----------------------------------|-------|---------|
| | Knowledge | 0.006 | 4.285 |
| | Attitude | 0.000 | 8.618 |
| | Affordability of health resources | 0.085 | 2.235 |
| | Family support | 0.000 | 5.986 |

Table 7. Multivariate Test Results with linear regression at the final stage

| Step 3 | Variable | Sig | Exp (B) |
|--------|----------------|-------|---------|
| | Knowledge | 0.007 | 4.008 |
| | Attitude | 0.000 | 9.159 |
| | Family Support | 0.001 | 5.606 |

basic immunization: A) Predisposing factors: 40.3% of respondents lack knowledge, 56.5% of respondents' attitudes are not supportive and at 52.6% the respondent's trust is good. B) Possible factor: the affordability of respondents' health resources is unaffordable (42.9%). C) Enhancing factors: A significant proportion of the participants, specifically 48.1%, reported a decrease in familial support. Conversely, a substantial majority of respondents, accounting for 94.2%, reported receiving support from healthcare professionals, while 56.5% reported receiving support from community leaders.

Provision of complete basic immunization to infants

The analysis found that only 26.6% of infants were essentially fully immunized.

Bivariate Analysis

From [Table 3](#), the results of each factor are as follows: a) Predisposition factors: The chi-square test revealed a p-value of 0.003, suggesting a statistically significant association between comprehension and completion of essential immunization in infants.. The chi-square test results indicated a strong correlation between respondents' attitudes and the administration of the full basic immunization to infants, with a value of $p = 0.000$. b) Possible factors: The obtained p-value of 0.064 suggests that there is insufficient evidence to support a significant link between the availability of complete basic immunization and the affordability of health services. c) Reinforcing factors: 1) A noteworthy correlation was seen between the level of family support and the achievement of complete basic immunization. The chi-square test was performed to conduct a statistical analysis, which resulted in a p-value of 0.000. This p-value suggests a strong and significant relationship between the variables under investigation. 2) There was a lack of correlation observed between officer support and the achievement of comprehensive basic immunization with chi-square result p value = 0.391. The cub is complete. 3) There was a lack of correlation observed between the level of assistance from community leaders and the achievement of complete basic immunization, with chi-square test results p = 0.220.

Multivariate Analysis

The analysis used is a logistic regression test, carried out by entering bivariate result data $p < 0.25$ into the modeling; if all variables entered get a value of $p < 0.05$, then it is the latter modeling in multivariate analysis.

From the results of the analysis, the variables of belief support of health workers value is $p > 0.25$ so that the two variables were excluded from the model. The other variable with $p = <0.025$ was followed by multivariate test with logistic regression stage one, as shown in the following table.

From [Table 5](#) showing the multivariate test

results with logistic regression in stage one, it turns out that public figure support cannot be included in the next stage of multivariate analysis, because the p value >0.25 .

The results of the second stage multivariate test in [Table 6](#) show that there is still a variable with a sig result of $p > 0.05$, namely the variable of affordability of health resources with a value of $p = 0.085$ excluded from modeling.

In the final stage of multivariate analysis using logistic regression, significant results were obtained for three variables: knowledge, attitudes, and family support, with p-values less than 0.05. These three factors emerged as the dominant influencers in providing complete basic immunization. Specifically, the results showed that the maternal attitude factor had the most significant impact, with a value of 9.159 times. Following that, the family support factor had an impact of 5.60 times, and the maternal knowledge factor had an impact of 4.008 times.

Discussion

The objective of this study is to gain insight into the obstacles that hinder the achievement of high rates of newborn immunization, as well as to explore strategies to improve immunization rates, reduce the likelihood of severe diseases, and enhance overall infant health outcomes. The findings given in this study are consistent with previous research that has emphasized the need of addressing the several factors that contribute to insufficient coverage of baby immunizations ([Noh et al., 2018](#)). Furthermore, the COVID-19 pandemic has brought attention to the consequences on immunization initiatives, emphasizing the necessity for policies that guarantee the uninterrupted provision of immunization services ([Harahap, 2019](#)). By addressing these factors and conducting ecological analyses, we can better inform targeted interventions to enhance immunization coverage and contribute to better health outcomes for infants ([Devi et al., 2021](#); [Hardiyanti et al., 2023](#); [Susanti, 2019](#)).

The provision of comprehensive basic immunization in babies is primarily influenced by three things. The maternal comprehension of immunization, including its advantages, timetable, and possible adverse reactions, performs a pivotal position in guaranteeing the proper immunization of the infant. Adequate knowledge regarding the advantages of immunization helps mothers comprehend the significance of vaccinating their infants effectively ([Swarjana, 2022](#)). By being aware of the benefits, mothers are more likely to be motivated to take their babies to the immunization site and ensure that they complete the entire immunization schedule. Similarly, understanding the immunization schedule holds great importance for mothers. Knowing the immunization schedule enables mothers to plan the appropriate time and location for their babies to receive vaccinations. Mothers lacking adequate understanding of the

immunization schedule may exhibit suboptimal adherence in terms of timely attendance or complete omission of immunization appointments for their infants. Additionally, it is essential for mothers to be aware of the potential side effects of immunization.

The mother's mindset also plays a significant role in ensuring the proper immunization of her baby. Mothers who hold a positive outlook toward immunization are more inclined to take the initiative to vaccinate their infants (Notoadmodjo & Prasetya, 2019). They view immunization as a crucial and effective method to safeguard their babies from perilous diseases and to prevent the spread of illnesses throughout society. On the contrary, mothers with a negative attitude toward immunization may exhibit hesitation in vaccinating their babies. They might perceive immunization as unnecessary or even risky. These unfavorable attitudes can arise from baseless fears or misinformation concerning immunization (Harahap, 2019; Kartini, 2021).

Some mothers may hold a neutral stance regarding immunizations. Although this attitude is not harmful, they might require more information and comprehension about the advantages of immunization to make well-informed decisions about vaccinating their infants. This underscores the importance of the mother's disposition in facilitating the immunization of infants (Astuti, 2021). Mothers who possess a favorable disposition toward immunization demonstrate increased inclination to vaccinate their infants, whilst those who hold negative or indifferent attitudes may find it advantageous to enhance their comprehension of the advantages associated with immunization (Swarjana, 2022). Therefore, it is imperative for mothers to proactively pursue precise and dependable information on immunizations and to participate in dialogues with their healthcare provider if they possess any apprehensions or inquiries regarding the immunization procedure. Furthermore, the provision of family support plays a crucial role in ensuring the immunization of infants (Harahap, 2019; Kartini, 2021).

The provision of familial assistance plays a crucial role in ensuring the proper immunization of infants. The provision of emotional support by family members, including spouses, parents, or siblings, has the potential to significantly enhance a mother's self-assurance and drive to immunize her infants (Harahap, Suroyo, & Silaen, 2020). This type of assistance offers mothers a feeling of assurance and aid in ensuring the well-being of their infants. In addition, the provision of practical assistance, such as aiding in the organization of immunization appointments or accompanying the mother and infant to the designated immunization facility, can effectively facilitate the timely administration of immunizations to infants. The provision of practical assistance serves to facilitate the prompt immunization of infants, while concurrently addressing maternal apprehensions or uncertainties pertaining to the vaccination procedure.

Families have a key role in offering diverse types of support to mothers, encompassing informational support. By providing precise and dependable information regarding immunization, families may assist them in comprehending the advantages and importance of administering vaccines to their infants. Consequently, this phenomenon serves to enhance the mothers' incentive to ensure their infants' attendance at vaccination facilities and adherence to the full immunization regimen (Saxena et al., 2020). The provision of emotional, practical, and informational support by the family unit serves to enhance the empowerment of mothers, so bolstering their confidence, motivation, and perception of aid in the preservation of their infant's well-being. Therefore, it is vital for mothers to seek support from their families and engage in conversations with them about the advantages and importance of immunization for their babies (Swarjana, 2022).

The study findings reveal a concerning trend where a significant number of babies are not receiving complete basic immunizations. This poses a severe threat to their health, as the absence of complete basic immunizations can lead to potentially grave consequences. Ensuring the comprehensive implementation of fundamental immunization is of paramount significance in safeguarding infants against potentially fatal illnesses, including polio, diphtheria, pertussis, tetanus, hepatitis B, and haemophilus influenza type B (Hib) (Devi, 2021). Choosing not to immunize children raises the risk of contracting preventable, hazardous, and sometimes fatal diseases, such as measles, polio, and diphtheria. This risk extends not only to the unvaccinated child but also to others in their vicinity, including susceptible adults. Consequently, foregoing immunization can result in the dissemination of dangerous and potentially deadly diseases (Astuti, 2021).

Failure to immunize a child by parents or guardians could be viewed as neglecting their responsibility to ensure the child receives sufficient care and protection. If this persists and the child contracts a vaccine-preventable illness, such actions may be regarded as akin to child neglect (Paul et al., 2020). Various reasons may lead parents or guardians to opt against immunization, such as religious convictions or apprehensions about potential side effects. However, as a responsible parent or guardian, it is essential to carefully assess the risks and benefits of not immunizing a child and prioritize providing the utmost care and protection for them.

Conclusion

There are several factors that exert influence on the suboptimal attainment of comprehensive basic immunization among newborns residing under the jurisdiction of the Pariaman City Health Center. These factors include attitudes, familial support, and knowledge. To overcome this problem, it is

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strongly recommended that local governments, especially health workers, actively conduct health education about the importance of complete basic immunization for all babies. This proactive approach serves as an initial preventive measure against severe acute illness, benefiting not only the infant but the entire community in which he or she lives.

Comprehensive efforts are needed to increase public interest in basic infant immunization, including education initiatives, increased access to health facilities, provision of high-quality and safe vaccines, involvement of community leaders in campaigns, and strengthening of vaccine side-effect monitoring systems. With long-lasting results, it is hoped that public interest in basic immunization for infants will increase, thus contributing to the maintenance of public health as a whole.

This research has been conducted to the best of its abilities, but it has identified certain limitations. The obtained results are not entirely flawless as they rely solely on the responses provided by the respondents in the questionnaire. To gain a more comprehensive understanding, it is suggested that qualitative research be undertaken in the future. This qualitative approach will help uncover precise reasons why some mothers may exhibit a lack of interest in bringing their babies for complete basic immunization.

Declaration of Interest

No conflicts of interest were identified in regard to this study.

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Data Availability

All data is available

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Association between women's empowerment and contraceptive failure in Indonesia: 2017 IDHS data analysis

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Abstract

Background: Contraceptive failure has negative consequences, including unwanted pregnancies and abortions, which can cause maternal morbidity and mortality. Contraceptive failure is influenced by individual factors such as the user and the quality of the contraceptive method/device. One of the individual factors is the cultural factor which can be seen from the empowerment of women in improving the quality of health, including the use of contraception. There is no study which has discussed women's empowerment as the determination of contraceptive failure.

Purpose: Therefore, this study aims to analyze the association of women's empowerment in contraception failure in Indonesia.

Methods: The data source used is the results of the 2017 IDHS (Indonesia's Demographic and Health Survey) with the unit of analysis from the period of using contraceptives to women who get pregnant while using contraceptives. The dependent variable is the duration of contraceptive usage. The main independent variable is women's empowerment as measured by four indicators, namely asset ownership in the name of the wife, ability of decision-making in the household, ability to earn cash by working, and attending at least junior high school. Data were analyzed using the survival analysis method.

Results: The results of the analysis show that the four factors of women's empowerment have a significant negative association with contraceptive failure after controlling for socioeconomic, demographic, and environmental factors.

Conclusion: Variables that are positively associated with contraceptive failure are participation in household decisions, education, residence status, and internet usage. Variables that are negatively associated with contraceptive failure are asset ownership, working status, and number of children.

Keywords: contraceptive failure; calendar data; idhs; survival analysis; women's empowerment

Introduction

Singh et al. (2014) explain that as many as 74 million unwanted pregnancies occur every year in developing countries, and 30 percent of the causes are due to failure of contraception in both traditional and modern devices/methods, including those related to contraceptive methods/devices (effectiveness) and contraceptive usage (incorrect or inconsistent use). Unwanted pregnancies can have negative consequences, namely the birth of unwanted children or the practice of abortion, which will increase maternal and infant mortality rates (Trussell, 2009). Unwanted births affect the quality of the mother and child in the future.

From 2012 to 2017, the unwanted birth rate in Indonesia increased from 13.6 percent to 15.2 percent (BKKBN, 2017). Some of these unwanted births are entirely undesired by the parents, and the figures remained relatively constant from 2012 to 2017. Around 7 out of 100 births are completely unwanted, as shown in Figure 1. The slight decreasing trend shows the improvement in the quality of health.

Data on abortion from Utomo's latest study in 2000 suggest there were

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37 abortions for every 1,000 women who became pregnant at the age of 15-49 ([Guttmacher Institute, 2008](#)). In the report of the Indonesian Family Planning Association, there were 32,729 women in the 2010-2014 period who received safe abortion services at 13 PKBI clinics spread across Indonesia. The majority of this figure consisted of married women (83.4%), with 2.1 percent being previously married, while 16.5 percent were unmarried women. In order to prevent negative consequences, it is imperative to improve the involvement of women in accessing appropriate healthcare services ([Singh et al., 2019](#)).

Increasing the role of women is in line with goal number five of the Sustainable Development Goals (SDGs), which is achieving gender prosperity and empowering women; therefore, it is an issue that we should take into account in formulating women's quality of life. Women's empowerment is also recognized as a necessary element so that couples can access reproductive health services, including family planning to improve maternal and child health ([Medel-anonuevo, 1997](#)).

Indonesia's Gender Development Index (GDI) data show nearly a decade-long increase, namely 90.07 percent in 2012 and 91.27 percent in 2021. Meanwhile, Indonesia's Global Gender Inequality Index (GII) data have also increased from 2006 (0.654) up to 2021 (0.688) by 0.034 points. This indicates that gender development in Indonesia has increased, but has not necessarily reduced the gender gap that has occurred in Indonesia.

The contraceptive failure rate in Indonesia (within 12 months of use) shown a downward trend in the 1991-2012 period, but in 2017 there was slight increase of around 0.1 point compared to the previous period of the Indonesia's Demographic and Health Survey (IDHS). The number in 2017 seems small, but considering the negative consequences discussed earlier, even a small increase deserves attention.

The 2017 IDHS report does not specifically discuss contraceptive failure rates and only lists

contraceptive failure as one of the reasons for discontinuing contraceptive usage based on the contraceptive method/device. The report also discusses women's empowerment but not the association with contraceptive failure.

Utilization of IDHS calendar data is not only able to see the total discontinuation of contraception, but it is also important to look at each of the reasons for discontinuing contraception, including contraceptive failure. Contraceptive failure is the only reason for involuntary discontinuation of contraception. This makes the user exposed to negative consequences unnoticed.

Research on the determinants of contraceptive failure using IDHS data is rarely conducted ([Arifin, 2003](#); [Bradley, 2009, 2016a, 2019](#); [Curtis & Blanc, 1997](#); [Polis, 2016a, 2016b](#); [Rahmatiqa, 2016](#)). However, no research has discussed women's empowerment as a determinant of contraceptive failure. Research on the use of contraception in Indonesia generally focuses on the effectiveness of the method/device ([Nurullah, 2021](#); [Putri & Oktaria, 2016](#); [Yenie, 2017](#)), quality of family planning facilities ([Mulyaningsih & Sariyati, 2014](#); [Rahardja, 2011](#)) as well as those related to the behavior of using other contraceptive methods ([Indahwati et al., 2017](#); [Samosir et al., 2019, 2020](#); [Septalia & Puspitasari, 2017](#); [Suwardika, 2016](#); [Utami et al., 2020](#)). This issue makes it is important to study the relationship between women's empowerment in terms of socioeconomic, demographic, and environmental factors

Theoretical Review

Determinant Theory Regarding Contraception

[Easterline \(1975\)](#) created a synthetic framework between both child supply and demand together influencing the motivation of fertility regulation. In this, married couples are confronted with a significant issue in the future due to surplus supply of children compared to the demand for them, resulting in the potential occurrence of unwanted

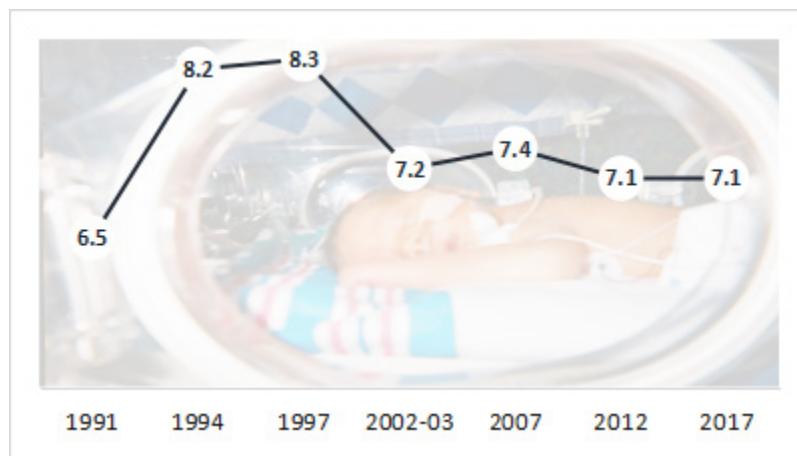
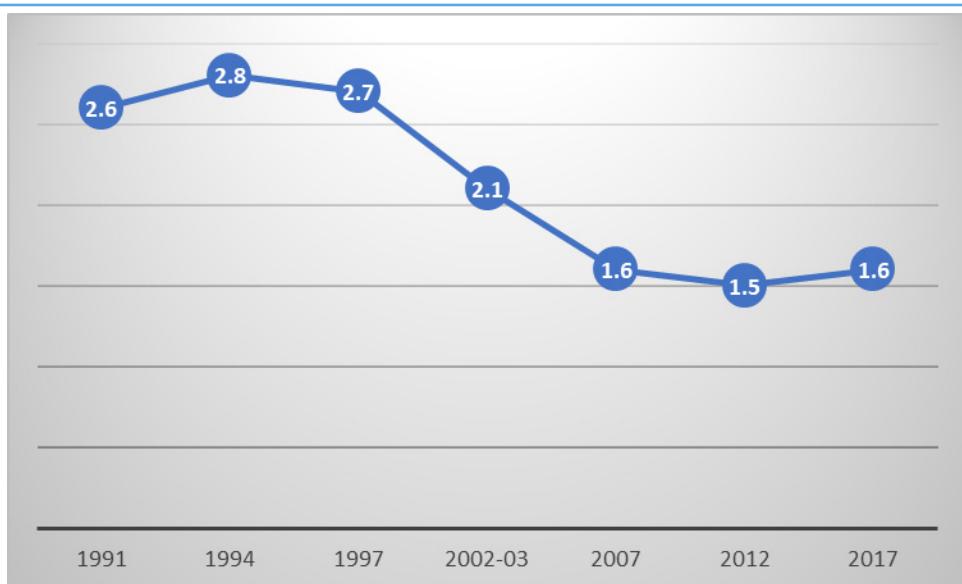


Figure 1. Percentage of Totally Unwanted Births in Indonesia, 1991-2017
Source: IDHS 1991-2017, reprocessed

**Figure 2. Failure Rate of Contraception Use for 12 Months in Indonesia, 1991-2017**

Source: IDHS 1991-2017, reprocessed

children. This motivates married couples to arrange the pregnancies. The motivation to control fertility is influenced by psychological costs, which entails dissatisfaction with ideas or practices in fertility management, and market costs, which are the costs of accessing contraceptive methods. Socioeconomic, demographic and environmental factors influence motivation through supply and demand of children.

[Bulatao \(1984\)](#) established a conceptual framework that describes the combination of key elements and policy levers to reduce fertility. Three types of fertility behavior directly affect fertility outcomes, namely timing of marriage, duration of breastfeeding, and contraceptive and abortion practices. These behaviors can also affect directly through regulations and programs, including family planning programs. In addition, these behaviors can also indirectly influence through development policies and programs that change the socioeconomic characteristics of households. Therefore, the tendencies and decisions of each household member depend on each of these types of behavior.

[Bulatao and Lee \(1983\)](#) conceptualized all the determinants of the behavior of using contraceptives seen from the demand and supply of children with the factors that influence them. Cultural, anthropological, religious, institutional, economic, and gender factors are seen from the perspective of social institutions, cultural norms, economy, and environmental conditions; family structure, kinship, and intergenerational relations; socioeconomic characteristics; and reproductive history, namely marriage and childbirth experience. These will all affect demand for children, supply for children, and costs related to fertility regulation. Contraceptive failure, i.e. getting pregnant while

using contraception occurs at the contraceptive usage stage. Factors that influence indirectly are the individual and social background of women and those that directly influence are the demand for children and the availability of children as well as the costs or efforts related to fertility. Contraceptive failure then affects the number of live births that will become a woman's birth experience.

[Bertrand et al. \(1996\)](#) stated that the demand for family planning was influenced by when a person enters childbearing age, the age of first marriage, fertility and all factors from users/acceptors. Family planning is also influenced by the provider, namely the quantity and quality as well as the acceptability of family planning services. Some of these factors will eventually reduce the number of births so that small quality families will be formed.

Health Behavior Theory

According to [Karr's \(1983\)](#) theory as cited in [Notoatmodjo \(2007\)](#), there are five determinants of health behavior, namely the existence of a person's intention to take action related to health or healthcare (behavior intention); existence of social support from the surrounding community (social support); availability or absence of information about medical treatment or medical facilities (accessibility of information); individual autonomy in making decisions or actions (personal autonomy); and situations that contribute to action or non-action (action situation).

Personal autonomy includes women in decisions regarding health, especially the use of contraceptives.

Women's Empowerment

Women's empowerment according to [UNESCO \(1995\)](#) can be defined as the ability of women to

Table 1. Variables used in research

| Variable | Symbol | Description |
|----------------------------|---------|---|
| Episode Length Before Fail | Conlghc | Length of use of contraception until stopping due to pregnancy while using/failure (in months) |
| Women's Empowerment Index | Iwe | Women's Empowerment Index from 4 dimensions: ownership of property in the name of the wife, self-participation in all decisions in the household, paid working status, minimum education equivalent to junior high school (0=low; 1=middle; 2=high) |
| Asset | Asset | Property in the name of the respondent (0=no;1=yes) |
| Decision | Dec | Participation in decision-making index calculated from self-decision making for all decisions on women's health, spending, physical mobility/visitation (0= weak; 1= strong) |
| Work | Work | Working status of women (0=not working and work is not paid with cash; 1=work and paid with cash) |
| Education | Educ | Last education level (0=have no education and elementary school; 1=junior high school and above) |
| Age | Age | Age of woman at onset of episode in years (0<25; 1=25-34; 2=>35) |
| Territory Status | Urban | Residential area status (0=rural; 1=urban) |
| Number of children | Parity | Number of children alive at the start of the episode (0=0; 1=1-2; 2=3+) |
| Method | Method | Type of contraception used in the episode (0=traditional; 1=pill; 2=IUD & implant; 3=injection; 4=condom) |
| Reason | Intent | Reasons for using contraception in the episode (0=spacing ; 1=limiting) |
| Internet | Net | Internet usage (0=never; 1=never) |
| Economy | Well | Economic Status (0=low; 1=medium; 2=high) |

gain power in managing all activities and decisions in all aspects of their lives. The United Nations Development Fund for Women (UNIFEM) defines women's empowerment as meaning that women have meaningful access and control in earning a sustainable and long-term livelihood, and are able to receive material reciprocity from this access and control.

The concept of women's empowerment, according to [Kabeer \(1999\)](#), consists of three dimensions, namely resources, i.e. the pre-conditions that affect a woman's ability to determine her life goals and act independently to achieve these goals. These initial conditions include women's employment status, education level, property status and social norms; Agency or autonomy is the ability of women to set goals in their lives and act independently to achieve these goals. In this dimension, there is a process of how women make decisions that have been considered and chosen; achievements are conditions that are the outcome of all of these processes, namely conditions where women are empowered, such as how to increase women's labor force participation, how to increase women's political participation, etc.

[Karp et al. \(2020\)](#) conceptualized the measurement of women's empowerment in women's health and reproduction. They examined how women and girls deal with external pressure or rewards to exercise and meet their reproductive needs. The proposed conceptual framework takes

the basis of the empowerment framework from the World Bank and considers that empowerment involves developing from using exercise of choice to achieve achievement of choice. The structure of resources and opportunities are the factors behind the emergence of existing choices, exercise of choice, and choice of goals to be addressed (achievement of choice). Teenagers will usually use existing options, and then, as they get older, women will practice self-efficacy, will negotiate and then make decisions. Agency influences this practice and leads women to their goal of doing something of their own choosing.

From several empirical reviews of women's empowerment, researchers combined previously used variables that had proven to have a significant effect. Therefore, the factor of women's empowerment is taken from four dimensions by looking at the variables of property ownership in the name of the wife, the wife's autonomous participation in household decisions, a school diploma of minimum junior high school level, employment/working status in the last 12 months and being paid with cash.

Materials and Methods

Design and participants

The type of data used in answering the research questions is cross-sectional in nature, originating from the 2017 IDHS.

Samples

The 2017 IDHS data were chosen because IDHS has complete contraceptive usage history data in the contraceptive calendar data. The units of analysis of the study are episodes or segments of contraception use by all women in the age group 15-49 years. One episode is a period of continuous use of one type of contraceptive device or method. The number of episodes found was 25,930 episodes of contraceptive usage from 17,784 women aged 15-49 years.

Data Analysis

The discussion of this research will begin with an overview of the data that have been obtained, then it will discuss the estimated duration of using contraceptives until it stops due to pregnancy (failure). This study will also discuss the formation of the women's empowerment index using the principal component analysis (PCA) method.

This study contains temporal information with events being an important assumption on the dependent variable in the analysis of survival rates. This is in line with the purpose of this study which wants to see the risk of contraceptive failure; therefore, the analysis used in this research is survival analysis. In this case the data used are incomplete data, that is, not all observation units are observed to have failed at the end of the study period. Then with the type III censorship method, the period in when the respondent used contraception was started. The measurement scale is in months and failure occurs when a woman becomes pregnant while using contraception.

A parametric approach is used in the survival analysis of this study because the number of analysis units in the observation period is relatively large. After the distribution of lifetime data is tested with AIC values, wherein the model with the smallest AIC is considered the best model, these data will be modeled with the Gompertz Proportional Hazard Model.

Two Gompertz Proportional Hazard models are used. The first uses all independent variables except for the women's empowerment index variable. The second model uses the women's empowerment index without its constituent components. Both models are controlled for socioeconomic, demographic, and environmental factors.

Results

Gompertz Proportional Hazard Model 1

$$h(t, x) = \exp(yt) \exp(\beta_0 + \beta_1 asset + \beta_2 dec + \beta_3 work + \beta_4 educ + \beta_5 ages_1 + \beta_6 ages_2 + \beta_7 urban + \beta_8 parity_1 + \beta_9 parity_2 + \beta_{10} method_1 + \beta_{11} method_2 + \beta_{12} method_3 + \beta_{13} intent + \beta_{14} inet + \beta_{15} wel) \quad (1)$$

Gompertz Proportional Hazard Model 2

$$h(t, x) = \exp(yt) \exp(\beta_0 + \beta_1 iwe + \beta_2 ages_1 + \beta_3 ages_2 + \beta_4 urban + \beta_5 parity_1 + \beta_6 parity_2 + \beta_7 method_1 + \beta_8 method_2 + \beta_9 method_3 + \beta_{10} intent + \beta_{11} inet + \beta_{12} wel)$$

Sample Overview

Contraceptive usage by women of childbearing age shows differences in asset ownership, participation in household decisions, education, age group, status of residence, number of children born alive at the end of the episode, method of contraceptive usage, reasons for using contraception, internet usage, and wealth index. Of all the analysis units, the segment that uses contraception most is women that do not independently participate in all household decisions, amounting to 94.5 percent.

[Figure 3](#) shows the percentage and the duration of failed contraceptive usage. The contraceptive usage segment that stopped due to pregnancy was 3.15 percent, which means that this segment experienced contraceptive failure. The rest, amounting to 96.85 percent of contraceptive usage, did not stop or stopped for reasons other than pregnancy. The figure also shows that the longer the use of contraception, the fewer contraceptive failures occurred. The graph shows a fairly flat shape in the first year of contraceptive usage, which means that contraceptive failure often occurs during short durations of use.

Patterns and Differences of Contraceptive Failure

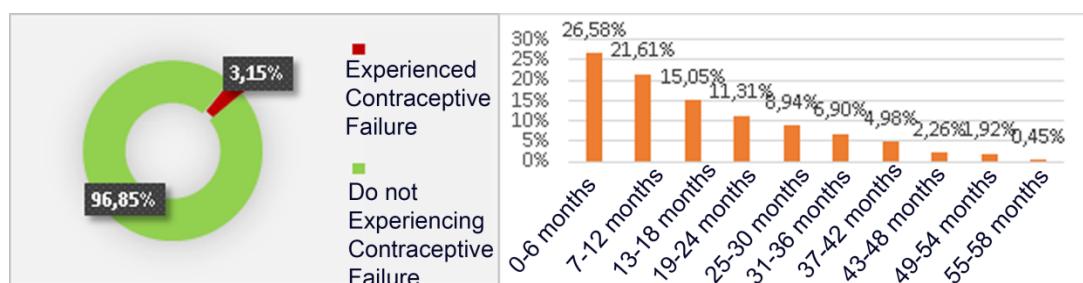
[Table 3](#) shows the percentage of contraceptive failure according to the women's empowerment factor. It can be seen that the highest percentage of contraceptive failure occurred among women who participated in household decisions themselves (3.5%), while the lowest was among women who did not attend school or attended school with an elementary school graduation/equivalent (2.2%). After being tested by Pearson correlation and likelihood-ratio, a significant difference is seen with a confidence level of 90 percent for asset ownership and above 99 percent for education, while the others are not significantly different.

The category that has the highest failure rate for each variable in [Table 4](#) is the segment aged 25-34 years (3.9%), living in urban areas (3.7%), having 0 children (4.3%), traditional contraception method (10.5%), reasons of using contraception for spacing (3.4%), ever used the internet (3.8%), and with a high wealth index (3.6%). Pearson correlation and likelihood-ratio testings show the variables that were significantly different with a 99 percent confidence level were age group, residence status,

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Table 2. Characteristics of the Sample According to Socioeconomic, Demographic, and Environmental Factors

| | Characteristics | Amount | % |
|--|--|--------|------|
| Ownership of assets in the name of the wife | Do not own | 22989 | 88.7 |
| | Own | 2,940 | 11.3 |
| Participation in household decisions | Not independently | 24,499 | 94.5 |
| | Autonomously | 1,431 | 5.5 |
| Working Status | Not working and working but paid not in cash | 14,093 | 54.3 |
| | Working and get paid in cash | 11,837 | 45.7 |
| Education | <Junior High School | 7,410 | 28.6 |
| | Junior High School minimum | 18,520 | 71.4 |
| Reasons for using contraception | Spacing | 15,354 | 59.2 |
| | limit | 10,576 | 40.8 |
| Age group | 15-24 | 6,837 | 26.4 |
| | 25-34 | 11,435 | 44.1 |
| | 35+ | 7,658 | 29.5 |
| Status of residence | Rural | 13,496 | 52 |
| | Urban | 12,434 | 48 |
| The amount of live born baby (ALH) at the end of the episode | 0 children | 1,018 | 3.9 |
| | 1-2 children | 18,396 | 70.9 |
| | 3+ kids | 6,516 | 25.1 |
| Methods of use of contraception | Traditional | 2,476 | 9.6 |
| | Pills | 6,056 | 23.4 |
| | IUDs & Implants | 3,178 | 12.3 |
| | Inject | 13,122 | 50.6 |
| | Male condom | 1,088 | 4.2 |
| Reasons for using contraception | Spacing | 15,354 | 59.2 |
| | limit | 10,576 | 40.8 |
| Internet usage | Never | 14,276 | 55.1 |
| | At least once | 11,647 | 44.9 |
| Wealth index | Low | 9,788 | 37.7 |
| | Intermediate | 5,632 | 21.7 |
| | High | 10,510 | 40.5 |

**Figure 3. Percentage of Samples Experiencing Contraceptive Failure and Distribution of Duration of Use of Certain Contraceptives in Women Experiencing Failure**

Source: IDHS 2017, reprocessed

Table 3 Contraception Failure according to Women's Empowerment Factors and Socioeconomic, Demographic, and Environmental Factors

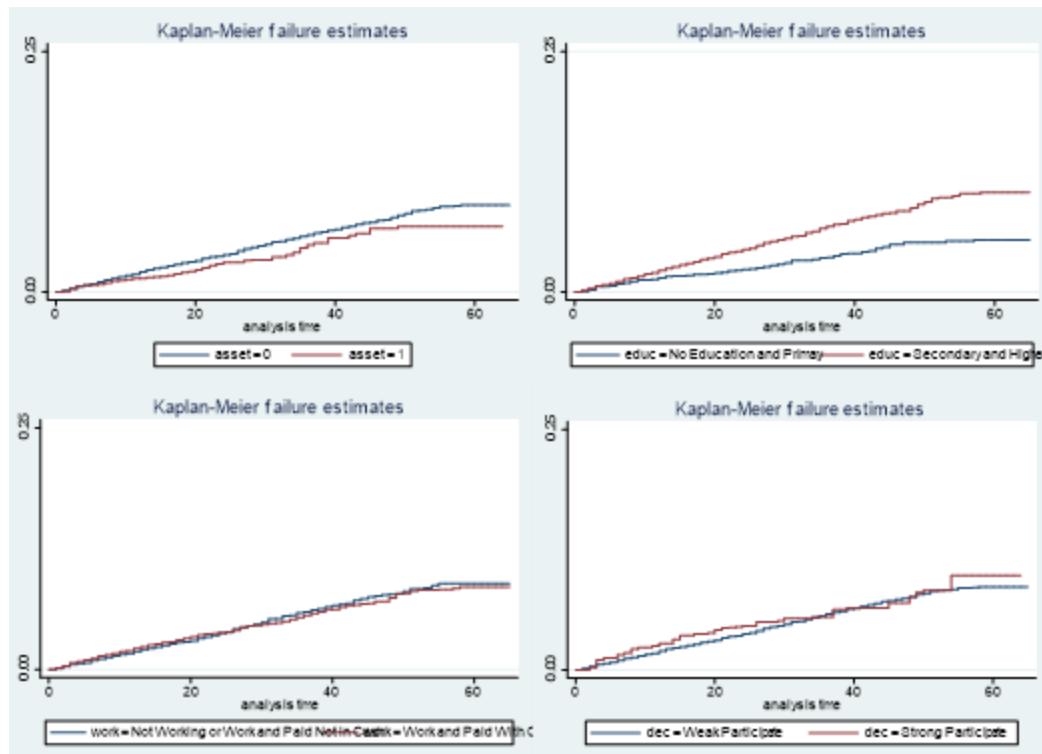
| Characteristics | Contraceptive Failure (%) | | Total | P-values | |
|---|---------------------------|------|--------|----------|--------|
| | No | Yes | Amount | % | |
| Asset ownership | | | | | |
| Does not own property in the name of the wife | 96.8 | 3.2 | 22,989 | 100 | 0.077 |
| Owns property in the name of the wife | 97.4 | 2.6 | 2,940 | 100 | |
| Participation in household decisions | | | | | |
| Does not participate independently in household decisions | 96.9 | 3.1 | 24,499 | 100 | 0.364 |
| Participates independently in household decisions | 96.5 | 3.5 | 1,431 | 100 | |
| Working Status | | | | | |
| Not working and working but paid not in cash | 96.9 | 3.1 | 14,093 | 100 | 0.69 |
| Working and get paid in cash | 96.8 | 3.2 | 11,837 | 100 | |
| Education | | | | | |
| Not attending school & attending school with primary school graduation/equivalent | 97.8 | 2.2 | 7,410 | 100 | 0.000 |
| Go to school with a minimum graduate of junior high school/equivalent | 96.5 | 3.5 | 18,520 | 100 | |
| Women's Empowerment Index | | | | | |
| Low | 96.9 | 3.1 | 12,080 | 100 | 0.338 |
| Intermediate | 96.7 | 3.3 | 11,681 | 100 | |
| High | 97.3 | 2.7 | 2,170 | 100 | |
| Age group | | | | | |
| 15-24 years | 96.9 | 3.1 | 6,837 | 100 | 0.000 |
| 25-34 years | 96.1 | 3.9 | 11,435 | 100 | |
| 35+ years | 97.8 | 2.2 | 7,658 | 100 | |
| Status of residence | | | | | |
| Rural | 97.3 | 2.7 | 13,496 | 100 | 0.000 |
| Urban | 96.3 | 3.7 | 12,434 | 100 | |
| The amount of ALH at the end of the episode | | | | | |
| 0 children | 95.7 | 4.3 | 1.018 | 100 | 0.085 |
| 1-2 children | 96.9 | 3.1 | 18,396 | 100 | |
| 3+ kids | 97 | 3 | 6,516 | 100 | |
| Methods of use of contraception | | | | | |
| Traditional | 89.5 | 10.5 | 2,476 | 100 | 0.000 |
| Pills | 94.8 | 5.2 | 6,056 | 100 | |
| IUDs & Implants | 99 | 1 | 3,178 | 100 | |
| Inject | 98.8 | 1.2 | 13,122 | 100 | |
| Male condom | 94.9 | 5.1 | 1,088 | 100 | |
| Reasons for using contraception | | | | | |
| Spacing | 96.6 | 3.4 | 15,354 | 100 | 0.0122 |
| limiting | 97.2 | 2.8 | 10,576 | 100 | |

Ginoga, S.Z., et al. (2024)

Cont. Table 3 Contraception Failure according to Women's Empowerment Factors and Socioeconomic, Demographic, and Environmental Factors

| Characteristics | Contraceptive Failure (%) | | Total | P-values | |
|-----------------------|---------------------------|-----|--------|----------|-------|
| | No | Yes | | | |
| Internet usage | | | | | |
| Never | 97.4 | 2.6 | 14,276 | 100 | 0.000 |
| At least once | 96.2 | 3.8 | 11,647 | 100 | |
| Wealth index | | | | | |
| Low | 97.1 | 2.9 | 9,788 | 100 | 0.000 |
| Intermediate | 97.3 | 2.7 | 5,632 | 100 | |
| Hlgh | 96.4 | 3.6 | 10510 | 100 | |

Source: IDHS 2017, reprocessed

**Figure 4. Differences in Contraceptive Failure Hazard Functions According to Women's Empowerment Factors**
Source: IDHS 2017, reprocessed

method of contraceptive usage, internet usage, and wealth index. The reason for using contraception has a 95 percent confidence level, while the number of children has a 90 percent confidence level.

Analysis of the hazard function in this study used the Kaplan-Meier analysis method which is illustrated in graphical form as above. In Figure 4, it can be seen that, at the beginning of the observation, the hazard rates of these two groups did not have a significant difference. However, over time, the hazard rate in each category looks different.

Variables that appear to have very different hazard rates between categories as time goes on are asset ownership and educational status variables.

The Relationship between Women's Empowerment, Socioeconomic, Demographics, and the Environment with Contraceptive Failure

Simultaneous test results show a significance value of 0.0011, which is smaller than , namely 0.05 (Prob > chi2 = 0.0011) which means rejecting H0. The

Table 4. Estimating Parameters and Hazard Ratio for Contraceptive Failure in Indonesia

| -t | Model 1 | | | Model 2 | | |
|---|--------------|------------|---------------|--------------|------------|---------------|
| | hazard Ratio | std. Error | 95% Conf. Int | hazard Ratio | std. Error | 95% Conf. Int |
| Women's Empowerment Index | | | | | | |
| Low (Ref) | | | | | | |
| Intermediate | | | | 0.889* | 0.066 | 0.769,1.029 |
| High | | | | 0.757** | 0.109 | 0.571,1.005 |
| Asset ownership | | | | | | |
| Does not own property in the name of the wife(Ref) | | | | | | |
| Owns property in the name of the wife | 0.799** | 0.097 | 0.630,1.014 | | | |
| Participation in household decisions | | | | | | |
| Does not participate independently in household decisions(Ref) | | | | | | |
| Participates independently in household decisions | 1.270* | 0.185 | 0.954,1.690 | | | |
| Working Status | | | | | | |
| Not working and working but paid not in cash(Ref) | | | | | | |
| Working and get paid in cash | 0.868*** | 0.063 | 0.753,0.999 | | | |
| Education | | | | | | |
| Not attending school & attending school with primary school graduation/equivalent (Ref) | | | | | | |
| Go to school with a minimum graduate of junior high school/ equivalent | 1.325**** | 0.130 | 1,092,1,606 | | | |
| Age group | | | | | | |
| 15-24 (Refs) | | | | | | |
| 25-34 | 1.176** | 0.111 | 0.111 | 0.977,1.415 | 1.161* | 0.109 |
| 35+ | 0.609**** | 0.078 | 0.078 | 0.474,0.782 | 0.587**** | 0.075 |
| Status of residence | | | | | | |
| Rural (Ref) | | | | | | |
| Urban | 1.115 | 0.088 | 0.088 | 0.955,1.300 | 1.130* | 0.089 |
| The amount of ALH at the end of the episode | | | | | | |
| 0 children (Ref) | | | | | | |
| 1-2 children | 0.476**** | 0.079 | 0.079 | 0.344,0.659 | 0.481**** | 0.079 |
| 3+ kids | 0.551**** | 0.104 | 0.104 | 0.380,0.799 | 0.549**** | 0.104 |
| Methods of use of contraception | | | | | | |
| Traditional (Ref) | | | | | | |
| Pills | 0.658**** | 0.057 | 0.057 | 0.556,0.779 | 0.645**** | 0.055 |
| IUDs & Implants | 0.077**** | 0.015 | 0.015 | 0.053,0.111 | 0.076**** | 0.014 |
| Inject | 0.109**** | 0.114 | 0.114 | 0.088,0.134 | 0.106**** | 0.011 |
| Male condom | 0.511**** | 0.076 | 0.076 | 0.381,0.683 | 0.510**** | 0.076 |

Cont. Table 4. Estimating Parameters and Hazard Ratio for Contraceptive Failure in Indonesia

| t | Model 1 | | | Model 2 | | |
|---------------------------------|--------------|------------|---------------|--------------|------------|---------------|
| | hazard Ratio | std. Error | 95% Conf. Int | hazard Ratio | std. Error | 95% Conf. Int |
| Reasons for using contraception | | | | | | |
| Spacing (Ref) | | | | | | |
| limiting | 0.921 | 0.075 | 0.786,1.079 | 0.926 | 0.343 | 0.790,1.085 |
| Internet usage | | | | | | |
| Never (Ref) | | | | | | |
| At least once | 1.206*** | 0.105 | 1.016,1.431 | 1.282**** | 0.109 | 1.083,1.516 |

Source: IDHS 2017, reprocessed

conclusion is that there is at least one independent variable that affects the duration of contraceptive usage until stopping using it due to pregnancy, or in other words experiencing contraceptive failure. Then a partial test was carried out to see which variables had a significant effect on contraceptive failure. The test results can be seen in [Table 4](#).

The results of the Gompertz parameter estimation in [Table 3](#) show that the variable age group, number of children, contraceptive methods, internet usage, and the wealth index significantly influence contraceptive failure at the 99 percent, 95 percent, 90 percent and 85 percent confidence levels in both models. The women's empowerment factors in the first model are all significant, namely education at alpha 1 percent, working status at alpha 5 percent, asset ownership at alpha 10 percent, and participation in household decisions at alpha 15 percent. Meanwhile, the women's empowerment index variable is significant at the 85 percent confidence level for the medium empowerment index and for the high empowerment index at the 90 percent confidence level.

The urban status variable becomes significant with an alpha of 15 percent in the second model, which was not significant in the first model. On the other hand, the high wealth index is significant in the second model, where in the first model it is significant at the 85 percent confidence level. The reason for using contraception was not significant in either model. The baseline hazard value of the Gompertz model can be interpreted using the Gompertz parameter value in [Table 4](#), namely the gamma value. The value of in the table is equal to 0.0025, then the hazard of contraceptive failure will increase exponentially from time to time. [Table 4](#) contains the Gompertz model coefficients shown based on the hazard ratio (HR) value. HR in this study is the relative likelihood of someone experiencing contraceptive failure compared to the reference category.

Discussion

Overall, by looking at the women's empowerment index, it appears that women's empowerment has a negative relationship with contraceptive failure:

women's empowerment will reduce the risk of contraceptive failure. This is consistent with the research hypothesis that women's empowerment will have a negative relation with contraceptive failure. Empowered women will tend to choose smaller family sizes ([Bongaarts, 2003](#)), so they will be more careful in using contraception and avoiding discontinuation, especially that causing failure ([Singh et al., 2019; Tadesse et al., 2013](#)).

Women who own a house in their own name have a small risk of experiencing contraceptive failure. Women who own or control assets are in a better position to improve their lives and survive a crisis ([Singh et al., 2019](#)). Women who work and are paid with cash have a smaller risk of experiencing contraception failure compared to women who do not work and women who work but are not paid in cash. This research is in line with [Bradley \(2009\)](#) who found that working women had a significantly lower tendency to fail than non-working women.

Women who make all decisions independently in matters of health, household expenses, and family visits have a higher risk than those who do not make all decisions independently. This is possible because these women will have more confidence in themselves to make decisions including regarding the use of contraception. [Jejeebhoy \(1999\)](#) states that women's autonomy gives women the right to control and make decisions about her life, regardless of the opinion of her partner or pressure from others ([All, 2016](#)). Women with at least junior high school education have a tendency to fail compared to women who do not attend school or whose education level is less than junior high school. This research is in line with [Arifin's \(2003\)](#) research which found that education had a positive relationship with contraceptive failure. [Bairagi and Rahman \(1996\)](#) found a positive association of education with contraceptive failure, and even though only on other methods. According to [Bongaarts and Potter \(1983\)](#), health and nutritional status are several determinants of fertility. Educated users can have better health and nutritional status. Therefore, they may be more fertile, and, in turn, have a higher risk of failure. In addition, women with extensive knowledge will provide reporting on contraception that is more comprehensive and on target in survey interviews

so that the incidence of contraceptive failure can be recorded properly. Contrary to this study, [Bonnet \(2021\)](#) found that contraception failure will increase along with lower education level.

Women at the peak of childbearing age (25-34 years) are more at risk of failure due to the natural biological factors of these women. For women who are more mature (35+ years), besides biological reasons, there are also experience reasons that make these women more careful in using contraceptives thereby reducing the risk of contraceptive failure. This finding is consistent with previous studies which found that, as age increases, the contraceptive failure rate also decreases ([Arifin, 2003](#); [Bairagi & Rahman, 1996](#); [Mulyaningsih & Sariyati, 2014](#)).

Women who live in urban areas are more at risk of experiencing contraceptive failure than those in rural areas. This is in line with research from [Moreno \(1993\)](#) but different from [Arifin's \(2003\)](#) research which states that women who live in urban areas have a smaller possibility of experiencing contraceptive failure compared to those who live in rural areas.

Women who already have between one and two or more than three children, are less at risk of experiencing contraceptive failure compared to women who have not had any children at all. This is in accordance with [Bairagi \(1996\)](#), [Kost \(2008\)](#), [Polis \(2016a\)](#), and [Sundaram \(2017\)](#), whereas research from [Bonnet \(2021\)](#), explains that women with two or more children have a high chance of failing. Then there is the mediating opinion that women not having children or having too many children will tend to experience contraceptive failure compared to other women ([Curtis & Blanc, 1997](#)).

The traditional method, namely periodic abstinence and interruption of intercourse, is the method with the greatest risk because the determining factor for the success of the method is only from one party, that is the user. Meanwhile, modern methods rely on other factors, namely the efficacy of these contraceptives. The most effective modern contraception is the long-term contraceptive method (MKJP), namely the IUD and implants. This research is in line with previous studies which prove that the traditional method is the method with the highest failure rate ([Arifin, 2003](#); [Bairagi & Rahman, 1996](#); [Bonnet et al., 2021](#); [Curtis & Blanc, 1997](#); [Jones & Forrest, 1992](#); [Kost et al., 2008](#); [Moreno, 1993](#); [Polis et al., 2016a](#); [Rahmatiqa et al., 2016](#); [Sundaram et al., 2017](#)). Contraceptive failure rates are high with condoms compared to other modern methods of contraception and injections and IUDs have low contraceptive failure rates ([Arifin, 2003](#); [Curtis & Blanc, 1997](#); [Moreno, 1993](#); [Polis et al., 2016b](#), [2016a](#)). Implants and IUDs are the most effective methods among other modern contraceptive methods ([Rahmatiqa et al., 2016](#)).

Women who use the internet are more likely to experience contraceptive failure than women who do not use the internet. This is because the

information that women receive through the internet is very diverse. Women can also access health and nutrition information along with fertility, which can lead to increased fertility which can, in turn, lead to contraceptive failure ([Trussell, 2009](#)). Women with medium and high wealth index have a negative relationship with contraceptive failure ([Polis et al., 2016a](#); [Sundaram et al., 2017](#)).

Conclusion

The results of the analysis showed that the percentage of contraceptive usage that failed, namely getting pregnant while using contraception, was 3.15 percent of the total episodes of continuous usage of certain contraceptives for 58 months. The results of the analysis, patterns and differences in fertility show that the percentage of contraceptive failures is more common in women who do not own property in their own name, participate in household decisions themselves, do not work or work without being paid cash, attend school with the highest junior high school diploma, aged 25-34 years old, live in an urban area, have no children, use traditional contraceptive methods, use contraception on the grounds of spacing births, have used the internet, and have a high wealth index.

The results of the analysis of the determinants of contraceptive failure show that the women's empowerment index has a negative relationship with contraceptive failure. The more empowered a woman is, the smaller the risk of failure. Each of the factors of women's empowerment, namely owning a property in her name and working paid in cash, has a negative association with contraception failure after controlling for socioeconomic, demographic, and environmental factors. The women's empowerment factor, namely their own decisions on all household decisions and a minimum education of junior high school graduates, has a positive association with contraceptive failure after controlling for socioeconomic, demographic, and environmental factors.

This study generally found that there was an association between women's empowerment and contraceptive failure. Women with low power are more at risk of failure. Therefore it is necessary to increase women's empowerment so that contraceptive failure can be suppressed. Collaboration between the Ministry of Women's Empowerment and Child Protection (PPPA) and the National Population and Family Planning Agency (BKKBN) in the Communication, Information, Education (IEC) activity program is needed to increase women's empowerment related to contraceptive usage, especially contraceptive failure.

The government, through the BKKBN, can socialize appropriate and effective contraceptive usage through social media by concentrating more on targeting women aged 25-34 years and highly educated. Through the BKKBN, the government

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can also make policies and regulations to tighten contraception use for women who are fertile, so that discipline in using contraception in this group increases and in the end contraception failure can be avoided.

The government, through the BKKBN, can further improve the quality of contraceptive socialization and counseling down to the village/ward government level. Family planning village programs should be further developed and require the participation of husbands/partners in these family planning programs. The contraceptive method that has high efficacy is MKJP, which tends to require deeper digging into the pocket. These contraceptive methods can be subsidized or even free of charge to make them more accessible to potential users.

IDHS 2017 data are cross-sectional data collected at one time of enumeration, while IDHS calendar data collect information for the last five years, so the variables taken in this study (besides contraceptive methods, number of live births, and reasons for using contraception) are variables whose information is assumed to be the same as when the contraceptive failure occurred (unchanged).

It is highly recommended to improve and update the method in order to be able to see contraceptive failure with conceptual factors, for example, or by adding appropriate variables, although this is rather difficult to obtain (health facility reports). This study did not include obedience or discipline variables from the respondents, because these variables are inherent in the use of certain contraceptive methods and are limited to one point in time, namely the use of contraception only during enumeration. For this reason, it is hoped that future research can use this variable with a method that is appropriate to the nature of the data. Further research can be conducted on women who experience contraception failure, whether the pregnancy will be continued or terminated (abortion).

Declaration of Interest

There is no conflict of interest.

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None

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Spatial distribution of pediatric cancer patients using Geographic Information System (GIS) across the Philippines

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Abstract

Background: Every year, many children around the world get cancer, and this is a severe health problem. The Philippines is one such country where childhood cancer is a leading cause of death. This study uses unique maps (Geographic Information Systems or GIS) to examine these young cancer patients' locations.

Purpose: By doing this, we hope to find areas with more cases and see if children in those areas have easy access to the medical care they need.

Methods: Methods involved primary and secondary data collection, including surveys and hospital records, with geospatial data analyzed using QGIS 3.4 Madeira. The study focuses on four Department of Health (DOH) tertiary hospitals: Philippine Children Medical Center (PCMC), Bicol Regional Training and Training Hospital (BRTTH), Southern Philippines Medical Center (SPMC), and Vicente Sotto Memorial Medical Center (VMMC). Participants from significant regions contributed to the study.

Results: Results indicate that cancer centers, notably the primary children's hospital, cater to patients from far-reaching areas, causing them to consult distant hospitals despite accessible alternatives. Nearly all (around 92.5%) patients seek care at specialized hospitals, even though only a small proportion (roughly 12.3%) live close to such facilities. Instead, 37.3% reported the closest health facility (within 10 kilometers) is a secondary government hospital, increasing the burden on patients with additional travel and non-medical costs.

Conclusion: The study concludes that pediatric cancer patients face challenges accessing healthcare facilities, necessitating alternative methods like telemedicine and mobile clinics. The findings underscore the need for improved healthcare infrastructure and human resources to address the burdens faced by these patients.

Keywords: cancer patients; geographic information system; GIS; pediatric cancer

Introduction

Prior research on pediatric cancer cases within the Philippines has primarily concentrated on treatment modalities. Notably absent is the application of Geographic Information Systems (GIS) to investigate spatial distribution and clustering patterns and facilitate epidemiological surveillance through case mapping. This project leverages data from the national ABC project or Care for Pediatric Cancer Patients. The project aims to tackle issues related to the geographic spread of the disease, monitor its patterns (epidemiology), and identify areas with higher concentrations of cases (cluster distribution). This project is a collaboration between the Department of Science and Technology and the University of the Philippines Open University (UPOU), the Philippine Council for Health Research and Development (DOST-PCHRD), with funding from the Department of Health (DOH), and four tertiary care hospitals in Luzon: Philippine Children Medical Center (PCMC) and Bicol Regional Training and Training Hospital (BRTTH) in Manila,

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Southern Philippines Medical Center (SPMC) in Mindanao and Vicente Sotto Memorial Medical Center (VMMC) in the Visayas.

This study used GIS technology to map where pediatric cancer cases occur across the Philippines. This revealed important information about the disease's uneven spread and access to care. By finding areas with higher caseloads and lower access to specialized hospitals, this study shows where resources and improvements are most needed to ensure all children have a fair chance at treatment.

Geographic Information Systems have become more powerful and reliable, making creating health maps much more accessible. This allows us to see how well-equipped different areas are to handle pediatric cancer cases compared to how many cases there are. By looking at these maps, we can identify places where cancer outcomes might be worse because of a lack of resources. This information is crucial for planning targeted interventions and improving healthcare infrastructure so that all children, regardless of location, have the same chance of getting good care (Aneja et al., 2011). The geographical aspect is crucial when strategizing healthcare services for pediatric cancer patients. By integrating geography with cancer screening data, valuable insights can be generated to enhance prevention strategies, particularly for pediatric cancer. Utilizing geographical data enables monitoring risk factors, mapping the accessibility of services, and locating hospitals to ensure efficient healthcare provision for pediatric cancer patients (Peng et al., 2017; Sahar et al., 2019). Researchers increasingly turn to GIS for health studies as the software helps analyze and visualize data based on location. This is particularly useful for understanding childhood cancer. With GIS, we can see how well-supplied different areas are with treatment options compared to how many cases there are. We can also track how well children do with treatment in other locations. This reveals any potential inequalities in cancer care. GIS is a powerful tool for policymakers deciding how to best distribute limited resources for cancer care, especially in areas lacking sufficient services (Aneja et al., 2011). Developed initially for environmental studies, Geographic Information Systems have become a valuable tool for health research, especially when tracking disease patterns.

By analyzing data with GIS, researchers can pinpoint areas where specific diseases are more common. This information is then used to plan healthcare services more effectively, like deciding where to place screening centers. Additionally, GIS can help identify areas with clusters of cases, which might provide clues about what's causing the disease (Samat et al., 2010). By examining location data, GIS can reveal why diseases cluster in specific areas, considering factors like environment, economy, and culture (Forrest & Wissink, 2017). By analyzing the geographic patterns of cancer patients, we can identify areas with limited access

to screening clinics. This information can be used to improve healthcare policies and prioritize resources for regions with higher spatial clustering of cases (Bansal et al., 2020; Roche et al., 2015).

GIS maps clearly show health data, like cancer rates, across different locations (Sahar et al., 2019) and turn this into clear visuals, informing targeted prevention programs by revealing risk factors and affected populations. A geographic analysis of cancer data in Mashhad, Iran, by Amin et al. (2017) investigated potential risk factors and GI cancer occurrences to guide cancer prevention efforts. Goshayeshi et al. (2019) also explored risk factors for colorectal cancer in high-risk areas to understand geographic disparities. A study by Yoon and Tourassi (2018), using GIS, compared web-based cancer mortality data with official statistics. They found strong agreement in age distribution, geographic spread, and death rates. This suggests that web-based data hold promise for real-time cancer trend monitoring.

The Objective of the Study

This study used Geographic Information Systems to analyze and visualize pediatric cancer patients' spatial distributions across the Philippines, focusing on the three main island groups: Mindanao, Visayas, and Luzon. The objectives were particularly:

Development of a thematic map to visually represent the spatial distribution of pediatric cancer cases across the Philippines. The map will specifically delineate the major island groups.

Determine groupings of pediatric instances indicative of geographical areas demonstrating an increased likelihood of pediatric occurrence.

Evaluate the accessibility: this means assessing the ease with which patients can reach and utilize specialized care facilities.

Delineate and evaluate geographic variations in the incidence of pediatric cancer and accessibility to healthcare services. The analysis will focus on pinpointing specific regions where children encounter significant obstacles in obtaining timely and appropriate medical treatments.

The furnishing of insights aimed at enlightening policymakers and healthcare practitioners in the Philippines regarding the spatial dispersion of pediatric cancer occurrences linked to healthcare inequalities, thereby facilitating the formulation of focused intervention and resource allocation strategies to enhance pediatric cancer management nationwide.

Materials and Methods

Design

A geographic analysis or mapping of the geographic distribution of pediatric cancer patients was conducted using QGIS 3.4 Madeira, a Geographic Information System software program.

Sample and Setting

The study involved 212 participants from four cancer institutes across the Philippines: Davao City, Metro Manila, Cebu City, and Bicol Region.

(SPMC) in Mindanao, and Vicente Sotto Memorial Medical Center (VMMC) in Visayas.

Variables and Instruments

Data analysis was employed using an existing survey instrument developed for the ABC project. The data obtained from this survey served as the primary source for the study's variables.

Data Analysis

Researchers used the Spatial and Cluster Distribution Geographic Information System (QGIS 3.4 Madeira) to analyze cases' spatial distribution and clustering. They also employed frequency, percentages, and qualitative assessments from survey responses to evaluate healthcare accessibility.

Data Collection

This study adopted a multi-source data collection strategy, employing primary and secondary data. Primary data were obtained through surveys administered directly to participants. Secondary data were leveraged by incorporating hospital records from four major Department of Health (DOH) hospitals in the Philippines. Data were collected from four major Department of Health (DOH) hospitals: Philippine Children's Medical Center (PCMC) in Luzon, Bicol Regional Training and Training Hospital (BRTTH), Southern Philippines Medical Center

Ethical consideration

The researcher received ethical approval from all four participating tertiary Department of Health (DOH) hospitals involved in the ABC project. This ensured the study adhered to ethical guidelines for conducting the survey.

Results

Spatial Distribution of Pediatric Oncology Patients

Table 1. Spatial Distribution of Pediatric Oncology Patients in terms of Province, Frequency, and Percentage consulting in the four referral-retained DOH tertiary hospitals in the Philippines, 2018 (n=212)

| Province | Frequency | Percentage |
|---------------------------------|-----------|------------|
| Metropolitan Manila Area | | |
| National Capital Region (NCR) | 58 | 27.4% |
| Bulacan | 20 | 9.4% |
| Rizal | 15 | 7.1% |
| Laguna | 8 | 3.8% |
| Quezon | 7 | 3.3% |
| Nueva Ecija | 7 | 3.3% |
| Cavite | 5 | 2.4% |
| Pampanga | 4 | 1.9% |
| Occidental Mindoro | 4 | 1.9% |
| Bataan | 3 | 1.4% |
| Romblon | 3 | 1.4% |
| Bicol Area | | |
| Albay | 9 | 4.2% |
| Sorsogon | 6 | 2.8% |
| Camarines Norte | 3 | 1.4% |
| Cebu Area | | |
| Cebu | 7 | 3.3% |
| Davao Area | | |
| Davao del Sur | 8 | 3.8% |
| Sarangani | 3 | 1.4% |
| Agusan del Sur | 3 | 1.4% |
| Camarines Sur | 7 | 3.3% |

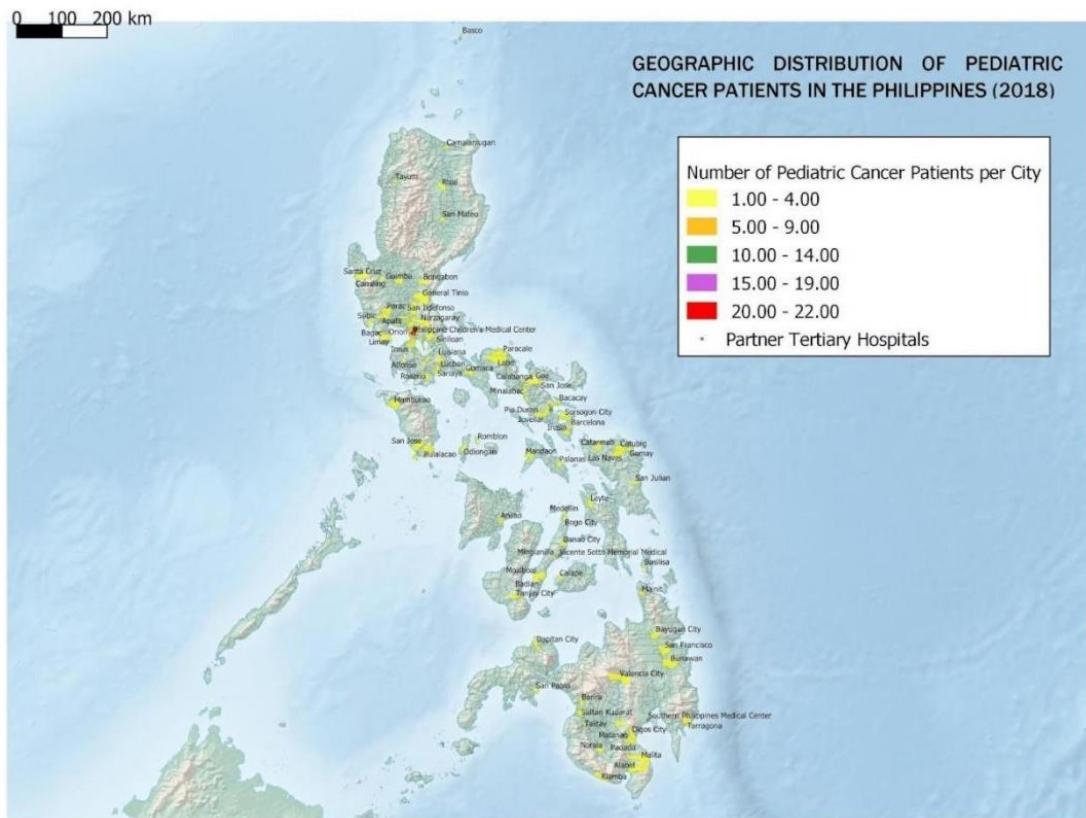


Figure 1. The Spatial Distribution of pediatric cancer patients seeking consultation across four cancer institutes per city/municipality in the Philippines in the year 2018 (n=212)

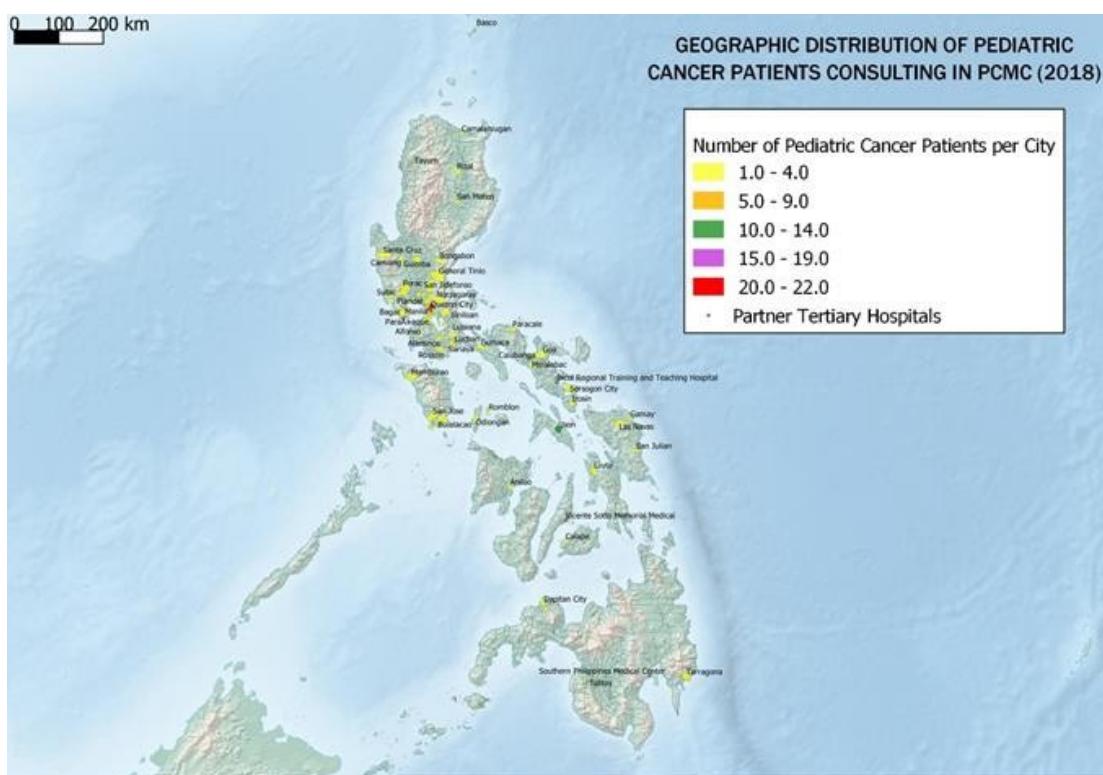


Figure 2. The spatial clustering analysis of pediatric cancer patients seeking consultation at the PCMC disaggregated by urban centers and municipalities across the Philippines in 2018 (n=161)

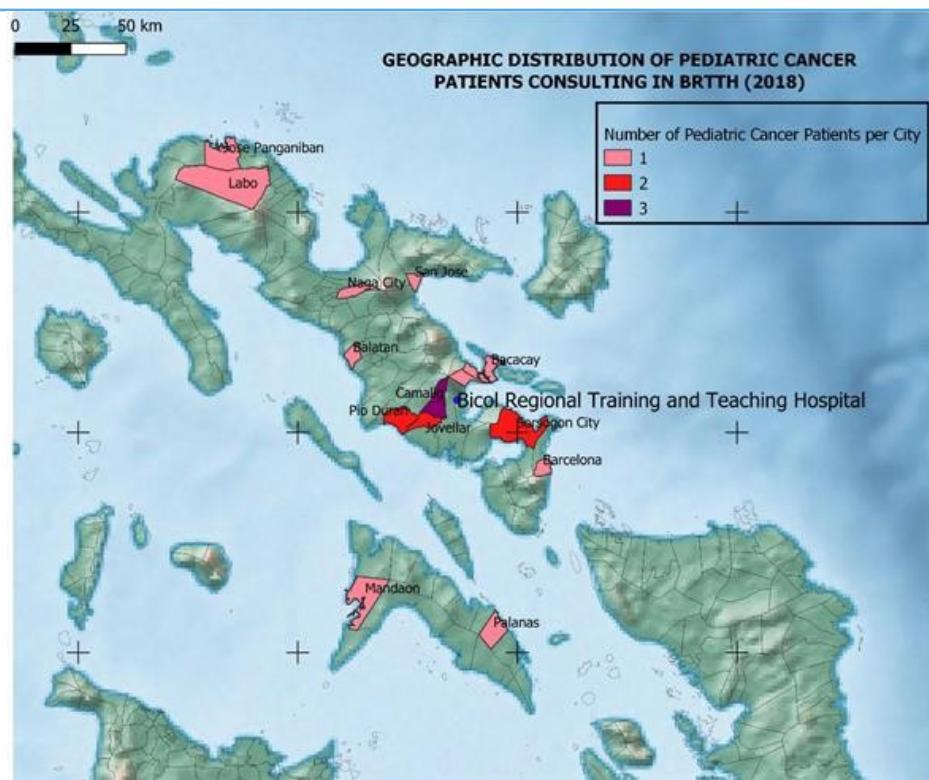


Figure 3. The spatial clustering analysis of pediatric cancer patients seeking consultation at BRTTH disaggregated by urban centers and municipalities across the Philippines in 2018 (n=20)

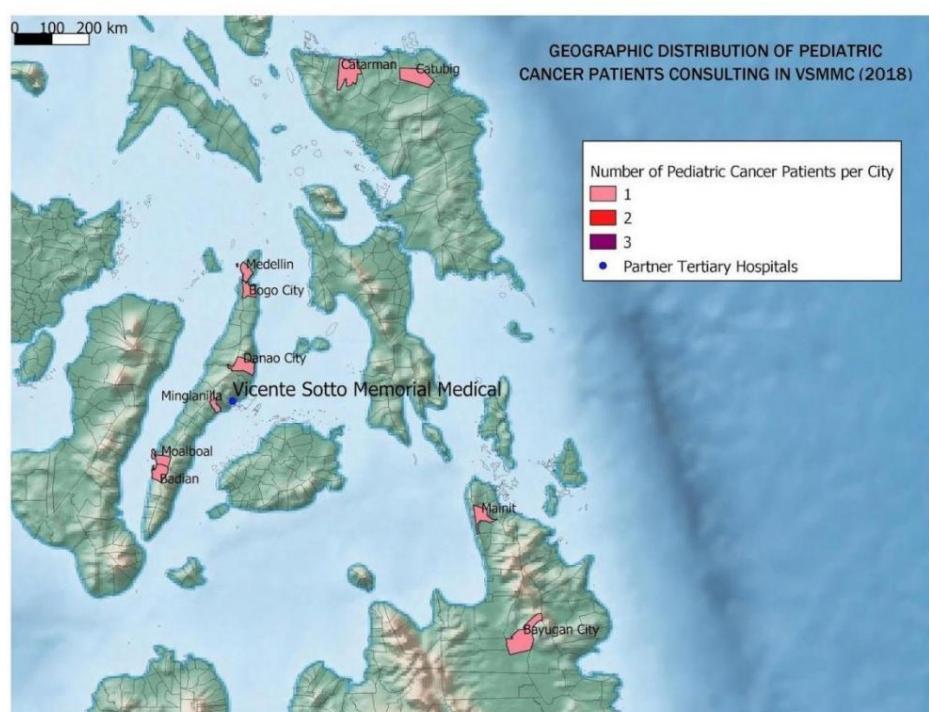


Figure 4. The spatial clustering analysis of pediatric cancer patients seeking consultation at VSMC disaggregated by urban centers and municipalities across the Philippines in 2018 (n=10)

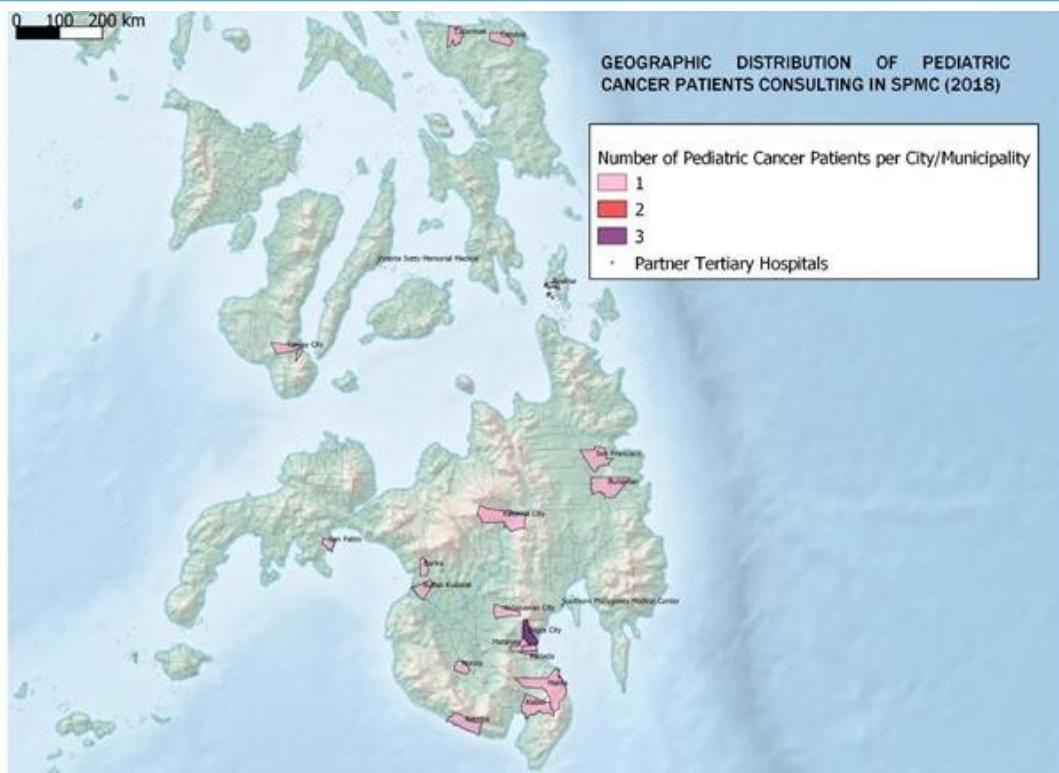


Figure 5. The spatial clustering analysis of pediatric cancer patients seeking consultation at SPMC disaggregated by urban centers and municipalities across the Philippines in 2018 (n=21)

Cluster distribution of pediatric cancer patients in the Philippines (2018)

Using data from 2018, this examines how pediatric cancer patients cluster around four DOH-affiliated tertiary hospitals in the Philippines.

Discussions

Table 1 shows the spatial distribution of pediatric oncology patients in terms of province; an analysis of patient locations in 2018 revealed that Metro Manila exhibited the highest number of cases (58 patients, constituting 27.4%) among the four regions the principal DOH hospitals served. Subsequently, Bulacan accounted for 20 patients (9.4%), Rizal for 15 patients (7.1%), and Albay for nine patients (4.2%). Amin et al. (2017) emphasize the crucial role of cancer patients' classifying. This classification allows doctors to make informed decisions about prognosis and tailor treatment approaches for everyone, ultimately improving patient outcomes (Bansal et al., 2020). Patient survey data from this study suggests a possible correlation between the concentration of pediatric cancer cases in specific regions and accessible, specialized healthcare facilities and doctors (DuGoff et al., 2018; Farazi et al., 2018; Farmer et al., 2010). A map (Figure 1) illustrates the distribution of pediatric cancer patients across various cities and municipalities in the Philippines who visited four cancer institutes in 2018. An examination of the dataset unveiled that Quezon City exhibited the highest incidence

of pediatric cancer cases, encompassing 22 patients (constituting 10.5% of the total sample). Subsequently, Caloocan City accounted for 11 patients (5.2%), followed by Manila with seven patients (3.3%).

The study identified a spatial clustering of pediatric cancer cases at the Philippine Children's Medical Center (PCMC) with 161 consultations. Notably, within PCMC's service area, Quezon City exhibited the highest number of cases (22 patients, constituting 13.7% of the total), followed by Caloocan City (11 patients, 6.8%) and Manila (7 patients, 4.3%) (see Figure 2). Similarly, at the Bicol Regional Training and Teaching Hospital (BRTTH), a smaller sample of 20 patients showed clustering. The highest proportions came from Camalig, Albay (3 patients, 15%), Legazpi, Albay (2 patients, 10%), and Pio Duran, Albay (2 patients, 10%) (See Figure 3).

An analysis of patient consultations at the Visayas State Medical Center (VSMMC) revealed ten pediatric cancer cases. Each case originated from a distinct location within the province of Cebu (Argao, Moalboal, Badian, Danao, and Minglanilla) or nearby provinces (Agusan del Sur; Catarman City in Northern Samar; Bayugan City; Mainit, Surigao del Norte). Notably, one patient only received palliative care (Figure 4). Furthermore, a separate study investigating the spatial distribution of pediatric oncology patients at the Southern Philippines Medical Center (SPMC) identified Digos City (Davao del Sur) and Kiamba (Sarangani) as having

the highest concentration of cases. Amongst the 21 patients treated at SPMC, three (14.3%) originated from Digos City, and two (9.5%) from Kiamba. A more detailed illustration of this distribution is provided in [Figure 5](#).

The study's mapping revealed that some pediatric cancer patients travel long distances (up to 968 miles south) for treatment, even when closer cancer centers exist. For instance, patients from Mindanao provinces like Maguindanao and Davao Oriental choose the leading children's hospital in Metro Manila despite having a cancer institute in nearby Davao City. This suggests patients may prioritize access to more advanced treatment technologies, even if it means traveling further. Davao City has facilities comparable to Metro Manila, indicating a potential preference for the most cutting-edge treatments available ([Peng et al., 2017](#); [Samat et al., 2010](#); [Siegel et al., 2018](#); [Sundaram et al., 2015](#)).

The study found that nearly all patients (92.5%) seek treatment at tertiary hospitals offering the most specialized cancer care. However, only a small proportion (12.3%) of these patients live close to such facilities, highlighting a potential challenge in accessing this critical care ([Weaver et al., 2015](#)). While nearly all patients need specialized care at tertiary hospitals, only 12.3% live near one. Most patients (37.3%) have a secondary government hospital closest to them (within 10 kilometers). This reliance on less specialized facilities, often further away from home, increases the burden on patients due to travel, accommodation, and other non-medical expenses. The study's findings suggest that the primary obstacles faced by pediatric cancer patients can be attributed to two key domains, such as limitations experienced at the individual level and in the healthcare system systemic shortcomings ([Abu-Odah et al., 2020](#); [Yoon & Tourassi, 2018](#)).

Conclusion

The study revealed significant hurdles regarding healthcare services for pediatric cancer patients in the Philippines. It showed that these patients face challenges beyond just reaching hospitals quickly, placing added burdens on them. Limited healthcare facilities catering to pediatric cancer mean patients must expend considerable physical, emotional, and financial resources to access care. Moreover, there's a shortage of healthcare professionals trained to deal with pediatric cancer, thereby exacerbating the issue. The study suggests exploring alternatives like telemedicine and mobile clinics to address these challenges and reach marginalized patients. Spatial analysis using Geographic Information System mapping provides crucial insights into the landscape of pediatric cancer care in the Philippines, aiding policymakers and healthcare providers in devising strategies to enhance accessibility and deliver timely, efficient care to these patients.

Declaration of Interest

This research was financially supported by a grant from the Department of Science and Technology-Philippine Council for Health Research and Development (DOST-PCHRD) and the University of the Philippines Open University (UPOU), in collaboration with several healthcare institutions, including PCMC in Manila, SPMC in Davao City, BRRTH in Bicol, and VSMMC in Cebu City. The authors affirm that they have thoroughly considered the protection of intellectual property related to their work, and there are no obstacles to publishing the findings, including any concerns regarding intellectual property rights or the timing of publication.

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Data Availability

Due to data privacy regulations outlined in the Philippine Data Privacy Act, the data supporting these findings cannot be publicly shared. However, interested parties can request access to anonymized (aggregate) data by contacting the ABC Initiative via email at abc_initiative@upou.edu.ph or by visiting the project website at arugaproject.com.

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The trend of research on oral hygiene in intubated patient based on bibliometric analysis

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Abstract

Background: ICU patients with critical conditions are generally intubated due to their inability to breathe independently. These patients require assistance from nurses in meeting their basic needs, one of which is oral hygiene. ICU nurses use several protocols when doing oral hygiene in intubated patients.

Purpose: This study was conducted to reveal the trend of research on oral hygiene in intubated patients in the last two decades through bibliometric analysis.

Methods: This study is a quantitative research. The research publications were collected from the Scopus and PubMed databases through the Publish or Perish application. Then, for further analysis, the VOSViewer application was used to create visualization maps of co-occurring terms that include the research themes.

Results: There were a total of 88 publications from two databases in the last two decades that discussed oral hygiene in intubated patients. Visualization in VOSViewer illustrates five main clusters on oral hygiene-intubated patients. Most of the publication themes were oral hygiene protocols and the relationship between the oral hygiene and VAP incidence. However, suction toothbrush as one of the oral hygiene protocol did not appear in the co-occurring terms in the first search; therefore, the researchers conducted a separate search about this term.

Conclusion: Based on the analysis, the most common themes used are oral hygiene protocols and the relationship between oral hygiene and VAP in the last two decades. However, research on suction toothbrush as one of the protocols is still lacking, so it can be used as a novelty in conducting further research.

Keywords: bibliometric; intubated patient; oral hygiene; suction toothbrush

Introduction

Patients admitted to the Intensive Care Unit (ICU) are patients with critical conditions who are generally intubated and use mechanical ventilation to help them breathe (Zhao et al., 2020). In intubated patients, oral immunity will tend to decrease, which causes the colonization of microorganisms in the mouth to develop rapidly and cause oral health problems. These patients need help from nurses in meeting their basic needs, including oral hygiene. Oral hygiene is a form of personal hygiene measure to maintain the health of the mouth, teeth, and orofacial structures. Maintaining oral hygiene is essential to support humans in daily activities (World Health Organization, 2023). In dependent patients, such as in the ICU, oral hygiene care must be carried out by health professionals, one of which is a nurse, to prevent aspiration of oral cleaning fluids. Routine oral hygiene care is carried out to remove plaque and debris and replace the function of saliva in moisturizing and cleaning the oral cavity (Zhao et al., 2020).

Poor oral hygiene can lead to severe complications such as pneumonia and other infections (Murray & Scholten, 2018). Oral hygiene in intubated

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patients is closely related to the incidence of ventilator-associated pneumonia (VAP), which is the most common cause of morbidity and mortality in the ICU. VAP is pneumonia within two days of a patient being placed on a ventilator (National Healthcare Safety Network, 2023). VAP causes prolonged length of stay and increases mortality by up to 70% (Micik et al., 2013). A plugged ETT allows bacteria to enter the respiratory tract quickly, leading to VAP (McHugh et al., 2015). Several studies have examined the relationship between oral hygiene measures and the incidence of VAP. Research studies mention that patients in the ICU who get oral care have a lower incidence of VAP than those who do not get oral care (Atashi et al., 2018; de Araújo et al., 2023; Haghghi et al., 2017). Based on research, nurses in intensive care rooms agree that the oral hygiene of patients must be maintained, but as many as 40.8% of nurses agree that the implementation of oral hygiene care is challenging (Saddki et al., 2017). Research in Indonesia states that as many as 99% of nurses agree that oral hygiene is essential for patients. As many as 59.7% of nurses have good knowledge, but the implementation of oral hygiene care in the ICU room is in the poor category, namely as much as 60% (Setianingsih et al., 2017; Werdani et al., 2021).

Oral hygiene care for patients in the ICU can be done through several protocols. Some of them are oral hygiene using chlorhexidine liquid, swabs using gauze, manual and electric toothbrushes, petroleum jelly to moisturize lips, and suction. Swab using gauze is one of the most common protocols performed by nurses, due to the ease of obtaining the tools. Suction is done to reduce fluid, toothpaste, and debris from the oral cavity (Zhao et al., 2020). One of the practical tools for oral hygiene is a toothbrush. When used optimally, a toothbrush can remove plaque and debris from the oral cavity (Dejulio et al., 2023). Another method that can be used for oral hygiene is the suction toothbrush. Studies state that using a suction toothbrush as a tool for oral hygiene effectively reduces plaque and the incidence of VAP in patients (Dejulio et al., 2023; Rayanti et al., 2023; Samim et al., 2022).

Oral hygiene in intubated patients is a widely discussed issue because of its role in preventing secondary infections such as VAP. Several publications on oral hygiene in intubated patients mention that the implementation of oral hygiene in the ICU room is still in the poor category (Setianingsih et al., 2017; Werdani et al., 2021). This study was conducted to reveal the trend of research on oral hygiene in intubated patients in the last two decades through bibliometric analysis, so that we can find new themes about oral hygiene in intubated patients that have not been researched widely. Hopefully, after we do this research, new research can be done to optimize the implementation of oral hygiene in intubated patients to prevent from VAP.

Materials and Methods

Design

This study is a quantitative research using bibliometric analysis, which is used to determine research trends and analyze the themes found in order to identify those that have not been widely researched and afford novelty for future studies (Donthu et al., 2021).

Data Collection

Research publication searches were conducted in August 2023 and were collected from the Scopus and PubMed databases through the Publish or Perish application by the two researchers using the keywords "oral hygiene intubated patient." The collected publications were published in the last two decades, namely from 2003-2023.

Data Analysis

The publications that have been collected were then checked for completeness and visual analysis carried out using the VOSViewer_1.6.18 application. The VOSViewer application is used to visualize bibliometric maps of co-occurring terms in titles and abstracts (Donthu et al., 2021) through three different types of visualization: network visualization, overlay visualization, and density visualization (Van Eck & Waltman, 2014).

Ethical Consideration

Approval from the ethics committee is unnecessary since this study uses bibliometric analysis and does not use humans as an object.

Results

Volume and Types of Publications

Based on the results of the publication search through the Publish or Perish application, 114 publications were collected, consisting of 85 publications from the Scopus database and 29 publications from the PubMed database that discussed oral hygiene intubated patients in the last two decades. All publications collected were then checked for duplication through the Mendeley Desktop application, and, out of 114 articles, 88 publications were produced. Original article was the most common type of publication related to oral hygiene intubated patients, 79.54% (n=70), followed by review (n=11; 12.5%), case report (n=2; 2.27%), comparative study (n=2; 2.27%), abstract (n=2; 2.27%), and letter (n=1; 1.13%).

Growth Research Analysis

Over the last two decades (from 2003 to 2023), publications that discuss oral hygiene in intubated patients have fluctuated, as shown in Figure 1. It can be seen from the graph that there were years when there were no publications published on oral hygiene intubated patients, namely in 2004 and

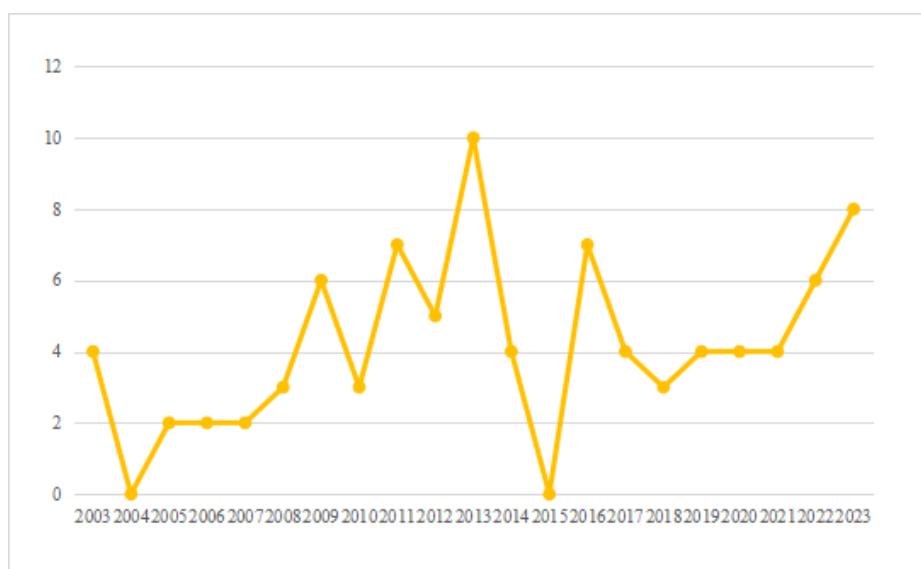
The trend of research on oral hygiene in intubated

Table 1. Top 10 Most Cited Publications about oral hygiene intubated patient over the last two decades (from 2003 to 2023)

| Ranking | Authors (year) | Source | Cited by |
|---------|---------------------------|------------------------------------|----------|
| 1st | Labeau et al.(2011) | The Lancet Infectious Diseases | 217 |
| 2nd | Scannapieco et al. (2009) | Critical Care | 140 |
| 3rd | Grap et al. (2003) | American Journal of Critical Care | 139 |
| 4th | Rello et al. (2007) | Intensive Care Medicine | 116 |
| 5th | Berry et al. (2007) | American Journal of critical Care | 104 |
| 6th | Klarin et al. (2008) | Critical Care | 89 |
| 7th | Terezakis et al. (2011) | Journal of Clinical Periodontology | 88 |
| 8th | Feider et al. (2010) | American Journal of critical Care | 85 |
| 9th | Dennesen et al. (2003) | Critical Care Medicine | 81 |
| 10th | Pobo et al. (2009) | Chest | 75 |

Table 2. Publication related to suction toothbrush from 2003-2023 from Scopus and PubMed database

| Authors (year) | Source |
|------------------------------|---|
| Warren et al. (2019) | American Journal of Nursing |
| Zhao et al. (2020) | Cochrane Database of Systematic Reviews |
| Ferozali et al. (2007) | Special Care in Dentistry |
| Di Filippo et al. (2011) | Scandinavian Journal of Infectious Diseases |
| Letsos et al. (2013) | Nursing Leadership (Toronto, Ont.) |
| Yamazaki et al. (2006) | Special Care in Dentistry |
| Sumi et al. (2003) | Gerodontology |
| Schlosser & Hebbes (2016) | General Dentistry |
| Saddki et al. (2017) | Nursing in Critical Care |
| Kjonegaard et al. (2010) | American Journal of Critical Care |
| Hirokawa & Kimata (2023) | Anesthesia Progress |
| Prendergast & Chapple (2021) | Cureus |
| Hutchins et al. (2009) | American Journal of Infection Control |

**Figure 1. Graph of publications on oral hygiene intubated patients from 2003 to 2023**

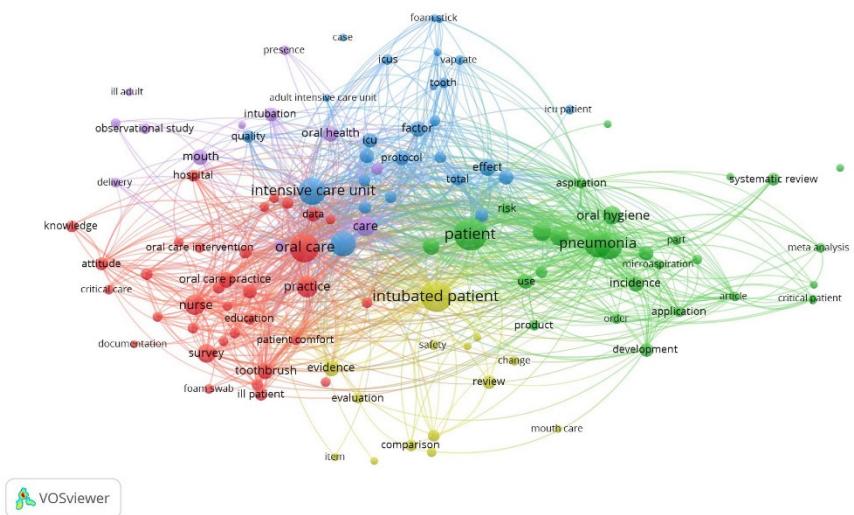


Figure 2. Network visualization map of terms in the title/abstract fields of publications related to oral hygiene intubated patient from 2003-2023

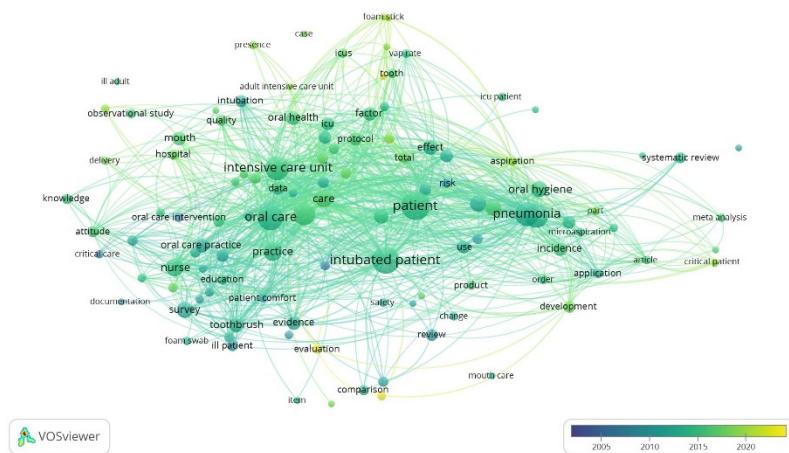


Figure 3. Overlay visualization map of terms in the title/abstract fields of publications related to oral hygiene intubated patient from 2003-2023

2015. However, the growth of publications began to increase steadily since 2018 with 2013 being the year with the most publications on oral hygiene intubated patients, followed by 2023 (Figure 1).

Most Cited Publications

The ten most cited publications can be seen in Table 1. The most cited publication was written by Labeau et al. (2011), published by The Lancet Infectious Diseases, with 217 citations. Then, in second position is a publication written by Scannapieco et al. (2009), published in Critical Care, with 140 citations (Table 1).

Co-occurrence Terms and Topic Analysis

The results of the analysis using the VOSViewer application on publications collected from Publish

or Perish regarding oral hygiene intubated patients can be seen in Figures 2-4. Figure 2 shows network visualization, and it can be seen that, from 115 keywords, five main clusters are formed which are divided into cluster 1 in red, cluster 2 in green, cluster 3 in blue, cluster 4 in yellow, and cluster 5 in purple.

The red cluster consists of 34 keywords. In this cluster, the research focuses on oral hygiene protocols and nurses as implementers of oral care actions. The protocols most often used by nurses to perform oral hygiene in intubated patients are moisturizers, gauze or cotton swabs, suction, toothbrushes, and mouthwashes (Dennesen et al., 2003; Labeau et al., 2011; Pobo et al., 2009; Saddki et al., 2017). The green cluster consists of 29 keywords and cluster illustrates the researchers'

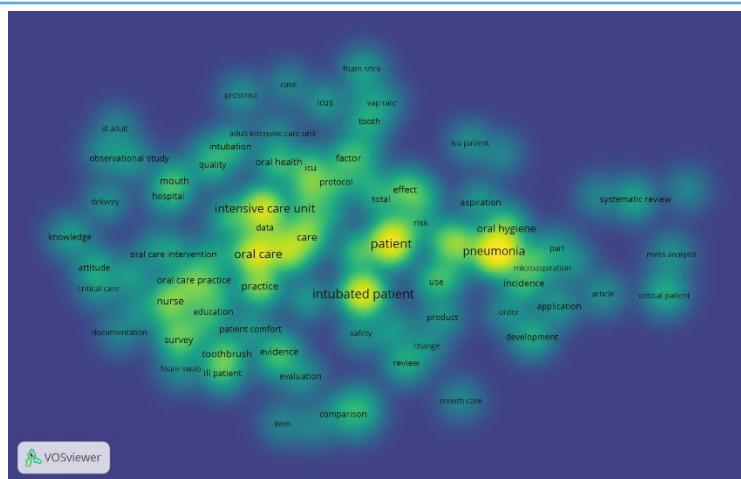


Figure 4. Density visualization map of terms in the title/abstract fields of publications related to oral hygiene intubated patient from 2003-2023

interest in the relationship between oral hygiene and the incidence of pneumonia in critical patients. The blue cluster consists of 26 keywords and has a research publication on the intensive care unit patient study. The yellow cluster consists of 14 keywords describing the research focus on intubated patients, evidence, and comparison. The purple cluster has 12 keywords. In this cluster, the main research focus is on oral health and observational studies.

Figure 3 shows the overlay visualization. This visualization is used to see the keywords that often appear and are used in the titles and abstracts of publications from 2003 to 2023. In this visualization, the lighter the color, the more recent the publication year, and the larger the circle and letter of the keyword, the more often the word appears (Van Eck & Waltman, 2014). Blue is the color for keywords that appear extensively in publications before 2005. Green is for keywords appearing in publications between 2005 and 2020, and yellow is for those appearing in publications after 2020. From this visualization, we can conclude that publications about oral hygiene in intubated patients mainly were published between 2010 and 2020.

Figure 4 shows the density visualization of keywords. In this visualization, the color indicates how the keywords are distributed in the two-dimensional space underlying the visualization (Van Eck & Waltman, 2014). Figure 4 shows that some keywords have more vivid colors and more giant letters than others, indicating that more of these keywords appear in publications. Figure 4 concludes that the most frequently used keywords are patient, intubated patient, oral care, intensive care unit, and pneumonia.

Suction Toothbrush

Based on the results of the publication search that has been carried out, oral hygiene protocols were one of the most common themes but there were no suction toothbrush keywords that appeared in the VosViewer analysis. Therefore, the researchers continued to search for publications on Publish or

Perish using the suction toothbrush keyword. The search was conducted through two databases Scopus and PubMed, with the same period and method as the search for the keyword oral hygiene intubated patient. The result was 22 publications in the last two decades (2003 to 2023). Then, a duplication check was carried out and 13 publications were found which discussed the suction toothbrush.

Discussion

The analysis results using the VOSViewer application show that publications discussing oral hygiene intubated patients create five main clusters. The red cluster consists of 34 keywords. In this cluster, the research focuses on oral care and nurses as implementers of oral care actions. A study states that nurses are one of the professionals responsible for meeting the self-care needs of dependent patients, one of which is oral hygiene (Zhao et al., 2020). The protocols most often used by nurses to perform oral hygiene in intubated patients are moisturizers, gauze or cotton swabs, suction, toothbrushes, and mouthwashes. In one study, it was mentioned that hospital supplies for oral hygiene were sufficient but needed to be improved. A Malaysian study said that some nurses stated that using a suction toothbrush was beneficial in performing oral hygiene in intubated patients, but most nurses still found it difficult and uncomfortable to perform oral hygiene in intubated patients (Saddki et al., 2017).

The green cluster consists of 29 keywords and illustrates the researchers' interest in the relationship between oral hygiene and the incidence of pneumonia in critical patients. The most common pneumonia in ICU patients is ventilator-associated pneumonia (VAP), which causes morbidity and mortality in the ICU (National Healthcare Safety Network, 2023). Oral hygiene is closely related to VAP, but there are different results regarding the relationship between the two. For example, Pobo et al. (2009) found that using an electric toothbrush and chlorhexidine was ineffective in preventing VAP.

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However, some studies confirm that chlorhexidine liquid positively prevents VAP (Pobo et al., 2009).

In the blue cluster, the keywords found totaled 26 keywords. This cluster contains a research publication on the intensive care unit patient study. A prospective study states that patients admitted to the ICU have inadequate saliva flow and poor oral mucosal conditions. These patients also had bacterial colonization in the oropharynx, which increased in the second and third weeks after intubation (Dennesen et al., 2003). From the results of this study, it is essential to do oral hygiene to improve the oral health of patients in the ICU.

The yellow cluster consists of 14 keywords describing the research focus on intubated patients, evidence, and comparison. One study in Taiwan compared the use of boiled water and green tea to improve the oral mucosal status of intubated patients. The result was that the mucosal status of patients given oral hygiene using boiled water was better than green tea (Hsu et al., 2011). Another study that discussed the comparison of oral hygiene in intubated patients stated that using a comprehensive protocol in ICU patients was more effective than using a manual toothbrush alone. This comprehensive protocol uses an electrical toothbrush, tongue scraper, and moisturizer (Prendergast & Chapple, 2021).

The purple cluster has 12 keywords and the main research focus is on oral health and observational studies. Of all the publications that have been collected, three publications focus on these keywords. The first study was an observational study conducted to consider oral health and the prevalence of microorganisms present in the oral cavity of patients with the potential to cause nosocomial infections in non-intubated patients (Cruz et al., 2022). Lin et al. (2009) conducted an observational study investigating nurse actions and factors that influence oral care actions for patients in the ICU. The results of this study showed that nurses in the ICU needed to follow the procedures and recommendations of the latest evidence-based practices (Lin et al., 2009). Another observational study stated that nurses in the ICU experienced difficulties when performing oral care on intubated patients, as much as 83%. The difficulties experienced by nurses include patient cooperation, difficulty inserting oral care tools, and difficulty reaching areas that need to be visible (Dale et al., 2018).

A suction toothbrush is one of the tools that can be used as a protocol for implementing oral hygiene. According to Saddki et al. (2017), a suction toothbrush effectively removes dental plaque in patients. However, from the VOSViewer visualization of oral hygiene intubated patients, the keyword suction toothbrush did not appear. Therefore, we conducted a search again using the keyword suction toothbrush. Of the 22 publications obtained from two databases through Publish or Perish, several duplicates were found, so the total publications

became 13. Of the 13 publications obtained, not all focused on discussing suction toothbrushes. For example, some publications discussed electric toothbrushes used for oral hygiene in older adults (Schlosser & Hebbes, 2016; Sumi et al., 2003). There were only two publications that discussed suction toothbrush as an oral hygiene protocol in intubated patients. Both publications mentioned that suction toothbrush can be effective in removing plaque and reducing the incidence of VAP in intubated patients. However, in its implementation, nurses still find it difficult to use the suction toothbrush, and the availability of tools is still limited in the hospital (Saddki et al., 2017; Zhao et al., 2020). From all the publications that we collected, we can conclude that research about suction toothbrush as oral hygiene protocols in intubated patients is still lacking.

This is the first bibliometric analysis study about oral hygiene in intubated patients and shows information about the research so it can be used as a reference in choosing the theme of further research on oral hygiene in intubated patients. However, there are several limitations to this study. It should be noted that this study only uses two databases, so it cannot represent all research published in other databases. Secondly, this study was limited to the search term "oral hygiene," thus any publication that used another term, like "oral care," may have been missed in this analysis. Further bibliometric research is expected to complete this limitation.

Conclusions

Despite the importance of oral hygiene in intubated patients, research on protocols and appropriate tools for oral hygiene in intubated patients still needs to be done. As evidenced by the last two decades, only 88 publications were collected from two databases after duplication check.

There is consensus on the association between inadequate oral hygiene and increased incidence of VAP. However, there has yet to be a standard protocol regarding intubated patients' most appropriate oral hygiene (Hajibagheri & Fini, 2012). In addition, many studies have shown that nurses find it difficult to perform oral hygiene on intubated patients. This is due to the difficulty of reaching oral cavities that are not visible, so many nurses do not carry out oral hygiene according to procedures and recommendations (Dale et al., 2018).

Based on the analysis conducted using VOSViewer, it is concluded that most of the publication themes were oral hygiene protocols and the relationship between the oral hygiene and VAP incidence. However, suction toothbrush as one of the oral hygiene protocols did not appear in the co-occurring terms in the first search. From the second round of search, there were only two publications that discussed suction toothbrush as an oral hygiene protocol in intubated patients. From this, we can conclude that research on suction toothbrush as one of the oral hygiene protocols in intubated

patients is still lacking, so it can be used as a novelty in conducting further research. Further research can be done to optimize the implementation of oral hygiene in intubated patients to prevent from VAP.

Declaration of Interest

This study stated that there is no conflict of interest in this study.

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Data Availability

The corresponding author will provide interested parties with access to the dataset upon reasonable request.

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The culture of caring for low birth weight infants at home after treatment: An ethnographic study from Indonesia

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Abstract

Background: Caring for low birth weight (LBW) babies is a challenge for parents, especially after being discharged from the hospital, to continue the care provided by professional nurses. Culture can influence how parents behave and decide to keep babies healthy.

Purpose: This study examined the culture that influences mothers in Aceh, Indonesia, to care for LBW infants at home following hospital treatment.

Methods: This study used an ethnographic design that involved ten participants consisting of mothers who had an LBW infant after receiving hospital care, a grandmother, a midwife, and health cadres. The data were collected using focus group discussion (FGD). FGDs were audio-recorded, transcribed verbatim, and analyzed using thematic analysis.

Results: The finding revealed three themes associated with cultural practices influencing mothers to care for LBW infants at home following treatment: (1) mothers are not the only caregivers, (2) traditions to safeguard family members, and (3) the dilemma between obeying medical advice or their grandmother's commands.

Conclusion: Culture substantially impacts a mother's decision-making, mainly when she and her infant are ill. For traditions and health advice to coexist, sufficient support is required.

Keywords: culture; home care; low birth weight infant; mother

Introduction

Child mortality is still a major issue on a global scale. In 2019, Indonesia was ranked seventh among the top 10 countries with the highest newborn mortality worldwide (WHO, 2020). Low birth weight is the most common cause of neonatal death (Ministry of Health Republic of Indonesia, 2021). Low birth weight (LBW) infants are babies with a birth weight of less than 2500 grams (Cutland et al., 2017). LBW babies are very vulnerable to morbidity and mortality (Endalamaw et al., 2018). LBW infants need hospital care according to their clinical conditions (Carducci & Bhutta, 2018). When the baby is ready and stable, the baby will be discharged from the hospital (Aloysius et al., 2018). But nurses need to identify family readiness for the transition of LBW care at home (Smith, 2021). To this end, each family needs to participate in a comprehensive discharge planning program adapted to their and their babies' specific needs (Smith et al., 2022). It is challenging for parents to take care of LBW infants, especially after they leave the hospital and need to continue the professional nurses' care.

Culture is a set of distinctive patterns of beliefs and behavior that are useful and shared by a group of people to organize and control their daily lives. Cultural values are passed on from parents to children through the parenting process. Children are human beings acculturated to a particular culture by their parents and other people who raise them (Riany et al., 2017). Indonesia is very attached to cultural aspects of social life, including the birth process (Sutan & Berkat, 2014). The birth of a baby is part of the life

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cycle, which means happiness with the addition of a new family member (Corner et al., 2023). The birth of the baby will attract visits from relatives (Hans et al., 2013).

In Asian families, grandparents as parties who are embraced and respected unconditionally are held as a fundamental belief (Buchanan & Rotkirch, 2018). Grandparents have a higher social status in the family and society; they hold a respected role of authority as leaders in the family (Buchanan & Rotkirch, 2018). In Indonesian culture, the role of grandparents, that is the parents of the current parents, have a central role in the hierarchy. The values of obedience and high love for parents are still adhered to (Antawati, 2020). Grandmother is a family member who will support the mother in caring for the newborn. Many mothers return to their parents' house when they are about to give birth or call their parents to accompany them (Xiao et al., 2020).

Indonesian society has a tradition of ways of behaving which is believed to be passed down from generation to generation, including caring for children (Hasan & Suwarni, 2012). Culture is considered beneficial for the safety of mothers and babies (Withers et al., 2018). The results of previous research found that mothers in Asian communities still continue to carry out various traditional beliefs and practices during pregnancy, giving birth, and after giving birth. Most of these traditional beliefs are not harmful to the mother and baby (Withers et al., 2018). However, there are also beliefs that conflict with health principles, such as giving birth in a hospital is considered unnatural, and babies cannot survive (Bohren et al., 2014).

Over time, some traditions have reached the younger generation. The current generation tends to look for explanations of reasons for doing something (Van Zomeren, 2013). Many of them like to follow things that are easy, cheap and have clear reasons. Dilemmas arise when there is a discrepancy between health advice and people's habits (Xiao et al., 2020). In Indonesia, there is a traditional practice of giving turmeric and betel leaves to the umbilical cord so that it heals quickly, becomes dry and loose (Lubis et al., 2022). In various countries, similar practices use substances such as oils, herbs, powders, water, food, and medicines (Coffey & Brown, 2017). The World Health Organization (WHO) has recommended against administering anything to the umbilical cord so as to prevent neonatal sepsis (McInerny et al., 2017; Goel et al., 2015).

Research results in Asia report that mothers do not want to break traditions because they are afraid of going against their parents, embarrassed, feeling guilty and worried about the bad impact on themselves and their children (Talbert et al., 2016). However, mothers also want to follow scientific health advice to save their babies. As a solution, they modified, summarized, and even secretly abandoned several traditions that they felt were less important (Naser et al., 2012). The results of a study

in Australia of ten mothers who had very premature babies who were cared for at home found that the mothers had difficulty controlling their situation, felt isolated, and could not fulfill their hopes of being good mothers. Mothers expressed the need for social assistance and support to be available (Fowler et al., 2019).

The ethnographic design of this research was chosen because it examines cultural patterns within groups by exploring cultural practices, behavior and beliefs. Ethnographic studies related to LBW care in Indonesia are still rarely presented. The results of this research are unique and will contribute scientific evidence as well as a deeper understanding of the cultural traditions that accompany the lives of mothers who care for LBW infants in Indonesia. Therefore, this study aims to explore the culture that influences mothers in Aceh, Indonesia, to care for LBW infants at home following hospital treatment

Materials and Methods

Design

This research uses ethnographic qualitative research to search for and interpret patterns of values, behavior and beliefs of mothers and their interactions between community members who have the same culture through extensive observations regarding the care situation of LBW mothers after returning home from the hospital. Researchers carry out observations to observe behavior and become part of situations in society, then conduct interviews.

Following the stages of ethnographic research presented by Streubert and Carpenter, (2011), observation is the first step in this research. Researchers use three types of observation, namely descriptive observation by observing social situations to get an idea of the situation that occurs in the research area; focused observation to see specifically the care of LBW infants who were cared for at home by mothers after being discharged from the hospital, and selective observation by only observing four mothers whose babies had been treated at government hospitals, living with grandmothers in the area. Next, interviews were conducted through in-depth discussions in focus groups with researchers. Researchers need the ability to adapt quickly and smoothly to the situation under study in order for the immersion process to be successful, including dressing appropriately, covering the private parts and not being dominant, spending more time in activities with the community, having the ability to coordinate, build trust and operate various tools such as audio recorders in a way that does not interfere during the discussion process (Roller & Lavrakas, 2015).

Participants and Setting

Homogeneity in FGD is important regarding interaction and group dynamics. Age and role in interactions at home homogeneity is also a consideration considering that, in non-Western

countries, the younger generation is considered impolite if they make comments that differ from the older generation (Creswell & Poth, 2018). This study involved ten participants consisting of four mothers with an LBW infant after treatment at the hospital, three grandmothers, two midwives, and one health cadre, who were selected using a purposive sampling method. After the researcher selects a cultural group, the ethnographer then uses judgment to select the unit to be studied using sampling criteria based on several perspectives in the social life of the group of people who represent the culture. The required inclusion criteria were that participants must live permanently at the research location, have LBW infants who have just been discharged from the hospital, mothers who live with or close to their mothers or in-laws, understand Indonesian, and willing to become participants.

Ethical Consideration

This study was approved by the Research Ethics Committee of the Faculty of Nursing, Syiah Kuala University (number 113003140623). The participants were previously given information about the research and sufficient time to read its contents. Then, they signed an informed consent stating that they were willing to participate in this study. All data are stored confidentially and uses a respondent's code for identity confidentiality.

Data collection

Data collection was using FGD, to see differences in perspectives between groups or categories of people being observed. Group discussions can provide insight into topics, opinions or attitudes that are conditional. In research that wants to explore comparative ways of thinking in certain types of people, it is recommended to separate these people into different groups (Krueger & Casey, 2015).

In this research, data were collected through three FGDs; consisting of four people in the mother group, three people in the grandmother group, and three people in the health worker group, consisting of midwives and health cadres. According to Mishra (2016), the optimal size for a focus group is six to eight participants (not including researchers), but focus groups can work successfully with as few as three participants. Small groups risk limiting discussion, while large groups can be chaotic, difficult to organize, and frustrating for participants who are unable to speak. To overcome the weaknesses of small groups, researchers created in-depth and optimal discussions, using discussion places that are easily accessible, comfortable, private, quiet and free from distractions.

FGDs are a type of in-depth interview conducted in groups, and are a good way to explore feelings, perceptions and thoughts, by bringing together people from similar backgrounds or experiences to discuss topics of interest. The group is guided by a moderator who helps group members participate in the discussion (Krueger & Casey, 2015). Before the

FGD, the researcher selected who will represent the cultural group, using sampling criteria. Researchers met with participants to build trust, provide research information, and obtain consent for involvement in the research. The researcher also agreed on the place and time for the discussion with the participants. A discussion guide was developed and contained open-ended questions and some socio-demographic questions. Key topics included home care practices after hospital discharge, values, availability of support and issues related to caring for LBW babies. The FGD was agreed to be at a place of worship which was located close to their house. The FGD was recorded and all environmental conditions, interactions, activities and information during the FGD were documented in field notes. The FGD was conducted within 60-90 minutes in Indonesian. After three FGD groups and no more new ideas or information arose, thematic saturation was reached.

Data Analysis

All collected interview data were transcribed verbatim written in Indonesian and analyzed using thematic analysis. Next, the researcher read it repeatedly to understand the meaningful statements from the information of the participants in each group. Key words and important sentences were marked and coded. The codes found from the three groups of participants were collected and compared with each other. If there were ideas that were close together they were combined into one category. After going through a reduction and modification process, words or phrases in categories with the same meaning were grouped and determined to become themes (Polit & Beck, 2014). Next, they were translated into English. All researchers were involved in reviewing the data and conducting careful analysis to ensure that coding, categories and themes were appropriate and answered the research objectives. The final stage was interpretation, connecting it with the literature and writing the final report.

Trustworthiness

This study data were validated in four ways: Credibility when researchers were directly involved in the process of collecting research data, recording FGDs, and listening to recorded voices repeatedly; Transferability was carried out when the researcher described the findings in a narrative form that recounted the recorded FGDs and field notes and discussed the results of the research using articles and literature appropriate to the research topic; Dependability was carried out by researchers together with experts or resource persons checking how to collect data ultimately, organize data, and conduct a thorough data review; and Confirmability was when researchers ensured objective data acquisition, both the results of FGDs and the results of observations such as field notes (Afifyanti & Rachmawati, 2014; Sugiyono & Puspandhani, 2020).

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Table 1. Mothers' and Grandmothers' demographic data

| Participant | Age (years) | Education level | Parity | Weight birth of baby (Gram) |
|-------------|-------------|-----------------|--------|-----------------------------|
| Mother 1 | 24 | SHS | 1 | 1750 |
| Mother 2 | 28 | JHS | 3 | 2400 |
| Mother 3 | 24 | SHS | 1 | 1800 |
| Mother 4 | 33 | SHS | 5 | 2200 |
| Granny 1 | 53 | ES | 6 | |
| Granny 2 | 70 | ES | 5 | |
| Granny 3 | 50 | JHS | 4 | |

ES= Elementary School, JHS = Junior High School, SHS = Senior High School

Table 2. Health workers' demographic data

| Participant | Age (years) | Education level | Work Experience(years) |
|-------------|-------------|--------------------|------------------------|
| Midwife 1 | 36 | Midwifery diploma | 15 |
| Midwife 2 | 35 | Midwifery diploma | 15 |
| Cadres | 35 | Senior high school | 10 |

Table 3. Overview of The Themes, Category and Statement of The Finding

| Themes | Category | Statement |
|--|--|--|
| Mothers are not the only care-givers | 1.The parties involved in caring for LBW 2. Unfulfilled mother expectations | Many people help me hold the baby at home; there are grandmothers, grandfathers, younger siblings, and other relatives (Mother 1) Until now, I haven't dared to bathe my baby (Mother 3, Mother 4) |
| Traditions to safeguard family members | 1.The aim of continuing the tradition 2. Values or beliefs held | My mother said that my hands should not move much after giving birth. Don't lift it above your head; your hands shouldn't be used to reach for things that are far away. If it is not obeyed, the milk will dry up (Mother 2) During childbirth, according to religious teachings, I am not allowed to perform worship, but I can still pray for help from God. I pray that my child is safe and has a speedy recovery (Mother 1) |
| The dilemma between obeying medical advice or their grandmother's commands | 1.Response to health advice 2.Respond to grandmother's advice | Doctors argue there are no food taboos. I may eat meat or whatever food is available. I trust the doctor, and I feel well soon. My mother permitted me to follow the doctor's advice because my grandmother said she did not understand how to care for mothers who gave birth to a small baby by surgery (Mother 4) I sometimes do not know what to do. The doctor said I had to do this, while grandma was different again. So when I was in the hospital, I obeyed the doctor. At home, I obey my grandmother (Mother 2) |

Results

There were ten participants in this study. Most of the participating mothers were between 24 and 30 years old and graduated from high school. The baby's birth weight ranged from 1750 grams to 2400 grams. All grandmothers were multiparities, and all health workers had been carrying out their duties for at least ten years. The socio-demographic characteristics of the participants can be seen in Tables 1 and 2.

The findings of this research reveal three themes related to the culture that influences mothers to care for LBW infants at home following hospital treatment: (1) Mothers are not the only caregivers, (2) Traditions of looking after family members, and (3) Dilemma between obeying medical advice or grandma's orders. The three themes are explained as follows.

Theme 1: Mothers are not the only caregivers.

The parties involved in caring for LBW infants

Family culture greatly influences the way family members live. For mothers who care for LBW infants at home, this is a supporting and inhibiting factor for the success of LBW treatment. Participants in this research were all indigenous people who had lived in Aceh, Indonesia, for several generations. They are used to living with extended families, and their homes are located close to other relatives. Giving birth to a baby is an important moment in the life cycle. So when the baby as a new family member arrives, all the other relatives visit the mother to show their love and happiness, especially the desire to help the mother who has just given birth and the baby who has just returned from the hospital. Some of the parties involved in caring for LBW babies are grandmothers, fathers, other family members and health workers. The baby will be carried in turns by family members and returned to the mother to be breastfed.

Many people help me hold the baby at home; there are grandmothers, grandfathers, younger siblings, and other relatives (Mother 1)

Family members, especially grandmothers, provided as much assistance as possible so that the mother would recover quickly, including taking over the housework so that the mother would not do much activity. The mother was asked to focus on self-recovery, given traditional herbs (herbs), and massaged so that she would produce lots of breast milk.

When I gave birth, my mother took on the role of caring for the baby because I wasn't allowed to move much. So, the grandmother bathed the baby. Apart from that, my mother also took care of me, such as preparing clothes, cleaning, helping to put pads on, and washing dirty clothes, including my clothes that were stained with blood (Mother 2)

Grandmothers play an essential role in ensuring that their daughter (mother) recovers quickly and her grandchildren grow up healthy. The grandmother also plays a role when carrying the baby, bathing, swaddling, calming the crying baby, lulling the baby while singing blessings to the Prophet Muhammad, and doing baby body massage using oil. Grandmothers felt like the person most responsible for the condition of the mother and grandchildren.

If the baby cries in the middle of the night, the grandmother wakes up faster. The wife's mother helps more than her mother-in-law. Mother-in-law only looked after mother for a few nights. However, the grandmother from the wife's side can stay with Mother for up to one month. Some even stay up to 70 days. If the grandmother's condition is still strong, then the main role is the grandmother. She takes care of her daughter and her granddaughter (Midwife 1)

Grandmothers who live in different cities will come and stay for up to 40 days during the postpartum period. Grandmothers sacrifice by leaving her activities to carry out their responsibilities in caring for her children and grandchildren. Grandmothers did not want their grandchildren who had just returned from the hospital to experience health problems, because the mother was weak and unable to care for their child alone. If the mother lived in another area, before giving birth she will return to her parents' house. The husband also came, but went back to work. However, the mother will continue to live with her parents until her postpartum period ends.

Grandmother will come to the house of her child who gave birth. If the mother migrates to another city, then later, she will return to give birth in the village. The main thing is to give birth accompanied by parents. Either the grandmother who comes or the mother who returns home. As long as the grandmother is still alive, she keeps going home to her parents (Midwife 2)

The father is seen as having little role to play in this situation, and his involvement is limited to holding the baby and asking why the baby is crying. If the father plays a lot of roles, it is feared that the grandmother will feel offended. Even though the help of grandmothers and other parties has good intentions, on the other hand, the dominance of the grandmother's role will reduce and hinder the opportunity for fathers and mothers to carry out their roles as parents. In fact, parenthood needs to be learned and is just beginning.

Actually, his father was willing to hold the baby, but only once in a while. Grandmother's role cannot be taken over, and she is worried too if Grandma is offended (Mother 1)

Health workers on duty in villages, such as village midwives and assisted by health cadres, are also involved in monitoring health conditions and accompanying families in caring for babies, especially LBW infants who have just returned from the hospital. One midwife reported having difficulty continuing treatment because of limited information

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about the baby's condition while in hospital.

I am rarely notified if a baby has just been discharged from the hospital and the resume letter from the hospital does not state what care should be continued. So it made me confused because I didn't know the previous condition when it was treated. During the visit to the baby's house, I will bring a scale to monitor the weight, carry out an examination of the newborn, and provide education to the mother (Midwife 1)

Unfulfilled mother expectations

The role of the mother that the grandmother took over made the mother even less confident that she could raise her baby. There is a tendency to give up parenting because the mother thinks she is weak after giving birth and lacks experience. The following are excerpts from participants:

Until now, I haven't dared to bathe my baby (Mother 3, Mother 4)

The unique tradition is providing a room occupied by mothers, babies, and grandmothers or female family members accompanying mothers. Father still occupies the master bedroom. This is done so that grandmothers have broad access to mothers and their babies and can react quickly to hold and act when the baby cries or the mother needs help. Even though she wants to be near her husband and raise their children together, mothers are embarrassed to break existing habits. One mother said:

After giving birth, I didn't sleep with my husband. I sleep with my mother, so if my child cries, my grandmother will pick him up first. If something happens at night, it's safe. There's a grandmother to handle it (Mother 3)

Theme 2: Traditions to safeguard family members

The aim of continuing the tradition

Culture is a belief that is passed down from generation to generation. Maintaining traditions is an honorable act in Acehnese society. Traditions need to be observed by everyone, and older members of society are responsible for teaching them to family members and younger citizens. If traditions are violated, it is thought that something bad will happen to a person or their family. So the grandma repeatedly reminded the mother to avoid things that were prohibited, for example forbidding her from doing certain movements, doing many activities, avoiding taboo foods and not drinking a lot of water.

Traditions based on cultural values aim to protect and provide goodness to mothers and their babies, who are the next generation in the family. The mother must be protected because she is the provider of breast milk for LBW infants. Mothers must not be tired so that the breast milk produced is abundant and of high quality. Restrictions are also placed on the type of food consumed by the mother because food substances will pass through breast milk to the baby. Spicy foods such as dishes that

use chili and pepper, as well as sour foods such as oranges, sunti (dried starfruit), and pineapple are believed to interfere with baby's digestion, causing flatulence and diarrhea in babies. Following are excerpts from participants:

My mother said that my hands should not move much after giving birth. Don't lift it above your head; your hands shouldn't be used to reach for things that are far away. If it is not obeyed, the milk will dry up (Mother 2)

I was forbidden to eat or drink cold, not to eat spicy and sour. When bathing and feeding a baby, the baby's head must be rubbed so that the shape of the head becomes round and nice. Not oval-like after birth (Mother 1)

Another cultural practice revealed by participants in this research that is inherent in mothers in Aceh in caring for LBW infants is carrying out traditions or ceremonies that involve distributing food and inviting relatives, as a form of gratitude for the birth and safety of the baby. This event is generally held seven days after the baby is born, but, because the baby is being treated in hospital, the event is postponed and the family still intends to hold it one day to maintain the family's dignity.

My grandson hasn't had the thanksgiving event yet, because the time isn't right yet. Maybe later after the holidays, the event will be held. It's a shame if you haven't made an event yet (Grandmother 2)

Values or beliefs held

In the Acehnese people, there is a belief in God who regulates human life and is a place to ask for help. The participants in this research were all Muslims. Aceh Province also has the nickname Veranda of Mecca and the social life of its people is very strong in Islamic teachings. People believe that reading prayers can grant wishes and turn difficult situations into easy ones. If the situation does not change, then it must be accepted as proof of faith that what happens is God's provision.

During childbirth, according to religious teachings, I am not allowed to perform worship, but I can still pray for help from God. I pray that my child is safe and has a speedy recovery (Mother 1)

Visiting holy places such as mosques and the graves of religious people is an effort to protect the baby from bad things that can happen and as a form of gratitude that the baby has survived so that he can be brought home from the hospital.

One day, I want to cook chicken for a Thanksgiving ceremony at the grave of Tengku Syiah Kuala (a famous religious figure). When I got there, I wanted to bathe my child to avoid bad things (Mother 2)

Belief in people who have supernatural abilities is also found in family and community interactions. The condition of LBW babies, who are smaller than babies in general, makes mothers and their families more vigilant, especially if their babies cry for a long time. The condition of a fussy baby indicates an uncomfortable condition. Families believe that

things that make babies uncomfortable may not be visible to the ordinary eye, such as babies who are sick or disturbed by spirits.

If the baby cries continuously, I, as a grandmother, immediately take it to a smart person to "rajah" (traditionally treated) by village parents. Usually, when going to "rajah," the baby is said to be crying because he is disturbed by a genie, then recites verses from the Koran and blows it on the baby. Prayers are also said over bottles of water to take home. When I got home, the water that had been recited the prayer earlier was mixed with the baby's bath water so that the benefits would be wider and affect the entire surface of the baby's body (Grandmother 2)

Theme 3: The dilemma between obeying medical advice or their grandmother's commands

Response to health advice

A history of a baby being hospitalized is a traumatic experience for parents and their family. Mothers and fathers receive health information regarding LBW care at home. Some of the health messages conveyed in hospitals are in line with existing beliefs in society, such as small babies must wear closed clothing, and need to be monitored frequently and to recognize dangerous conditions or signs of health problems. However, hospital regulations only allow babies to be visited by their father and mother, so health messages are only conveyed to their parents. This can be a knowledge gap, because grandmothers and family members do not know what is allowed or not allowed in caring for LBW babies according to the rules. One participant stated.

I was reminded the baby not to be exposed to the cold wind just stay in the room with the door closed so the baby doesn't get cold. In the morning, the baby needs to be dried in the sun to not be yellowish. I heard about this from the staff at the hospital.....I didn't dare to interfere too much because the baby was born surgically at the hospital. I just follow their message rather than being blamed (Grandmother 3)

Some of the cultural practices related to the care of LBW infants found in this research was that there are differences between health principles and tradition, thus placing mothers in a dilemma situation, including how to bathe the baby in a cloth vs dousing it with water, drying the baby in the sun vs not carrying baby leaving the house, umbilical cord care without putting anything on vs potions on the umbilical cord, only giving breast milk to the baby vs giving bananas or formula milk to babies who cry a lot.

However, there are situations where parents are given exemptions because their situation is not normal or different from the grandmother's previous experience. Grandmothers with limited knowledge tend to allow for things they are not well versed in, including how to care for mothers who give birth by surgery or for LBW infants who have been

hospitalized.

Doctors argue there are no food taboos. I may eat meat or whatever food is available. I trust the doctor, and I feel well soon. My mother permitted me to follow the doctor's advice because she felt she did not understand how to care for mothers who gave birth by surgery (Mother 4)

I usually apply turmeric on the baby's umbilical cord so that the umbilical cord dries quickly and falls off. However, the baby's mother refused. Even though in the old way, the umbilical cord recovered faster. Children now don't want to listen to their parents. But because this is a small baby, if you are sick, you prefer to be taken to the hospital. But I'm still trying to get his mother to recover quickly. After the medicine from the hospital ran out, I gave a special herbal concoction for mothers after giving birth (Grandmother 1)

Responding to grandmother's advice

In caring for LBW infants at home, there are differences. Mothers do not have enough strength to deny their family members' beliefs. Mothers who have just given birth are considered to be inexperienced and do not have adequate knowledge about the best way to care for LBW babies. On the other hand, grandmothers, as people who are respected in the family and have experience raising children, have a different perspective in dealing with LBW. This becomes an obstacle for mothers in carrying out health messages. The mother experienced a dilemma between following the health worker's advice or following her grandmother's orders. If the mother opposes the grandmother's opinion, it is feared that she will offend her and this will become a sin. So the mother will try to position herself and find the best way to follow the health message without hurting grandma's feelings.

I sometimes do not know what to do. The doctor said I had to do this, while grandma was different again. So, when I was in the hospital, I obeyed the doctor. At home, I obey my grandmother (Mother 2)

After giving birth, mothers are prohibited from drinking lots of water because the wounds caused by the birthing process are still wet and bleeding. The amount of water the mother drinks will make the wound dry for a long time. This is in contrast to adequate water during the breastfeeding process. One mother said:

The doctor told me to drink lots of water so that the milk would flow smoothly. But when I drank water, my mother saw it and was forbidden to drink a lot of water. I just followed my mother's words at that time. But behind my mother's back, I secretly drink a lot of water. After giving breast milk, I often feel thirsty, so I drink again (Mother 3)

In certain situations, the mother feels helpless because of her physical weakness after giving birth and the inability to negotiate with the situation. The mother prefers to avoid conflict with her grandmother, is worried that arguing will show a lack of gratitude for the help that has been given, and is worried that

she will not be helped again the next time.

The grandmother determines what can and cannot be done, including infant immunization. The mother must comply if the grandmother says not to be immunized. Because when the baby has a fever due to the immunization, later, the grandmother will not sleep and wakes up again and again at night (Cadre).

Discussion

Being in a home environment has a different atmosphere from a hospital environment. The interaction between mother and baby is influenced by culture, which will impact the baby's health status and the mother's ability to provide care as a parent. Culture is a set of distinctive patterns of beliefs and behavior shared by a group of people to organize and control their daily lives (Patterson, 2014). Cultural values and norms are transferred through parenting to their children so that cultural practices strongly influence parenting activities (Riany et al., 2017). The demands of parents' role as caregivers begin when the child is born. Parents experience stressful conditions after giving birth, especially if the baby is hospitalized (Lefkowitz et al., 2010). Giving birth and becoming a mother is a rewarding and challenging experience. Becoming a mother requires a variety of psychological, social, and physical abilities (Mercer, 2006). Parents need to be prepared to be confident and able to care for high-risk babies at home (Hall et al., 2016).

Once the baby is brought home from the hospital, disputes may develop. Family and friends can be a source of support or conversely a source of conflict if their points of view differ. Therefore, parents need help to normalize the routine of a sick baby (McInerny et al., 2017). In Western cultural literature, the nuclear family consists of father, mother and children (Shih, 2015). However, in Indonesia, they are used to living with large families and surrounded by many relatives. The belief held is that family members protect and provide loyalty throughout life (Effendy et al., 2015).

The results of this research found that Indonesian mothers are not the only caregivers of children. The presence of grandparents, brothers, sisters and other relatives means that many people take care of babies. The mother's physical inability and lack of confidence in caring for her baby will make the mother dependent on other parties. Research on women in Australia shows that mothers' self-confidence in carrying out their duties as mothers decreases after giving birth. A study of Iranian women showed that perceived social support came from three sources: partner, family, and friends (Saeieh et al., 2017).

The value of attachment in the family is maintained when the parents are still alive. As the oldest person in the family, the grandmother has a vital position culturally and religiously. The grandmother is a respected family member in religion, and society.

As a mother figure, a grandmother has experience caring for her family members, including her child who has just given birth (Buchanan & Rotkirch, 2018). A baby with a sick condition, such as low birth weight, creates a stressful condition (Hynan et al., 2013). In such a vulnerable condition, grandmothers tend to take on roles as decision-makers in the family, especially in matters related to women (Gattai & Musatti, 1999). Grandmother's affection is shown by trying to provide the best for her grandchildren (Giarrusso et al., 1996).

Grandmothers play a significant role in preserving the cultural traditions of their ancestors. Even in a society whose belief system has shifted toward modernity, grandmothers still express the importance of upholding traditions in their families and passing this knowledge on to their children and grandchildren. Data show that grandmothers often influence decisions in the family or ultimately decide (Gupta et al., 2015). Grandmothers are considered determinants in making decisions in the family because of the life experiences they have passed and have a broad perspective on life experiences that have and have not happened.

Grandmothers have many roles in maternal and child health and are often overlooked as the primary support provider for their daughter-in-law. Grandmothers tend to be the primary source of information, guidance, and emotional support for young women, especially those having children for the first time (Gupta et al., 2015). Most women cite their mothers as their primary support (Saeieh et al., 2017). Both grandmothers and other family members are sources of support that positively impact mothers. Mothers can rely on available assistance from family members for daily work, such as providing food, washing clothes, cleaning the house, and even caring for other children, so that mothers can save energy, focus on their recovery, and prioritize providing breast milk as the main source of nutrition for babies. This facility is available for Indonesian mothers for 40 days postpartum. The results showed that the mother's confidence in her abilities increased from six weeks to three months after giving birth (Gao et al., 2014).

The magnitude of the role of family members in the life of a mother who has just had a baby places the mother in a dilemma to make good decisions for herself and her baby. Indonesian mothers need to use their negotiation skills and avoid conflict to maintain positive relationships with their families (Poulson et al., 2018). In Muslim society, grandmothers have a noble and respected position. Disobeying parental orders will be sinful and invite bad things to happen. On the other hand, the baby's mother has received education about how to care for LBW infants from the hospital, which may differ from the grandmother's beliefs and experiences. Such values in the family need to be a concern for nurses in providing education, especially LBW care at home. Involving grandparents in the educational process is a good thing to support the implementation

of patient-centered care. Nurses need to realize that the support provided by grandmothers and members will maintain the implementation of LBW care at home by health principles (Gaskin, 2018).

Leininger's theory of transcultural nursing states that it is essential for nurses to pay attention to cultural diversity and health views from the patient's perspective in implementing culturally sensitive nursing care. This concept considers the variability among humans regarding cultural meanings, patterns, values, ways of life, symbols, or other matters related to providing beneficial care for clients from certain cultures (McFarland & Wehbe-Alamah, 2019).

Decisions made by mothers in caring for LBW babies at home are influenced by local culture and traditions. Family involvement in health-related decision-making is an important cultural factor that can influence the exchange of information. Cultural factors can affect the relationship between patients and their families. This can also affect satisfaction and compliance (Alden et al., 2018). The results of our study found that mothers and their families carry out a ceremony or ritual aimed at protecting the baby and mother. Mothers take their babies to visit holy places such as mosques and graves of religious people because mothers and their families believe that babies are weak creatures that need to be protected, both from the influences of the world, such as disease, and the harmful effects of supernatural things. Traditions that are not harmful and do not conflict with health principles can still be allowed. However, harmful cultures need to be negotiated so that you can reject them in a way that does not offend grandparents and extended family. Diversity in culture and different characteristics of specific cultures can facilitate or hinder health acceptance and can be detrimental to the health of infants (Brooks et al., 2016).

In matters of raising children, Indonesian fathers are often considered taboo in taking care of babies because of a patriarchal culture that places men in a dominant role, and it is inappropriate to take care of women's affairs, such as giving birth, breastfeeding, and caring for babies. Patriarchy is a view that considers men as superior to women. In the social system, men are the main authority and central figure, where men hold power over women, children, and property (Rawat, 2014). The patriarchal culture in the family views men as the head of the family and the breadwinner for the family. In the family environment, the wife is only limited to domestic work in the household. Studies in China also found something similar. The primary responsibilities of the traditional Chinese father were to be a firm but kindhearted educator, disciplinarian, and moral role model. Meanwhile, the mother's role is to provide daily care and care for children. Father figures are expected to keep their distance from their daily child-care duties and not show overt expressions of warmth (Li, 2020).

This research has limitations, including taking

locations in Aceh as one of the regions of western Indonesia. However, the participants involved in the study were patients and their families who had been treated at the highest referral hospital in the province. Second, the language translation process may have different terminology from the everyday language expressed by participants during the FGD, even though, during the research process, the researcher validated and confirmed to the participants regarding the verbatim transcript to maintain the objectivity and validity of the research data.

The results of this study have implications for the practice of caring for low birth weight infants, especially after being discharged from the hospital. The findings in this study will increase nurses' insight into choosing an appropriate approach for families who will care for LBW infants at home. Health workers at hospitals such as nurses, midwives and doctors need to write specific instructions on the discharge resume document, so that families accompanied by village midwives can continue with follow-up care for LBW babies. Nurses who carry out discharge planning for families also need to consider cultural aspects that will influence LBW care at home. Although in Western culture, education is usually only given to the nuclear family, considering that the people of Aceh, Indonesia, generally live in large families, written messages may be needed that parents can take home so they can be read and studied together with all the family members involved. This can be useful in reducing dilemmas and potential conflicts within the family, as well as maintaining positive cultural values.

Conclusions

Mothers in Indonesia who have LBW infants are surrounded by many family members at home. Their presence can help mothers care for LBW infants as the mother's condition recovers. However, on the other hand, the large number of parties involved in caring for LBW infants reduces the opportunity for fathers and mothers to act as parents, and many are dominated by grandmothers. Health messages from hospital staff are delivered only to parents. This can be a knowledge gap, because grandmothers and family members do not know what is allowed or not allowed in LBW care according to the rules. When these differences meet cultural habits in society, dilemmas arise and are prone to conflict within the family. Several cultural practices were found in this research that are attached to mothers in Aceh in caring for LBW infants, namely the involvement of all family members in caring for the baby, providing special rooms to facilitate access to the mother, carrying out traditions or ceremonies to maintain dignity and protect from bad things, having a belief in God, places and people that are considered holy. The cultural practices that can trigger a dilemma between health messages and tradition are bathing the baby, drying it in the sun, caring for the umbilical

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cord with concoctions, feeding banana or milk formula, food restrictions and limiting the amount of fluid the mother drinks. Mothers understand that traditions aim to protect family members from bad things, but when they conflict with health principles, mothers need to make the right decision in providing LBW infant care at home. The challenge for nurses is to develop culturally sensitive interventions to teach how to best care for LBW infants at home. Further research needs to be carried out to dig deeper into community support regarding the handling and prevention of health problems in LBW infants.

Declaration of Interest

The authors declare that there are no conflicts of interest.

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Data Availability

Data from this study are available upon request to the relevant authors. The data is not made public due to privacy and ethical restrictions.

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Nursing interventions for improving quality of life among patients with coronary heart disease after percutaneous coronary intervention: A scoping review

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Abstract

Background: Percutaneous coronary intervention (PCI) aims to improve the quality of life (QoL) for coronary heart disease (CHD) patients, but many patients still have poor QoL. The impact of poor QoL causes long-lasting feelings of frustration, anxiety, fear, and worry that make a person give up or lose enthusiasm for the future.

Purpose: This study aimed to describe nursing interventions to improve the QoL of CHD patients after PCI.

Methods: This research used the scoping review method by including all full-text primary studies written in English and published between 2013 to 2023 from three databases, EBSCO-host, PubMed, and Scopus, and one e-resource, Sage Journals. The keywords used were “coronary artery disease OR myocardial infarction OR cardiovascular disease AND quality of life AND percutaneous coronary intervention OR PCI OR Angioplasty AND Nursing care OR nursing intervention.”

Results: A total of eight articles discussed nursing interventions to improve the QoL among CHD patients after PCI. There are two categories of interventions that nurses can carry out: hospital-based (inpatient or outpatient) rehabilitation and cardiac tele-rehabilitation.

Conclusion: Hospital-based (inpatient or outpatient) rehabilitation and tele-rehabilitation interventions potentially improve post-PCI patients' QoL, psychological well-being, cardiovascular capacity, social support, and adherence to CHD rehabilitation program. Standardized intervention guidelines need to be created in the future for each outcome of interest based on evidence-based findings so that specific interventions to improve the quality of life of CHD patients can be applied directly in daily practice.

Keywords: coronary heart disease; PCI; quality of life

Introduction

Coronary Heart Disease (CHD) is a significant health problem with high morbidity and mortality rates in various countries ([World Health Organization \(WHO\), 2021](#)). CHD is a non-communicable disease caused by blockage of the coronary arteries due to oxidized fat or cholesterol deposition, resulting in insufficient blood supply to the heart ([Shahjehan & Bhutta, 2022](#)). If this process lasts long, it can lead to cardiac ischemia and myocardial infarction ([Benjamin et al., 2017](#)).

CHD patients generally experience various symptoms, both physically and psychologically ([Shahjehan & Bhutta, 2022](#)). As a result, the condition has a negative impact on quality of life (QoL) ([Kleisiari et al., 2021](#)). QoL is a person's perception of their position in life, as seen in the context of

their culture and value system, regarding the goals, expectations, standards and concerns in which they live (World Health Organization, 2012). Poor QoL can cause a person to quickly feel frustrated, anxious, afraid, annoyed, and worried for a long time, so they give up or lose enthusiasm for the future (Bahall et al., 2020; Shan et al., 2014; Takematsu et al., 2015). In contrast, someone with a good QoL will be more confident, happy and grateful for himself, and their enthusiasm for their future is higher (Shan et al., 2014). Hence, reperfusion therapy is essential for patients with CHD (Reynolds et al., 2021).

PCI is a revascularization intervention used extensively in treating CHD (Reynolds et al., 2021). This intervention has effectively improved post-PCI patients' QoL, especially in the first six months after the procedure (Reynolds et al., 2021). Previous studies reported increased quality of life in physical limitations and angina frequency domains (Abdallah et al., 2013; Safley et al., 2014), and also in social, emotional, and physical domains (Yazdani-Bakhsh et al., 2016).

Regardless those positive impacts of PCI, other studies showed that post-PCI patients reported a decrease of QoL in some months after PCI (Musthofa et al., 2022). Previous studies described that patients who have undergone PCI > 3 months reported a decrease of QoL in the physical domain (73.7%), social domain (70%), and environmental domain (70%) (Anggraini & Andani, 2018; Hutagalung et al., 2013). The effect of intervention on quality of life only emerged between two months and two years after PCI treatment. Most likely, the benefit of PCI on QoL after two years is small (Abdallah et al., 2013). Other study noted that the PCI interventions are proven to have effectively improved patients' QoL only if the patients adhered to a healthy lifestyle and practiced appropriate activities (Takematsu et al., 2015).

Nurses have a significant role in improving the QoL of CHD patients by building and increasing awareness of risk factors for the disease (Cho et al., 2015). In addition, nurses and other health professionals can play a role in changing health behavior (low-fat diet, reducing salt intake, quitting smoking, reducing or stopping drinking alcohol, and regular exercise) and anticipating stress, anxiety, and depression, as well as strengthening spirituality to maintain QoL post-PCI among CHD patients (Musthofa et al., 2022). However, there have yet to be any specific reviews discussing the types of nursing interventions to improve QoL in CAD patients after PCI.

Several previous reviews with the same population of CAD patients after PCI only identified

QoL levels and factors (Musthofa et al., 2022); the efficacy of continuous vital signs monitoring outside the critical care setting is feasible and may provide a benefit in terms of improved patient outcomes and cost efficiency (Downey et al., 2018), QoL benefits (Shan et al., 2014), and the efficacy of acupressure on depression and major adverse cardiovascular events after PCI (Lu et al., 2022; Ma et al., 2022). Therefore, further studies are needed to identify nursing interventions for improving the QoL among CHD patients who have undergone PCI. The review results may provide consideration in optimizing the role of nurses in improving the QoL among CHD patients after PCI.

Methods

Design

This review uses a scoping review design. Scoping reviews are a flexible methodological technique for exploring new, rapidly developing topics (Peterson et al., 2017). This design's more comprehensive conceptual range allows various studies with the latest rapidly developing topics to be explored comprehensively (Peterson et al., 2017; Tricco et al., 2018). The PRISMA Extension for Scoping Reviews (PRISMA-ScR) was used in this literature review to find various topics discussing various types of nursing interventions in improving the QoL of CHD patients after PCI.

The PRISMA Extension for Scoping Review (PRISMA-ScR) checklist was used to guide the article selection process (Page et al., 2021). This process is further described graphically (Fig. 1). The inclusion criteria of this study were all full-text primary studies written and published in English within the last ten years (2013-2023). This restriction in years was in line with technological developments that have occurred very rapidly and recently and that can produce various interventions for improving QoL among CHD patients. Therefore, ten years is a reasonable range to reflect this phenomenon.

Articles obtained through the initial search stage were then checked to determine whether they had duplications using a Mendeley reference manager. After duplicates were removed, the articles were divided into three separate folders for review for eligibility by three researchers (F.S, A.M.P, and N.A.A). Each researcher was assigned to independently assess the relevance of the title and abstract of each article in the previously divided folder. Articles with full text that had been selected were then thoroughly reviewed based on determined criteria. All articles that met the criteria

Table 1. A framework for searching strategy.

| PCC Framework | Search Strategy |
|---------------|--|
| Populations | Coronary Artery Disease OR Myocardial Infarction OR Cardiovascular Disease |
| Concept | Quality of life AND Nursing Care OR Nursing Intervention |
| Context | Percutaneous coronary intervention OR PCI OR Angioplasty |

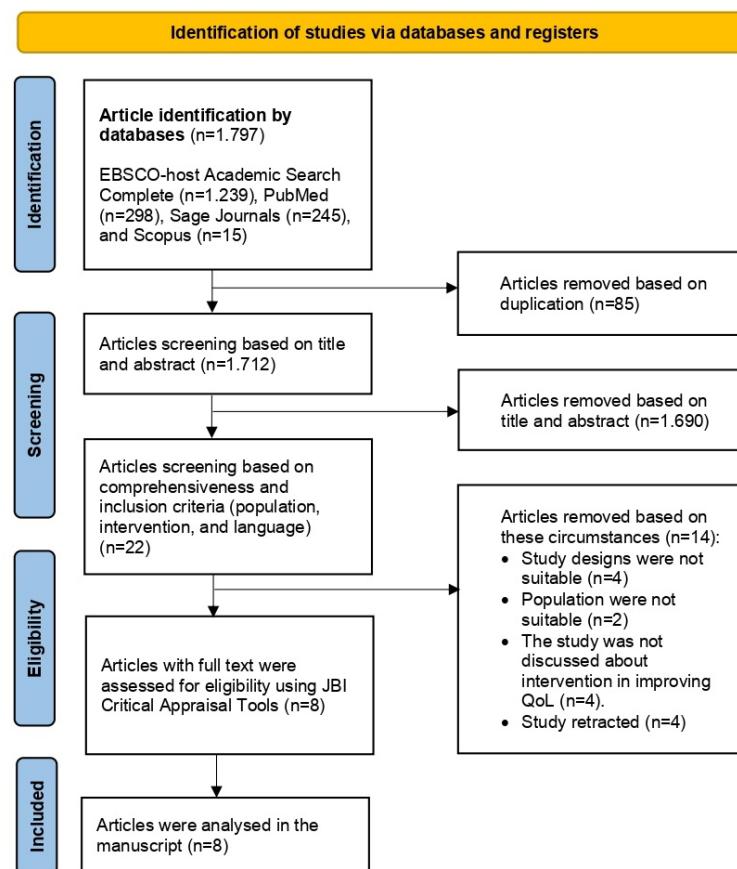


Figure 1. PRISMA Flow Diagram

were then examined and further evaluated for quality assessment by two researchers (N.A.A and A.M.P.). The final determination of included and excluded articles related to interventions for improving QoL among CHD patients after PCI was carried out by three other researchers considered as expert in the field of critical care nursing (F.S, Y.T, and A.N). Any discrepancies among those evaluators were discussed to gain firm agreement.

Data Extraction

Data extraction is presented in tabular form to describe all results related to the topics reviewed. The extracted data related to the author, year, research objectives, country, study design, sample characteristics, interventions, results and JBI assessment score based on the study design of the articles analyzed in this review. The primary subject matter of each article in this review can be identified, grouped, and described in further discussion.

Quality Appraisal

The quality of the articles in this review was assessed based on The Joanna Briggs Institute (JBI) critical appraisal tool checklist with minimum score >70%. In this review, RCT studies assessed JBI with 13 domains and cohort studies with 11 domains. JBI critical appraisal checklist consists

of several assessment criteria consisting of "yes," "no," "unclear," and "not applicable" with a score of 1 for each "yes" answer and a score of 0 for other answers.

Data Analysis

All research included in this scoping review is primary research with a quantitative approach with experimental studies such as randomized control trials and quasi-experimental studies. Therefore, data analysis was carried out thematically using a descriptive exploratory approach. This process begins with identifying and presenting the extracted data in tabular form. After obtaining the data, all authors analyzed and explained the results of each study that focused on interventions to improve the QoL of coronary heart disease patients after PCI therapy.

In this review, the nursing interventions were classified into two categories, namely hospital-based CR and cardiac tele-rehabilitation. Hospital-based CR covered intervention provided at inpatient settings and outpatient settings ([Flores, 1995](#)). In addition, Cardiac Tele-rehabilitation is defined as an intervention provided outside of both previous settings and assisted by the use of technology ([Knudsen et al., 2020](#)).

Table 2. Characteristics of Study

| Author & Year | Outcome | Country | Design | Sample & Setting | Intervention | Results | JBI |
|---------------------|--|---------|----------------------------|---|--|--|----------------|
| Peng et al. (2022) | Cardiac function and QoL | China | Retrospective cohort study | 100 patients with AMI after emergency PCI | Seven-step rehabilitation training program | Training group (QOL score 85.3 ± 4.21) Control group (QOL score 69.1 ± 5.65) | 8/11 92,7% |
| Yin et al. (2022) | Medication compliance, QoL and prognosis | China | Prospective cohort study | 100 patient with CHD after PCI | Omaha System-Based Continuing Care | Before intervention Physical function (52.44±2.84); Social function (50.68±4.51); Emotion (61.32±2.61); Vitality (44.67±4.52); Overall health (65.28±4.82). After intervention Physical function (61.24±2.48); Social function (58.62±4.38); Emotion (69.28±2.54); Vitality (52.77±4.83); Overall health (70.52±4.54) | 9/11 81.8% |
| Li et al. (2022) | Adherence and QoL | China | RCT | 80 patients with AMI after PCI | Phase II Remote Home Rehabilitation | Observation group At discharge (64.59 ± 6.78) 6 months after discharge (89.46 ± 9.33) Control group At discharge (63.85 ± 7.26) 6 months after discharge (77.35 ± 9.21) | 10/13 76,9% |
| Wu et al. (2019) | Adherence, QoL, and prognosis. | China | RCT | 154 patients with AMI after PCI | Transitional health management | Before the intervention IG (Total score 211.51 (182.45–248.87)) CG (Total score 201.51 (173.63–229.52)) 1 month after discharge IG (484.81±52.91) CG (432.49±34.99) 6 months after discharge IG (544.29 (509.99–568.04)) CG (494.33 (455.97–530.15)) | 12/13 92,3% |
| Chang et al. (2020) | Anxiety and QoL | China | RCT | 80 patients with AMI after PCI | Nurse-led psychological intervention | Before intervention IG (QOL 40.1 ± 5.2); CG (QOL 40.7 ± 4.8) 12 Months After Intervention IG (QOL 83.6 ± 5.9); CG (QOL 63.7 ± 4.9) | 13/13 100% |

Cont. Table 2. Characteristics of Study

| Author & Year | Outcome | Country | Design | Sample & Setting | Intervention | Results | JBI |
|--------------------------|---|----------------|-----------------------------------|--|---|---|----------------|
| Xu et al. (2021) | QoL, depression, adherence | China | RCT | 100 patients with AMI after PCI Setting: Tele-rehabilitation setting | WeChat Apps, Health Management and Refined Continuous Nursing Model | Research group Emotional dimension (24.18 ± 3.46); Physical dimension (21.26 ± 4.32); Economic dimension (17.24 ± 2.63) Reference group Emotional dimension (31.22 ± 3.27); Physical dimension (29.31 ± 4.36); Economic dimension (22.31 ± 2.84) | 10/13 76.9% |
| Zhou et al. (2020) | Complication, psychological status, QoL | China | Retro-spective case-control study | 63 patients after PCI Setting: Tele-rehabilitation setting | WeChat Platform to Implement Continuous Nursing | Before intervention Angina frequency (63.1 ± 9.2); angina stability (53.2 ± 8.4); degree of physical limitation (60.5 ± 10.5); cognitive perception of the disease (65.3 ± 12.5); and satisfaction with treatment (75.2 ± 11.2) After intervention Angina frequency (65.3 ± 10.7); angina stability (54.1 ± 9.9); degree of physical limitation (61.4 ± 11.7); cognitive perception of the disease (63.5 ± 11.4); and satisfaction with treatment (73.6 ± 12.5). | 9/11 81.8% |
| Hu et al. (2022) | QoL, social support and self-management | China | RCT | 60 patients after with PCI Setting: Tele-rehabilitation setting | Long-term nursing intervention | Before Intervention IG (63.98 ± 8.86); CG (65.13 ± 9.80) After intervention IG (85 ± 7.50); CG (70.73 ± 8.95) | 11/13 84.6% |

Results

Study Selection

We identified 1,797 articles in our initial search: 1,239 from EBSCOhost, 298 from PubMed, 245 from sage journals, and 15 from Scopus. We excluded 85 duplicate articles and 1,690 other studies because the title was irrelevant, and 22 then remained. Then, the selection was made based on inclusion criteria, leaving eight articles (see Fig.1) with 14 articles excluded because they were not intervention studies, the respondents were non-cardiac patients, they did not discuss QoL, or the study retracted.

Quality Appraisal Results

Tables 1 and 2 in supplementary files show the results of the quality of articles assessed based on the JBI critical appraisal tool following the study design of the included studies. All studies included in the analysis had a JBI score $\geq 70\%$. However, most RCT studies still do not meet some criteria, such as participants blind to treatment assignment, those delivering treatment blind to treatment assignment, and blinding outcomes assessors. In addition, most cohort studies still do not meet the two criteria for identifying confounding factors and strategies for dealing with confounding factors. Studies with limitations in addressing confounding factors tend to provide less consistent evidence or have a lower level of confidence, which will reduce the generalizability aspect of this review.

Characteristic of Study

Most of the articles analyzed in this scoping review were RCTs ($n=5$) and three studies used a cohort design ($n=3$). Of the eight articles, all research was conducted in China. All participants in the articles analyzed were CHD patients after PCI, with a total of 737 participants. The characteristics of the studies analyzed in this review can be seen in more detail in Table 1.

Types of Nursing Intervention

We found eight articles discussing nursing intervention to improve QoL among patients with CHD after PCI. These are classified into two types of intervention.

Hospital-Based Intervention

In this review, hospital-based interventions are classified into two categories, namely inpatient and outpatient. In the inpatients category, there are two nursing interventions, namely the seven-step rehabilitation training program (Peng et al., 2022) and nurse-led psychological intervention (Chang et al., 2020). The seven steps of the rehabilitation program are carried out with active and passive exercises for the limbs in stages every day (Peng et al., 2022). The first step starts with washing hands, washing the face, eating, and using the potty in bed. Medical personnel also assist the patient in sitting for 15-30 minutes. In the second step, the patient

is trained to perform personal hygiene (washing and wiping) at the bedside. Then, the patient starts walking to the toilet and walks slowly 30 meters. Next, the patient practices walking on the spot 10-15 times and goes to the bathroom on his own. In the fifth step, it is recommended to take three steps on the training escalator and walk 150 meters and walk about 150 meters twice a day. Furthermore, the patient is allowed to increase their exercise by adding two more steps from the previous exercise that is carried out twice a day. Then, twice a day, the patient begins walking ten steps up the training escalator (Peng et al., 2022).

Another nursing intervention that potentially improves QoL in post-PCI patients is a nurse-led psychological intervention (Chang et al., 2020). This intervention emphasizes structured counselling for 30 minutes daily when the patient has completed PCI at the hospital. This intervention is carried out by consultant nurses with psychological therapy and counselling qualifications. The psychological intervention consists of individual cognitive behavioral therapy and teaching relaxation techniques. These steps include identifying the causes of anxiety, challenging and changing unhelpful thoughts or attitudes that may trigger or worsen anxiety, and the development of personal anxiety coping strategies for the prevention and treatment of anxiety (Chang et al., 2020).

In the outpatient category, post-PCI interventions provided in outpatient settings either through follow-up after discharge or centralized remote monitoring carried out by hospital staff consist of two interventions: Omaha System-based continuous care and transitional health management (Wu et al., 2019; Yin et al., 2022). In general, post-PCI patients receive standard interventions such as health education about CHD, pharmacological therapy, and daily precaution (diet, exercise, and psychological care) before discharge and are asked to make a return visit to the hospital (Yin et al., 2022). Meanwhile, Omaha System-based continuous nursing interventions are divided into four categories such as health education, pharmacological therapy and surgery, case management, and supervision (Yin et al., 2022). The fundamental difference between these interventions lies in continual monitoring and evaluation of outcome achievement. The components of the Omaha System itself are assessment, care plan, and evaluation (Martin et al., 2011). This intervention emphasizes providing care to post-PCI patients on an ongoing basis through intervention strategies prepared based on the results of regular assessment and analysis of actual and potential problems (Yin et al., 2022).

Another intervention included in the outpatient category is health management interventions (Wu et al., 2019). Through this intervention, patients receive assistance for three months, with follow-ups carried out 1-2 times a week for 10 minutes. The follow-up content includes assessing the patient's learning needs, emphasizing the importance of maintaining a

good lifestyle, and helping patients strengthen their self-management skills, such as quitting smoking and drinking and doing routine work. Participants also receive a handbook containing guidelines for caring for patients and their families at home. This study found that this intervention effectively improved patients' self-management skills, including exercise and food and drink consumption (Wu et al., 2019).

Cardiac Tele-Rehabilitation

Cardiac Tele-Rehabilitation is an intervention that utilizes the use of technology that can be provided outside of inpatient and outpatient care (Knudsen et al., 2020). Four types of nursing interventions fall into the tele-rehabilitation category namely remote home rehabilitation, health management and refined continuous nursing model, WeChat Platform to Implement Continuous Nursing, and long-term nursing intervention (Hu et al., 2022; Li et al., 2022; Xu et al., 2021; Zhou et al., 2020). These four interventions can significantly improve QoL in CHD patients after PCI.

In this review, the four studies analyzed used the WeChat platform as a medium for implementing tele-rehabilitation programs. First, phase II is remote home rehabilitation (Li et al., 2022). The rehabilitation program combines follow-up management by a medical rehabilitation team that is divided into six groups through the WeChat group (Li et al., 2022). Each group has one doctor and nurse who monitor the training program implementation process. The nurse tracks the patient's medication and exercise completion through a monitoring "daily checklist" and then collects and records the patient's heart rate, Borg level, and other discomforts after exercise. Then, patients would be followed up by phone once a week. Based on the study results, this intervention facilitates AMI patients to improve heart function, activity tolerance, and QoL.

The second nursing intervention is health management and refined continuous nursing model using WeChat (Xu et al., 2021). These nursing interventions include forming a team and a WeChat group to arrange planned monthly family visits and at least weekly follow-up calls. At the time of the visit, the family receives health education about self-management and follow-up treatment. Then, if the patient experiences negative emotions such as depression and anxiety, it can be communicated to the health worker through the WeChat platform. For three months, nurses need to remind patients four days before finishing treatment.

Third, continuous nursing using the WeChat application was also carried out by Zhou et al. (2020). Through this platform, patients and families will receive health education covering three parts: rehabilitation, personal health, and WeChat support. First, the component of rehabilitation includes information about diet and activity management, behavior management, and first aid for self-rescue. Second, the individual component displays

the patient's primary health file and contains various information, such as psychological status, medication reminders, rate of recovery, and lifestyle management (daily diet, sleep, and exercise). Then, the WeChat platform supports answers to patient questions, provides medication adherence reminders, and counsels on psychological problems.

Lastly, long-term nursing intervention (Hu et al., 2022). This intervention consists of health education, providing a diary based on records of their disease conditions and medical procedures (medication, exercise, diet, and others), updating important information about CHD and answering questions from patients through groups on the WeChat platform every day. During the intervention, patients must fill in the diary at weeks 1, 4, 8, and 12 after discharge from the hospital. The patient diary includes six items, namely rehabilitation training, three daily meals, daily life, and routine medication. Follow-up is carried out by telephone every week with a duration of 15-30 minutes to evaluate compliance with filling in the diary that has been given previously. The study's results reported that this intervention could improve QoL, social support, and self-management in the intervention group (Hu et al., 2022).

Improved Quality of Life Domains

Based on the results of the review, it shows that there are several domains of QoL in CHD patients that experience improvement after undergoing PCI. The QoL domains identified as having increased after PCI are physical, emotional, economic, function or level of physical limitations, angina frequency, angina stability, social, psychosocial, and cognitive function. In addition, the domain most identified as experiencing improvement in CHD patients after PCI was the physical domain (Wu et al., 2019; Xu et al., 2021; Yin et al., 2022; Zhou et al., 2020), emotional (Xu et al., 2021; Yin et al., 2022), and psychological domain (Peng et al., 2022; Wu et al., 2019). Two other studies reported improvements in total QoL scores without investigating scores from individual domains (Hu et al., 2022; Li et al., 2022).

Discussion

This review aims to identify types of nursing interventions to improve the QoL of CHD patients after PCI. The results of this review show two categories of nursing interventions, namely hospital-based interventions and long-distance rehabilitation (tele-rehabilitation). This review shows how important the role of nurses is in improving the QoL of CHD patients through post-PCI interventions. Thus, nurses need to be oriented toward improving health outcomes and a better QoL (Zhang & Qi, 2021).

Even though PCI is the primary treatment method that can provide a better health prognosis, significantly improving the QoL in CHD patients, this procedure still has shortcomings, one of which is the

occurrence of post-PCI restenosis, which can affect clinical benefits (Al-Lamee et al., 2019; Giacoppo et al., 2017). This has the potential to provide more limitations in the patient's life, which can later make it difficult for them to adapt and experience a decrease in QoL (Szpilewska et al., 2018). In addition, quality and consistent continuity of healthcare is needed in CHD patients after PCI. Interventions to improve the QoL of patients with CHD will then be discussed further based on two categories.

Hospital-based Intervention

Traditional hospital treatment and follow-up methods can no longer meet the long-term recovery requirements of patients after PCI (Yin et al., 2022). Continuing care can be widely applied in various clinical practices as it has been proven to improve patients' medication adherence and their quality of life (Shahrani et al., 2016). This effort can be optimized through various interventions facilitated by hospitals, both in inpatient and outpatient settings.

Post-PCI CHD patients may benefit from early rehabilitation exercises (Vallabhajosyula et al., 2019; Yeow et al., 2020). Based on the results of a study by Peng et al. (2022) using the seven-step rehabilitation training guidelines of the American Heart Association (AHA), the number of patients with LVEF ≥50% was significantly higher in patients who received the intervention in stages. Exercise can gradually restore physical fitness and improve cardiovascular regulation in relatively good condition with increasing ventricular systolic function (LVEF) (Giannitsis et al., 2019). The improvement of patient's health condition can support them to do more daily physical activity, especially in the aspect of self-care (Peng et al., 2022). According to Majumdar et al. (2014), a person who has better activities of daily living has a better quality of life across all domains. Therefore, early rehabilitation exercises can improve QoL in post-PCI patients.

Previous reviews reported that many post-PCI patients experience depression and anxiety (Liu et al., 2019). Chang et al. (2020) reported that there was a significant increase in anxiety scores and the proportion of patients meeting criteria for generalized anxiety disorder 12 months after PCI. If the patient's mental health problems cannot be treated properly, this will trigger long-term discomfort that interferes with daily work and reduces the patient's QoL. Counseling is one intervention that nurses can do to overcome this problem. According to a study conducted by Chang et al. (2020), brief psychological counseling by a trained nurse the day before and after PCI was associated with significantly reduced anxiety scores, and higher scores on QoL measures. Improving the psychological condition of post-PCI patients can help patients adopt positive coping styles, increase endocrine hormone levels and reduce symptoms of psychological stress (Shen et al., 2018).

Yin et al. (2022) reported that Omaha System-based continuous care can improve patient

treatment adherence and QoL after PCI. It can strengthen patients' health knowledge on the one hand, and, on the other hand, this intervention can educate patients to be aware of relevant diseases, the importance of taking medications, and the risks of drug discontinuation (Yin et al., 2022). The data are also consistent with previous studies, that continuous care based on the Omaha System can increase patient medication adherence, which has been proven to improve the quality of life of CHD and myocardial infarction patients (Wei, 2018).

Strengthening health management during the transition period of patient care from hospital to outpatient settings is important to prepare post-PCI patients after being discharged from the hospital. According to previous studies, a large number of CHD patients (25%-40%) do not adhere to the treatment regimen and this leads to recurrence acute myocardial infarction (Ho et al., 2014; Wong et al., 2013). Through this intervention, patient readmission and relapse rates decreased along with improved patient prognosis (Wu et al., 2019). Improved patient prognosis and reduced recurrence rates have been proven to be associated with a better quality of life for CHD patients (Weintraub et al., 2008).

Cardiac Tele-Rehabilitation

During the short hospital stay after PCI, patients cannot thoroughly learn from healthcare professionals how to manage their illness. However, post-CHD patients cannot rely completely on the curative effects of PCI and still require long-term treatment to prevent recurrence and readmission (Kim et al., 2019). On the other hand, patients are also more susceptible to experiencing depression and anxiety after being discharged (Zhou et al., 2020). Meanwhile, the current standard of care for post-PCI patients still does not implement continuous and comprehensive post-discharge care (Kim et al., 2019). Technology is essential in facilitating sustainable patients' treatment after leaving the hospital.

In this review, all studies utilized the WeChat platform for communication and intervention (Hu et al., 2022; Li et al., 2022; Xu et al., 2021; Zhou et al., 2020). This application supports patients receiving long-term and sustainable care and helps them develop good living habits outside the hospital (Hu et al., 2022). Through the WeChat platform, patients can educate themselves on topics relevant to their health at their convenience (Mihalko, 2015).

The use of technology such as WeChat can not only improve QoL, but previous studies reported that this application can also improve psychological status and reduce complication rates after PCI (Zhou et al., 2020). In addition, other studies also report the same thing, where the WeChat platform can provide better social support and self-care and can reduce the level of depression in patients with CHD after PCI (Hu et al., 2022; Xu et al., 2021). Lack of social support in CHD patients after PCI will

increase the mortality rate of myocardial infarction patients, worsen the prognosis, and can even cause psychological problems such as depression (Hu et al., 2022).

We Chat is one of the most popular and frequently used social media apps in China. This application is often used as a communication medium to access and share information related to medical services and healthcare (Zhou et al., 2020). Through the WeChat platform, health workers can provide information and understanding to patients who have wrong perceptions of the management of CR. Furthermore, WeChat has a variety of information formats, such as text, sound, animation, and video. This is beneficial in ensuring the accuracy and professionalism of nursing interventions and increasing patient understanding in receiving information visually from home (Wang et al., 2022). In addition, WeChat can also effectively reduce the missed readmission rate and enhance its initiatives for long-term and chronic rehabilitation management among CHD patients.

This review study has several methodological limitations, especially regarding that year restriction limits publication years (2013-2023) in inclusion criteria. Although the search for study results in this review is based on the criteria of the last ten years (2013-2023) and has the potential to limit the scope of findings beyond that period, the acquisition of the latest data based on up-to-date sources allows relevant studies to be identified and utilized. In addition, the articles analyzed in this review are quite heterogeneous (cohort, RCT, and quasi-experimental). Cohort studies were included because there were no additional studies conducted as RCTs or quasi-experiments. The cohort studies included in the analysis also have good quality because the critical appraisal was carried out with the JBI tool. Therefore, future research can carry out similar interventions in RCT study designs so that additional studies in the future will strengthen the results of this review.

Conclusions

This scoping review shows that eight articles discuss the types of nursing intervention for improving QoL in CHD patients after PCI. In this study, there are two categories of interventions that nurses can carry out: hospital-based (inpatient or outpatient) rehabilitation and tele-rehabilitation. All interventions analyzed in this review significantly improve QoL in CHD patients after PCI. Therefore, these findings provide the options for nurses to maximize their role in providing interventions to improve QoL of CHD patients after undergoing PCI. In line with the promising potential of nursing interventions to improve the quality of life of CHD patients, implementing evidence-based interventions in nursing care settings remains a challenge. Standardized intervention guidelines need to be created in the future for each outcome of interest based on evidence-based findings, so

that specific interventions to improve the quality of life of CHD patients can be applied directly in daily practice.

Declaration of conflict of interest

The authors declare no conflict of interest.

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Data Availability

Not applicable.

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Hope in children with cancer: A narrative review and a concept synthesis

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Abstract

Background: Hospitalized children with cancer encounter pain, suffering, fear, and life-threatening situations which can cause them to feel hopeless.

Purpose: The aims of this study are to acquire new insights about the concept of hope in children with cancer and to identify the attributes, antecedents, and consequences of hope in children with cancer.

Methods: Nine English and Thai-language studies that discussed the hope in children or adolescents with cancer were located using the online database in nursing (1990–2023). Qualitative analysis and synthesis of these studies were completed using an adaptation of Walker and Avant's concept synthesis method.

Results: The antecedents of hope of children with cancer were hope of other persons surrounding them and the relationship between these children and others. The attributes of hope in children with cancer were hope for cure, intentional hope and inner strength. Also, the consequences of hope in children with cancer were well-being, quality of life, coping behavior, expressing new feelings of safety or comfort, and conveying trust to others.

Conclusion: This study found that hope is important and has a positive effect on body-mind and the emotions of children with cancer. Thus, healthcare providers such as nurses should enhance hope in children with cancer by promoting their inner resources, positive experiences, and emotional support, while decreasing negative emotional factors. Therefore, children with cancer have hope in their treatment outcomes and inner strength, leading to their expressing new feelings of safety and a good quality of life.

Keywords: cancer; children; concept analysis; concept synthesis; hope

Introduction Children

Cancer is presently a leading cause of deaths worldwide both in adults and children ([World Health Organization, 2022](#)). In Thailand also, cancer remains an important problem in the country's public health ([Tiankanon, Aniwat, & Rerknimitr, 2021](#)). Cancer in children has negative effects on both the children and all of their family members, resulting in physical and psychological problems ([Lewandowska et al., 2021](#)). Children with cancer not only suffer from cancer but also the procedures for investigation or treatment, and from hospitalization. They encounter pain, suffering, fear, and life-threatening predicaments ([Matziou et al., 2016](#)), which can cause them to feel hopeless.

Psychological distresses, such as anxiety, distress, depression, and hopelessness, are normal feelings within patients with a threatening illness, whether adults or children. Particularly in children with cancer, there are many negative effects from the disease, treatments, and hospitalization. Hope encourages persons encountering a crisis and having hope can result in successful experiences ([Rosenbaum & Spiegel, 2023](#)) and help patients to have trust in their healthcare providers ([Hendricks-Ferguson,](#)

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1997). A threatening illness caused by cancer is a crisis for patients and their family. Moreover, it is also a stressful event for the parents of children with cancer (Deribe et al., 2023). Hope is related to feelings, thinking and experiences as an inner resource (TenHouten, 2023). It can have a different effect from one person to another person, especially family members. Also, levels of hope can increase or decrease due to related situations.

Hope in patients with cancer has been studied by many researchers in both quantitative and qualitative studies. In children, hope is an abstract and, therefore, difficult for children to understand. The spiritual part of children is not well-understood yet, and it is important to know more about the hope of children with cancer.

This study describes the use of the concept synthesis method by Walker and Avant (2005) to develop the concept of hope in children for extracting meaningful categories and behavior from previous studies. The empirical studies have been identified

as key to the investigation of the literary synthesis of hope in children with cancer.

This literary synthesis report was undertaken to acquire new insights about the concept of hope in children with cancer. Also, the authors identify the attributes, antecedents, and consequences of hope in children with cancer.

Methods

Search strategy

The empirical studies about hope in children were identified through a computerized search of Clinicalkey, ProQuest, USMLEeasy, Access Medicine, Cochrane Library, Scopus, Wiley Online Library, BestPractice, SpringerLink, BML Journal online, CINAHL, OvidSP, ClinicalEvidence, PubMed, and Google Scholar for the period from 1990–2023. The keywords for searching were: hope, children or child or childhood, and cancer or oncology. The inclusion criteria were: (1) database research (2) concepts

Table 1. Meaning of hope in children

| Authors | Participants | Methodology and Measurement | Definition |
|---------------------|--|---|--|
| Promsripitak (2000) | Children with leukemia age between 6-12 years. | Correlational research (Quantitative), Herth Hope Index | Hope is stage of mind like confidence in expectation to be successful in the future, hope is the thought and feeling that can resolve complicated situations. Hope has positive correlation with coping behavior of school-age children with leukemia. |
| Snyder (2003) | Children aged between 7-13 years. | Children's Hope Scale | Hope is defined as goal-directed thinking in which the person has the perceived capacity to find routes to goals (Pathways thinking) and motivation to use those routes (Agency thinking). |

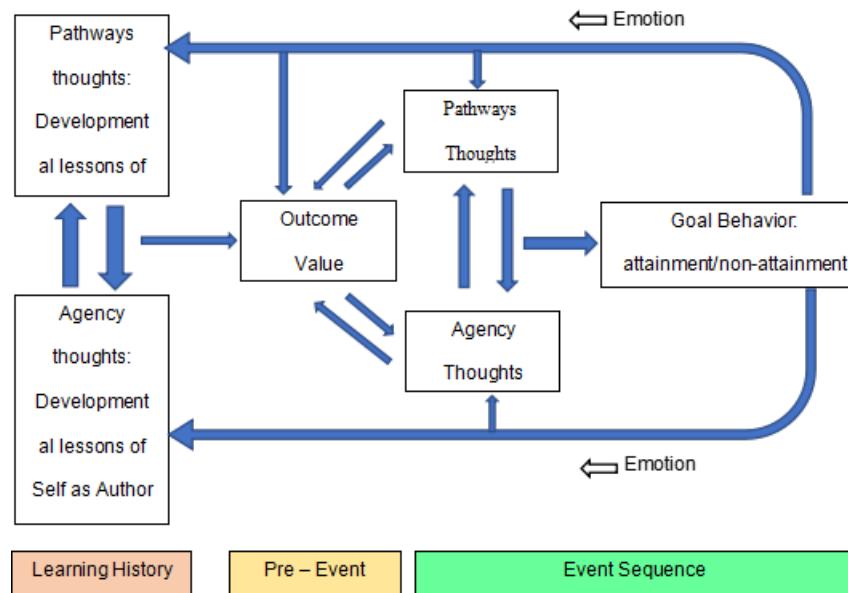


Figure 1. Agency and Pathways Goal-Directed thoughts in Hope Theory. (Snyder and Lopez, (2002) Handbook of positive psychology. New York, NY: Oxford University Press)

associated with hope in patients with cancer, such as hope in children or adolescents with cancer, hope in parents or caregivers, hope in siblings of children with cancer, and hope in healthcare providers, and (3) online publication. The selected articles are those that comprise the attributes and/or antecedents or consequences of hope. Totally, nine articles that were published from 1995 to 2017 were chosen. The step of concept development was performed following [Walker and Avant \(2005\)](#).

The first concept development step was to select the articles that were closest to the concept of hope in children with cancer. The next step was to divide the group of articles that were relevant to the hope of children with cancer. There are four groupings, titled: (a) hope in children with cancer, (b) hope in adolescents with cancer, (c) hope in caregivers or parents who care for children with cancer, and (d) hope in healthcare providers who care for children

with cancer. There are three articles of hope in children, three articles of hope in adolescents with cancer, and four articles of hope in parents and healthcare providers. The field results of definition of hope in children are shown in [Table 1](#). Moreover, the results of the antecedents, attributes, and consequences of hope in children are shown in [Table 2](#).

Results

The model of hope from a previous study shows that hopeful thought reflects the belief that one can find pathways to desired goals and become motivated to use those pathways. Then, when people feel hopeful, this hope can drive their emotions and well-being. [Snyder \(2002\)](#) reported that there are three main aspects that make up hopefulness: goals, the pathway and the agency. The meaning

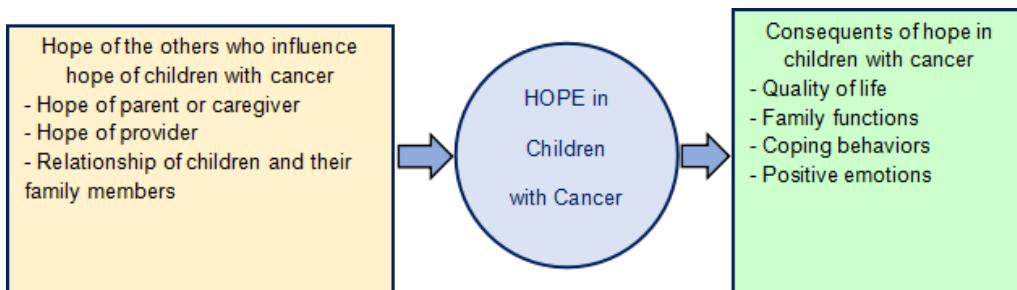


Figure 2. Factors influencing hope in children with cancer and consequences

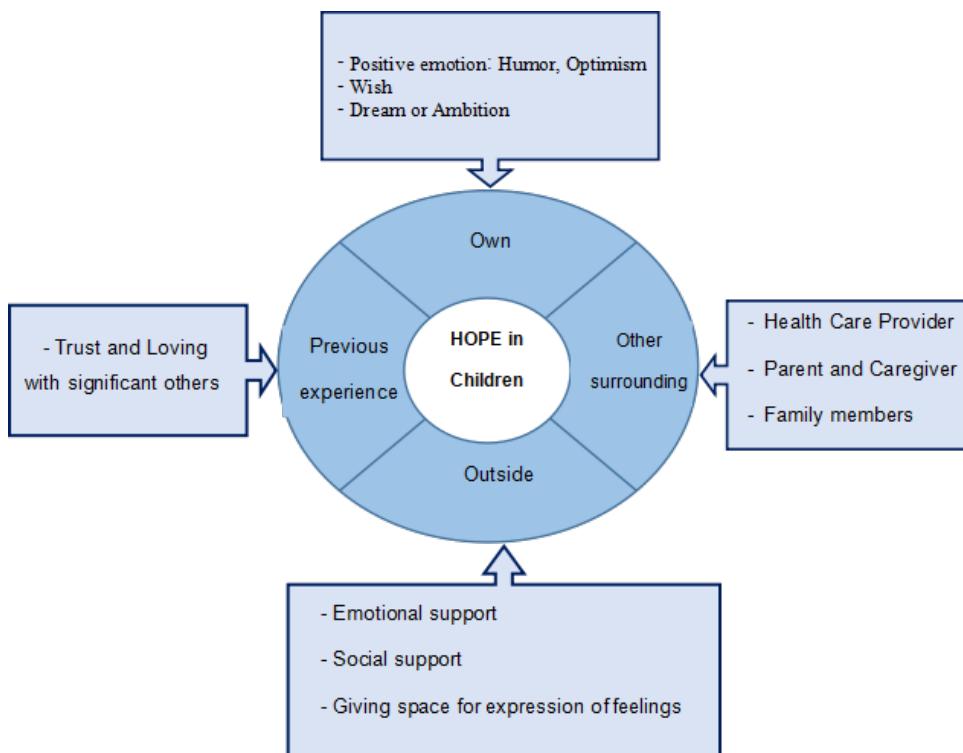
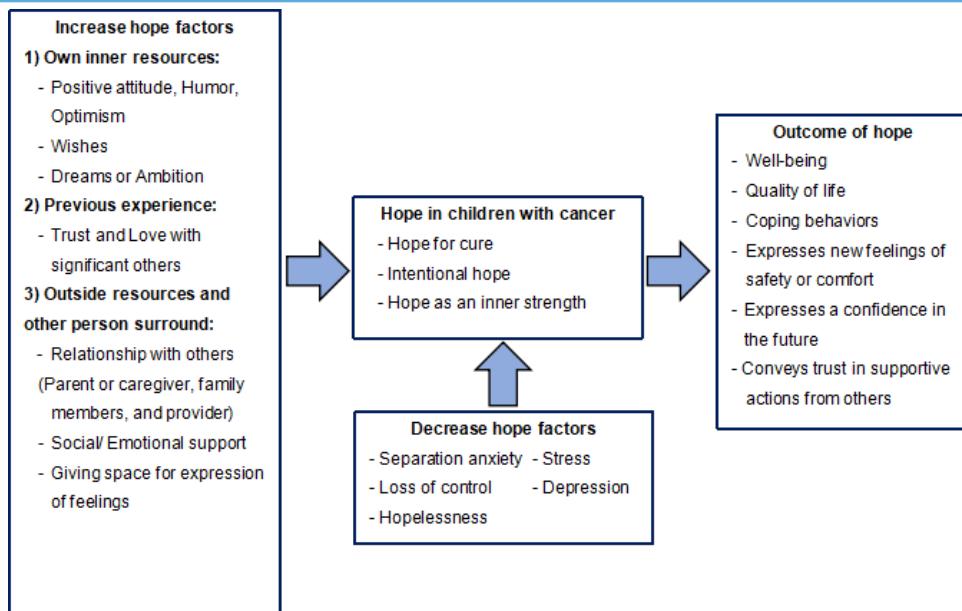


Figure 3. Model of antecedents of hope in children with cancer

**Figure 4. The model of hope in children with cancer**

of goal is approaching life in a goal-oriented way. The pathway is finding different ways to achieve one's goal. Lastly, agency is believing that a person can instigate change and achieve these goals. The details of Snyder's hope theory can be seen in [Figure 1](#):

This study developed the concept of hope in children with cancer by using the information of hope from the literature review; although there is not a direct research study of hope in children with cancer, there is close pattern of hope in children with cancer. This study attempted to search for articles which studied hope in children with cancer but only quantitative studies were found and most of the research was undertaken in parents or caregivers of children. For this study, hope in children with cancer can be summarized as: the factors that influence hope in children with cancer and consequences as shown in [Figure 2](#), and the model of antecedents of hope in children with cancer as shown in [Figure 3](#). Finally, the model of hope in children with cancer is shown in [Figure 4](#).

Discussion

Evaluation of Concept Development of Hope in Children with Cancer

According to the review of the literature, there is little research that studies hope directly in children with cancer. However, it can be concluded that the studies conducted in regard to hope in children with cancer yielded the following research contexts: hope in parents of children with cancer or hope in adolescents with cancer. This study reports on the antecedents of hope that influence, increase and decrease in the hope factor, attributes of hope in children with cancer, and outcomes or consequences of hope.

Antecedents of hope in children with cancer which increase hope factors are: 1) Own inner resources, such as, positive attitude, humor, optimism, wishes, dreams or ambition; 2) Previous experiences, such as, trust and love with significant others; 3) Outside resources and other surrounding persons, such as, relationship with others (parents or caregiver, family members, and provider), social/emotional support, respect, and giving space for the expression of feelings. On the other hand, antecedents of hope in children with cancer which decrease hope factors are: separation anxiety, stress, loss of control, depression, and hopelessness.

The consequences of hope in children with cancer are: well-being, quality of life, coping behavior, expressing new feelings of safety or comfort, expressing a confidence in the future, and conveying trust in supportive actions from others.

Conclusions

Hope in children with cancer refers to the thought and feelings involving the self-perceptions that children have confidence in the expectation to be successful and resolve complicate situations. For the antecedents of hope of children with cancer, there were both positive and negative effects on hope. However, for the consequences of hope were many all-positive affects to children: well-being, quality of life, coping behavior, expressing the new feeling of safety and a confidence in the future, and conveying trust in supportive actions from others. Thus, pediatric healthcare providers such as nurses should enhance hope of children with cancer and their caregivers. On the other hand, nurses should eliminate the factors that decrease hope of children with cancer (separation anxiety, stress, loss of control, and depression) to protect these children from a sense of hopelessness.

Table 2. Antecedent, attributes, and consequences of hope in children with cancer

| Author(s) | Participants | Attributes | Antecedents | Consequences |
|---------------------------|--|---|---|---|
| Graves and Aranda (2008) | Children with relapse cancer aged between 2-16 years old and their parents | + Relationship between child and family + Communication of information - Prognostic uncertainty -Event unfamiliarity for example new treatments, admission to intensive care unit - Inconsistent symptom pattern - Unexpected or unfamiliar symptoms | Coping mechanisms to sustain uncertainty focus on - chance of cure - choosing all offered treatments - trying alternative treatments | |
| Mack et al. (2007) | Parents of children with cancer | - hope for cure | | - Hopeful - Trusts in the physician - Manage and decrease distress of prognosis |
| Esteves et al. (2013) | Adolescents | | + Life satisfaction + Health practices + Well being + Purpose + Academic achievement + Positive affect - Internalizing behaviors - Externalizing behaviors - Substance use - Negative effect | |
| Hendricks-Ferguson (1997) | Adolescent with cancer | | + Age and gender + Social support + Self esteem + Optimism + Future time perspective + Self-efficacy + Religiousness - Stress - Hopelessness - Depression - Anxiety | The individual: - Previous experience in trusting and loving relationships with significant others - Previous experience with successful learning experiences - History of successful goal obtainment - A stressful stimulus, for example being diagnosed with cancer |

Cont. Table 2. Antecedent, attributes, and consequences of hope in children with cancer

| Author(s) | Participants | Attributes | Antecedents | Consequences |
|--------------------------|---|---|---|---|
| Juvakka and Kylmä (2009) | Adolescents with cancer aged between 16-21 years | - intentional hope - hope as an inner strength Feelings - fears - wishes, dreams - belief in God Factors situated between an adolescent and their surroundings - conception about the flow of time - factors situated between an adolescent and their surroundings - positive information - positive perception - limitation - focusing thoughts on other things - continuity and stability of everyday life | Own inner resources - positive attitude towards life - humor - belief in God Factors situated between an adolescent and their surroundings - conception about the flow of time - factors situated between an adolescent and their surroundings - positive information - positive perception - limitation - focusing thoughts on other things - continuity and stability of everyday life | Factors endangering adolescent hope (Not outcome from hope) Grief - grief due to giving up familiar everyday life and giving up one's identity Knowledge - information about the illness - information closely related to the illness Body - fluctuating course of the illness - side effects of treatment |
| Santos et al. (2015) | Parents and children and adolescents with cancer (8-20 years) | | | Quality of life - level of family rituals - parent's hope |
| Conway et al. (2017) | Parents of children 18 years old or younger | | | + Staff's caring actions + positive connection staff - received negative news - children negative experience with procedure and symptoms uncontrolled |

Note: + = Positive relationship to hope, - = Negative relationship to hope

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Conflict of Interest Statement

The authors have declared no potential conflicts of interest.

Data Availability

none.

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Post-operative nursing bleeding management in mitral valve repair-re-exploration patient during early post-operative period: A case report

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Abstract

Background: One of the first targets of post-operative care for cardiac surgery is to control bleeding. Significant bleeding can affect cardiac function as it can lead to hemorrhagic shock, severe anemia, and cardiac tamponade. Valve surgery has a mortality rate of 3.4%. Mitral valve repair surgery has a mortality rate of 1.2% compared to a valve replacement mortality rate of 4.5%. A quick and appropriate decision in the management of bleeding is one of the factors determining the patient's outcome.

Case: 59-year-old female with a medical diagnosis of mitral valve prolapse with severe mitral regurgitation of non-significant coronary artery diseases performed mitral valve repair surgery. This case has a score of 1 on the Papworth scale, which means low risk of bleeding. During treatment in the ICU, there was an increase in blood production from the chest tube of 1,670 ml within six hours post-surgery. PT APTT value was within normal range. Bleeding management during early post-operative period was carried out, namely conducting supporting laboratory tests, monitoring hypotension, monitoring urine production, performing chest tube maintenance, giving blood transfusions, fluid management and collaboration for re-exploration. Re-exploration surgery was performed at the sixth hour of post-operative care.

Objective: This study aims to report on nursing bleeding management in mitral valve repair-re-exploration patient during early postoperative period.

Method: This research is qualitative research using the case study method.

Conclusion: The application of post-operative nursing bleeding management in mitral valve repair-re-exploration patient during the early post-operative period provides good clinical outcomes. Effective collaboration (multi-disciplinary teams) between cardiac surgeon, perfusionist, anesthetist, clinical pharmacist, and nurse is required to prevent and manage post-operative bleeding.

Keywords: early post-operative period; mitral valve annulus repair; nursing bleeding management post cardiac surgery

Introduction

One of the surgeries with high mortality and morbidity is cardiac surgery. According to the Society for Thoracic Surgeons (STS) database, over 774,000 coronary artery bypass surgeries showed a 30-day mortality rate of 2.3% and for over 109,000 isolated valve surgeries it was 3.4% (Mazzeff et al., 2014). Meanwhile, the mortality rate in mitral valve repair is 1.2% compared to mitral valve replacement of 4.5% (Bowdish et al., 2020).

To reduce the mortality rate in cardiac surgery, more efficient early post-operative management is needed. The initial management in the post-operative care after routine cardiac surgery has fundamentally shifted during the past two decades toward a more efficient use of limited post-operative care facilities, early extubation and rapid discharge. The use of fast-track protocols after cardiac surgery is feasible because it can improve

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the effectiveness of perioperative anesthesia management, new surgical techniques, and better myocardial protection and better bleeding management by using point-of-care testing and new hemostatic drugs (Roekaerts & Heijmans, 2012).

One of the initial goals in early post-operative cardiac recovery is control of bleeding (Roekaerts & Heijmans, 2012). Significant post-operative bleeding can result in hemorrhagic shock, severe anemia and cardiac tamponade. All of these impair cardiac function (Zhou et al., 2020). Re-exploration of bleeding after cardiac surgery is associated with significant morbidity and mortality (Elassal et al., 2021). Reoperation for bleeding occurs in anywhere between 2.2% and 11.6% of the seven most commonly performed adult cardiac surgical procedures as reported by the Society of Thoracic Surgeons National Report (D'Agostino et al., 2018). Thus, the survival rate of patients who experience excessive bleeding after cardiac surgery can be improved by thorough assessment, early detection and prompt intervention.

The nursing team's work is essential since it performs continuous observation of the patient and needs to make quick decisions required by the post-operative period of heart surgery. These professionals must identify and prevent complications, acting immediately and contributing to reducing hospital stay (Reisdorfer et al., 2021). This study aims to present nursing bleeding management in mitral valve repair-re-exploration patients during the early post-operative period.

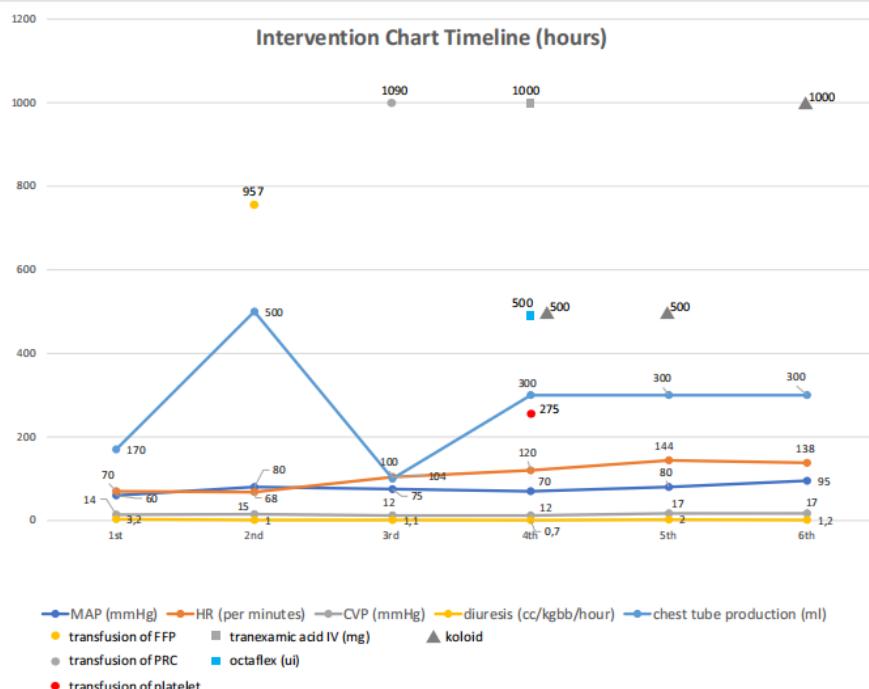
Case Presentation

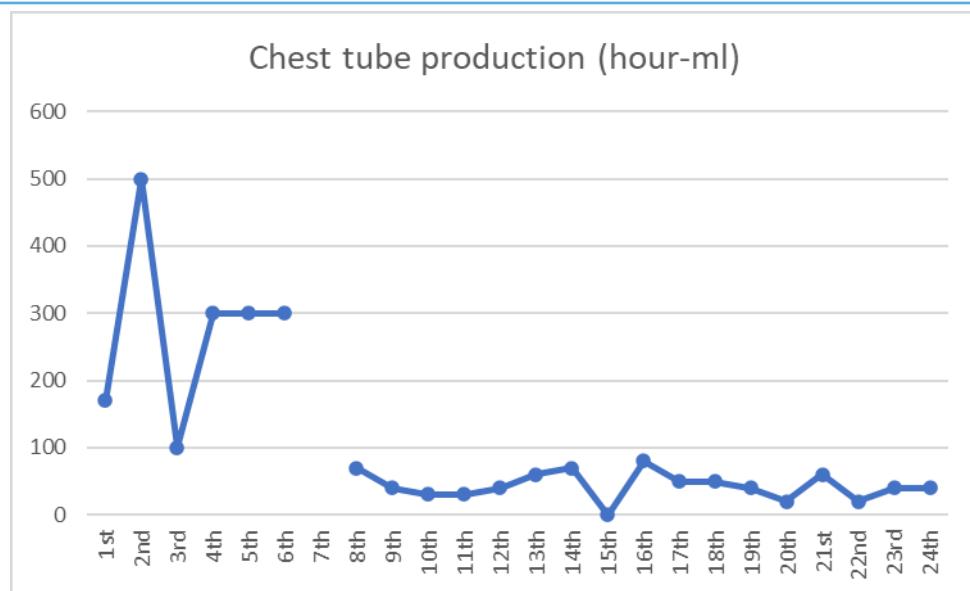
A 59 year old woman, with a preoperative diagnosis of Mitral Valve Prolapse with severe Mitral Regurgitation, non-significant Coronary Artery Diseases, underwent mitral valve repair surgery. Regarding preoperative medications, the patient stopped taking warfarin three to four days and clopidogrel five days before operation while aspirin continued till the time of surgery.

During intraoperative annular dilatation, P2-P3 prolapse, P2 flail, rupture cordae P2, cleft at P1-P2 were found. At the intro operation, a mitral annuloplasty repair was performed with a 32 mm profile 3D band. The operation was carried out for five hours and 15 minutes with a CPB time of 116 minutes. Intraoperative bleeding for five hours and 15 minutes was 1800 ml, intraoperative urine output 2.96 cc/kg/hour, 1000 ml crystalloid incoming fluid, PRC 650 cc.

Based on the Papworth bleeding score, this case has a score of 1. The operation was an elective operation, single valve type of operation, no disease of the aortic valve, age less than 75 years. Only BMI is worth 23.5 kg/m². With a score of 1, this case has a low risk factor for bleeding. This patient was also screened using Pursout scale used to assess the risk of surgery. The patient had a score of 5 (average result) which means the possibility of worsening the condition after surgery is very small.

On arrival at the ICU, vital signs BP 103/56 mmHg with dobutamine inotropic supported 5 mcg





per kilograms of body weight per minute, pulse 69 times per minute, respiratory rate 22 times per minute, with ventilator support mode PS 5 PEEP 5 FiO₂ 50% MV 8.16 VT 377-380 SaO₂ 100% CVP 14 mmHg PAP 23/14 (18). Post-operative laboratory results on Hb 5.3gr/dL; AGD pH 7.304 pCO₂ 41.3 pO₂ 223 HCO₃ 20.5 BE -6.0 SaO₂ 100%.

In the patient, two chest tubes were installed substernal No. 32 Fr and intra-pleural right No. 28 Fr with continuous suction at a pressure of 20 mmHg, no seepage in the area around the CTT insertion, not folded. Drain production one hour after installation of CTT was 120 cc. Furthermore, CTT production while in the ICU in the first hour was: 170 cc; second hour 500 cc; third hour 100 cc; fourth hour 300 cc; fifth hour 300 cc; sixth hour 300 cc.

Intervention or Clinical Examination

Based on the results of our study, we determined the risk of shock related with hypovolemia as the main focus of diagnosis in this case. The NOC (Nursing Outcome Classification) determined was the severity of blood loss with post-operative bleeding indicators.

Furthermore, we define nursing interventions with reference to the nursing intervention classification (NIC), namely (1) prevention of bleeding: closely monitor the risk of internal and external bleeding in patients (amount of drainage from surgical drains, dressings full of blood); record hemoglobin and hematocrit values before and after the patient loses blood; monitor signs and symptoms of persistent bleeding (hypotension, decreased urine output); give blood products; (2) chest tube care: do stripping and milking on the tube only if there is an indication according to the patient's condition or according to the doctor's order; observe the volume, turbidity, color, and consistency of lung drainage, and record it correctly; (3) administration of blood products: check

again that the blood products have been prepared, matched; monitor for transfusion reactions; monitor for excess fluid; (4) fluid management.

Nursing implementation carried out by nurses is in accordance with planned interventions during the early post-operative period, namely prevention of bleeding, chest tube care, administration of blood products and fluid management. Re-exploration interventions are carried out in collaboration.

Chest tube patency is a concern in the Guidelines for Perioperative Care in Cardiac Surgery Society Recommendations for Enhanced Recovery After Surgery ([Engelman et al., 2019](#)). During ICU care, chest tube patency is performed continuously and documented in the flowchart. During treatment in the ICU, the chest tube was not subjected to clothing, continued effective suction, and there was no seepage in the chest tube insertion area. Drain production is recorded hourly in a flow chart.

According to ERAS, patients should receive 1.5-1.7 liters of fluid per day to meet their fluid needs ([Kłodziej et al., 2019](#)). In this case, crystalloid fluids were given as much as 1500 cc/24 hours. In patients with bleeding, packed RBCs are given if Hb is less than 8 g/dL with mixed venous saturation > 60% and if Hb is < 10 g/dL with mixed venous saturation < 60%. platelet transfusion is recommended by NIH and ASA for active bleeding associated with thrombocytopenia (platelets <50,000 μ L⁻¹) or in abnormal platelet function ([Elassal et al., 2021](#)). The patient was given a 957 cc FFP transfusion, 1090 cc PRC, 275 cc TC transfusion.

In accordance with the ERAS protocol, during post-operative care in the ICU, Prevention of Renal Stress and Acute Kidney Injury was performed. This included recording the details of urine output every hour, namely the 1st hour 160 cc, 2nd hour 50 cc, 3rd hour 55 cc, 4th hour 40 cc, 5th hour 100 cc, 6th hour 60 cc. Fluid balance: +640 cc/last 3 hours.

Nurrahmani, U., et al. (2024)

For collaborative medical action, administration of octaflex injection 500 iu, extra injection of vitamin K 20 mg IV and tranexamic acid 1000 mg IV was carried out. Lab tests were carried out with results within normal limits PT 15.5, INR 1.10, APTT 34.20. on to re-exploration at the sixth hour of treatment in the ICU. The re-exploration lasted one hour and 10 minutes. A source of bleeding was found from a branch of the innominate vein and oozing was found in the area of the sternum, other organs were intact. During the surgery, an additional drain was placed in the left intrapleura. Intra op bleeding re-exploration 1000 mL Urine output intraoperative re-exploration 150 cc.

Hemodynamically stable with minimal inotropic support. CTT production after re-exploration 20-50 cc/hour. post re-exploration CTT drain production decreased from before re-exploration. After re-exploration, transfusion was carried out with PRC 1049 cc FFP 967 cc and Hb post-transfusion 11.7gr/dl; hematokrit (36,0-45,0) 35,3%; platelets 86,000; coagulation factors normal ((PT 15,2; INR 1,07; APTT (21-41) 34; fibrinogen (238-498) 256 mg/dl; quantitative D-Dimer (<0,55) 0,28)). Eight hours after surgery, the doctor extubated the patient. Urine production decreased to 0.5 cc per kilogram of body weight per hour; it was decided to furosemide 10 mg/hour. With stable hemodynamics and POD 1, patient was moved to the HCCU room.

The nursing interventions during the early post-operative period are illustrated in the chart below.

The graph above illustrates the nurse's actions to closely monitor the patient's hemodynamics, diuresis, and chest tube production. In addition, the nurse also intervened immediately and appropriately according to clinical decisions, such as transfusion, medication, and fluid administration. During six hours of monitoring and intervention, with appropriate and immediate bleeding management interventions for the hemodynamic fluctuations of the mitral valve repaired patient during early post-operative period, the patient's outcome was stable.

Ethical consideration

The patient has given written informed consent. The Health and Research Committee of Dr. Hasan Sadikin Hospital approved this study (No. LB.02.01/X.6.5/298/2022).

Results

After repair-re-exploration, nurses continuously monitored the risk of shock related to hypovolemia associated with post-operative bleeding indicators. From the graph, it can be seen that post re-exploration there is a decrease in the amount of drain production. Re-exploration intervention at six hours and installation of an additional drain in the left intrapleura was able to overcome the bleeding in the patient.

Nursing evaluation is carried out based on the

patient's response after nursing interventions, the results of the evaluation on the 24 hours treatment show no signs of risk of shock and the patient can be transferred to a semi-intensive room. Based on that, we conclude that patients improve with the interventions that have been given and the problem of nursing risk of shock is resolved.

Discussion

Perioperative nursing care demands an understanding of the risk factors for excessive bleeding after cardiac surgery to ensure vigilance in prioritizing and promptly addressing those that are modifiable (Lopes et al., 2015). In this case, the risk assessment of worsening is very low and the possibility of bleeding is very small. But, in this case, the patient experienced active bleeding and underwent re exploration. This is in accordance with a study that states reoperation for bleeding is generally due to technical failures, and less dependent on patients' preoperative risk factors (Zhou et al., 2020). An ICU nurse who plays a role in early post-operative period care should provide intensive care that is able to handle unexpected situations. The intensive care should be provided in early post-operative period and is related to the surgical success and adequate patient recovery (Reisdorfer et al., 2021).

Timing of re-exploration greatly affects outcome. The decision of re-exploration is a teamwork decision involving cardiac surgery and ICU physicians and finally approved by the operating surgeon (Elassal et al., 2021). With appropriate medical intervention and decisions, the patient in this case can be re-explored in the sixth hour post-operative. According to a prospective observational multicenter study in 2016, a six hour bleeding rate of 1.5 ml/kg/hour is an indicator of active bleeding in post-cardiac surgery patients (Colson et al., 2016).

A study states that delay in returning to the operating room may also lead to increased risk of morbidity and mortality (Zhou et al., 2020). Another study stated that the increased risk of in-hospital mortality is partly attributed to delays in operating room access for emergency surgeries (McIsaac et al., 2017). Quick and precise decisions for re-exploration improve patient outcomes. Poorer outcomes and increased mortality of up to 37.5% were closely associated with delayed re-exploration (>12 hours) (Colson et al., 2016).

In this case, the patient underwent cardiac surgery using a CPB (Cardio Pulmonary Bypass) machine. The use of CPB machines has several complications including System Inflammatory Response Syndrome, bleeding, pain, cardiovascular complications, pulmonary complications, neurological complications, renal complications, endocrine complications, infections, and gastrointestinal complications.

Another effect of using a CPB machine is bleeding. Heparin is applied to all parts of the

machine during CPB use to prevent massive extravascular coagulation. During using the CPB machine, the body temperature is lowered by 28-32 degrees Celsius to lower the body's metabolism. After completion of the use of the CPB machine, protamine is given as an antidote to heparin. When the patient enters the ICU room, the patient's condition is still hypothermic so it must be warmed up immediately. Hypothermic conditions make coagulation factor enzymes unable to work optimally. But when the body temperature has returned to normal, heparin is reactivated, increasing the risk of bleeding (Urden et al., 2014).

In these patients, CPB time was 116 minutes. To minimize the occurrence of unfavorable adverse outcomes, it is recommended that the CPB/graft time and cumulative CPB time be kept below 56 minutes and 180 minutes, respectively (Madhavan et al., 2018). CPB time in this case is within the normal range. In these patients, with a normal CPB time range, it is hoped that complications can be minimized. By looking at the CPT time still within the normal range and normal coagulation factors, the decision to re-explore is the right action in handling bleeding cases due to surgical factors.

Monitoring of nursing interventions in this case uses invasive and non-invasive hemodynamic parameters. Invasive monitoring used is Invasive Blood Pressure, central venous pressure, and pulmonary artery pressure. Non-invasive monitoring includes Mean Blood Pressure, heart rate, and urine output. In the first two hours in the ICU, there was no change in vital signs. In the third hour, heart rate started to rise, CVP rose either due to the effect of loading or there was intrathoracic pressure due to the production of a lot of drain that had not been released. In the third hour, when the MAP dropped, the patient was given resuscitation fluid, namely colloidal fluid as much as 2000 cc. After resuscitation, the patient's hemodynamic monitoring parameters were still within the normal range.

Fluid administration is a powerful tool for hemodynamic stabilization as it increases preload and improves cardiac function in fluid-responsive patients (Bignami et al., 2017). Cardiac surgery and CPB elicit a systemic inflammatory response which produces a capillary leak. Therefore, fluid resuscitation with crystalloids and/or colloids is necessary to offset the hemodynamic consequences of the capillary leak and the vasodilation that occurs from rewarming and vasodilating drugs. However, the maintenance of intravascular volume in the leakage phase occurs at the expense of expansion of the interstitial space (Roekaerts & Heijmans, 2012).

Managing bleeding in cardiac surgery poses a considerable challenge (Pearse et al., 2019). In the management of bleeding after cardiac surgery, PRC transfusion must be managed according to protocol and determined by the clinical status of the patient. In this case, the patient was given PRC transfusion with a laboratory result of 5.4 g/dl. A

study mentioned Packed RBC is given if Hb is less than 8 g/dl with mixed venous saturation >60% and if Hb <10 g/dl with mixed venous saturation <60% (Elassal et al., 2021). Allogeneic RBC transfusion is unlikely to improve oxygen transport when the hemoglobin concentration is greater than 10 g/dL and is not recommended (class III: no benefit; level B-R) (Huang et al., 2021).

However, the indiscriminate use of blood products in cardiac surgery has been associated with increased risk of infection, increased need for mechanical ventilation, increased organ failure, longer length of hospital stay, and higher mortality rates. Although blood transfusion may become imperative for the management of postoperative cardiac surgery patients, several efforts have been made to restrict and standardize transfusion practice and improve outcomes for patients (Moraes et al., 2021). Therefore, transfusion monitoring is very important in the post-operative management of cardiac surgery patients. In the intervention that has been carried out, the administration of transfusion is in accordance with medical indications and during the monitoring of transfusion administration no transfusion reaction was found.

Medication administration in bleeding management is done collaboratively. Nurses must understand how to administer drugs and the side effects that may occur after injection. Hemostatic medications play a vital role in the management of perioperative bleeding (Elassal et al., 2021). In this case, the patient was given medications, namely octaflex injection 500 iu, extra injection of vitamin K 20 mg IV and tranexamic acid 1000 mg IV. A decrease in the incidence of allogeneic blood transfusion and re-exploration rate is associated with the use of tranexamic acid (Miles et al., 2022; Myles et al., 2017).

Morbidity and mortality are significantly associated with the incidence of rebleeding after cardiac surgery (Elassal et al., 2021). Therefore, post-re-exploration monitoring for signs of bleeding should be improved. A study mentioned that re-exploration for bleeding was significantly associated with longer ICU stay, hospital stay, and increased incidence of SWI. A higher mortality rate was found in patients who underwent re-exploration (15.4%) (Elassal et al., 2021). However, in this case, the patient's prognosis improved after undergoing re-exploration.

Conclusions

The implementation of post-operative nursing bleeding management in patients with mitral valve repair-re-exploration during the early post-operative period includes performing supporting laboratory examinations; monitoring hypotension; monitoring urine production; performing chest tube care; providing blood transfusions; fluid management and collaboration for re-exploration provides good clinical outcomes. Effective collaboration (multi-

disciplinary teams) between cardiac surgeon, perfusionist, anesthetist, clinical pharmacist, and nurse is required to prevent and manage post-operative bleeding.

Declaration of Interest

The authors have no conflict of interests.

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Data Availability

Please contact on reasonable request: ulfahnurrahmani@yahoo.com.

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Critical thinking of repositioning practice as a quality of nursing care indicator

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Abstract

Repositioning is all nursing activities that aim to change the posture of bedridden patients from one side to another during the hospital stay to minimize the pressure load on bony prominences and prevent pressure ulcers or injuries from developing. This is a discussion paper based on nursing and healthcare quality literature references. This paper describes the importance of repositioning practice based on the empirical study and experience as nurses and nurse managers. This perspective supports the existing literature to link repositioning practice and the quality of nursing care process indicators. Repositioning practice could be considered as an indicator of the process of care. This paper emphasizes repositioning practice as a fundamental nursing intervention and how it becomes meaningful for nursing indicators. Nurses need a standard of repositioning and its measurement at the international level.

Keywords: bedridden persons; nursing process; quality of healthcare; posture

Introduction

Over the last 200 years, nurses have played a notable role in preventing pressure injury development. Nursing science presents guidelines and protocols to ensure proper prevention for pressure injury development that includes repositioning practice, pressure offloading, nutrition support, and skin hygiene (Al-Dorzi, 2017; Beeckman et al., 2010, 2011; Cameron et al., 2014; Jankowski & Nadzam, 2011). However, pressure injuries still challenge hospitals and insurance agencies. It presents a broad level of impact in different levels of hospitals (Bates-Jensen et al., 2003; Beeckman et al., 2010; Courvoisier et al., 2018; European Pressure Ulcer Advisory Panel et al., 2019; Jankowski & Nadzam, 2011). This pushes the hospital accreditation bodies to include pressure injury as a nursing quality indicator (Joint Commission on Accreditation of Healthcare Organizations [JCI], 2014), which means it measures the quality of nursing care (Montalvo, 2007). In essence, pressure injuries can be seen as an indicator of substandard nursing care. Consequently, a decrease in the incidence of patients developing pressure injuries can be interpreted as a positive outcome, suggesting the provision of high-quality care. Nevertheless, it is essential to acknowledge that, while nurses bear some responsibility for pressure injury management, numerous other factors, totaling more than 13, are intricately associated with developing pressure injuries. These factors include, but are not limited to, the type of mattress utilized, underlying disease processes, and the age of the patients. (Avsar et al., 2019; Collier & Moore, 2006; Moore, 1988, 2010; Moore & Van Etten, 2014). Therefore, considering the pressure injury rate to reflect nursing care quality is unfair and needs further modification.

Pressure injury development results from the interaction of several factors that lead to tissue death in skin layers (Gefen, 2018; Schwartz & Gefen, 2019). The key factors influencing the development of pressure sores are the intensity and duration of pressure and the skin's and its supporting

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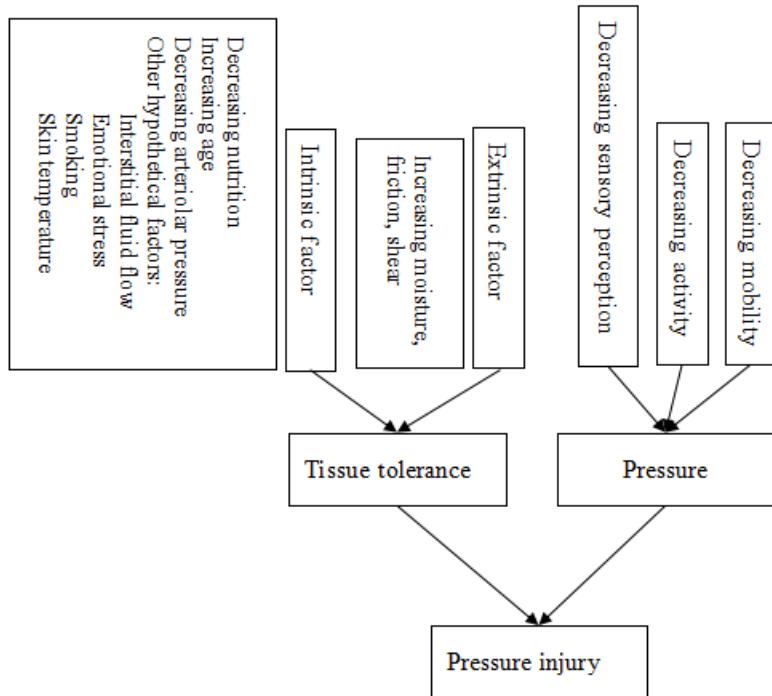


Figure 1. Pressure injury scheme (Braden & Bergstrom, 1987)

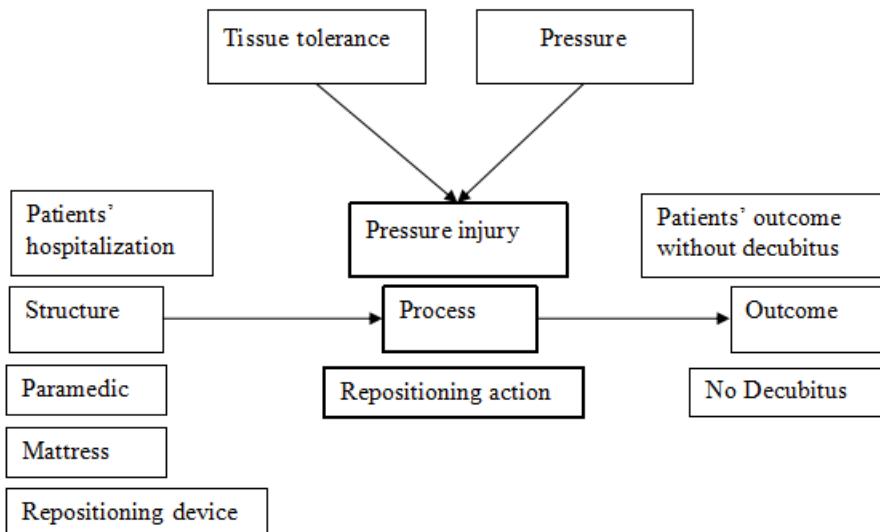


Figure 2. Repositioning practice as a quality nursing care process indicator frame concept

structure's ability to tolerate pressure (refer to Figure 1) (Braden & Bergstrom, 1987). The concept of "tissue tolerance" refers to the capacity of both the skin and its underlying structures to withstand the impact of pressure without experiencing negative consequences. The factors contributing to extended and heightened pressure levels can be broadly examined through the frameworks of mobility, activity, and sensory perception.

The concept of tissue tolerance for pressure encompasses two distinct categories of extrinsic and intrinsic factors. Extrinsic factors play a role in

determining tissue tolerance by affecting the skin surface, and they indicate the extent to which the skin is subjected to moisture, friction, or shearing forces. Intrinsic factors refer to the elements that impact the structure and integrity of the skin's supportive systems and the vascular and lymphatic systems that provide service to the skin and underlying structures.

Therefore, experts have two options to maintain the quality of care in preventing pressure injury development. Either control all factors that are associated with a pressure injury and separate it for

pressure injury due to low quality of nursing care and pressure injury due to other factors. Alternatively, monitor the nursing actual performance in doing pressure injury prevention, which in this case includes repositioning practice, skin inspection, offloading mattress application, and nutritional support (European Pressure Ulcer Advisory Panel et al., 2019). However, in different hospitals, nutritional support overlaps with other healthcare disciplines, such as dietitians and medicine (Fossum et al., 2013). Furthermore, mattress availability is a more administrative issue and might be associated with the hospital management not directly related to clinical nursing performance, and is either available or not (Casey, 2013; Duncan, 2007; Giesbers et al., 2016). Repositioning practice monitoring is most representative for the intended objective of evaluating the quality of nursing care in preventing pressure injury.

Based on the aforementioned background, repositioning practice is the action during patients' hospitalization. We consider nurses' activity as a process to achieve patient outcomes. The importance of nurses' repositioning practice becomes essential as an indicator of the process and becomes an important consideration. Therefore, the current paper intends to answer the question: To what extent is the repositioning practice measurement among nurses in hospitals accepted as a process indicator for the quality of nursing care for bedridden patients in hospitals? The sub-objective of this study emphasizes the importance of repositioning as a nursing intervention and how it relates to the quality of the nursing care process. Thus, nurses have to deeply explore the intervention and its impact, which would increase the value of the nursing intervention.

Discussion

A critical value of the process

Donabedian's (1966) module symbolizes healthcare quality based on the flow of events in which he proposes a description of healthcare quality consisting of three components: structure, the process, and the outcome (Closs & Tierney, 1993). The model defines quality as doing the right things at the right time in the right way for the right person, which presents a significant mental shift in the perspectives, ideas, and thinking approaches in healthcare to define quality as a comprehensive frame (Ayanian & Markel, 2016). Best and Neuhauser (2004) assume that the movements from structure to outcome through the process define the overall quality of care. Therefore, the structure is the input components, such as the providers' characteristics, the client, and where the care occurs (Donabedian, 1966). The process is the mental and physical activities for the interactions between the input components, making it the central aspect of care (Donabedian, 1966). Finally, the outcome results from care and presents the consequence (Donabedian, 1988).

The nurse examines the patient, analyzes the

patient's problems, develops a plan to meet the patient's needs, implements the program, and evaluates patient care in nursing care (Juanamasta et al., 2021). Nurses' perception is vital to identifying, analyzing, refining, and preventing patient care problems. It shows the critical nature of assessing the quality of nursing care that would increase its quality, particularly during the care process, as shown in Figure 2 (National Council of State Boards of Nursing, 2010).

Quality care and collaborative processes are equally important in the primary functions of nursing. Measures of process aspects of practice assist nurses in understanding the limitations of their discipline-specific clinical practice, allowing them to quickly integrate evidence-based practice into patient care without undue deliberation or hesitation. More importantly, increased knowledge of the care process will help nurses maintain their autonomy during patient encounters. Additionally, it will raise awareness of the importance and value of high-quality nursing care. Evaluating the practice process will raise nurses' awareness to accept their professional identity. However, nursing management continues to place a premium on outcome measurement, with less emphasis on nursing care measurement.

Repositioning as a nursing care

Florence Nightingale valued repositioning for pressure injury prevention (Nelson, 1954). During the Renaissance (Selander, 2001), the term "moved out" was used to denote "providing on-the-bed therapy" with "muscular effort" according on what Florence Nightingale said (Elliot, 1896) and many considered its role in pressure ulcer prevention (at that time known as bedsores). The research also indicates that this depends on the number of times. However, though the claims were supposedly based on expert analysis, they were not. Also, the technique lacks any notes about shifting the patient into the new position, which describes the procedure or scheduling (time). Since it was surprisingly claimed by some that the prevention of pressure ulcers is accomplished with vacuuming, new therapies have been offered (Scanlan, 1886).

Nursing science aims to be more standardized. Therefore, the body of nursing science presents the repositioning practice as the nursing responsibility that assures caring for bedridden patients through several steps to offload the pressure area and prevent ulcers from happening (Brunner, 2010; Hinkle & Cheever, 2018). However, the agreements of nursing experts about the repositioning practice are still defragmented descriptions and discussion about aspects of repositioning such as the timing issue and the position descriptions (Moore & Van Etten, 2014).

Moreover, repositioning is one of the nurse competencies. A study from the United States showed repositioning as a part of competency included in curricula of certified nursing assistants/nursing assistants, nursing associates, and bachelor nurses (Howe, 2008; Powell-Cope et al., 2018).

However, [Du et al. \(2020\)](#) found that turning or repositioning patients lacked nursing care, ranking 5th out of 29, although it was the primary number two of nurse activity. Thus, whether the problem comes from curricula or practicals becomes a major question in our profession.

[Pasquale \(2008\)](#) revealed pressure ulcers are caused by neglect. To maintain safety and outcomes, she emphasized that the professional nurse and their staff must fully understand secondary development's critical causes and effects. We can illustrate that patients with mobility limitations have a higher chance of getting ulcers, which will become pressure ulcers if the nurse does not give repositioning. Many studies found repositioning is the critical factor that predicts pressure ulcers, ([Ayello et al., 2017; Crumbley & Kane, 2010; Tannen et al., 2008](#)). This cause and effect should be clearly described as the importance of repositioning is an essential nursing fundamental action.

Repositioning as a quality of the nursing care process

Repositioning is currently based on what the nurses "perform" for bedridden patients to prevent harm from happening (pressure ulcers). Also, quality of nursing care defines the processes as what the caregiver "performs" to satisfy the patient's need for "input" to provide the required care "outcome." So, by defining the repositioning performance as what nurses will "perform" to prevent the harmful "outcome," there appears to be an apparent consistency between the general understanding of the "low repositioning performance" and the theoretical description "input to processes to output," and the relation to pressure ulcer development ([Iblasi et al., 2022](#)).

Undoubtedly, repositioning practice is a crucial process for pressure injury prevention. The literature shows that repositioning practice is used as a quality indicator in some hospitals ([Renganathan et al., 2019; Schutt et al., 2018](#)). Moreover, [Burston et al. \(2014\)](#) explained that the process included specific interventions that reposition pressure ulcers. They emphasized that the quality nursing care process of repositioning would help to prevent pressure ulcers. Furthermore, [Oner et al. \(2020\)](#) described pressure ulcers as a patient outcome and repositioning practice as part of the quality of care in the process phase ([Källman et al., 2016](#)). Therefore, repositioning can be considered a quality of nursing care process to prevent pressure ulcers.

Indicators would help a nurse improve the quality of nursing care by regularly monitoring and evaluating the structure, process, or outcome of nursing care ([Heslop et al., 2014; Mainz, 2003](#)). Process indicators assess the treatment given to the patient, both how it was provided and the patient outcome. A process is a chain of actions connected to achieving a goal. Indicators are applied in providing care for a patient during one or more episodes ([Mainz, 2003](#)). The nurse's tasks in delivering treatment are part of the nursing care process concept. Thus it can be claimed that repositioning is responsible for the

patient's pressure ulcer.

[Mainz \(2003\)](#) showed examples of the process, such as the proportion of patients with diabetes given regular foot care, the proportion of patients with myocardial infarction who received thrombolysis, and the proportion of patients treated according to clinical guidelines. It can be considered as a proportion of patients with limited motion given repositioning. Further empirical studies are needed to find the best measurement for repositioning as an indicator.

Process variables include both the specific interventions nurses provide such as regular repositioning for pressure ulcer prevention and the process of care delivery, such as the model of care. The association between the process of care variables and patient outcomes have been explored, but to a lesser extent than structural variables. Process variables include both the specific interventions nurses provide such as regular repositioning for pressureulcer prevention and the process of care delivery, such as the model of care. The association between the process of carevariables and patient outcomes have been explored, but to a lesser extent than structural variables

A lack of a care process during hospitalization could lead to pressure ulcer development. It is painful and costly, and skin breakdown significantly impacts the patient's quality of life, morbidity, and mortality ([Iblasi et al., 2022](#)). Although not all patients can get prevention, early surveillance is essential to maintain quality nursing care ([Casey, 2013; Tayyib & Coyer, 2017](#)). Thus, early assessment of repositioning needs to be developed.

Challenge in nursing

The review assured that repositioning practice is the nursing's responsibility. As such, the repositioning practice is considered a logical aspect in considering its role in preventing pressure ulcers. Nurses are responsible for preferring the repositioning practice to prevent pressure ulcers, which may be associated with other non-nursing factors if developed, even with the prevention in place.

On the other hand, a fundamental challenge for considering repositioning practice as a quality of nursing indicators is the need for measurement tools. Nursing science is required now to create a standardized, well-formatted, and available repositioning practice tool. The standard measurement tools should be able to satisfy the clinical needs by creating reliable and valid measuring instruments for the repositioning practice, as well as to satisfy the ease of use and the availability in hospital. Currently, there are different methods presented by the literature, such as repositioning practice measurements, chart review, and observations. However, these options need to standardize the measurements.

In several studies, as a suitable way of measuring the repositioning practice, this method assumes that, when the nurse documents the repositioning practice as it happens, it has happened already

(Ali et al., 2018; Beeckman et al., 2011). Although this option is suitable for use in hospitals, it is likely that missing documentation is part of the current nursing practice. Thus, the validity of the collected measurements needs to be more convincing to the reader (Li, 2016).

Observing nurses while doing the repositioning practice might appear a valid approach (Gillespie et al., 2014; Hartmann et al., 2016). However, studies present that there is no actual ability to observe the nurses twenty-four hours a day, seven days a week, even by taking the possibility of having the Hawthorne effect or changing the nursing practice when they feel they are under observation. Therefore, observing the nursing repositioning practice data and considering it a quality indicator is challenging in nursing (Tayyib et al., 2016).

Implication for nursing

Repositioning practice has significant benefits for patient outcomes and quality of nursing care. As a fundamental practice, repositioning must be distinct from nursing competence and intervention. A lack of understanding leads nurses to neglect it. Therefore, considering how to measure appropriately would help the nurse perceive it as an indicator. The indicator will then support the nurse to observe it daily, weekly, or monthly. Nurse managers and nurses can improve their quality based on the evaluation of the indicator. Therefore, it is a critical concern for repositioning practice.

Nurses need to explore repositioning practice as inadequate understanding of the state of nursing science needs further study. The study for a specific position and specific disease would increase nurses' knowledge of repositioning practice. Moreover, repositioning involves musculoskeletal issues that impact blood hemodynamics.

Conclusion

Repositioning practice is vital as a practical nursing intervention that Florence Nightingale developed in World War I. Nursing science has explored it over time; however, many nurses have decreased their concern and need to pay more attention to it nowadays. This condition makes it shift from nursing practice into integrated care with other professionals.

Meanwhile, repositioning practice is an essential task for preventing pressure ulcers and must be considered as regard the quality of nursing care process indicators, specifically in the hospital. If the nurse can control the process strictly, it can be predicted that pressure ulcers can be reduced. Thus, the quality of the process is vital in guaranteeing the outcome.

However, the evidence shows that nurses have several layers of challenges in using the concept of repositioning practice as quality aspects. This refers to the lack of standardized measurements for the "repositioning practice" and the need for international comparisons using the same tool in different places to reach the benchmarking.

Declaration of Interests

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