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Transdisciplinary Approach to Prevent Stunting in Indonesia

Laili Rahayuwati[1*], Desy Indra Yani[1], Arlette Suzy Setiawan[2], Myra D Oruga[3]

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Abstract

Stunting remains a public health burden in Indonesia. National strategy and coordination of acceleration implementation for stunting reduction have been applied. The transdisciplinary approach is essential to improving the effectiveness and efficiency of all levels of participating in stunting programs. This transdisciplinary approach is expected to solve stunting problems from upstream to downstream and provide innovations based on local and national needs. In creating a stunting-free area, a transdisciplinary approach not only decreases stunting prevalence but also sustains children's health status.

Keywords: growth disorders; prevention; stunting; transdisciplinary

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A high prevalence of stunting poses a severe danger to the nation's ability to attain the Sustainable Development Goals (SDGs) and its economic growth and development. The convergence of crises, led by COVID-19, climate change, and wars, has repercussions on all of the Sustainable Development Goals, including food and nutrition. By 2030, goal two aims to eradicate hunger and all types of malnutrition, including reducing stunting in children by 50% by 2030; as such, the annual rate of decline must double. There were 149.2 million children under five suffering from stunting in 2020 (UNICEF, 2021). In 2020, Asia was home to over half of all stunted children under five, while Africa was home to the other half. The results of the 2022 SSGI survey on Indonesia's nutritional status decreased from last year's 24.4% fell by 2.8% to 21.6% (The Ministry of Health of the Republic of Indonesia, 2023). The stunting reduction rate is targeted to be 3% annually; however, for 2022, it was only 2.8% due to the impact of the pandemic. The five regions with high proportions are in East Nusa Tenggara, West Sulawesi, Aceh, West Nusa Tenggara, and Southeast Sulawesi, and the high stunting numbers are in West Java, East Java, Central Java, North Sumatra, and Banten (The Ministry of Health of the Republic of Indonesia, 2023). Stunting is a serious health issue for Indonesian newborns and toddlers. The government must overcome the stunting problem because it will slow Indonesia's golden generation in 2045.

A national strategy to accelerate stunting reduction is stated in Presidential regulation number 72 of 2021 (Presidential Regulation of Indonesia, 2021). The pillar of national strategy, specific intervention services, and sensitive intervention services are explained in Figure 1. Eleven stunting-specific interventions focused on before birth and children aged 6-23 months have been evaluated. In terms of prenatal care, including anemia screening and antenatal care, 18.5% has been done in Indonesia. Monitoring of toddler growth and development was carried out on 13.7% of children aged 6-11 months and 22.4% of children aged 12-23 months (The Ministry of Health of the Republic of Indonesia, 2023). In addition, the nutrition-sensitive intervention that has had the most significant impact on the prevalence of stunting in infants between the ages of 6 and 24 months in three regencies in Indonesia during the COVID-19 pandemic is access to sufficient latrines (Sugianti & Putri, 2022). Sensitive and specific intervention programs include

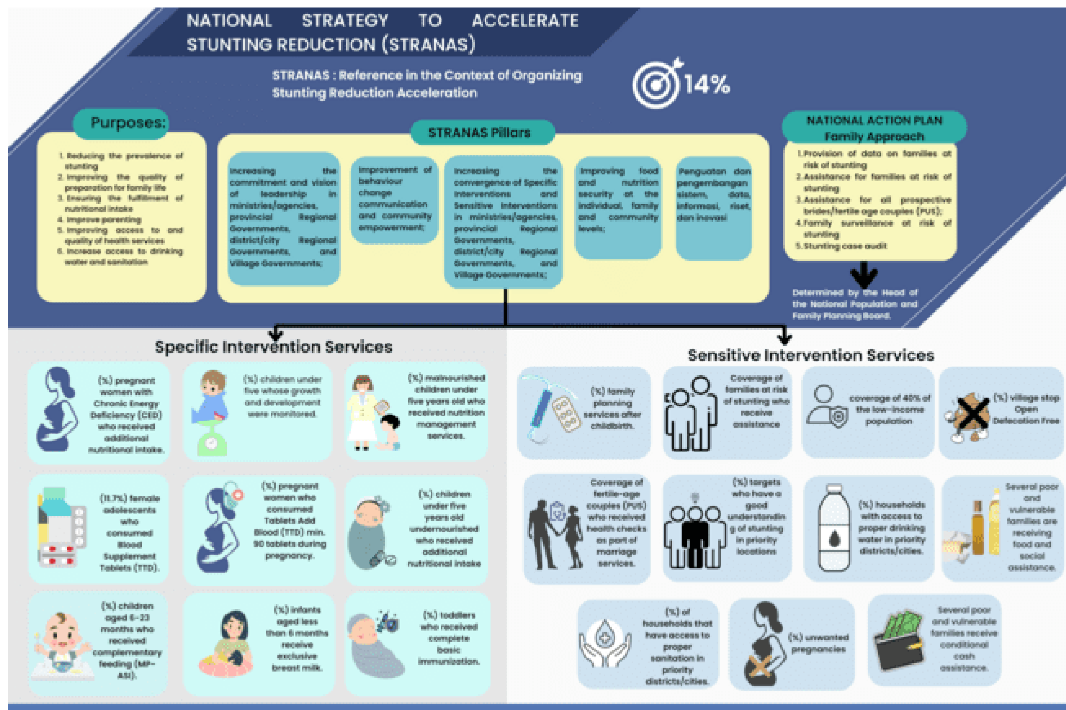

Figure 1. National Strategy to Accelerate Stunting Reduction

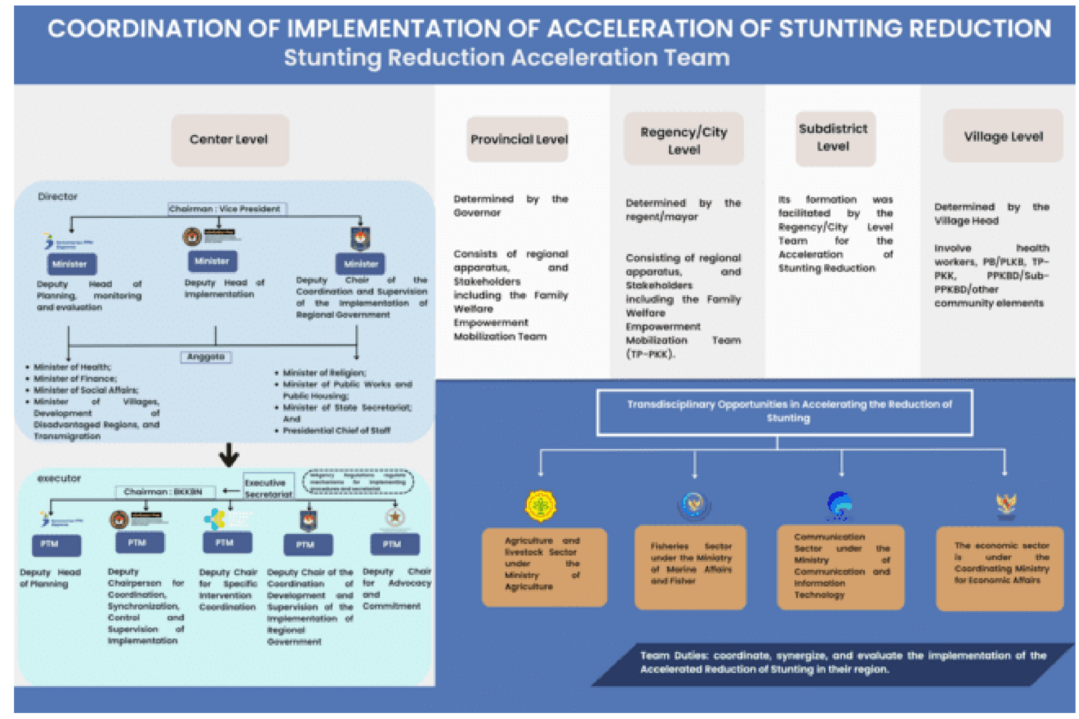

Figure 2. Coordination of Implementation of Acceleration of Stunting Reduction

strengthening supplementary feeding programs for mothers and toddlers, providing supplements to prevent toddler diarrhea, and counseling parents on parenthood and health insurance to prevent childhood stunting in Aceh (Muliadi et al., 2023). Moreover, the convergence action for one-year intervention substantially reduced stunting in 0-11 months of children but not in other age categories of children under five in Central Sulawesi (Gani et al., 2021). The convergent action policy's district-level implementation outcome factors worked effectively due to the central government's proper regulation, control, and budget (Herawati & Sunjaya, 2022). However, sub-district and village levels solely assessed intervention acceptability, appropriateness, and coverage, and the village acceptance was low. Commitment, staff capability, and coordination were sub-district and village

impediments. Stunting reduction duty returned to the health sector due to superficial understanding and capacity issues, and village politics affected implementation. Therefore, a transdisciplinary approach will help this issue.

Stunting is an indicator of the child's long-term development and intellectual potential and is a reflection of the child's diet and environment. UNICEF emphasizes diet and care as immediate determinants of child nutrition. In contrast, food, nourishment, and the environment are highlighted as underlying determinants, and resources, norms, and governance as enabling determinants (UNICEF, 2020). Therefore, programs must strengthen the capacity and accountability of five critical systems, namely food, health, water and sanitation, education, and social protection, to provide children with nutritious diets, essential nutrition services, and positive nutrition behaviors (UNICEF, 2020). For example, improving nutrition for children cannot be carried out by one institution or one profession because this improvement in nutrition must get a contribution to the food supply whereby food provision must be at a level of food security so that, sustainably, it will be able to provide the food needs of these children. Therefore, fulfillment of nutrition for children is generally worked on by the fields of medical health, nursing, public health, and nutrition. However, the completion of nutrition related to food sources and food security must involve other disciplines, such as agriculture, fisheries, animal husbandry, economics, and communication on managing existing materials to meet nutrition needs, including management and administration. Food security ensures good children's nutrition, and the central pillar to achieve sustainable results is food security. A previous study found that stunting and severe stunting were connected with moderate and severe household food insecurity, and special attention in interventions should be given to children who did not attend the monthly growth monitoring sessions, male children, and households with moderate to severe food insecurity (Agho et al., 2019). Food security is one of the transdisciplinary problems requiring transdisciplinary solutions. At the implementation level, the drawback is collaboration.

In order to combat stunting in Indonesia, a systematic approach and multi-professional teamwork are required. There are several orders of cooperation in the scientific field, namely multidisciplinary, interdisciplinary, and transdisciplinary. Multidisciplinary refers to combining multiple disciplines with individual goals with multiple professions, while interdisciplinary refers to work between several professions with common goals (Choi & Pak, 2006). Transdisciplinary refers to work across and beyond multiple disciplines that have shared goals and skills (Choi & Pak, 2006). For example, food security is the responsibility of agriculture and is related to health, such as pregnant women and children. Therefore, transdisciplinary has to focus on the objectives of one program and research so that they complement each other. For example, conducting an expedition to the Osing ethnic group about how to take advantage of local traditions to increase the capacity of Posyandu in handling stunting - in the various fields of sociology, anthropology, public health, and technology, they immediately fill in several areas of knowledge to solve problems and find the best solutions.

Risk factors for stunting have been identified, including individual, family, and environmental factors (Yani et al., 2023). Family participation is essential for stunting coordination, integration, socialization, and education (Nuriyanto et al., 2022). Prevention and socialization are essential to prevent stunting as early as possible among children (Setiawan et al., 2022; Yohana et al., 2022). Coordination of implementation of acceleration of stunting reduction is explained at all levels (Figure 2). Transdisciplinarity in healthcare entails bridging disciplinary divides, sharing knowledge, expertise, and decision-making, emphasizing practical issues, and involving numerous stakeholders, including patients, their families, and communities (Van Bewer, 2017). A transdisciplinary approach can offer an organized, thorough theoretical framework to define and analyze the social, economic, political, environmental, and institutional aspects influencing human health and well-being (Rosenfield, 1992). Transdisciplinary, revolutionary research combines analytical, strategic, and normative methods. Scientific analysis and stakeholder engagement are needed to create sustainable development strategies and action plans (Smetschka & Gaube, 2020). Problem- and context-driven transdisciplinary research incorporates academic and non-academic collaboration. Transdisciplinary strategies boost public engagement, scientific productivity, and knowledge integration (Grigorovich et al., 2019). Transdisciplinarity shares power, connects knowledge holders and the field of practice and leads to problem-solving and action. This method's transdisciplinarity comes from focusing on various disciplinary problems and seeks to understand a problem space from multiple perspectives to evaluate and solve it (Knapp et al., 2019). Most studies found improvements in time efficiency, care quality, and how stakeholders felt about the program. Transdisciplinary collaborations are transitions toward sustainable solutions motivated by the pursuit of collective benefits (Hölsgens et al., 2023). The authors divided the things that help and hurt transdisciplinary teams into four groups: person/interpersonal, workflow, organizational, and implementation factors (Martin et al., 2023). Although building a transdisciplinary strategy is a challenge, when all barriers can be overcome, results will be more efficient, effective, and safe for human health and welfare.

Declaration of Interest

We have no conflict of interest.

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Data Availability
The data are easily available.

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The mobile health application can add our insight into caring for children: The benefit and future usage of the Chemo Assist for Children

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Abstract

Background: The ease of use of mobile health applications felt by users is essential to ensure the sustainability of digital-based intervention programs. The mHealth Chemo Assist for Children (CAC) application has been used by parents with children with acute lymphoblastic leukemia (ALL) who are undergoing chemotherapy in usability tests and positive benefits felt by users have been reported. A deeper understanding of the barriers and factors supporting implementing the CAC mHealth application can help guide strategies to overcome these challenges.
Purpose: This study aims to evaluate the obstacles and factors supporting implementing mHealth CAC application in a natural setting.
Methods: Qualitative research was conducted at two government hospitals in Indonesia. Focus group discussions were conducted with nine parents of children with ALL following chemotherapy. The interview was transcribed verbatim and analyzed using qualitative content analysis.
Results: This research produced three main themes, namely the use of CAC and additional usage expectations, application quality, and current and future application usage.
Conclusion: It is necessary to improve the benefit, ease of use of application features and overcome the obstacles experienced in using the CAC application.

Keywords: acute lymphoblastic leukemia; expectations; natural setting; parents; quality

Introduction

The industrial revolution 4.0 has affected the development of technological advances in the health sector, including the emergence of web and mobile-based health applications. Mobile health (mHealth) is a broad concept that describes various smartphone technologies and, most frequently, consumer healthcare technologies, such as web-based information resources, remote monitoring, and telehealth (Moumtzoglou, 2019). The mobile health application is a form of digital health intervention (Labrique et al., 2020). It is estimated that there are almost 3 million Android applications worldwide in the Google Play Store and more than 3 million in the Apple App Store (Cannon, 2018). Meanwhile, more than 400 health applications in Indonesia have been developed by local and central governments (Ministry of Health, 2021).

In the area of cancer, past studies have revealed that patients value the importance of using apps for healthcare management and feel comfortable using them (Girault et al., 2015), they overcome barriers to care and improve the delivery of resources to hard-to-reach populations, and provide opportunities for behavior change interventions (Phillips et al., 2019). A systematic review explained that around 54 articles were found to analyze application development in cancer. Approximately 28 of these articles are applications for early cancer detection, especially melanoma,

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with nine articles (Ana et al., 2020). Furthermore, a systematic review reported 12 studies that assessed interventions for the early detection of cancer in children in developing countries in the form of training of health professionals in early detection of childhood cancer, public awareness campaigns, and the “Teman Kanker” application (Zabih et al., 2020).

Children diagnosed with cancer have been on treatment for a long time, requiring secondary preventive measures to routinely monitor symptoms that appear as side effects or are related to treatment. A scoping review of 14 articles obtained nine health technologies in the area of pediatric oncology that have been developed in various developed countries to monitor symptoms and manage symptoms due to chemotherapy alone or multiple, namely Supportive Care Prioritization, Assessment, and Recommendation for Kids (SPARK), Empower Stars!, Pain Squad+, Kræftværket app, Sisom, Care Assistant, Cancer-Tailored Intervention for Pain and Symptoms (C-TIPS), THRIVE, and Facebook-based “Healthy Teens for Soaam” (Novrianda et al., 2022). Chemo Assists for Children (CAC) is an mHealth application developed to monitor and manage symptoms due to chemotherapy in children with acute lymphoblastic leukemia (ALL) in Indonesia (Novrianda et al., 2023).

The mHealth CAC application has been used by parents with children with ALL who are undergoing chemotherapy at two government hospitals in Indonesia and reported positive benefits felt by users. However, this is not in line with adherence to the mHealth CAC application (Novrianda et al., 2022). There are several reasons for the discrepancy in implementing this mHealth application, where users experience certain obstacles and challenges in using the mHealth CAC application. A deeper understanding of the barriers and factors supporting implementing the CAC mHealth application can help guide strategies to address these challenges. A consolidated framework for implementation research (CFIR) was used to describe factors associated with the successful adoption of evidence-based practice across five domains: internal settings, individual characteristics, external settings, characteristics of interventions, and implementation processes with evidence that supports its use in resource-limited environments. This study uses the CFIR framework to evaluate the barriers and factors preventing implementing mHealth CAC applications in hospitals with limited resources and explores strategies that support implementation in this environment.

This study aims to evaluate the application of the Chemot Assists for Children (CAC) mobile health application to parents with children with acute lymphoblastic leukemia.

Materials and Methods

Design

This type of research is qualitative, using the focus group discussion method, which aims to evaluate the use of the mHealth CAC application in parents of children with ALL in natural or real-world settings through exploring an in-depth understanding of user experiences, perceptions, and satisfaction with the mHealth CAC application. The mHealth CAC application includes a collection of symptoms, symptom management strategies (14 strategies and 120 sub-strategies for 17 chemotherapy-related symptoms), online consultations, arrangements for nutritional and fluid needs, and information in the form of animated videos. When the user logs in to the CAC application, several demographic, physical, and chemotherapy data will appear for the child, calculating the child’s calorie and fluid needs. Based on the severity score of the child’s symptoms entered into the application, a symptom management strategy is obtained that is recommended for parents to apply to children with ALL.

Sample and setting

In qualitative research, participants who are part of the target population are required to share experiences following the research objectives to explore the constraints and supporting factors for the application of mHealth CAC. The population in this study was parents of children with acute lymphoblastic leukemia who were undergoing chemotherapy at Dr. M. Djamil Hospital Padang and Arifin Achmad Hospital Pekanbaru.

Participants were taken by purposive sampling and selected based on the inclusion criteria: Fathers or mothers who have children with ALL who are undergoing chemotherapy for induction, consolidation, and recovery; Fathers or mothers who have ALL children aged 1-18 years; Father or mother who has used the mHealth CAC application; Able to communicate and cooperate reasonably.

Ethical consideration

This research has obtained ethical approval from the Health Research Ethics Commission Dr. M. Djamil Hospital Padang (LB.02.02/5.7/461/2022). Permission and authorization to conduct the study were received from the Director of Dr. M Djamil Hospital Padang and Arifin Achmad Hospital Pekanbaru.

The researcher provided brief information to the respondents regarding the implementation of the study, the confidentiality of information, and the participants’ right to withdraw at any time. All participants in this study were parents of children with acute lymphoblastic leukemia undergoing chemotherapy, and no children under 16 years old were involved. All parents or guardians obtained an informed consent form for audio recording and using excerpts in publications and reports.

Data collection

Data collection procedures include data collection methods and data collection procedures. The data collection strategy used focus group discussion (FGD) online using the Google Meet

The mobile health application can add our insight of our

Table 1. Characteristics of Respondents who used the mHealth CAC application (n=16)

Characteristics	Frequency	Percentage
Parents		
Age		
20-30 years	9	56.3
31-40 years	4	25.0
41-50 years	2	12.5
51-60 years	1	6.3
Sex		
Male	1	6.3
Female	15	93.8
Education		
High education	1	6.3
Senior high school	5	31.3
Junior high school	6	37.5
Elementary school	4	25.0
Occupation		
Entrepreneur	1	6.3
Private staff	2	12.5
Not working (housewife)	13	81.3
Province		
West Sumatera	6	37.5
Riau	6	37.5
Jambi	4	25.0
Ethnic		
Minang	5	31.3
Melayu	3	18.8
Aceh	1	6.3
Batak	2	12.5
Sunda	1	6.3
Jawa	2	12.5
N.A	2	12.5
Child		
Age		
Toddler (1-3 years)	4	25.0
Preschool (4-6 years)	8	50.0
Age school (7-12 years)	1	6.3
Adolescent (13-18 years)	3	18.8
Sex		
Male	10	62.5
Female	6	37.5
Protocol		
High-risk	8	50.0
Standard-risk	7	43.8
AML	1	6.2

Cont. Table 1. Characteristics of Respondents who used the mHealth CAC application (n=16)

Characteristics	Frequency	Percentage
Phase		
Induction	7	43.8
Consolidation	6	37.5
Maintenance	3	18.8

Note: AML = acute myeloblastic leukemia, N.A = not available

Table 2. Frequency of using the Chemo Assist for Children (CAC) application and user characteristics (n=16)

Respondent	Frequency	Age, year	Sex	Education	Occupation	Ethnic	Child's age, year	Protocol	Phase
Arifin Achmad Hospital Pekanbaru									
1	6	27	Female	High education	Not working	Melayu	4	SR	Consolidation
2	4	35	Female	Senior-high	Not working	Melayu	7,5	SR	Maintenance
3	5	24	Female	Senior-high	Not working	Melayu	6	SR	Consolidation
4	8	41	Female	Senior-high	Private staff	Minang	5,9	HR	Maintenance
5	5	25	Female	High education	Not working	Batak	4	SR	Induction
6	5	30	Female	Senior-high	Not working	Aceh	6,8	SR	Induction
7	3	30	Female	High education	Not working	Jawa	4,5	SR	Induction
8	3	32	Male	High education	Employee	Jawa	3,5	SR	Induction
Dr. M. Djamil Hospital Padang									
9	1	42	Male	Senior-high	Entrepreneur	Jawa	15,3	HR	Maintenance
10	1	21	Female	Senior-high	Not working	Batak	3,4	HR	Consolidation
11	1	24	Male	Senior-high	Farmer	Sunda	1,5	SR	Induction
12	2	24	Female	Senior-high	Private staff	Caniago	16	HR	Consolidation
13	1	37	Female	Junior-high	Not working	N.A	4,4	HR	Consolidation
14	1	33	Female	High education	Employee	Minang	2,8	HR	Consolidation
15	2	20	Female	Junior-high	Not working	Tanjung	3,2	HR	Induction
16	1	23	Female	Elementary	Private staff	N.A	4,7	SR	Induction

Note: SR = Standard-Risk, HR = High-Risk

Table 3. Characteristics of parents who attended FGD (n=9)

Participant	Age, year	Sex	Education	Occupation	Origin	Ethnic
1	41	Female	Senior	Private	Kubang	Minang
2	30	Female	Senior	Not working	Tanjung balai karimun	Aceh
3	25	Female	High	Not working	Riau	Batak
4	27	Female	High	Not working	Riau	Melayu
5	32	Male	High	BUMD	Riau	Jawa
6	35	Female	Senior	Not working	Riau	Melayu
7	24	Female	Senior	Private	Padang	Caniago
8	24	Male	Senior	Farmer	Jambi	Sinda
9	38	Female	Junior	Not working	Pariaman	Piliang

Table 4. Themes and quotes from the content analysis of the focus group discussions

Themes	Quotes
Uses of CAC and additional usage expectations	Assess the child's condition "I feel this application helps me in assessing my child's condition." (P6)
	Solutions to overcome child complaints "... besides that, we are also given directions or suggestions on what I can do to deal with my child's complaints." (P6)
	Train mother's patience "Besides that, this application can train mother's patience too." (P5)
	Increase knowledge of caring for children "It's the best because we parents know what complaints children experience and what actions parents can take. This application can also add to our insight in caring for children." (P6)
	To increase recommendations, information, and education (e.g., genital hygiene) "In my opinion, there should be more information and education regarding children's health, for example, maintaining the cleanliness of the child's genital area. Parents sometimes miss that cleanliness is important so that children stay healthy and protected from disease." (P6)
	More detailed assessment of the child's condition "It is better to add questions for a more in-depth condition assessment." (P1)
	Ease of downloading apps for all types of apps "I hope this application can be downloaded easily regardless of the type of cellphone because some parents also want to get this application, ma'am, but cannot download it on their respective cellphones." (P2)

application. Nine parents had used the mHealth CAC application for one month and were willing to participate in the FGD. The FGD lasted for two hours. In conducting the FGD, the researchers used semi-structured interview guidelines based on research objectives and CFIR. Observations of field conditions complement the data collected, including expressions and situations.

Focus group technique is a type of qualitative research methodology, generally defined as a structured discussion with a small group of people, run by a facilitator or using a moderating team, to generate qualitative data on a precise topic of interest (Masadeh, 2012). FGDs are carefully planned discussions designed to elicit group members' perceptions of a defined area of interest (Kontio et al., 2004). In FGDs, several users are brought together to discuss their attitudes

Cont. Table 4. Themes and quotes from the content analysis of the focus group discussions

Themes	Quotes
Application quality	Favorite part of using the CAC app
	Features of nutritional needs "... apart from that, there is a nutrition menu as well so I can also see my child's nutritional needs, ma'am." (P1)
	Music and murotal therapy "Usually, my child is often fussy, crying so when I assess his condition, there is a suggestion to give music therapy, so if my child is fussy, I usually turn murottal so he can calm down mom, and this is routine therapy that I do., and Alhamdulillah my child can sleep well, and I always follow and carry out the suggestions given from the application, ma'am." (P2)
	Doctor consultation "Recently, my child has had a cold cough, ma'am, so this application suggests consulting a doctor to be given the medicine." (P6)
	Very challenging part
	Setting caloric needs "Maybe the division fills the nutritional needs of children, ma'am because I don't understand that part. For example, if I adjust the calories, the result is that the nutrition has not been fulfilled or is still lacking. So, I'm confused, ma'am." (P5)
	Problems downloading the app for certain types of cellphones "If I ever recommend to other parents. But because the cellphone is insufficient, they cannot download this application. Many want it, but the problem is insufficient cell phone type, ma'am." (P2)
	Barriers to logging in if you forget your password/ email "Apart from that, when I registered, I had quite a bit of trouble, ma'am, because we had to enter our email and password. Well, when parents log out to log in again, they must enter their email and password. OK, sometimes I forget that." (P6)

and feelings about the topic for about one to two hours, with the moderator facilitating the discussion using a pre-planned script (Nielsen, 1993, 1995). Focus group sizes often range between six and 12 individuals (Guest et al., 2017).

As such, FGDs are best suited for exploring and gaining an in-depth understanding of end users' experiences, opinions, hopes, desires, and concerns, mainly after they have used the technology in real-world settings. The tools or instruments used in collecting data were questionnaire sheets for patient demographic data and interview guides designed by researchers.

Data analysis

In qualitative research, the data analysis process is carried out simultaneously with the data collection process (Utarini, 2021). Data analysis in qualitative research is subjective because researchers are the main instrument for data collection and research data analysis (Afiyanti & Rachmawati, 2014; Utarini, 2021). Each interview was audio recorded using a tape recorder. The audio data were transcribed verbatim after each interview by A.F. (a newly-graduated nursing student with experience in qualitative research). After that, another researcher (D.N) examined the transcripts using audio recordings. Furthermore, data analysis carried out by researchers was qualitative content analysis (Elo et al., 2014), one of the qualitative methods currently available for analyzing data and interpreting their meaning. This method is a systematic and objective way to describe and measure phenomena. The prerequisite for a good qualitative content analysis is that it can be reduced to concepts that describe research phenomena by creating categories, concepts, models, conceptual systems, or conceptual maps.

The resulting categories were obtained from data that have meaning related to the phenomenon

Cont. Table 4. Themes and quotes from the content analysis of the focus group discussions

Themes	Quotes
Current and future use of the app	Use when there is a complaint “But not all of our children experience the symptoms in the application, ma’am. Because of that, we didn’t charge it on that day.” (P2)
	Rarely used because a child uses the cell phone “But I rarely use this application because my cellphone is often held by children.” (P3)
	Not optimal because it works “I answered the questions according to what was in the application, then such as the symptoms experienced by children, weight, but for other menus, I could not open them because I was working.” (P4)
	I didn’t use it because I asked other people “I have never used this application, just looking at it, ma’am, since it was introduced. Because my child and I live in a halfway house, ma’am, there are also consultants available regarding child problem measures, so if Aqil has a problem, I usually ask him right there, ma’am.” (P8)
	I don’t understand yet because of the new app “This is the first time I know about this application, ma’am, so I don’t understand how to use it.” (P4)
	Willingness to use the app “While this application can help us, why not, ma’am, for me, God willing, I will continue to use this application.” (P2)
	Need to recommend to others “Yes, ma’am, we can recommend this application, especially for those who are new to becoming parents. Sometimes they don’t know what action to take when a child experiences complaints.” (P6)

under study. The resulting themes were not derived from theory and emerged from the data inductively. Decisions regarding data saturation were discussed with the research team.

Trustworthiness

The trustworthiness in qualitative content analysis starts from the data collection phase to reporting results. Going through these phases should give the reader a clear indication of the trustworthiness of the research as a whole. In this study, we conducted member checking to reduce description and interpretation bias. We conveyed the verbatim transcript of the discussion to the participants to gain confidence and confirm that the data collected were consistent with what the participants expressed during the group discussion. The discussion findings were re-evaluated with other researchers to review and understand the data. In addition, peer debriefing was conducted between researchers and external reviewers, representatives of qualitative methodologists with relevant expertise.

Results

Of the 18 parents invited to use mHealth Chemo Assist for Children (CAC), 16 used the app for one month (28 October to 29 November 2022). Furthermore, nine parents (56.3%) were willing to be interviewed in online focus group discussions (FGDs) via the Google Meet application. Table 1 shows the characteristics of the participants who used the mHealth CAC application.

Table 1 shows that, generally, the ages of parents are in the early adult category (56.3%), female (93.8%), secondary education level (68.8%), not working (81.3%), coming from West Sumatra Province (37.5%) and Jambi (37.5%). Children are 4-6 years (50%) and are male (62.5%). Eight children underwent high-risk chemotherapy protocols (50%), and seven were in the induction phase (43.8%).

Table 2 shows that the frequency of using the app by parents whose children are treated at Arifin Achmad Hospital Pekanbaru is more frequent than those treated at Dr. M. Djamil Hospital Padang.

Table 3 describes the characteristics of parents who attended the FGD. Six out of nine participants whose children were treated at Arifin Achmad Hospital Pekanbaru had regional origins from Riau Province (n=4), West Sumatra Province (n=1), Nanggroe Aceh Darussalam Province (n=1).

We analyzed transcripts from two focus group discussions for emerging themes regarding the

perceived use of the mHealth CAC application by end-users in real-world settings based on participants' experiences, perceptions, and satisfaction with using the CAC application. Participants used the app for one month and received questions about how much the symptoms bothered their ALL child undergoing chemotherapy, then they were given self-management strategies for any such symptoms. Three themes were identified from the focus group discussions. From the Consolidated Framework for Implementation Research (CFIR) used as a theoretical framework in CAC's research into implementing mHealth applications in natural settings, the themes identified by participants were related to use of CAC and expectations of additional uses, application quality, and current and future use of CAC. The results are governed by the three primary constructs below. Themes and excerpts from the content analysis conducted from the focus group discussions are reported in Table 4.

Theme 1. Use of CAC and expectations of additional uses

Based on participants' expressions, we developed the theme *"Use of CAC and other usage expectations."* This theme revealed that CAC was useful in treating children with ALL and parents' desire to increase the application of CAC.

CAC benefits

Parents stated that the CAC application has several benefits, including assessing the child's condition, solutions for dealing with child complaints, training mothers' patience, and increasing insight into caring for children.

"I feel this application helps me in assessing my child's condition." (P6)

"... besides that, we are also given directions or suggestions on what I can do to deal with my child's complaints." (P6)

"Besides that, this application can train mother's patience too." (P5)

"*It's the best because we parents know what complaints children experience and what actions parents can take. This application can also add to our insight in caring for children."* (P6)

User expectations for the CAC application

Four out of nine parents stated that this CAC application needed to add information to care for their children, as stated by one of following parents.

"In my opinion, there should be more information and education regarding children's health, for example, maintaining the cleanliness of the child's genital area. Parents sometimes miss that cleanliness is important so that children stay healthy and protected from disease." (P6)

Theme 2. Quality of CAC application

Participants conveyed the quality of the features and ease of application of CAC. This theme shows how good the quality of CAC can be seen from the features that are favorites and the obstacles encountered in using the application.

Use of favorite application features

When parents were asked about the features of the CAC application that they liked the most, they conveyed, among other things, nutritional needs, music and murottal therapy, and doctor consultations.

"... apart from that, there is a nutrition menu as well so I can also see my child's nutritional needs, ma'am." (P1)

"Usually, my child is often fussy, crying so when I assess his condition, there is a suggestion to give music therapy; so if my child is fussy, I usually turn murottal so he can calm down ma'am , and this is routine therapy that I do, and, Alhamdulillah, my child can sleep well, and I always follow and carry out the suggestions given from the application, ma'am." (P2)

"Recently, my child has had a cold cough, ma'am, so this application suggests consulting a doctor to be given the medicine." (P6)

Application usage constraints

There are two obstacles experienced by parents while using the CAC application, namely problems downloading applications for certain cell phones and problems logging in if you forget your password or email.

"Maybe the division fills the nutritional needs of children, ma'am, because I don't understand that part. For example, if I adjust the calories, the result is that the nutrition has not been fulfilled or is still lacking. So, I'm confused, ma'am." (P5)

"If I ever recommend to other parents. But because the cellphone is insufficient, they cannot download this application. Many want it, but the problem is insufficient cell phone type, ma'am." (P2)

"Apart from that, when I registered, I had quite a bit of trouble, ma'am, because we had to enter our email and password. Well, when parents log out to log in again, they must enter their email and password. OK, sometimes I forget that." (P6)

Theme 3. Current and future use of the application

The participants used the CAC application for 28 days, but revealed that the application was not used every day. There were variations in the use of the application in terms of time, reasons for usage, and willingness to use the application in the future.

Application usage time

Participants revealed that the application was used when parents found their child experiencing the symptoms contained in the application. Furthermore, some parents rarely use the application for work reasons, prefer to ask friends or volunteers at shelters, and don't know how to use it.

"But not all of our children experience the symptoms in the application, ma'am. Because of

that, we didn't charge it on that day." (P2)

"But I rarely use this application because my cellphone is often held by children." (P3)

"I answered the questions according to what was in the application, then such as the symptoms experienced by children, weight, but for other menus, I could not open them because I was working." (P4)

"I have never used this application, just looking at it, ma'am, since it was introduced. Because my child and I live in a halfway house, ma'am, there are also consultants available regarding child problem measures, so if Aqil has a problem, I usually ask him right there, ma'am." (P8)

"This is the first time I know about this application, ma'am, so I don't understand how to use it." (P4)

Future use of the app

Participants expressed that they wanted to use the application and would recommend it to parents who needed information support through the CAC application.

"While this application can help us, why not, ma'am, for me, God willing, I will continue to use this application." (P2)

"Yes, ma'am, we can recommend this application, especially for those who are new to becoming parents. Sometimes they don't know what action to take when a child experiences complaints." (P6)

Discussion

This study aimed to evaluate the effectiveness of implementing Chemo Assist for Children (CAC), a chemotherapy-related symptom monitoring app, and a free, evidence-based symptom management strategy in a naturalistic context. The results provide preliminary data to support using CAC to assess chemotherapy-related symptoms for children with cancer who have access to Android devices. Previous studies reported that children with cancer experience the impact of chemotherapy and its side effects on their lives, such as feeling constrained, sick, and tired. The existence of a family is the most important aspect for children with cancer during their diagnosis and treatment (Mant et al., 2019). Children with chronic conditions require educational-based interventions; involving parents as the primary caregivers of children, and using eHealth and mHealth can improve children's health or psychosocial status (Lau et al., 2020; Sheng et al., 2019; Stenberg et al., 2019). Therefore, this study also identified barriers and challenges associated with end-user use and uptake of mHealth CAC applications.

Similar to what has been reported in other mHealth studies (Amagai et al., 2022; Pfammatter et al., 2017), we encountered challenges with recruiting and retaining participants in this naturalistic context outside of traditional clinical research trials. Of the 18 parents invited to participate, 16 used the app, and only 50% used the app more than three times a month. This is in contrast to the CAC validation trial, which recruited 30 parents of children and adolescents with acute lymphoblastic leukemia and retained all enrolled participants throughout the study (Novrianda et al., 2022). We suspect there are vital contextual differences that may explain these differences. The current study recruited and included participants regardless of the type of cellphone parents used. The CAC application is designed to be installed on cellphones with the Android 10 operating system. Of the 18 people who were willing to be involved in this research, two people used iOS cellphones. The upcoming public version of CAC should consider the possibility of the application being accessible for all mobile phone operating systems, both Android and iOs. These contextual differences reflect real-world problems that parents who download and use CAC may face in their daily lives outside a tightly controlled and well-resourced research trial environment.

These results indicate that the parents involved in this study had positive perceptions and experiences of using CAC to monitor and manage chemotherapy-related symptoms in children with ALL. Participants found CAC helpful in recognizing complaints that children felt and overcoming these complaints. This result follows previous studies (Slater et al., 2018). Participants' comments about their experiences with CAC were generally positive. They reported that the application is practical, acceptable, feasible, sustainable, and has broad penetration potential. Almost all participants (9/9) said they would use CAC during their child's treatment later in life; however, they described the limited time to use the app and the required commitment as a challenge. These challenges were also identified by participants in the CAC validation study (Novrianda et al., 2022). Future versions of the CAC should take this feedback into account to improve compliance. Furthermore, the current study was only one month in duration; therefore, future versions of the app should also consider additional incentives for long-term use. Participants' perceptions of the app's suitability varied. Participants reported that the application was beneficial for assessing and understanding children's conditions but needed a more detailed assessment, additional recommendations, and other information, such as genital hygiene. This version of the CAC recommends strategies participants can take to manage or reduce their child's chemotherapy-related symptoms. Based on the current research results, it is vital to conduct CAC implementation studies after their effectiveness has been demonstrated to optimize their relevance to children with cancer in the real world.

The findings from the study indicated that our participants considered CAC to have good qualities, including having nutritional needs regulated, being useful for self-management of symptoms due to chemotherapy, and having the potential to be used as a communication tool with healthcare providers. CAC is intended to provide evidence-based self-management strategies to help parents of children

with ALL deal with their child's complaints; therefore, this study supports this intention. In addition, this study adds to the existing literature on the application of mHealth as a potentially effective tool for treating chemotherapy-related symptoms, which can help improve health outcomes. However, some participants still experienced challenges in using the CAC application, such as managing caloric needs, installing the application on specific cellphone devices, and logging into the application when they forgot their password. Setting calorie needs is an additional feature of the CAC application, where parents can adjust the calories obtained from each food nutrient in grams. So that, in the future, this feature for setting nutritional needs can use household size standards, although problems with inaccuracies in measurements will arise later. In addition, this application needs to be improved so that it can be used on all cellphones and make it easy to log in and register applications while maintaining system security.

The findings of this study demonstrate the novelty of digital-based interventions for children with cancer in Indonesia. The successful implementation of mobile health applications in the industrial revolution era needs to be supported by other contributing factors, including user acceptance to commit to using the application, apart from the convenience and benefits the user feels.

The strength of this study is evaluating the use of the CAC mobile health application at two government referral hospitals in central Sumatra in management of symptoms related to chemotherapy. Therefore, these findings represent parents' experience with children with ALL undergoing chemotherapy to identify the perceived benefits, favorite features and those that need to be improved, obstacles encountered during the application use, and expectations for using the application in the future.

The limitation of this study was that parents who used the CAC application for 28 days in two hospitals could not be analyzed statistically to determine whether the characteristics of parents, children, and chemotherapy affected the app usage frequency. However, it is generally seen that parents use the application more often at Arifin Achmad Hospital. Thus, future research must explore other parental characteristics such as self-efficacy, intention to use mobile health applications, and support systems. In this study, we only have one FGD, which became another limitation of the study. We recommend for subsequent research do a longitudinal study.

Conclusion

The CAC application has several benefits for parents in assessing the child's condition and dealing with the child's symptoms, but there are still some challenges. Therefore, it is necessary to improve the aspect of ease of use of the application so that the continuity of using the application by parents is better.

Declaration of Interest

The author(s) declare there is no conflict of interest.

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Data Availability

The corresponding author's data supporting this study's findings are available upon reasonable request.

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The fulfillment of pregnancy-related needs of women in refugee camps in Indonesia: A phenomenology study

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Abstract

Background: As Indonesia lies on several tectonic plates, it is often hit by natural disasters such as earthquakes. Women are included in the vulnerable group category during disaster situations, especially pregnant women.
Purpose: This study aims to explore the needs of pregnant women in refugee camps after natural disasters.
Methods: This is qualitative research with a phenomenological approach. The data were collected in 2019 through in-depth interviews with 9 women who were pregnant when the disaster occurred using purposive and snowball sampling techniques. The participants were refugees who were victims of the earthquake in Kalibening, Banjarnegara, Central Java, in 2018. Interview transcripts were analyzed using thematic analysis.
Results: The following three themes were found and discussed: (1) the basic needs of pregnant women during a disaster situation in refugee camps, (2) comprehensive health examinations for pregnant women in disaster situations, and (3) pregnant women's reluctance to stay in refugee camps.
Conclusion: This study shows that pregnant women's limited mobility restricts them from meeting their basic and perinatal needs in refugee camps. After natural disasters, many pregnant women experience complications during their pregnancy. Moreover, from a cultural aspect, being together with family was found to be important for pregnant women. Thus, there is a need for coordination between local governments and other stakeholders regarding the needs of pregnant women so that they can receive appropriate assistance accordingly.

Keywords: natural disasters; pregnant women; special needs; vulnerable groups

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Introduction

Indonesia is a country that is prone to natural disasters (Priester, 2016). The National Disaster Management Agency (2018) noted that, between 2008 and 2018, there were 10 types of natural disasters that occurred in Indonesia, one of them being earthquakes. As many as 187 earthquakes happened in Indonesia over the 10-year period mentioned above and have caused large impacts, both in terms of victims and economic losses. These losses include around 2000 deaths, almost 1 million people living in refugee camps, and the destruction of thousands of health facilities, places of worship, education facilities, and others (National Disaster Management Agency, 2018). Moreover, Walsh (2007) stated that the occurrence of a natural disaster on an individual level results in the loss of a safe and comfortable place to live, loss of family members, loss of employment, loss of economic resources, and trauma.

In April 2018, an earthquake occurred in the Kalibening District, which lies on the border between Banjarnegara Regency and Pekalongan Regency,

Central Java. The 4.4 magnitude earthquake was also followed by several aftershocks and was felt by residents around the Banjarnegara Regency and Pekalongan Regency (Nugroho, 2018). Based on the BNPB's data in 2018, it was recorded that two people died and more than 5000 people had to live in refugee camps.

According to Walsh (2007), women are more likely to die than men after large-scale natural disasters. In addition, a study conducted by Oxfam (2006, as cited in Hidayati, 2014) also stated that, in every natural disaster event, most victims (60-70%) are women, children, and the elderly. Likewise, according to the Women's Solidarity Association (2018) report regarding the earthquake and tsunami that occurred in Palu in 2018, most of the victims in the refugee camps were women (1511), including pregnant women (69) and breastfeeding women (10).

The identification of vulnerable groups in disaster situations is important. Women in particular are members of the vulnerable group due to their special needs before, during, and after a disaster (Gokhale, 2008). This is in line with Jahangiri, Izadkhah, and Sadighi (2014) who stated that, in the disasters that have occurred in recent years, a focus on the special needs of women during various disaster cycles, especially during and after disasters, is needed. Furthermore, according to Hidayati (2014), the vulnerability of women in disaster situations can be grouped into two stages, namely, during and after a disaster (recovery period). Hidayati (2014) further explains that, when a disaster occurs, women are at a disadvantage due to their position or role in society. This is because women tend to not only think about how they can survive, but also how they would save their children and family. In addition, women cannot quickly leave their house when a disaster occurs as they would need certainty on whether their children are safe or not, in addition to her having to carry or lead her child to safety. This is also evidenced by the tsunami disaster in Aceh in 2004, where most of the women killed were inseparable from their young children or were found in a position where they were still holding their children (Chineka, Musyoki, Kori, & Chikoore, 2019).

In contrast to the moment of the disaster, the recovery period after the disaster is closely related to the non-fulfillment of women's rights. The fulfillment of post-disaster needs should address both the needs of women and men. However, many women's needs are ignored because they are not considered urgent. For example, women of reproductive age would need more clean water, underwear, and sanitary products to maintain their reproductive health, especially during menstruation (Women's Solidarity Association, 2018). However, these have not been considered as urgent needs that must be immediately fulfilled in a disaster. In addition, the needs of each woman are very different as it depends on the stage of the woman's life cycle (baby, toddler, teenage, adult women, pregnant women, breastfeeding women, and older women).

Pregnant women require resources, such as food and clean water, access to healthcare and medicine, and psychological care due to post-disaster trauma to reduce pregnancy-related morbidity (American College of Obstetricians and Gynecologists, 2010). Harville, Xiong, and Buekens (2010) reported that the earthquakes that occurred in several locations, such as China, Taiwan, Northridge, Israel, Japan, and Mexico, a few years ago were associated with many negative conditions that affected pregnant women including birth complications, higher rates of low birth weight, preterm birth, birth defects, lower Apgar scores, higher psychiatric distress, increased preterm delivery, and anxiety that leads to depression. This illustrates that experiencing a disaster during pregnancy will pose a risk to the mother or fetus. Therefore, to prevent maternal and child morbidity and mortality, the needs of pregnant women during and after a disaster should be identified by exploring their experiences. Meanwhile, teenage girls or adult women who are still in their productive age would need to maintain their reproductive health, especially during menstruation. They would need more clean water, underwear, and sanitary products (Women's Solidarity Association, 2018). Due to the lack of fulfillment of women's needs in post-disaster situations, the purpose of this qualitative study was to investigate the experiences of post-disaster pregnant women and their needs fulfillment.

Materials and Methods

Design

This is a descriptive qualitative research that used a phenomenological approach. Phenomenological research records and analyzes the beliefs, feelings, and perceptions of the participants that are looking to be studied in relation to the thing being reviewed (Greening, 2019; Rodriguez & Smith, 2018). Using this method is expected to obtain in-depth information of the challenges faced by pregnant women who were victims of natural disasters. A focus was made on how their needs were met while living in refugee camps. Data were collected through in-depth interviews that used semi-structured interview guidelines.

Participants and Setting

The purposive and snowball sampling techniques were used to select participants. The participants were pregnant women who were displaced by the earthquake in Kalibening District, Banjarnegara Regency, Central Java Province, in April 2018, able to communicate orally in Indonesian, and were willing to participate in this study by signing the consent form. The number of participants in this study was nine because saturation was reached by the ninth participant interviewed.

Data collection

Data were collected from July to August 2019.

Table 1. Characteristics of Participants (n = 9)

Participant code	Age	Education	Occupation
P1	33	ES	Housewife
P2	28	ES	Housewife
P3	30	Bachelor	Teacher
P4	38	ES	Farmer
P5	21	JHS	Housewife
P6	26	JHS	Merchant
P7	23	SHS	Merchant
P8	26	ES	Housewife
P9	20	JHS	Housewife

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

Table 2. Thematic Analysis of The Needs of Pregnant Women During A Disaster Situation

Theme	Category
The basic needs of pregnant women in the refugee camp	Nutritional needs of pregnant women Personal hygiene equipment Bedding
Comprehensive health examinations for pregnant women in disaster situations	Examination of maternal and fetal well-being Proactive health worker visits to the evacuation post
Pregnant women's reluctance to live in refugee camps	Families could provide assistance, facilities, a sense of security, and comfort to pregnant women

After obtaining research approval and permission, the researcher contacted the proposed participant, provided research-related information, and asked for her willingness to participate in this study. Then, the informants signed a consent form to indicate that they understood and wanted to participate in this study voluntarily. The interviews were conducted in Indonesian using an interview guide. The interviews lasted for about 60 minutes for each informant and were recorded using an audio recorder.

Data analysis

Data analysis and collection were conducted continuously and in parallel to each other. All recorded data were transcribed verbatim. Next, qualitative thematic analysis was conducted. Important sentences, keywords, or phrases that described the experiences of pregnant women in meeting their needs while in refugee camps were identified and marked. The general ideas in the manuscript were then sorted and coded according to their differences and similarities so as to create categories and sub-categories. The words and phrases in the categories were then reduced by crossing out repetitions of similar words or phrases to reduce redundancy. After several modifications, three themes were identified (Table 2). All authors participated in this process and discussed the development of themes, categories, and sub-categories. Saturation was achieved at nine participants after using an individual response approach to generate the themes and categories.

Ethical consideration

Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine, Jenderal Soedirman University number 2514/KEPK/V/2019. In addition, the research permit required to conduct data collection was received from the relevant local government. Each participant was given an information sheet that explained the purpose and procedure of this research. The participants were aware that their participation in this study was voluntary and that their names were kept confidential. In addition, it was reassured that their withdrawal as participants at any stage would have no impact on their work and/or daily life.

Trustworthiness

Trustworthiness in a qualitative study consists of four components. They are dependability, dependability, confirmability, and credibility (Schwandt, Lincoln, & Guba, 2007). The researchers should stay on the research site for extended periods of time to ensure credibility. The study's researchers are all Javanese and have lived in the Central Java Province for a considerable amount of time. Informant observation, peer debriefing, member checking, and triangulation were used as research methods. This study employed triangulation techniques, and data were gathered through in-depth interviews and observations (Klein & Olbrecht, 2011). In order to gather information, the researchers also used sources from pregnant mothers, family members,

and medical professionals. The researchers gave a detailed description of the informant's traits to ensure transferability.

Results

This study was conducted with nine participants, where the majority of the pregnant women were housewives and as many as three were of ages ranging from 21–38 years. Only one participant had obtained a bachelor's degree; the remaining participants' highest levels of education were elementary school (ES) and junior high school (JHS). The majority of participants were Muslim. The characteristics of the participants can be seen in Table 1.

In this study, three themes that represent the needs of pregnant women as survivors from natural disasters were found and are stated in Table 2. The three themes are explained as follows:

Theme 1: The basic needs of pregnant women in refugee camps

All participants revealed that they need a variety of basic needs.

Nutritional needs of pregnant women

Maternal nutrition during pregnancy affects the health of the mother and fetus. The nutritional status of pregnant women is believed to be closely related to the nutritional intake of the food consumed by the mother. The following is an excerpt from a participant's statement regarding their nutritional needs:

"… we would normally eat rice with eggs, there were no vegetables, so sometimes I would cook vegetables myself to add to my meals…. I asked for milk to be sent and milk for pregnant women was sent ... I want to drink milk as quickly as possible so I can be healthy..." (P1, 33 years old, housewife) *("… makan rames nasi telor ga ada sayurnya, jadi kadang masak sendiri sayurnya jadi ditambahi masak sendiri…minta susu terus dikirim ada susu ibu hamil ensiti ibu hamil …pengennya cepet minum susu biar sehat...").*

Personal hygiene products

During pregnancy, pregnant women reported that they tend to sweat more easily, especially in refugee camps. This condition caused mothers to need personal hygiene products to maintain their personal hygiene. Almost every participant provided the same statement regarding personal hygiene, one of which is the following quote:

"…yes, we changed clothes a lot, I first bought them at the market to change into, toiletries too… At that time, soap and toiletries were given, panties, bra…" (P3, 30 years old, teacher) *("…ya banyak ada kaya baju ganti gitu-gitu, waktu pertama kan saya beli ke pasar untuk ganti, alat mandi juga... waktu itu disitu dikasih sabun sama perlengkapan mandi celana dalam, BH...").*

Bedding

One of the physical changes during pregnancy is the growing belly of pregnant women with increasing gestational age. This affects their comfort level when going to sleep. However, the overcrowded conditions as well as limited facilities in the refugee camps have caused the mothers' discomfort, especially when going to sleep. The following are excerpts from participants:

"… We had to sleep in rows, with pregnant people, you know, how are we supposed to do so with our large stomachs… We weren't given a mattress, we had to bring our own floor mattress and blankets…" (P1, 33 years old, housewife) *("… tidurnya berjejer-jejer, orang hamil kan gimana ya perutnya… Engga dapet [kasur], kasur lantai bawa sendiri selimut apa bawa [sendiri]…").*

Theme 2: Comprehensive health examinations for pregnant women in disaster situations

Examination of maternal and fetal well-being

Some participants were worried about the condition of the fetus they were carrying after the earthquake they experienced. Some pregnant women have even experienced increased blood pressure to the point of having to lose the fetus they are carrying. The following are excerpts from participants:

"...yes, I have high blood pressure... normally my blood pressure would be 100, but now it's 140...I also experienced spotting, like bleeding...because I'm tired and keep thinking too...the bleeding is a lot..." (P2, 28 years old, housewife)*("…iya tinggi [tekanan darah]…kan 100 normalnya pas ditensi jadi 140…ngeflek-flek gitu kaya perdarahan…karena kecapean terus pikiran juga…perdarahannya banyak banget…").*

Moreover, because they could not check the condition of the fetus through ultrasound examination, pregnant women had to seek other independent means. This statement was made by one of the participants:

"…I was afraid of my 4 months pregnancy, so I went to Banjar for an ultrasound…I just wanted to check because yesterday there was an earthquake, but the doctors and midwives laughed because I was worried about my pregnancy…" (P1, 33 years old, housewife) *("…takut di dalam [kandungan] 4 bulan gimana-gimana jadi dibawa ke banjar buat di USG…mau periksa aja soalnya kemarin abis ada gempa terus sama dokter susternya malah diketawain soalnya saya takut kenapa-kenapa…").*

Proactive health worker visits to evacuation posts

The survivors preferred to be visited by health workers in refugee camps due to reasons such as access

or time constraints and physical weakness. Most of the participants hoped that the health workers would not only stay at the health posts, but that they would also visit the refugee camps. This has been done by several health workers who directly visited pregnant women in some refugee camps. However, some health workers still required pregnant women to go to health posts that are outside the refugee camps. The following two pregnant women expressed an important point in this matter:

"… there is a midwife called Mrs. Teguh who always does control check-ups of the condition of pregnant women at the refugee camp…" (P6, 26 years old, merchant) *("… ada bu bidan teguh yang selalu mengontrol kondisi ibu hamil di posko pengungsian…")*.

"… they need to visit the refugee camps more often… they would normally just inform us that we need to go to the health posts, they don't check us one-by-one..." (P2, 28 years old, housewife) *("…didatengin ke posko [pengungsian] satu-satu, lebih sering-sering lah…kan Cuma diumumin suruh datang ke posko kesehatan ga didatengin satu-satu…")*.

Theme 3: Pregnant women's reluctance to live in refugee camps

Families provide assistance, facilities, a sense of security, and comfort to pregnant women. However, families were separated into a separate section of the refugee camp, that is, for pregnant women. Due to overcrowded tents and separation from their families, most pregnant women felt less safe and uncomfortable when living in refugee camps. The presence of family members and being physically close to their family is one form of support that families can provide for pregnant women. The following is a statement sourced from a participant that supports this theme:

"…we were told to evacuate to a safe place but then we were not gathered together, if something goes wrong, it's always better if we're together as one family…it's better if you and your husband are together so if there's anything wrong you can get help right away…I said I didn't want to go to the refugee camp without my family close… I want to stay here so I can be close to my family, it's right near my grandparent's house, there is a toilet, there is a stove…" (P1, 33 years old, housewife) *("…suruh ngungsi ditempat aman tapi gak pada ngumpul pada tetep jadi satu kalo ada apa-apa kan satu keluarga gitu…mending sama suami kumpul kalo ada apa-apa bisa langusng ditolong…saya bilang engga mau biar disini aja sama keluarga biar deket…kan deket rumahnya mbah disitu ya ada toilet ada apa… ada kompor…")*.

Discussion

Women need special attention in natural disaster management, especially during and after disasters because they have higher morbidity and mortality rates than men due to social, cultural, and biological gender roles (Jahangiri et al., 2014). According to Sato et al. (2016), pregnant women are particularly vulnerable to natural disasters as they may suffer from an increased risk of pregnancy-related problems. Pregnant women faced challenges with evacuation, a lack of basic survival necessities, and attending to their own health concerns. Pregnant women were also concerned about their families' needs and health issues, especially if they had small children.

During post-disaster, women are vulnerable to various health risks, such as: physical, mental, and emotional stress, reproduction and sexual health issues, as well as difficulty in obtaining adequate aid, water, food, medicine, and access to health facilities, being susceptible to social and economic risks, like the loss of a husband or family breadwinner, livelihoods, and rights to land and property (Septanaya & Fortuna, 2023). Indonesia has guidelines for handling reproductive health problems in disaster situations through the implementation of the Minimum Initial Service Package (PPAM) (Indonesian Health Ministry, 2017). One component of PPAM implementation is preventing increased maternal and neonatal morbidity and mortality. Prevention is carried out by: (1) Feeling that there are special places for giving birth in several places such as health posts, in evacuation sites or in other appropriate places; (2) Costs for providing services (competent personnel and standardized tools and materials) for normal delivery and emergency maternal and neonatal care at basic and referral healthcare facilities; (3) Building a referral system to facilitate transportation and communication from the community to the puskesmas and puskesmas to the hospital; (4) Availability of birthing kits for pregnant women who will give birth in the near future; (5) Community care to find out about the existence of maternal and neonatal birth assistance and emergency services; (6) Adequate availability of contraceptives.

In this study, pregnant women have expressed their needs while in refugee camps. Three themes have been found, namely, (1) the basic needs of pregnant women during disaster situations in refugee centers, (2) comprehensive health examinations for pregnant women in disaster situations, and (3) pregnant women's reluctance to live in refugee camps. Based on the themes obtained, it can be seen that basically there is no difference in the needs of pregnant women in disaster conditions or not in disaster conditions. However, the difference lies in their affordability in meeting their needs in a more difficult disaster situation.

Basic needs such as food and nutrition are felt to be essential for pregnant women. Unfortunately, during the initial period in refugee camps, these needs could not be met immediately. Some pregnant women who still have savings or other sources of income chose to fulfill it independently, but those who do not have a source of income while they are evacuated would have to wait for help to arrive.

The nutritional needs of pregnant women are described in detail by the UNHCR, UNICEF, WFP, and WHO (2004). During pregnancy, a woman's nutritional needs for macronutrients (carbohydrates, protein, and fat) increase significantly as pregnant women need an additional 285 kcal per day. Micronutrients are also essential, such as iron, folic acid, vitamin A, and iodine, which are important for the health of mothers and babies. Maternal nutrition is a major contributor to the health and survival of newborns (Gee, Vargas, & Foster, 2018). Callaghan et al. (2007) stated that the unavailability of adequate food in refugee camps will increase health problems for pregnant women. In addition, the impact of poor nutritional status and intake on mothers during pregnancy can have a negative impact on their infant's birth weight and early development (UNHCR et al., 2004). One participant in this study stated that the baby she gave birth to had a small birth weight, which was less than 2500 grams (normal birth weight), so her child had to receive treatment in the NICU (neonatal intensive care unit). This shows that impact disasters can increase the morbidity rate in neonatal which leads to an increase in neonatal mortality. As also stated by El-Shal, Mohieldin, and Moustafa (2022), in low- and middle-income countries, health disasters increase maternal, under-5, and neonatal mortality by 0.3%, 0.3%, and 0.2% respectively and by 35%, 80%, and 26% after one year, respectively.

Maintaining personal hygiene is also another basic need for pregnant women in refugee camps. This statement is in line with the Women's Refugee Commission (2002) who stated that not only food but sanitation facilities for personal hygiene such as clean water, toiletries, and change of clothes are also serious problems found among refugees living in refugee camps. Personal hygiene is also synonymous with the availability of toilet facilities. Even though all refugees already have these, what needs to be considered is the ratio of the availability of toilets to the number of refugees (Buleleng Regency Social Service, 2017).

The need for adequate personal hygiene is important for pregnant women because, during pregnancy, women sweat more and produce more vaginal discharge than non-pregnant women (due to hormonal changes). Therefore, they may be more susceptible to infection by bacteria in the environment (Widhi, Damayanthi, & Khomsan, 2021). Keeping the body clean helps prevent infection. If possible, a pregnant woman should wash her body every day with clean water, especially in the genital area. In addition, dental hygiene is also essential during pregnancy because increased levels of estrogen can cause swelling and increased sensitivity of the gum tissue (Shiferaw, Mengistie, Gobena, Dheresa, & Seme, 2021).

In addition to eating well and maintaining good hygiene, pregnant women need to get enough sleep and rest every day. Good rest will also help pregnant women to stay strong and give the fetus a better chance of being born healthy (Shiferaw et al., 2021). However, pregnant women in refugee camps are living in crowded and cramped conditions with limited blankets and pillows. Thus, they would not be fulfilling their need for rest optimally. Similarly, in the tsunami disaster that occurred in Banten, West Java, Indonesia, in 2007, one of the volunteers said that the items most needed by refugees were bedding and blankets (Adji & Zuraya, 2018).

Moreover, the discomfort pregnant women refugees experience when going to sleep is not only due to the limited facilities for sleeping equipment. As Sukorini (2017) stated, when close to delivery, pregnant women will find it difficult to adjust their sleeping position as their diaphragm will be pressed up and interfere with their breathing. Furthermore, Emilia (2010 as cited in Sukorini, 2017) said that poor breathing in pregnant women will cause reduced supply of oxygen to the brain and affect the quality of sleep. Sleep disturbances are common in pregnant women and are physiological in nature but become more severe due to overcrowded evacuation conditions and limited supporting equipment for sleeping (Lowdermilk, Perry, Cashion, & Alden, 2016).

In this study, it was found that an earthquake shock caused pregnant women to worry about the condition of their fetus such that they felt the need to check the condition of their pregnancy. The concerns felt by pregnant women refugees are very well-founded, as has been shown by several research results. Liu, Liu, and Tseng (2015) found that 4.4% of pregnant women who felt earthquake shocks in early pregnancy had miscarriages. In addition, the results of Torche's (2011) study conducted with pregnant women who were victims of the Chile earthquake in 2005 found that fetuses exposed to earthquake shocks also had poorer pregnancy outcomes such as low birth weight and premature birth.

The negative impact is partly due to the result of maternal stress (Torche, 2011). The results of a literature review conducted by Hawkins, Gullam, and Belluscio, (2019) explained that the stress mechanism in humans is initiated by a physiological response characterized by the release of corticotrophin-releasing hormone (CRH) by the hypothalamus, thereby stimulating the release of adrenocorticotrophic hormone (ACTH) by the pituitary gland. This is followed by the release of cortisol from the adrenal glands. In addition to the physiological response of the stress mechanism, in pregnant women, CRH is also produced by the placenta and the amniotic membrane; therefore,

the levels of CRH and cortisol in pregnant women who experience stress also increase (Hawkins et al., 2019). This causes a decrease in the hormone progesterone which functions to maintain pregnancy and stimulates the release of the hormone prostaglandin, which triggers contractions and increases the intensity of contractions, thereby causing an increased risk of premature birth (Jesica & Friadi, 2019).

Fetal loss, premature birth, and low birth weight were also experienced by some of the participants in this study. Comprehensive health examinations of pregnant women during a disaster situation are a necessity that must be met to prevent these issues from happening. Other supporting examinations related to maternal and fetal welfare as recommended by the WHO should also be provided to improve health services for pregnant women refugees (Essén, Puthoopparambil, Mosselmans, & Salzmann, 2018). In addition, the arrival of health workers who visit the refugee camps one-by-one to conduct health examinations on each refugee was a hope that was expressed by most participants. Therefore, having more health workers visit the refugee camps might also relieve some pregnant women's concerns (Winn, Hetherington, & Tough, 2018).

One of the policies for pregnant women during the earthquake disaster situation in Banjarnegara was to separate pregnant women from other refugees in the camp. This was so that they could be cared for in safe locations and monitored by health workers. Meanwhile, husbands or other family members who were not included in the vulnerable group would remain in the general refugee camp. However, this did not obtain a positive response from some pregnant women refugees. They refused to be moved to the separate camp for pregnant women and chose to remain close to their families, even though the assistance they received would be the same as the other refugees in the general refugee camp.

There is a Javanese cultural saying that states *"mangan ora mangan sing penting kumpul"* which translates to "whether we could eat or not, the important thing is that we are always together." This saying is interpreted by the Javanese as a preference to stay together with their relatives even though they are miserable, rather than be separated or far apart no matter what the conditions are (Widodo, Akbar, & Sujito, 2017). This preference is seen from the responses obtained in this study. In addition, according to Lewis, Lee, and Simkhada (2015), the presence of husbands has an important role in the safe delivery and maternal health of the pregnant women, even though their role is secondary. The husband's roles include responding to complications, seeking medical assistance, paying for transportation, and allocating household resources (Furuta & Salway, 2006; Mullany, Becker, & Hindin, 2007). Although some roles will be resolved more quickly if they are close to the presence of health workers, Stapleton et al. (2012) proved that pregnant women who feel stronger social support from their partners will have lower emotional stress after childbirth.

The concept of maternity nursing care emphasizes the importance of providing care that involves the family through Family Centered Maternity Care (FCMC), a family-centered care concept that provides care for women during pregnancy, childbirth, postpartum, and emergency infant care by involving the family (husband) (Enkin, 1973). Katz (2015) stated that FCMC can be conducted in any place, such as a home, maternity center, hospital, or even in an emergency situation. This statement supports the application of the FCMC concept in providing care to pregnant women in disaster situations while in refugee camps. The results of the research conducted by Mayasari, Suhita, and Indasah (2018) proved that FCMC can increase independence in meeting care needs during the postpartum period. This does not rule out the possibility that it will also have a positive impact if applied to pregnant women. Therefore, the FCMC approach can be an effective strategy that could be implemented by the government to meet the needs of pregnant women in disaster situations while in refugee camps. In accordance with the regulation of the Indonesian Minister of Health number 75 of 2019 concerning health crisis management, in determining the need for Health Rehabilitation and Reconstruction in the health sector, all relevant stakeholders and the community should be involved, taking into account all aspects, including local wisdom, social, technological and community culture.

As already mentioned, the earthquake victims in Kalibening, Banjarnegara, experienced a little difficulty in meeting their needs, due to reasons such as access or time constraints and physical weakness; the survivors preferred to have health workers visit the evacuation sites. But not without reason, this policy might be due to restrictions on the number of health workers or maybe other things. This can also happen due to unpreparedness of related parties in disaster management. Prastowo and Wahyuningsih (2020) stated that in regard to the percentage of implementing disaster mitigation based on Minister of Home Affairs Regulation No. 33 of 2006 in Banjarnegara Regency as a whole, as many as 29 criteria were met and there was only one criterion that was not met, namely the indicator of cooperation procedures. There are five related agencies in Banjarnegara Regency that play a role in implementing disaster mitigation in terms of policies and commitments, one of which is the Health Service. The achievement of the implementation of disaster mitigation by the Health Service has only reached 53%, of which 16 indicators have been achieved out of 30 new indicators. Even so, the Health Service in this case has made optimal efforts in handling disasters, one of which is by forming a rapid reaction team (TRC).

This study has some possible limitations that can impact the result. One limitation would be because the disaster studied occurred locally, the victims were also local residents, and the population sampled lacked cultural diversity. Therefore, the cultural perspective obtained from this study is also narrow, as it only focused on the culture in Javanese society. Thus, it is also necessary to identify the needs of disaster victims at disaster locations with different or more diverse cultural backgrounds. Another limitation is that the participants in this study were only victims of natural disasters living in refugee camps. The health workers who were involved in handling were not informants in this study, so the information obtained regarding the limited fulfillment of the needs of refugees was not validated from the health worker's point of view.

Conclusion

This study showed that there are still limitations on the fulfillment of the basic and perinatal needs of pregnant women in refugee camps. Based on the themes obtained, it can be seen that basically there is no difference in the needs of pregnant women in disaster conditions or not in disaster conditions. However, the difference lies in their affordability in meeting their needs in a more difficult disaster situation. Many of them have experienced complications during their pregnancy. It was found that, from a cultural aspect, togetherness with family was found to be important for pregnant women. Pregnant women were concerned not only about their needs, but also about their families. Therefore, family-centered care would allow pregnant women to feel safe and comfort, both physically and emotionally. Thus, there is a need for coordination between local governments and other stakeholders regarding the needs of pregnant women as vulnerable people, so that these survivors will receive appropriate assistance according to their needs.

Declaration of interest
There is no conflict of interest.

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Data Availability
The datasets generated during and/or analyzed during the current study are not publicly available due to the data but are available from the corresponding author on reasonable request.

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Nurses' self-compassion and professional quality of life during COVID-19 pandemic: A cross-sectional study

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Abstract

Background: Self-compassion enables nurses to understand, know, and love themselves when faced with challenges, specifically during the COVID-19 pandemic. It will decrease compassion fatigue and raises compassion satisfaction.
Purpose: This study aimed to test how nurses' self-compassion related to their professional quality of life (compassion satisfaction, burnout, and secondary traumatic stress) during the COVID-19 pandemic in Indonesia.
Methods: This was a quantitative correlational study which recruited 234 nurses from all over Indonesia using convenience sampling technique. To collect data, an online survey was administered. Descriptive statistics and the Spearman rank test were used to analyze the collected data.
Results: Self-compassion and compassion satisfaction have been found to have significant relationships (p=0.718), likewise self-compassion and burnout (p=0.726), and self-compassion and secondary traumatic stress (p=0.516).
Conclusions: Self-compassion increases compassion satisfaction. When nurses care for themselves, compassion fatigue (burnout and secondary traumatic stress) will be reduced, and vice versa. Self-awareness is required for nurses to cultivate self-compassion by focusing on and accepting each live event without regret.

Keywords: burn out; compassion satisfaction; COVID-19; nurse; secondary traumatic stress; self-compassion

Introduction

The Coronavirus disease or known as COVID-19, first surfaced in November 2019 in Wuhan, China, then swiftly spread and triggered a worldwide pandemic (Chorwe-Sungani, 2021). The virus quickly spread, resulting in an increase in confirmed cases and numerous deaths. As of August 5, 2022, there have been over 500 million reported cases of COVID-19 and over six million deaths worldwide (World Health Organization, 2022). Meanwhile, in Indonesia, there were more than five hundred deaths and more than six million confirmed positive COVID-19 cases as of August 8, 2022 (Manuhutu, 2022).

At the onset of the COVID-19 pandemic in 2020, nurses were reportedly more compassionate and empathetic (Dwyer et al., 2021). A study revealed that, before COVID-19 pandemic, nurses had more compassion satisfaction compared to compassion fatigue (Jakimowicz et al., 2018). However, due to the large number of people who were being treated in hospitals, there was a considerable demand for the medical team, which includes nurses, to provide patients with treatment and care at the frontline (Hermawanto, 2020). These conditions contributed to the already heavy workload and stress experienced by nurses. As a result, healthcare workers, particularly nurses with direct

patient contact, have experienced exhaustion, worry, anxiety, and depression (Ruiz-Fernández et al., 2021). In addition, with daily COVID-19 instances and new coronavirus variations, the number of nurses with compassion fatigue may continue to rise (Dwyer et al., 2021; Labrague & de los Santos, 2021). Eventually, it will diminish the job satisfaction of nurses, which will have a negative impact on both the personal and professional quality of life of the nurses (Ruiz-Fernández et al., 2021). Nurses' professional quality of life (ProQoL) is defined as positive and negative feelings in relation to their work of assisting others who are suffering (Stamm, 2010). It consists of compassion satisfaction (CS) and compassion fatigue (CF), and has two sub-components: burnout and secondary-traumatic stress (Stamm, 2010). According to a study in Spain, the levels of compassion satisfaction, burnout, and compassion fatigue are all significantly high in health crises caused by COVID-19 (Ruiz-Fernández et al., 2021). Conversely, when nurses are frequently exposed to physical and emotional pain in serious and complex situations, such as during the COVID-19 pandemic, and when they are frequently confronted with stressful work situations, they are susceptible to compassion fatigue, burnout, and secondary traumatic stress, which can negatively affect their health and the care they provide (Ageel & Shbeer, 2022). Consequently, nurses must practice self-compassion.

Self-compassion is one of the elements that can have an effect on the overall ProQoL (Durkin et al., 2016). This refers to a way to regulate one's emotions and a strategy for relating to oneself to deal with shortcomings or difficult life circumstances (Neff & McGehee, 2010). Self-compassion, according to Neff (2016), includes three essential components: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. These elements symbolize self-compassion. Self-kindness means being kind to oneself and self-judgment is replaced with unconditional love, which entails self-soothing. Common humanity means acknowledging that all humans fail and make mistakes and live imperfect lives. Instead of feeling isolated by one's imperfection—egocentrically feeling as if I am the only one who has failed or is suffering—one gets a broader and more linked perspective on personal faults and individual struggles. Mindfulness, the third component of self-compassion, involves being aware of one's present moment experience of suffering without getting caught up in an exaggerated storyline about oneself or life experience.

When nurses care more about themselves and behave better when facing a difficult life journey, they will enjoy their work, thereby enhancing their quality of life as professionals. It will ultimately reduce compassion fatigue and improve compassion satisfaction (Hashem & Zeinoun, 2020; Neff & McGehee, 2010). Healthcare professionals may experience either compassion satisfaction or compassion fatigue, depending on personal characteristics such as the level of resilience, self-compassion, and empathy. External factors that have the potential to influence an individual's perception of their job include the required workload, the organization of the workplace, the social climate, and the level of professional recognition (Ruiz-Fernández et al., 2020).

There is currently no evidence to suggest that practicing self-compassion can positively affect ProQoL of Indonesian nurses working during the pandemic. Even though normal operations have resumed in Indonesia, and nurses have become accustomed to COVID-19 cases, it is still essential to understand nurses' professional quality of life during the pandemic. This study aimed to find out the correlation between self-compassion and the dimensions of nurses' professional quality of life during the COVID-19 pandemic.

Materials and Methods

Design

This was a quantitative correlational study, using a cross-sectional design, that examined the correlation between nurses' ProQoL and self-compassion during the COVID-19 pandemic.

Participants and Setting

The data were collected using an online survey from February to April 2022. Two hundred and thirty-four licensed Indonesian nurses working in hospitals, or the community health centers were recruited using a convenience sampling. Participants had been treating patients who were suspected or confirmed with COVID-19 in the past. This research was conducted using a Google Form (https://bit.ly/3r0dsYS).

Instrument

The online questionnaire consisted of demographic information, a self-compassion scale (Neff, 2003), and a professional quality of life questionnaire (Stamm, 2010). The demographic characteristics section included questions about age, gender, educational background, length of employment, workplace, COVID-19 training, and location.

The instruments used in this study were the Indonesian version of the Self-Compassion Scale (SCS) and the professional quality of life (ProQoL) version 5. Both instruments have been used in previous study (Eka & Tahulending, 2018; Sugianto et al., 2020). The original English version of ProQol v.5 was translated into Indonesian. The Indonesian version was tested for validity and reliability for each sub-variable of the ProQol (compassion satisfaction Cronbach's alpha=0.738; burnout Cronbach's alpha = 0.795; and secondary traumatic stress Cronbach's alpha =0.7) (Eka et al., 2016). The Professional Quality of Life scale v.5 has 30 items with a maximum score of 5 (1=never, 2=rarely, 3=sometimes, 4=often, and 5=very often) (Stamm,

Table 1. Characteristics Demographic of The Respondents (n=234)

Demographic Characteristics	F	%
Gender		
Men	93	39.7
Women	141	60.3
Age		
<25 years	111	47.4
25-34 years	97	41.5
35-44 years	16	6.8
>45 years	10	4.3
Educational background		
Diploma	32	13.7
Bachelor in Nursing	19	8.1
Bachelor in Nursing + RN	183	78.2
Length of employment		
< 3 year	114	48.7
3-5 year	45	19.2
6-10 year	42	17.9
11-15 year	22	9.4
>15 year	11	4.8
Work place		
Government hospital	86	36.8
Private Hospital	140	59.8
Community Health Center	8	3.4
Length of work in the COVID-19 unit		
< 3 month	47	20.1
3-6 month	84	35.9
6-12 month	61	26.1
12-18 month	21	9
18-24 month	12	5.1
>24 month	9	3.8
Training received for caring COVID-19 patients		
No	119	50.9
Yes	57	54.4
Independent Learning	58	24.8
Location		
Western of Indonesia	165	70.5
Central of Indonesia	63	26.9
Eastern of Indonesia	6	2.6

2010). Reverse scoring was applied to items 1, 4, 15, 17, and 29, among the five unfavorable statements on this questionnaire. The total score was used to quantify compassion satisfaction, burnout, and secondary traumatic stress and categorized as follows: Compassion satisfaction was categorized into high ≥41, moderate 21 - 40, low ≤20; burnout was categorized as high ≥29, moderate 15 – 28, low ≤14; secondary traumatic stress, high ≥35, moderate 18 – 24, low ≤17.

The Indonesian version SCS contains 26 statements and is a widely used self-report measure that assesses six components of self-compassion: self-kindness (5 items); self-judgment (5 items); common humanity (4 items); isolation (4 items); mindfulness (4 items); and over-identification (4 items) (Cunha et al., 2016; Duarte et al., 2016; Neff, 2003, 2016; Neff & McGehee, 2010). On a 5-point

Table 2. Descriptive Statistics for Professional Quality of life and Self-Compassion (n=234)

Variables	Mean±SD	Skewness	Kurtosis
Profesional quality of life (ProQoL)			
Compassion Satisfaction (CS)	42.99 ±7.34	-1.27	1.61
Burnout (BO)	19.32 ±6.37	.58	-.81
Secondary Traumatic Stress (STS)	19.42 ±7.27	.98	.42
Self-Compassion Scale (SCS)			
Self-kindness	4.01 ±0.97	-1.13	.82
Self-judgment	3.95 ±0.83	-.074	-.05
Common humanity	4.09 ±0.97	-1.1	.57
Isolation	3.76 ±0.88	-.47	-.46
Mindfulness	4.03 ±0.87	-1.07	1.12
Over-Identification	3.99 ±0.83	-.72	-.1

Table 3. Spearman Rank Correlation Test Results (n=234)

		1	2	3	4	5	6	7	8	9
1	Compassion Satisfaction (ProQoL)									
2	Burnout (ProQoL)	-.706**								
3	Secondary Traumatic Stress (ProQoL)	-.272**	.623**							
4	Self-Kindness (SCS)	.742**	-.533**	-.181**						
5	Self-Judgment (SCS)	.312**	-.465**	-.555**	.230**					
6	Common Humanity (SCS)	.720**	-.569**	-.193**	.831**	.227**				
7	Isolation (SCS)	.138*	-.427**	-.557**	.019	.586**	.007			
8	Mindfulness (SCS)	.711**	-.568**	-.183**	.825**	.211**	.798**	.114		
9	Over-identification	.324**	-.519**	-.621**	.186**	.717**	.207**	.660**	.220**	
10	Total Score (SCS)	.718**	-.726**	-516**	.738**	.653**	.733**	.519**	.727**	.660**

Note: ProQoL = Professional Quality of Life; SCS = Self-Compassion Scale
**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

scale, items are rated as follows: 1 = almost never to 5 = almost always. Self-compassion scores can be tallied following the reverse-coding of negative elements. In this investigation, the six criteria are utilized independently. Internal consistency and validity were good in the Indonesian scale. The Cronbach's alpha of the Indonesian version was self-kindness 0.71, self-judgment 0.69, awareness 0.60, over-identification 0.68, common humanity 0.72, isolation 0.78, and total scale 0.87 (Sugianto et al., 2020). The higher the score, the more self-compassion there is (Duarte et al., 2016).

Data Collection

An online survey was used for data collection. A description of the research and informed consent were provided on the first page of the questionnaire. To better understand the characteristics of the respondents, demographic information was collected. The questionnaires were distributed from 3 February until 31 March of 2022 using an e-flyer to invite participants to participate in the online survey. The e-flyer containing a brief information about the survey was posted on social media (Facebook, Instagram, and WhatsApp). Two hundred and thirty-four participants completed the entire questionnaires.

Data Analysis

The sample and responses to the study instruments were described using descriptive statistics (mean, median, standard deviations, and frequencies). A bivariate analysis was conducted using the Spearman rank test to determine the relationship between self-compassion and the dimensions of professional quality of life of the participants.

Ethical Consideration

This research received ethical approval from the institutional review board (No.052/KEPFON/I/2022). The online data were anonymous and only researchers had access to the data. A brief paragraph at the beginning of the questionnaire described the purpose of the study. Participation was voluntary and participants were required to complete the online consent form before accessing the questionnaire. Participants might withdraw from the study by contacting the researchers using the information listed at the beginning of the questionnaire.

Results

The majority of respondents (47.4 percent) are female and younger than 25 years old (60.3 percent), with a bachelor's degree in nursing (78.2 percent). More than half of the respondents work in private hospitals. Nearly half of the respondents had less than three years of work experience, and roughly one-third had worked in the COVID-19 unit for three to six months. As many as 119 respondents (50.9 percent) did not receive training on how to treat COVID-19 patients, and the majority of respondents (70.5 percent) live in Indonesia's western region.

Table 2 displays the mean values for the variables that were analyzed. Concerning the professional quality of life (ProQoL) dimension, it can be seen that the participants had a slightly high level of compassion satisfaction (M = 42.99; SD = 7.34), a moderate level of secondary traumatic stress (M = 19.42; SD = 7.27), and a moderate level of burnout (M = 19.32; SD = 6.37). High mean scores were observed on the self-compassion scale (SCS) for common humanity (M= 4.09; SD = 0.97), mindfulness (M = 4.03; SD = 0.87) and self-kindness (M = 4.01; SD = 0.97).

Correlations using Spearman rank are provided in Table 3. The results indicated a positive relationship between compassion satisfaction and all higher levels of self-kindness, common humanity, and mindfulness, and lower levels of self-judgment and isolation. Burnout negatively correlates with high levels of self-kindness, common humanity, and mindfulness, as well as with low levels of self-judgment and isolation. Secondary traumatic stress is strongly correlated with self-judgment and isolation. In addition, secondary traumatic stress shows a negative correlation at a lower level with self-kindness, humanism, and mindfulness. Specifically, we found that self-compassion is significantly correlated positively with compassion satisfaction. The higher nurses' self-compassion, the greater their satisfaction with compassion. This suggests that those who can give themselves attention and affection during difficult times experience less fatigue due to their workload. In addition, self-compassion has a significant negative correlation with burnout and secondary traumatic stress.

Discussion

According to the findings of this study, self-compassion has a strong positive correlation with compassion satisfaction and a strong negative correlation with burnout and secondary traumatic stress. Constant exposure of healthcare professionals to the suffering of others, which occurred during the COVID-19 pandemic, may be associated with burnout and secondary traumatic stress. As a result, the well-being of healthcare professionals is at risk (Duarte et al., 2016). The COVID-19 virus is spreading throughout Indonesia, posing a significant challenge, especially for frontline healthcare providers. A study found that nurses who cared for COVID-19 patients reported higher levels of anxiety, used fewer coping strategies, and experienced more difficulty than expected while working with these patients (Nurhidayah et al., 2023).

A study conducted in Australia revealed that the compassion satisfaction score was higher than the compassion fatigue score prior to the COVID-19 pandemic (Jakimowicz et al., 2018). Similarly, during a COVID-19 outbreak in Indonesia, both CS and CF were found to be at moderate to high levels, which is consistent with a number of studies conducted in other countries that discovered a relatively high level of compassion satisfaction and compassion fatigue (burnout and secondary traumatic stress) during the COVID-19 crisis (Duarte et al., 2016; Ruiz-Fernández et al., 2020; Yeung et al., 2023). This current study, however, did not attempt to quantify the differences in professional quality of life between Indonesia's various regions.

This study was conducted in Indonesia at a time when COVID-19 cases were rising. At the end of 2020, the highest number of COVID-19 cases was found in Western Indonesia, followed by Central Indonesia and Eastern Indonesia (Manuhutu, 2021). Despite the pandemic's adverse conditions, nurses continue to demonstrate high self-compassion for COVID-positive patients and their families. It provides an opportunity for nurses to rediscover the motivation that drives them to choose the best profession thro`ugh unconditional effort and commitment that can alleviate patients' suffering. At the same time, it raises nurses' visibility and professionalism in the community (Ruiz-Fernández et al., 2021).

Findings from this study suggest that nurses regularly practice self-compassion despite the increasing number of COVID-19 cases. Self-compassion is argued to be one of the protective factors that protect nurses from mental health issues during the COVID-19 crisis (Gerace, 2022; Joy et al., 2023). Several factors, including age, gender, and level of education, influence the capacity for self-compassion. According to a study, self-compassion increases as age does (Hwang et al., 2016). Women and adults who have a lot of self-compassion are also more accepting of themselves

and their situations. Additionally, women and adults with a high level of self-compassion are more accepting of their circumstances, which, in turn, enables them to have a high level of self-compassion (Neff, 2011). In contrast, a study found no evidence that gender, marital status, or level of education influence healthcare workers' professional quality of life or general health (Yadollahi et al., 2016).

In addition, this study showed more than half of the respondents reported a high level of compassion satisfaction, indicating that respondents were highly satisfied with their work as nursing care providers. According to Gurdogan and Uslusoy (2019), there was a significant positive correlation between respondents' happiness and professional quality of life. This is consistent with the findings of Jang et al. (2016), who found that the higher the level of compassion satisfaction, the lower the burnout and secondary traumatic stress levels. Inversely, if the level of compassion satisfaction is low, burnout and secondary traumatic stress levels will be higher (Ortega-Campos et al., 2020). A higher level of compassion satisfaction will positively affect a person's prosocial behavior, including a more attentive attitude, improved character, and decreased self-isolation (Duarte et al., 2016). In addition, a rise in compassion satisfaction would affect the quality of work and care provided to patients (Alkema et al., 2008). It is also argued that good team coordination and collaboration among healthcare teams, as occurred during the COVID-19 crisis, as well as a positive work environment, can result in compassion satisfaction (Anjara et al., 2021; Kesumaputri et al., 2021).

This study demonstrates a positive strong correlation between self-compassion and compassion satisfaction, indicating that as nurses' self-compassion increases, so will their compassion satisfaction. Consistent with a study of Spanish Red Cross volunteers conducted during the COVID-19 pandemic that found a positive correlation between self-compassion and compassion satisfaction, the present study demonstrates a positive relationship between self-compassion and compassion satisfaction (Gonzalez-Mendez & Díaz, 2021). Furthermore, the ability to consciously view negative experiences, such as during the COVID-19 crisis, contributes to compassion satisfaction (Duarte et al., 2016).

The current findings are also in agreement with those of a later study that found a negative correlation between self-compassion and burnout or compassion fatigue (Kesumaputri et al., 2021). This indicated that respondents are capable of performing their duties despite being fatigued. However, it is essential to keep in mind that compassion fatigue can lead to increased physical illness and sick leave, high turnover rates, and decreased productivity among nurses (Murray, 2019). Depression and anxiety are also strongly linked to compassion fatigue and secondary traumatic stress (Hegney et al., 2015).

Secondary traumatic stress refers to the emotional and behavioral effects of knowing about the traumatic experiences of others, and it may result from exposure to stressful events such as the COVID-19 pandemic (Figley, 1995; Trumello et al., 2020). One of the causes of secondary traumatic stress in nurses is seeing family members, friends, or patients who have tested positive for COVID-19 (Orrù et al., 2021). According to the results of this study, more than a third of the participants experienced low levels of secondary traumatic stress. It can be inferred that respondents on the frontlines of the COVID-19 pandemic felt fear and anxiety when interacting with patients. However, after prolonged contact with COVID-19 patients, frontline nurses will experience a decrease in secondary traumatic stress (Li et al., 2020).

The results of the bivariate test between self-compassion and secondary traumatic stress in this study showed a negative relationship between the two variables, such that a high level of self-compassion was associated with a low level of secondary traumatic stress. Secondary traumatic stress in the workplace is less likely to affect someone who has a high level of self-compassion and the ability to pay more attention when confronting difficult situations. Self-compassion is attainable through practice, which contributes to the quality of life and well-being and greater resilience to work stress (Durkin et al., 2016; Gonzalez-Mendez & Díaz, 2021). In contrast, the tendency to criticize and isolate oneself, as well as being too immersed in negative experiences, heightens the risk of compassion fatigue (Duarte et al., 2016; Durkin et al., 2016).

Factors that significantly affect nurses' quality of life on the job include compassion satisfaction and burnout. Compassionate care workers need effective coping mechanisms, such as problem-solving and social support networks, to reduce their risk of burnout and secondary stress syndrome and improve their overall sense of well-being (Hashish & Atalla, 2023). In contrast to the findings of the present study, a study conducted in Indonesia during the COVID-19 pandemic found that nurses had a low quality of life (Patricia & Apriyeni, 2022). Multiple factors, including psychological stress, social support, coping strategies, and self-efficacy, were found to influence the quality of life of nurses during COVID-19. However, it was unclear in the report from which region of Indonesia the respondents originated. Self-compassion ultimately enables nurses to love and care for themselves despite adversity; consequently, it may be a factor that protects against burnout. Due to the COVID-19 pandemic, it is imperative that frontline nurses practice greater self-compassion to mitigate the negative effects of their jobs on their mental health. In addition, enhancing the professional quality of life of nurses can increase job satisfaction, thereby reducing secondary trauma caused by COVID-19 patient handling.

Limitations

This research was conducted in Indonesia, a vast country with a sizable population. This study is limited by the fact that the collected data are not uniformly distributed across Indonesia. In addition, we selected a non-probabilistic sample of hospitals and nurses for our study, so the outcomes may not be representative of the entire population. All of the information was collected through self-report measures, making it susceptible to the typical limitations of this research design.

Conclusions

During the recent COVID-19 pandemic, nurses reported lower levels of self-compassion and higher levels of burnout. Findings from this study point to the potential benefits of self-compassion in helping people love themselves and prioritize self-care in the face of adversity. If frontline nurses are going to be less stressed by their jobs, they need to learn how to practice self-compassion. Additionally, lowering fatigue and secondary trauma from treating COVID-19 patients can be avoided by improving one's professional quality of life.

Declaration of Interest

The authors have stated that there is no potential for a conflict of interest.

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Data Availability

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

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Can D-dimer predict length of hospital stay in COVID-19 survivors? A cross-sectional study

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Abstract

Background: COVID-19 has been shown to increase the risk of thrombosis, where this mechanism occurs due to cell damage that triggers the release of various proinflammatory cytokines and chemokines, thereby activating the coagulation cascade. Thus, an increase D-dimer levels in COVID-19 patients occurs. Patients' length of hospital stay (LOS) is pivotal in order to improve patient care, lower overall expenses, and distribute resources effectively.
Purpose: This study aims to identify the association between D-dimer and other parameters as a predictor of LOS in COVID-19 survivors.
Methods: This observational analytic study included COVID-19 patients who were admitted to Universitas Sebelas Maret Hospital in Sukoharjo, Indonesia, from November 2020 to January 2021. The data were taken from the medical records of patients diagnosed with COVID-19. Age, gender, comorbidities, admission oxygen saturation, D-dimer, neutrophil-lymphocyte ratio (NLR), haemoglobin, platelet count, white blood cells (WBC), estimated glomerular filtration rate (eGFR), and LOS were analysed in this study. Binary logistic regression was applied to determine the correlation between potential predictors on LOS.
Results: A total 104 patients was included in the final analysis. The median LOS was 13 days (IQR 9-17 days). There was an increase of D-dimer in 79 patients with the median 759.39 ng/ml. Patients with prolonged LOS tend to have higher D-dimer levels (Median 924.95 vs 591.54 ng/ml, $p = 0.018$). However, D-dimer and other parameters were not associated with prolonged LOS in COVID-19 survivors (D-dimer $p = 0.188$; Age $p = 0.138$; Diabetes mellitus $p = 0.172$; NLR $p = 0.859$; Platelet count $p = 0.097$).
Conclusion: D-dimer levels do not accurately predict prolonged LOS in COVID-19 survivors. Therefore, we suggest D-dimer solely should not be used as a tool to predict a patient's LOS.

Keywords: COVID-19; D-dimer; length of hospital stay

Introduction

COVID-19, a pandemic affecting healthcare systems worldwide (di Gennaro et al., 2020), originated in late 2019 when a novel coronavirus, later identified as SARS-CoV-2, was linked to acute respiratory illnesses in Wuhan, China. Subsequently, in March 2020, this virus was officially declared a pandemic (Güner et al., 2020). It was found that COVID-19 is a systemic disease that can affect vascularisation in the pulmonary alveolar tissue, glomerular capillary loops, small intestines capillary, and myocardiocytes, and, therefore, has a high risk of thrombosis. This situation can certainly be a life-threatening situation in COVID-19 patients. Thus, anticoagulation is the

cornerstone treatment in thromboembolic (Ortega-Paz et al., 2021).

D-dimer levels elevated from 3.75% up to 68% in COVID-19 patients. D-dimer is one of the products of fibrin breakdown process, namely the fibrinolysis process. Pathological and non-pathological conditions that increase both fibrin production and fibrin breakdown will increase D-dimer levels in plasma (Yao et al., 2020). This thrombosis mechanism occurs due to cell damage caused by the COVID-19 virus which triggers release of various proinflammatory cytokines and chemokines, thereby activating the coagulation cascade, and compensated by the process of fibrinolysis which makes the patient's D-dimer level increase (Kasinathan & Sathar, 2020). D-dimer levels serve as a valuable marker for assessing the severity and prognosis of COVID-19 patients, with higher levels indicating a more unfavourable outcome. Research has demonstrated that D-dimer levels surpassing 2.14 mg/L are associated with an increased risk of mortality in COVID-19 patients (Yao et al., 2020). As a result, D-dimer examinations remain an essential practice in the early evaluation of hospitalized COVID-19 patients (Zhan et al., 2021a).

The rapid spread of COVID-19 presents a significant challenge to healthcare systems, particularly hospitals, as they face an increasing caseload (Mahboub et al., 2021). Length of Hospital Stay (LOS) is a crucial metric that determines the number of days an in-patient remains hospitalized (Stone et al., 2022). It has proven to be instrumental in improving patient care, reducing overall expenses, and optimizing resource distribution based on staff and patient needs. Additionally, LOS provides valuable insights into hospital care unit efficiency and patient flow. Accurate prediction of patient LOS holds great benefits for healthcare specialists, enabling them to make informed medical decisions, allocate medical teams and resources effectively, and ensure adequate bed capacity (Abd-Elrazek et al., 2021). The use of clinical data to predict the demand for hospital and Intensive Care Unit (ICU) beds in COVID-19 patients has become indispensable in optimizing therapy effectiveness (Rees et al., 2020; Vekaria et al., 2021). Currently, there is no existing study investigating the association between D-dimer levels and LOS in COVID-19 survivors, particularly in Indonesia. Hence, the main objective of this study is to establish the correlation between D-dimer and other relevant parameters as potential predictors of LOS in COVID-19 survivors.

Materials and Methods

Design

This study follows an observational analytic design with a cross-sectional approach. The research was carried out on hospitalized patients diagnosed with COVID-19 at Universitas Sebelas Maret Hospital in Sukoharjo, Indonesia, during the period from November 2020 to January 2021. Participants were selected based on specific inclusion and exclusion criteria.

Sample and setting

The inclusion criteria in this study were patients with a positive diagnosis of COVID-19 which was confirmed through a real-time polymerase chain reaction (RT-PCR), discharged patients with the approval of medical personnel, and patients who had D-dimer examination within three days of admission. Patients who died during hospitalisation, discharged at personal request, pregnant during hospitalisation, had history of anticoagulant therapy, and who were not tested with D-dimer examination within three days of admission were excluded from this study. A total of 104 samples was obtained.

Data collection

We collected patient demographic, clinical characteristics, and laboratory data. The data was taken from the medical records of patients diagnosed with COVID-19 at the Universitas Sebelas Maret Hospital including age, gender, comorbidities, oxygen saturation at admission, D-dimer, neutrophil-lymphocyte ratio (NLR), haemoglobin, platelet count, white blood cells (WBC), estimated glomerular filtration rate (eGFR), and LOS. Admission oxygen saturation were divided into two groups (i.e., < 95% and 95%). In this study, LOS was calculated as the duration from the date the patient was admitted to the hospital until the date they were discharged. If a patient was transferred to the Intensive Care Unit (ICU) or a non-COVID-19 ward during their hospitalization, the LOS continued to be recorded until the patient was ultimately discharged from the hospital. Median was used as cut-off for prolonged LOS. All blood panels were measured using automatic haematology analyzer with flow cytometry. For calculating eGFR, we used the 2021 CKD-EPI equation. D-dimer levels were measured using a latex turbidimetric immunoassay, and the results were given in ng/ml. Elevated D-dimer defined as 500 ng/ml.

Data analysis

In this study, all statistical analyses were conducted using IBM SPSS Statistics Version 26. Continuous data were presented as either frequency, mean ± standard deviation, or median with interquartile ranges (IQR). The choice between the independent t-test or Mann-Whitney U test depended on whether the data followed a normal distribution. Categorical data were presented as frequency with percentages, and the differences between variables based on Length of Hospital Stay (LOS) were assessed using either Pearson's Chi-square test or Fisher's exact test. For the normality test of the data, the Kolmogorov-Smirnov test was employed. To identify the correlation between potential variables and LOS, variables with a p-value less than 0.25 in the univariate analysis were included in the binary logistic regression. A p-value less than 0.05 was

Table 1. Baseline Characteristics of Hospitalized COVID-19 Patients

Characteristics	All patients (n=104)	Length of hospital stay		p
		<13 days (n=49)	13 days (n=55)	
Age (years), median (IQR)	52 (43.25-58.75)	50 (38-57)	54 (46-61)	0.199m
Gender, n (%)				
Male	55 (52.9)	25 (59)	30 (54.5)	0.719c
Female	49 (47.1)	24 (41)	25 (45.5)	
Comorbidities, n (%)				
Without Comorbidity	53 (51)	23 (46.9)	30 (54.5)	0.439c
Hypertension	22 (21.2)	10 (20.4)	12 (21.8)	0.86c
Diabetes Mellitus	34 (32.7)	19 (38.8)	15 (27.3)	0.212c
Asthma	2 (1.9)	1 (2)	1 (1.8)	1.000f
Acute Kidney Injury	2 (1.9)	1 (2)	1 (1.8)	1.000f
Congestive Heart Failure	4 (3.8)	2 (4.1)	2 (3.6)	1.000f
Oxygen saturation at admission, n (%)				
<95%	37 (35.6)	20 (40.8)	17 (30.9)	0.292p
95	67 (64.4)	29 (59.2)	38 (69.1)	
Laboratory parameters				
D-dimer (ng/dl), median (IQR)	759.39 (485.42-1548.55)	591.54 (455.93-1187.99)	924.95 (579.03-1839)	0.018*m
NLR, median (IQR)	4.12 (2.85-6.34)	3.69 (2.36-5.83)	4.7 (3.18-6.76)	0.082m
Hemoglobin (g/dL), mean SD	13.63 1.8	13.54 1.69	13.73 1.91	0.597t
Platelet count (103/L), median (IQR)	246 (185-309)	252 (201-347)	233 (176-301)	0.201m
WBC (103/L), median (IQR)	7.59 (5.89-9.68)	6.74 (5.77-9.42)	7.77 (6.26-10.98)	0.324m
eGFR (ml/min/1,73m2), median (IQR) (n=95)	97 (58-111)	97 (64.5-116.5)	93 (54.25-108.25)	0.553m

Note: Labelled with *: significant; t: independent t test; m: mann-whitney U test; c: pearson's chi-square; f: Fisher's exact test; IQR: interquartile range; NLR: neutrophil-lymphocyte ratio; WBC: white blood cells; eGFR: estimated glomerular filtration rate based on CKD-EPI equation.

Table 2. Analysis of Potential Risk Factor for Prolonged Length of Hospital Stay

Variables	Length of hospital stay	
	OR (95% CI)	p
D-dimer (mg/dl)	1.000 (1.000-1.001)	0.188
Age (years)	1.028 (0.991-1.066)	0.138
DM (yes)	0.539 (0.222-1.308)	0.172
NLR	1.010 (0.914-1.115)	0.859

Note: DM: diabetes mellitus; NLR: neutrophil-lymphocyte count.

considered statistically significant.

Ethical consideration

This study was conducted after obtaining ethical approval from the Health Research Ethics Commission of Dr. Moewardi Hospital (ethics number 393/III/HREC/2021).

Results

This study included 104 patients who were hospitalised in Universitas Sebelas Maret Hospital between November 2020 and January 2021, consisting of 55 (52.9%) males and 49 (47.1%) females. The median age of the study population was 52 years (IQR 43.25 to 58.75 years). Fifty-one percent of the patients had no comorbidity, while the most common comorbidities found in this study were diabetes mellitus (32.7%) and hypertension (21.2%). Admission oxygen saturation 95% was found on 64.4% of the population. The median of

LOS in this study was 13 days; therefore, prolonged LOS is defined as LOS 13 days. Laboratory findings collected in this study were D-dimer, haemoglobin, platelet count, WBC, and eGFR. There were 79 patients having elevated D-dimer with the median of D-dimer 759.39 mg/dl. Patients with prolonged LOS tend to have higher D-dimer levels (Median 924.95 vs 591.54 ng/ml, p = 0.018). The differences in demographic, clinical, and laboratory data between LOS of less than 13 days and LOS of 13 days or more are shown in Table I.

D-dimer, age, patients with diabetes mellitus, NLR, and platelet count were included in binary logistic regression analysis ($p < 0.25$). The results of the binary logistic regression are shown in Table II. There were no independent factors associated with prolonged LOS in this study. All independent factors had p 0.05 (D-dimer p = 0.188; Age p = 0.138; Diabetes mellitus p = 0.172; NLR p = 0.859; Platelet count p = 0.097).

Discussion

This cross-sectional study analysed baseline characteristics and the association between potential risk factors with prolonged LOS in COVID-19 patients at Universitas Sebelas Maret Hospital, Sukoharjo, Indonesia. We found the median of D-dimer levels in 104 COVID-19 patients was higher than the normal range (759.39 ng/ml), while the normal range is <500 ng/ml (Soni et al., 2020). Similar result was found from a retrospective study in China, where the median of D-dimer was 800 ng/ml (Yu et al., 2020). Patients with prolonged LOS tend to have higher D-dimer levels. Several studies showed COVID-19-driven pro-inflammatory state and hypoxia (Cidade et al., 2022). This condition leads to hyperactive coagulation and complement system followed by an increase in the fibrinolysis process in COVID-19 patients, resulting in an increase of plasmin activity. Increased plasmin activity will cause a significant increase in D-dimer levels (Kasinathan & Sathar, 2020; Page & Ariëns, 2021). Higher D-dimer levels are linked to greater severity (Zhan et al., 2021b). As a result, we assumed that patients with greater severity would require more time to recover.

The median LOS in this study was 13 days (IQR 9-17). Thus, LOS more than 13 days was considered as prolonged LOS. LOS was found to be heterogenic across the world. Previous retrospective cohort study at Guangzhou Eighth People's Hospital reported higher median of LOS (18 days) compared to this study (Chen et al., 2021). Nevertheless, several European countries have shorter median LOS (seven days) (Wise, 2020). This difference might be due to difference in strategies used to control COVID-19 infection (Thai et al., 2020). Hence, we assumed that LOS may vary around the world due to different criteria for patient discharge used by every country to control COVID-19 infections.

Previous study from South India showed that there was an association between D-dimer levels and LOS for COVID-19 patients (Thiruvengadam et al., 2021). However, our study clearly showed that D-dimer was not a good marker to predict prolonged LOS in COVID-19 survivors. A study from China also had a similar result where the study examined risk factors during admission that affect LOS of COVID-19 and revealed there was no relationship between D-dimer levels and the prolonged LOS in COVID-19 patients (Guo et al., 2021). D-dimer levels are influenced by many factors such as female sex, increased age, neurologic immobility, and other factors (Kabrhel et al., 2010). Therefore, the D-dimer levels during admission may vary among patients (Soni et al., 2020). We suggested to not use D-dimer as a single predictor for prolonged LOS. However, clinicians should be aware of the elevated D-dimer levels in COVID-19 since higher D-dimer levels are associated with greater severity and mortality in COVID-19 patients (Zhan et al., 2021b).

Although we did not find significant association between age, NLR, patients with diabetes mellitus, platelet count and prolonged LOS, previous study reported that older age and NLR were associated with longer LOS (Chen et al., 2021; Zhao et al., 2016). Older age might be associated with decreased immune responses to control viral replication (Busse & Mathur, 2010), An elevated NLR can indicate an increase in neutrophils, which may be associated with bacterial infections and worsening infections. Simultaneously, a decrease in lymphocyte count suggests a weakened immune function. NLR is considered to be a potential marker for assessing inflammation and the severity of various diseases, including infectious diseases like COVID-19 (Ye et al., 2020). A retrospective cohort study found weak evidence of diabetes mellitus associated with longer LOS because diabetes mellitus might suppress immunological function (Wu et al., 2020). Patients with thrombocytopenia were associated with increased LOS and mortality (Zhu et al., 2021). Further evidence is needed to explain the association between platelet and LOS. Different results between this study and others might be due to different criteria for patient discharge used by every country in order to control COVID-19 infections.

This study's findings have provided an updated major review of predictor prolonged LOS especially among COVID-19 survivors in Indonesia. We strictly chose our sample using the inclusion and exclusion criteria; therefore, making the result more reliable. However, this study has some limitations. First, this is a unicentral study hence making it lack of heterogeneity, and has low sample size. Second, we only used the first D-dimer examination. Thus, D-dimer levels may vary in every patient depending on their clinical condition. It is recommended to identify the correlation between serial D-dimer and LOS in hospitalised COVID-19 survivors.

Conclusion

D-dimer serum levels do not accurately predict prolonged LOS in COVID-19 survivors. Therefore, we suggested D-dimer solely should not be used as a tool in order to predict a patient's LOS. However, the presence of elevated D-dimer levels in COVID-19 should be highly noted by clinicians, as higher D-dimer levels have been linked to greater severity and mortality.

Declaration of Interest

The authors declare no conflict of interest in this study.

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Data Availability

The corresponding author will provide the datasets used and/or analyzed during the current study upon reasonable request.

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The relationship between cyberbullying and the risk of suicidal ideation in adolescents

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Abstract

Background: Cyberbullying is a serious problem experienced by almost all countries. In Indonesia; the highest internet users are adolescents, high internet use puts adolescents at risk of being involved in cyberbullying. Cyberbullying is bullying that is done through social media. Bullying carried out both traditionally and through social media has a psychological impact in the form of feelings of sadness and suicide attempts.
Purpose: To analyze the relationship between cyberbullying and the risk of adolescent suicide ideation.
Methods: This study was a correlational study with a cross-sectional approach of 1043 students from ten state high schools and four state vocational schools with random sampling. Adolescent involvement in cyberbullying was measured using The Second revision of the revised cyber bullying inventory-II (RCBI-II) and the risk of suicidal ideation in adolescents was measured using the Risk Factors of Suicidal Ideation (RFSI) instrument. Data analysis in research using Chi-Square test, kruskal-wallis test, and Mann-Whitney test.
Results: As many as 21.0% of adolescents involved in cyberbullying are at risk of suicidal ideation. The results of the study show that there is a relationship between cyberbullying and the risk of suicidal ideation in adolescents p = 0.000 (p <0.05).
Conclusion: The risk of suicidal ideation is not only for adolescents who are involved as victims of cyberbullying but also affects adolescents who are involved as perpetrators.

Keywords: adolescents; cyberbullying; suicidal ideation

Introduction

Internet users in 2018 in Indonesia reached 171.17 million (64.8%), the highest internet users were in Java (55.7%) and in West Java (16.7%). The highest were aged 15-19 years (91%), and the highest penetration of internet users based on education level was high school students (90.2%). Based on these data, the highest internet users are adolescents. The survey results showed that 49.0% of internet users said they had been bullied on social media. As many as 31.6% do nothing when bullied, they just let it go. This shows that public awareness to follow up on cyberbullying problems is still very low.

The use of digital information and communication technology is an integral part of the daily lives of adolescents. Besides being used for positive things such as seeking information, entertainment, and communication, the use of information media and digital communication also shows the risk of cyberbullying in adolescents (Müller et al., 2014). Adolescents are one of the highest users of social media, so they are at risk of cyberbullying, which is a type of intimidation done through social media adolescents, social media users are at risk of being involved in cyberbullying 1.16 times (Müller et al., 2014). (Cole et al., 2016) adolescents who use social media are 1.16 times more likely to be involved in cyberbullying (Duarte et al., 2018).In cyberspace, forms of intimidation are carried out through information and communication technology, especially the internet, and cell

phones, are known as cyberbullying (Garaigordobil & Machimbarrena, 2017). Cyberbullying refers to aggressive behavior that is carried out repeatedly through communication on social media that aims to frighten and harm other people (Müller et al., 2014) can reach a wider range of targets because it is done anonymously and happens at any time (Hutson et al., 2018). Cyberbullying includes abusive comments, threats, spreading rumors, and posting embarrassing photos via social media. The usual act of cyberbullying is to say harsh words and isolate someone (Chang et al., 2014; Müller et al., 2014).

Intimidation carried out both traditionally and through social media has a psychological impact in the form of feelings of sadness to suicide attempts (Merrill & Hanson, 2016). by Roberts et al. (2016) conducted Research in a Canadian psychiatry clinic on 109 adolescents as victims of cyberbullying and 108 adolescents as victims of bullying. This study showed that the problem appeared in more than two-thirds of patients most women who have a history of cyberbullying are suicidal.

The results of the study were that the problem that emerged in more than two-thirds of patients was suicidal ideation, especially in women with a history of cyberbullying. The results of research in the United States of 233 students revealed that students who were victims of cyberbullying had a much greater level of suicidal behavior (Williams et al., 2017). Research in Jakarta shows that 57.4% of adolescents are involved in cyberbullying. Cyberbullying hurts adolescents, namely an increased risk of smoking behavior and self-harm behavior (Wiguna et al., 2018). The results of research conducted in Jogyakarta showed that as many as 80% of teenagers experienced cyberbullying with intensities ranging from occasionally to almost every day. That shows that cyberbullying can be a psychological pressure for adolescents.

Cyberbullying can affect the lives of adolescents because it can have an impact on the physical and emotional health of adolescents in the long term (Hutson et al., 2018). But many don’t know and understand cyberbullying and the impact of cyberbullying, especially the psychological impact experienced by adolescents who are involved in cyberbullying. Almost all countries consider cyberbullying to be a serious problem (Lozano-Blasco et al., 2020) and is common among students at school (Baldry et al., 2015; Dennehy et al., 2020; Lozano-Blasco et al., 2020; Zych, Farrington, & Ttofi, 2019). However, only a few victims report cyberbullying. The reasons that victims of cyberbullying don’t ask for help are because they feel embarrassed, fear that the perpetrator will retaliate, and think that no one can take action to help them (Hoff & Mitchell, 2009).

This phenomenon shows that, although cyberbullying has a major impact on the lives of adolescents, reports of cyberbullying are rarely carried out and are considered not to be a big problem because the impact cannot be seen directly, unlike traditional bullying. In Indonesia, there is little research on the psychological impact of cyberbullying. To increase awareness among adolescents, it is important to research cyberbullying and its relation to the psychological impact, especially suicidal ideation in adolescents. The research aims to analyze the relationship between cyberbullying and the risk of adolescent suicide ideation.

Materials and Methods

Design and participants

This study was a correlational study with a cross-sectional approach of 1043 adolescents from ten state senior high schools and four public vocational high schools in Tasikmalaya City, who were selected by random sampling. Researchers and schools selected adolescents as a random sample from four classes for each school based on inclusion and exclusion criteria. The inclusion criteria in this study were students who had gadgets and accounts on social media, active on social media for at least the last six months, log in on their social media accounts every day, and were willing to be respondents The exclusion criteria were students who had a history of mental disorders, a history of chronic diseases, and children with special needs who were students in inclusive schools. Data collection period was May 2020 to July 2020. Data analysis used the Chi-Square test, Kruskal-Wallis test, and Mann-Whitney test.

Instruments

The Second Revision of the Revised Cyber Bullying Inventory-II (RCBI-II)

RCBI-II consists of two statement columns where each column consists of 10 items. The first column is “ I did it “ and the second column “ It happened to me.” Each column uses a Likert scale (never = 1, once = 2, 2-3 times = 3, more than 3 times = 4). If the participant gets a score of 10 in each column, it means that the participant is in the category not involved in cyberbullying. If the score in the “I did it” column is greater than the score in the “It happened to me” column, then the participant is categorized as the perpetrator, otherwise the participant is categorized as a victim (Topcua & Erdur-Bakerb, 2018).

Risk Factors of Suicidal Ideation (RFSI)

This instrument consists of 14 items and has a cut-off score of ≥ 31, ranging from 16 to 56. If A score of ≥ 31 means the teenager has a risk of experiencing suicidal ideation. If ≤ 34 then they have a low risk of experiencing suicidal ideation (Yusuf et al., 2019).

Ethical consideration

This study obtained ethical approval from Padjadjaran University with number 27/ UN6.KEP/ EC/2020. Informed consent was obtained from each participant in this study.

Table 1. The Risk of Suicidal Ideation in Adolescents (n=1043)

Gender	No risk of suicide Ideation		Risk of Suicide Ideation		Total	
	∑	%	∑	%	∑	%
Male	285	79.6	539	78.7	824	79
female	73	20.4	146	21.3	219	21
Total	358	100	685	100	1043	100

Table 2. Comparison The Risk of Suicidal Ideation in Cyberbullying Cases (n=1043)

The Risk of Suicide Ideation	Cyberbullying Characteristics				p*) Value
	Perpetrator	Victim	Perpetrator/ Victim	Non-Perpetrator	
Non risk male	Non-Victim	110 (73.8%)	38(71.7%)	80(95.2%)	<0.001
Non risk female	78 (71.6%)	166(69.5%)	72 (67.3%)	223 (97.0%)	
Risk Male	15 (20.8%)	39 (26.2%)	15(28.3%)	4(4.8%)	<0.001
Risk female	31(28.4%)	73 (30.5%)	35 (32.7%)	7 (3.0%)	

*) Chi-Square Test

Table 3. Comparison Scores of Suicidal Risk Ideation in Cyberbullying Cases

The Risk of Suicide Ideation	Cyberbullying Characteristics				p*) Value
	Perpetrator	Victim	Perpetrator/ Victim	Non-Perpetrator	
Median	29	30	30	26	<0.001
Range	17 – 53	16 – 59	17 – 51	16 – 53	

*) Kruskal-Wallis Test

Table 4. Comparison Scores of Suicidal Risk Ideation among Cyberbullying Characteristics

Comparison of cyberbullying characteristics	p*) Value
	Risk of Suicide Ideation
Perpetrator vs Victim	0.251
Perpetrator vs Victim/Perpetrator	0.214
Perpetrator vs Non-Victim/Non-Perpetrator	<0.001
Victim vs Victim/Perpetrator	0.785
Victim vs Non-Victim/Non-Perpetrator	<0.001
Victim/Perpetrator vs Non-Victim/Non-Perpetrator	<0.001

*) Mann-Whitney Test

Results

Based on Table 1, it shows that the risk of suicidal ideation among students of state senior high schools and state vocational high schools in Tasikmalaya City is mostly in the category of not at risk (79%). As many as 219 students (21.0%) were in the risk category, consisting of 73 male students (20.4%) and 146 female students (21.3%).

Based on Table 2, it shows that students who have the highest risk of having suicidal ideation are in the perpetrator and victim group (28.3% in male and 32.7% in female) and the smallest group is that not involved in cyberbullying (4.8% in male and 3.0% in female). Based on the Chi-Square test, there was a relationship between cyberbullying and the risk of suicidal ideation in adolescents (p value <0.001, p<0.05).

Table 3 and Table 4 present a comparison of the suicide ideation risk scores of the four cyberbullying groups. The results of statistical tests based on the Kruskal-Wallis test showed that the median score for the risk of suicidal ideation between perpetrators, victims, perpetrators/victims did not show any significant difference, except for groups not involved in cyberbullying. In the group that did not engage in cyberbullying, the median score for the risk of suicidal ideation was lower when compared to the other three groups. Based on the Mann-Whitney test, there was a significant difference between the

characteristics of the cyberbullying group and the group not involved in cyberbullying ($p = 0.000$, $p < 0.05$).

Discussion

The current study investigates the relationship between cyberbullying and the risk of suicidal ideation among adolescents. Adolescents who are involved in cyberbullying either as perpetrators, victims or perpetrators and victims are at risk of suicidal ideation, where adolescents who act as perpetrators and victims have a higher risk of suicidal ideation. Based on the results of the Chi-Square test, there was a relationship between cyberbullying and the risk of suicidal ideation among adolescents ($p < 0.05$). Furthermore, the comparison between groups based on the median score showed that there was no significant difference between the perpetrator, victim, and perpetrator and victim, except for groups that were not involved in cyberbullying. The results of this analysis show that adolescents who are bound in cyberbullying either as perpetrators, victims, or perpetrators and victims have a risk of suicidal ideation.

Cyberbullying is related to a risk suicidal ideation. These results are consistent with similar studies conducted previously (Duarte et al., 2018; Goebert et al., 2011; Kim et al., 2019; Roberts et al., 2016; Williams et al., 2017). The results showed as many as 219 adolescents (21.0%) were in the category at risk of suicidal ideation. Previous research conducted in Depok, West Java, on 207 students in two high schools showed that as many as 48.3% of students had suicidal ideation, and most of the students who had suicidal ideation were in the category of high suicidal ideation of 44.4% (Primananda & Keliat, 2019). These findings indicate that adolescents in Indonesia are vulnerable to the risk of suicide with different prevalence.

Females have a higher risk of suicide than males. The results of this research are in line with research conducted by Miranda-Mendizabal et al., (2019), which revealed that females have almost twice the risk of suicide than males. All forms of violence perpetrated on a person become a risk factor that causes adolescents to attempt suicide, both men and women. The more frequent bullying causes depressive symptoms to get worse, cause adolescents to have suicidal thoughts and suicide attempts. Victims of cyberbullying are 1.9 times more likely to attempt suicide than those who are not involved in cyberbullying, and cyberbullies are 1.5 times more likely to attempt suicide than those who are not involved in cyberbullying (Hinduja & Patchin, 2010).

Cyberbullying is one of the factors that cause adolescents to engage in suicidal risk behavior (Roberts et al., 2016). The results of the meta-analysis study identified 43 articles that showed a relationship between suicide attempts in children and adolescents with cyberbullying and suicidal ideation. Suicidal ideation is more closely associated with cyberbullying than is traditional bullying (Geel et al., 2016).

Students who experienced cyberbullying in the past 12 months were four times more likely to have depressive symptoms and suicidal ideation, and five times more likely to be at risk of making more suicide attempts than students who did not experience cyberbullying (Schneider et al., 2012). Cyberbullying is positively related to depression and suicidal ideation, where depressive symptoms that adolescents feel can increase the risk for suicidal ideation (Tokunaga, 2010), which can lead to a greater likelihood of suicidal behavior (Ribeiro et al., 2016).

Several factors can influence youth involvement in cyberbullying, including individuals, family, friends, school, and internet usage (Dewi et al., 2020). Therefore, multiple approaches are needed to reduce and prevent cyberbullying. Mental nurses are assigned to reach students experiencing transitions, screening mental health in adolescents, providing a safe place for adolescents to explore their experiences of cyberbullying, and providing direction toward positive mental health (Williams et al., 2017). However, the high incidence of cyberbullying in adolescents and the absence of reports of cyberbullying is a challenge for mental health nurses. As a communicator, a mental nurse who identifies problems related to adolescents as a result of cyberbullying then communicates verbally or in writing to parents and teachers so that they can provide appropriate interventions in overcoming psychological problems faced by adolescents related to cyberbullying.

Conclusion

This study showed a relationship between adolescents' involvement in cyberbullying and the risk of suicidal ideation in adolescents. Adolescents who are involved in cyberbullying, either as perpetrators, victims or perpetrators or victims are at risk of suicidal ideation, where adolescents who act as perpetrators and victims have a higher risk of suicidal ideation. These findings indicate that adolescents in Indonesia are vulnerable to the risk of suicide, where female adolescents have a higher risk of suicide than males. Cyberbullying is a form of violence and can be one of the factors that cause adolescents to attempt suicide. Suicidal ideation as an experienced psychological impact is not only for adolescents who are involved as victims of cyberbullying but also the perpetrators and perpetrators/victims. If the idea of suicide in adolescents is allowed, it can become an act of suicide as a solution to the problems they are experiencing. To overcome problems caused by cyberbullying, especially the idea of suicide, cooperation from schools, parents, and health workers is needed to prevent and overcome the psychological impact of cyberbullying on adolescents.

Implications

This study shows that cyberbullying is high in Indonesia and is a common problem among adolescents. Cyberbullying has a psychological impact on adolescents. This study showed that suicidal ideation as an experienced psychological impact is not only for adolescents involved as victims of cyberbullying but also among the perpetrators and perpetrators/victims. As a preventive effort and to help overcome psychological problems due to cyberbullying, collaboration is needed between parents, teachers, and mental nurses in providing education related to cyberbullying to adolescents. Mental nurses can carry out health promotions to adolescents and families about the dangers of using social media and using healthy social media. Mental nurses can also provide counseling by providing emotional, intellectual, and psychological support, especially for adolescent victims of cyberbullying who are prone to experiencing psychological problems such as the risk of suicide.

Declaration of Interest

The authors declare that the disclosed information is correct and that no conflict of interest.

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Exploring the usage of conventional logbooks during the clinical learning practice: A phenomenological study

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Abstract

Background: The use of a logbook during practice serves as a tool for ongoing assessment, continuous interaction between supervisors and students, and provides continuous feedback for learning activity evaluation
Purpose: This research aims to explore the utilization of logbooks in clinical practice among nursing students.
Methods: This qualitative research uses a phenomenological study approach. Data collection was conducted through open interviews to synchronize informant responses with the observed phenomena. Snowball sampling technique was used to select six students, one responsible lecturer for field practice, and one field supervisor. The obtained data were then processed and analyzed through editing, data reduction, category creation, and drawing conclusions.
Results: Four research themes emerged, namely an exploration of clinical practice and the obstacles experienced by students, the importance of logbooks for students, the weaknesses of paper-based logbooks, and student acceptance of online-based logbooks.
Conclusion: Nursing profession students need the development of a logbook that is easier to fill out. The design of the logbook can be digitally developed with attractive and innovative features while still reflecting the communication medium between students, faculty, and the field. It should also serve as a tool for evaluating students' competencies in their professional roles.

Keywords: assessment; clinical practice; logbook, nursing, online

Introduction

Field practice is an integral part of the targets that must be achieved by the Nursing Profession Program students. The aim is to apply the theoretical knowledge obtained after a Bachelor of Nursing education. The Nurse Profession Program, which emphasizes the clinical learning experience, is related to the opinion of Chesser-Smyth (2005), which provides opportunities to gain professional knowledge and skills about how to perform in professional situations. In Indonesia, nursing profession students have taken a Bachelor of Nursing education; they are usually students whose preferred orientation is to work as health workers. Therefore, they must take two semesters in several places, such as hospitals, health centers, nursing homes, or mental hospitals.

Nurse profession students undertake many stations for one year in order to be involved in the health workforce. According to Egan and Jaye (2009), ideally, a nursing student joins a team of doctors to learn about

professional practice. This study is an exploratory effort for students to create a clinical learning and role development environment. Salamonson et al. (2011) and Henderson et al. (2012) state that clinical placements for students in various health institutions such as hospitals, health centers, nursing homes, and mental hospitals are ultimately expected to bring them face-to-face with the reality of nursing.

The clinical placements facilitated by the university are a means of integrating theory and practice, which must be fulfilled by more than the faculty. Eraut (2000) argues that creating a clinical learning environment is essential for developing clinical skills and learning about the 'norms' of practice, i.e., processes in delivering care. The university assigns nurse profession students to shape their cultural and psychological situation by providing care through the stations they live in for two semesters. The authors' interviewees had to pass through various stations such as primary, community, emergency, psychiatric, pediatric, gerontic, management, maternity, and medical surgery. Therefore, they must have learning guidelines and records as benchmarks and evaluations from responsible universities.

Learning notes in nursing science are known as logbooks. The logbook develops to enhance the continuity of information in the care and treatment of patients. More specifically, logbooks communicate with and between care professionals, leading to increased continuity of communication between students, supervisors, and preceptors. Preceptors bridge the students with their supervisors to avoid losing touch, especially in assessment and evaluation. As a university representative who has provided theory and knowledge in clinical skills, the supervisor requires continuous situations assessment carried out during clinical practice. Duers and Brown (2009) argue that logbooks can prepare students to succeed in the review in the classroom and play their clinical role effectively in proving their success in the field.

The quality of nursing documentation has become a national and international issue, and the low quality of documentation needs to be addressed promptly. Nursing documentation is an integral part of safe and effective nursing care, capable of communicating the observations made, decision-making, actions, and outcomes regarding the clients receiving care (Blair & Smith, 2012). While carrying out clinical practice, in addition to writing nursing documentation, students are required to fill out an activity logbook. According to Mohammadi et al. (2010), using logbooks in the field directs and provides information to nurse profession students about educational goals and skills that they must achieve at each stage. In addition, the logbook indirectly serves as a feedback tool (reporting) on the accuracy of the practice carried out by students to the preceptors and supervisors. In this case, the author tries to evaluate the logbook used by the nursing profession student. Like any evaluation tool, the logbook has the advantages mentioned above. However, in practice in the field, it was found that students used only one piece of equipment as 'required' documents from the university, which inevitably had to be filled out.

The significance and presence of a logbook for the nursing profession student, which is the subject of this research, is one of the oldest technologies. Universities, especially in Indonesia, must rethink how the logbook functions comprehensively as an evaluation and assessment tool. The explanation t above raises various research questions. Is the logbook just a notebook that is nothing more than a document the nursing profession student must fill in? How does the university provide an efficient logbook for students? Is student negligence in filling out the logbook another form of weak assessment and evaluation of the university?

This article analyzes the relationship between students, universities, and preceptor in student assessment and evaluation sustainability. The case of students who often forget their logbooks when practicing in the field, wet logbooks due to exposure to water, and even those who lose their logbooks are particular problems in the student assessment and evaluation process.

Materials and Methods

Research Design

The research design utilizes a qualitative method with a phenomenological approach. Phenomenological study aims to explore individuals' experiences through the descriptions provided by each participant involved. In phenomenological research, informants are asked to describe their experiences as they perceive them. These experiences are captured in written form by the informants, and the researcher gains a general understanding of the experiences through interviews.

Participants and Setting

The research was conducted at Muhammadiyah University of Yogyakarta, specifically among students of the Nursing Science program. The participants or informants in this study were nursing profession students who were undergoing clinical practice at several hospitals, namely Temanggung Hospital, Universitas Islam Indonesia (UII) Hospital, and Tidar Hospital in Magelang City. During their clinical practice, students went through various stages, including primary care, community care, emergency care, psychiatric care, pediatric care, gerontic care, management care, maternity care, and medical-surgical care. The study involved a total of eight participants, including six nursing profession students, one faculty member responsible for the program, and one field supervisor.

This research obtained approval from all informants through a consent form provided verbally and in writing prior to the interviews. Informants were informed about their rights and responsibilities

during their participation in the study, and their involvement was voluntary, with the freedom to withdraw at any time without impacting their clinical practice assessment or the writing of the logbook prepared by the students (informants). The researcher coordinated with the responsible course instructor as the initial step of the research and to obtain information about the list of participating students. Data collection in this study was carried out from March to April 2022, using online with a video conference platform while still paying attention to the research code of ethics.

Data Collection

The research explored the experiences of nursing profession students in filling out traditional logbooks when carrying out clinical practice. Experience in filling out a logbook can be an essential assessment of the performance of skilled nursing students, which evaluates the clinical practice learning process. In the initial stage, the researcher conducted an interview with one nursing profession student who was currently undergoing clinical practice. From this student, the researcher obtained several participant contacts. In order to gain insights into the clinical practice from the supervisor's perspective, the researcher conducted an interview with the responsible instructor of the clinical practice.

All participants were recruited using the snowball sampling technique. Snowball sampling is a convenience sampling method employed when accessing individuals with the desired characteristics is challenging. This technique involves initially selecting participants who meet the criteria and then asking them to refer others who also fit them. The data collection method employed in-depth interviews, conducted in a focused manner using an interview guide. The interview guide used by the researcher during interviews included questions regarding student identity, daily activities, utilization of technological gadgets, difficulties encountered, utilization of data or Wi-Fi, preparation and implementation of practical activities, and the use of logbooks in applications or web applications. The interview guide concludes by providing the researcher's contact information and the contact information of subsequent informants based on recommendations from previous informants.

Data Analysis and Trustworthiness

The obtained data were processed by transcribing the interview results and reviewing logbook documents. Subsequently, the data were analyzed by manually coding to identify themes and descriptions, allowing for the identification of connections between themes based on the phenomena under investigation. The final stage involves interpreting the meaning of the themes and descriptions. The analysis process, from transcription to interpretation, is conducted to validate the accuracy of the obtained information. Data triangulation was conducted with the responsible course instructor for clinical practice and the field supervisor.

To ensure trustworthiness and credibility of the study, this research employed data triangulation and reflexivity in data analysis. Data triangulation utilized in this study involved the interview process, literature review, and observations to corroborate findings and increase the credibility of the utilization of logbook among nursing profession. The authors also acknowledge any potential biases and/or preconceptions of the researcher that may have influenced the data collection and analysis process. Thus, reflecting on the researcher's role and potential biases enhances the transparency and trustworthiness of the research.

Results

This study involved eight informants, including six nursing profession students undergoing clinical practice, one responsible program lecturer, and one field supervisor or preceptor. The complete findings of the study are presented based on the following organized themes:

Overview of Clinical Practice and Some of the Obstacles Experienced

The Nursing profession student emphasizes clinical practice more than the learning theory process in the class. The student can prove him or herself as a worker in a health institution rather than a student. However, some students have another employment outside health institutions. These are limited to freelance work and which do not constrict their time, like being a writer. The nursing profession dtudents only take a day off on Sunday. In contrast, days off are usually taken up with homework such as journal presence, nursing care documentation, and writing the practical activity report.

"If you are looking after you come, if you go home, if you have an assignment, you will immediately do it, just like that, because professional students tend to be monotonous, like working people. Honestly, there is no free time in this profession. We have a day off on Sundays for assignments; we can meet for an hour or two to chat together, even for a while." (I1, aged 23)

"For daily activities for about a year, maybe apart from studying, I also do freelance work when I am in my profession, at least it is a profession to go home from work if I get the afternoon shift, I work in the morning, if I get the morning shift I work in the afternoon, not tied down, and free, not like I entered an institution, I worked online, right, I got information from Instagram. Then after that, there was a kind of community called 'Cakra Writer's', so he needed writers to write articles that entered his vacancies, so we-we were told to write on demand; so far, it's only been online; I didn't join them." (I2, aged 23)

The description of the implementation carried out by student nurses consists of several stages, from preparing documents to placement and station procedures. The documents prepared by

the students relate to the graduation requirements from the previous undergraduate nursing education. Since the Covid-19 pandemic, there has been an additional letter, namely approval of the risk of being affected by Covid-19 transmission from students and their parents. The procedure for placing and dividing groups is carried out and determined directly by the campus; students will later be divided into groups and distributed to their respective homebases. Nurse profession students for two semesters are also given a role to carry out practice according to stations, including primary, community, emergency, psychiatric, pediatric, gerontic, management, maternity, and medical surgery.

"What is more prepared is mental. That is all because practice is like working people; every day is like that; if you are mentally lazy, you will get bored. It means that knowledge and other things have been obtained in the past; if practical knowledge like that right at the hospital can be added, only if we are lazy, can we not get the knowledge." (I3, aged 22)

"The most preparation is to prepare clothes that have been ironed, dresses, if the PKU Jogja hospital is not provided, if it is already provided at UII Hospital, so at the beginning of the UII hospital there is more preparation because you have to wear black shoes from there, dresses from campus unused. Every practice, sometimes I bring a logbook, sometimes I don't. I bring it at the end of the station when I want to collect it. If you forget, it's okay to leave the logbook behind, sometimes because your bag is full of laptops, sometimes you don't even bother to fill it up at the hospital." (I3, aged 22).

Clinical practice learning for professional nursing students is part of professional nursing education. In this stage of clinical practice, students are allowed to provide nursing care to improve technical skills, intellectual skills and interpersonal skills.

"If the placement process from the beginning was already plotted from the campus, for the division of groups and which hospital was from the campus itself, this child was placed at the Temanggung Hospital, UII Hospital, PKU Gamping and so on. At first, I was at the Purworejo Hospital. Still, because I was afraid that Covid-19 would increase to a d-1 week before the practice, I was suddenly transferred to UII Hospital even though we had never had a profession at UII Hospital. Still, after S1, there was someone who had practiced there. So, because it was a homebase, I was at UII Hospital while I was there, I was there, but because it was the first time I was evaluated because UII Hospital was still a new hospital, about three years. Because the number of cases is small, we are networked to other hospitals that can accept us. At the same time, the campus knew only maternity status at UII Hospital couldn't be made, so they moved to Panembahan Senopati Hospital, and the girls stayed at UII Hospital. It's just that there is an evaluation at the KMB station if there are fewer cases, so they are transferred to another hospital." (I4, aged 23)

"Many, right from S1 transcripts, continue to take care of graduation letters for nurses, continuation letters that want to go to nurses, parental approval letters to continue nurses and homebase placements, only now in the pandemic, adding one letter like approval if there is a risk of getting Covid, there are two like that from my parents and me. Besides, official photos are usually filled in for new students; I think it's like uploading a Family Card. There is no letter to be filled in at the hospital because the nurses are at UMY; if not, Poltekkes will deliver the letter themselves on the first day; only if at UMY the campus will immediately take care of it, so when you come, you have to go straight to orientation." (I5, aged 23)

The Importance of a Nursing Profession Student Logbook

Most nursing profession students think that the logbook is a clinical practice record that is only limited to the obligation of the final report. There are some interesting statements from students about the logbook itself; students feel it could be more efficient to fill it out. This reason makes students lazy to bring logbooks to clinical practice. The only reason students keep filling out logbook sheets is that they feel that the lecturers need academic assessments they can obtain through the logbook. On the other hand, one student said that he recorded all clinical practice activities using his smartphone, not in a logbook.

"If I fill out the logbook, I don't know the benefits. What needs to be seen is the guide, what is filled in is what the lecturer needs for assessment, so we fill it out because of obligation…… The logbook is for student monitoring carried out by the lecturer so that it becomes a guide during practice. " (I1, aged 23)

The Weakness of Paper-Based Logbook

The inefficiency of paper-based logbooks makes students lazy to take them to clinical practice for various reasons, one of which is that thick books are too heavy to carry in their bags. In addition, the potential for damage from paper-based logbooks is that they are easily torn and damaged if exposed to water, so the data cannot be saved.

"Usually, the paper is written by hand or manually. there is already a format provided…... If you have trouble writing but a friend has spilt water, that's the problem. If books are often forgotten or left behind, only if you get a good friend and remind them, for example, you have left them in the ward, then you will see them later, they will be taken and given to us and once left in the ward. I don't have a problem staying because we usually fill it out together when we want to get together. Still, someone doesn't immediately take the logbook from the receiver, so it's left there; sometimes, something gets lost; it just hasn't happened yet at my place." (I5, aged 22)

"During the practice, I still brought it with me because it wasn't very efficient, but I never opened it unless I needed it. I have a small note to record the patient's case; if I don't bring it, I will use a cell

phone……. The difficulty is because the book is thick, I can't take it anywhere, so for example when I have free time I can't fill it, for example when I go to the canteen, I want to I brought it, but I am afraid it would be lost so that I couldn't take it anywhere. I prefer to fill in at the end. If it is difficult to fill in the logbook, there is no one; if the appraiser sees it, it seems that it is a bit difficult, too much and thick. If it's a student, it's easy." (I2, aged 23)

The Acceptance of Logbooks Online Application-Based

Various educational and training activities can be recorded in a logbook, including giving a lecture, participating in training courses, morning reports, and providing particular procedures and skills. Unified logbooks help trainees and attendants identify learning objectives and review development and self-assessment results (Karimialavijeh et al., 2020). Nasiriani et al. (2022) stated that students and educators were satisfied with using the logbook in their nursing courses. However, the logbook was not enough to record some goals in clinical education, and suggestions for modifying logbook items should be to upgrade and use it more and use another method to record it. Based on the statement, the use of technology in nursing is essential. Information and communication technologies (ICTs) for health, called e-Health, represent a means to support healthcare delivery. These technologies change how nurses plan, deliver, document, and review clinical care, and this will continue as technology advances (Mohammed, 2018).

Electronic logbooks are rapidly increasing because they simplify data analysis and access (O'Neill et al., 2014). In addition, electronic logbooks can serve as a massive archive of information stored in a tiny space (Qoreishy et al., 2020). Nurse profession students accept logbooks based on online applications because they are considered more practical and accessible than writing directly in less applicable books, making them lazy to do it. On the other hand, students can easily access online applications, most of whom carry their smartphones when they practice clinically. The ease of accessing this online application logbook is an important point that is considered a solution to replace traditional paper-based logbooks.

"That's good; I think it's beneficial. It's an online application to use. maybe with an application, friends prefer to fill it out rather than write it down; maybe that can be a solution if there is an online application so it can be filled through a cell phone, so it's better than on a laptop, you have to open the laptop, you have to open it first and make it complicated if on a cell phone it's easier." (I6, aged 22)

"If it depends on what kind of application, like this if the problem is that the application can only be used from Android, it can't be used on IOS, that's a problem; you want the application to be opened anywhere, not only on Android phones. Besides that, how to use it, sometimes it's good, but it's even difficult to use, don't let it be like that, don't make it difficult." (I1, aged 23)

"Maybe if it's in the form of an application, it might be easier. Maybe it can be carried everywhere. Then there is no need for any storage space. For example, if you forget a book, if you forget it, you will miss it, right? Maybe if the application on the cell phone can access it." (I5, aged 22)

As for the ideal display for online application-based logbooks, it should adjust according to the logbook features provided by each university. It does not reduce the elements in the paper-based logbook but nor does it make inputting activities more complex so as to make them more effective in filling them out. It contains more columns so that students can further explore the experience gained during practice in the field.

"Adjusting from what's on my campus, so I need an application, for example, WA in the menu below there is status, call, camera, settings, now the status can be used as a task guide, for example, the call to fill in the skills performed, for example, those who call are for task assessment, those who are camera are for example submitting assessments. That's enough and simple than many features but difficult. For my logbook, I choose to use a cell phone for efficiency; if a laptop is the same as a book, you have to carry a bag where you want to go. For example, if we watch in the morning and remember what we've done, we can check via cell phone when we eat lunch while waiting to eat. The concern is that if you make an online logbook, you have to use the internet and use a large database, so if you make an application that doesn't know how big the server is, it's going to crash frequently, go down if it often dies, why to make an application like that because you have to wait for it to fill it up, so there's a queue. So that's not the solution." (I1, aged 23)

"Maybe there are features other than competency achievement, but the assessment form can also be displayed to see the value at all, but for explanations, it can still be entered to know what this station is doing. The problem is that sometimes the value is old from the campus; if paper-based is directly in the book, how much is the value, only when we use the online form we don't know because the lecturer directly deposits it, so hopefully, the value in the application will still be there." (I2, aged 23)

"If it's done, it's usually like a list of attendance, attendance; then there are notes for the study contract, then activity sheets per day. Usually, some do not have an activity sheet per day. So maybe an activity sheet is added every day, for example, in one station or four weeks. So, in the four weeks of the activity sheet, the scoring rubric may also be explained again, like the score or the assessment. Maybe that's it, or the achievement of the skill might also be made even more. It's like here, the column. In the book, the model for skill achievement is only how many columns. Even though maybe every day there is an achievement of that skill. Maybe it's set for every day. Imagine or what." (I5, aged 22)

Discussion

Logbook usage in clinical practice is significant in fulfilling nurse competencies, especially in nursing care documentation during clinical practice. Research revealed some critical information as described below.

The Daily Activities of a Nursing Profession Student

Hamza et al. (2020) state that students are a group of young intellectuals pursuing a particular field of science in an institution called a university. Students carry out various academic and non-academic activities to achieve their goals as university graduates. Activity is essential to didactic principles because learning is something someone cannot know (Hamza et al., 2020). Some experts say that activity is doing something that leads to physical and spiritual development.

The academic activities of professional nursing students are primarily spent in the practice area, namely the hospital, then in the classroom. This is by the type of education, namely the profession, that the nursing profession stage education is a stage of the professional adaptation process to be able to accept the gradual delegation of authority in carrying out professional nursing care, providing health education, carrying out the function of advocating for clients, making legal and ethical decisions and using the results according to recent research related to nursing (Ministry of Health, 2018).

Based on the research results, apart from doing clinical practice, students also have other activities as freelancers. The existence of other activities besides learning will influence students, as illustrated in the definition of activity in the previous paragraph, in that activities provide physical and spiritual development for students. The implementation of student academic and non-academic activities must be balanced so that the educational target can be achieved, namely the education of the nurse profession stage.

The Description of Clinical Practice

The implementation of clinical practice in hospitals by professional nursing students is an opportunity for students to apply the theory gained during lectures in clinical practice settings and as an opportunity to provide excellent and correct nursing care so that students are expected to be more skilled in applying theory and practice, although sometimes there is a fear of taking action (Etildawati & Yulistika, 2022).

According to the research results, in carrying out the practice, students prepare documents, and the procedures set by the campus include practice areas and practice groups. The formats that must be designed are the learning contract format, the nursing care documentation format, the skill achievement book, the practical exam format and the attitude assessment format. This format is according to the theory in the clinical practice manual for maternity nursing from the Board for Development and Empowerment Human Resources of Health (Ministry of Health, 2018).

Based on the competencies that must be achieved, the practice of nurses is divided into stations consisting of primary nursing stations, community nursing stations, emergency departments, gerontic nursing stations, management stations, maternity nursing stations, mental nursing stations, medical surgical nursing stations, and nursing stations. In this study, groups of new students completed several stations because academic activities were still ongoing.

Nursing students carry out several implementation stages, from preparing documents placement, and station procedures. The documents prepared by the students relate to the graduation requirements from the previous undergraduate nursing education. Since the Covid-19 pandemic, there has been an additional letter, namely approval of the risk of being affected by Covid-19 transmission, both from students and their parents. The procedure for placing and dividing groups is carried out and determined directly by the campus; students will later be divided into groups and distributed to their respective homebases. Nurse profession students for two semesters are also given a role to carry out practice according to stations, including primary, community, emergency, psychiatric, pediatric, gerontic, management, maternity, and medical surgery.

The Clinical Practice Learning

Learning clinical practice for professional nursing students is an advanced process from the academic education stage. At this stage, students learn in a clinical environment (Etildawati & Yulistika, 2022) so that they are skilled and able to think critically in clinical decision-making. Such practice is provided with various interactive and inspiring learning methods to motivate students to be creative and independent according to their talents and interests (AINEC, 2016).

The study results stated that students underwent several stages of practical implementation, starting from preparation, execution and closing. The preparation stage begins with preparing the required documents or files and physical and mental preparation, including tools such as sandals, shoes, and dresses. In this stage, students also conduct environmental orientation, preparation for self-development and functional materials, including goals, objectives, and learning outcomes. This is done to be more confident when carrying out student practices directly with patients/clients.

Closing the practice, students must collect a logbook as evidence of documentation of nursing care provided to patients during the procedure. In this stage, students fill out a learning reflection sheet as in the practice cycle, namely reflection, to see the learning experience they have obtained.

The Importance of a Nursing Profession Student Logbook

In addition to clinical supervision, nursing care provided to patients is documented in a logbook. The logbook is evidence of the implementation of activities as a clinical assessment tool for clinical nurses in hospitals (Komsiyah & Indarti, 2019). Yousefy et al. (2012) state that clinical performance in the form of a logbook is a valuable tool in assessing the competence of nursing students during clinical practice in the ICU (Intensive Care Unit). Documentation written in the logbook can be put to good use if it is filled out and collected on time because the available data are still relevant, valid, and reliable.

In this study, the usefulness of the logbook has not been utilized to make it. Technical reasons such as weight and the benefits of the logbook are only for lecturers. Komsiyah and Indarti (2019) argue that that the logbook serves as evidence of competency implementation. Based on the study results, the benefits of the logbook need attention and the possibility to improve on several aspects, such as the form, filling method, and the mechanism for collecting and intensively socializing with students.

The Weakness of Paper-Based Logbook

In a case study regarding the use of logbooks manually using paper, the results were that many obstacles were encountered. These constraints are ineffectiveness in terms of form and the amount of data that must be written down, causing the writing to be small and difficult to read. Another problem is the primary material in paper, causing it to get wet and tear easily (Marzuki, 2011). This difficulty was also felt by nursing profession students who complained that the paper form could easily cause damage to the logbook. The ineffectiveness of the logbook form that is too large makes students feel lazy to open it when field practice activities take place, so the writing of the logbook is not done in a timely manner. Writing a logbook that is rushed at the end makes the contents in it less accurate; this is according to a study by Marzuki (2011), which states that, if the logbook is filled in in a hurry, it will result in making understanding complex in the future. Additionally, evaluating and analyzing the large volume of information in paper logbooks is a long and tedious process (Khalafi et al., 2023). The long time spent in filling out the logbook is also a drawback of the manual logbook, and eventually, the data become biased, especially the logbook data done jointly by students; the bias that occurs is not only in the final result but the experience received by students during field practice.

The Acceptance of Logbooks Online Application-Based

Online-based logbooks have several advantages over paper-based manual logbooks. The benefits of an online-based logbook are that it inputs activity records and collects data more clearly and is easy to carry anytime and anywhere without limits, and is supported by Personal Digital Assistants (PDA) (Yousefy, Shayan, & Mosavi, 2012). This is according to the findings of the researcher, where nursing profession students need conveniences such as practicality and ease of logbooks so that they can be carried everywhere, and they can still fill out the logbook even though they are carrying out practice in the field. The weakness is that the technicality of online-based logbooks is the limited number of users in digital applications (Yousefy et al., 2012). However, this weakness is not a significant obstacle because nurse profession students, when carrying out clinical practice, still carry a smartphone, so they can still access the application on the sidelines of the course.

Indeed, the need for online-based logbooks is inevitable in the current era of the industrial revolution 4.0. The online application-based logbook can be used in any area, including in the nursing field. Teachers can access student logbooks anytime and anywhere to monitor student performance and give immediate feedback (Cevik et al., 2018). Students can now record the results of field practice activities with the online logbook application feature that follows the previous format, so it does not reduce the substance of the manual logbook. Ideally, besides being monitored directly by the teacher, an online application-based logbook can also explore more experiences of nursing profession students during their practice in the field. Thus, proper monitoring and analysis will improve the quality of nursing because there are teaching and learning activities that are enhanced through curriculum improvements.

Conclusion

This study analyses the sustainability of the assessment and evaluation of logbook filling by nursing profession students during field practice. Apart from practicing the nursing profession, some students work as freelancers. Informants have practiced at several stations because academic activities are still ongoing. Students are placed in practice based on placements from the campus with guidebooks, logbooks and activity formats that function for skill achievement and practice evaluation. Clinical practice learning is carried out with a learning cycle of practical preparation, pre-conference, practical learning process and reflection of learning experiences. Various practical learning methods are made to achieve competence, and, at the end of the practice, students are required to collect an activity logbook. However, the activity logbook has not been considered necessary by students and has not even been used as a competency improvement tool when practicing in the nursing profession. On the other hand, the paper-based logbooks that have been used so far have not made it easier for students to record their experiences during field practice

and have weaknesses in the form of potential damage and are not ergonomic. Nurse profession students need convenience such as practicality in filling out a logbook. The design of the logbook can also be adapted to the needs of students, such as a digitally developed logbook with attractive and innovative features, while still reflecting a means of communication between students, faculty, and field personnel, and serving as a tool to assess professional competency as a student.

Declaration of Interest

This research has no conflict with the informants and all aspects during were conducted of the research.

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Data Availability

The data from this research comes from interview with informants and literature review.

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Development of early detection of low-birth-weight instrument based on maternal risk factors: A mixed-methods study

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Abstract

Background: Babies born with low birth weight (LBW) are at a higher risk of experiencing health problems. The absence of quick and reliable instruments to detect LBW conditions can significantly impact the growth and development of newborns.
Purpose: This study aims to develop an instrument to detect the incidence of LBW based on mother's risk factor.
Methods: In this study, mixed-methods research was conducted, consisting of qualitative and quantitative stages. A total of 20 participants participated in Focus Group Discussions (FGDs) during the qualitative stage, and 321 respondents took part in the quantitative stage. During the qualitative stage, the process of labeling, synthesizing significant codes, and theoretical integration was carried out. Furthermore, at the quantitative stage, the calculation of the cut-off point using receiver operating characteristic (ROC) analysis was performed.
Results: Four indicators were added in newly developed instrument; there are currently ten indicators based on results of our FGD with the experts (OR/score: 74.395/10, 15.557/2, 13.877/2, 9.952/2, 7.203/1, 2.756/1, 2.532/1, 1.280/1, 1.268/1, and 1.163/1). Instrument was tested on 321 samples; it was able to detect 111 (88.1%) cases from a total 123 (38.3%) cases of LBW (p=0.000). Cut-off point determination used Receiver Operating Characteristic (ROC) curve; any score greater than 3 was predicted with LBW incidence (AUC=0.952, 95% CI 0.923-0.973).
Conclusion: LBW could be predicted by our newly developed instrument. These finding could help health workers or policy makers to reduce the LBW incidence by early detection. Further study is needed to determine the ideal screening time to maximize the usage of this instrument.

Keywords: early detection evaluation; low birth weight; instrument; mixed-method study

Introduction

Child development begins from the occurrence of conception or early pregnancy. From this point, mothers need to maintain their physical and psychological conditions so that the fetus they contain can grow and develop optimally. Maternal nutrition is very influential on fetal growth and development (Klankhajhon & Sthien, 2022; Lowensohn et al., 2016). Undernourished mothers before or during pregnancy more often give birth to LBW (low birth weight) babies or they are born with health problems. LBW is a baby whose birth weight is less than 2500 grams (Cutland et al., 2017). The incidence of LBW contributes to the neonatal mortality rate because of the various problems it causes. Babies with LBW are more at risk of experiencing health problems than term babies, so efforts are needed to prevent the occurrence of LBW. The WHO also defines low birth weight

(LBW) as a newborn with a weight below 2500 g (World Health Organization, 2014). This institution defines very LBW as being less than 1500 g, and extreme LBW when it is below 1000 g. LBW is a public health problem at a global level with short- and long-term consequences. Low birth weight is usually the consequence of PTB, growth retardation, or both, and it may occur in preterm or term newborns. It is estimated that between 15% and 20% of all births in the world are LBW births. The goal of the WHO is to achieve a 30% reduction in the number of babies born weighing less than 2500 g by 2025 (World Health Organization, 2015).

Since the fetus is in the womb until it is 18 years old, the government has carried out child health efforts with integrated ANC programs, neonatal visits, immunizations, growth and development detection, etc. This effort aims to prepare healthy, intelligent, and quality future generations and to reduce child mortality (Ministry of Health Republic of Indonesia, 2019). Child health efforts have shown good results as seen from the child mortality rate from year to year which shows a decline. The results of the Indonesia Demographic and Health Survey (IDHS) in 2017 showed AKN of 15 per 1,000 live births, IMR of 24 per 1,000 live births, and AKABA 32 per 1,000 live births. The Toddler Mortality Rate has reached the 2030 Sustainable Development Target (TPB/SDGs) which is 25/1,000 live births and it is hoped that AKN can also reach the target of 12/1,000 live births (Ministry of Health Republic of Indonesia, 2019).

Infant Mortality Rate (IMR), Under-five Mortality Rate and Maternal Mortality Rate are important indicators to determine the health status of the community. Indonesia is expected to suppress MMR and IMR as an effort to support the achievement of the SDGs (Sustainable Development Goals), namely ending preventable maternal, infant and under-five mortality, which is targeted for a Maternal Mortality Rate of 70 per 100,000 live births; for infants 12 per 1,000 live births and under-five mortality rate 25 per 1,000 live births (Pramono & Paramita, 2015). There is a tendency to decrease the proportion of birth weight less than 2,500 grams. In 2013 the proportion of LBW was 5.7, in 2018 it was 6.2. The National Medium-Term Development Plan target in 2019 is 8%, but the 2016 National Labor Force Survey results are around 6.9% (Ministry of Health Republic of Indonesia, 2018), while the percentage of LBW in Surabaya in 2018 was around 1.96 (Surabaya Health Office, 2018). One of the risk factors for the occurrence of LBW babies is a history of high-risk maternal pregnancies. Estimates of pregnant women at high risk of complications in the city of Surabaya in 2016 amounted to 9,496 people. The coverage of high risk pregnant women or complications treated in health facilities is 90.24% (Rosnani & Mediarti, 2022; Surabaya City Government, 2016). In addition to giving birth to LBW babies, pregnant women are at high risk, which can lead to uneven / stuck delivery, dead fetuses in the womb, pregnant women/maternal deaths, and so on.

Various efforts have been made by the government to prevent the birth of LBW babies including integrated ANC during pregnancy, giving meals to pregnant women who have Calorie Protein Malnutrition (CPM), and giving vitamins. Another effort that can be done is to detect pregnant women who are at risk of giving birth to LBW babies by scoring. Many references have mentioned that pregnant women who are CPM or anemic tend to give birth to LBW babies, but so far there is no such tool or scoring used to determine that pregnant women with a certain score are more at risk of giving birth to LBW babies. If a scoring method can be found, it can be anticipated that pregnant women will not give birth to LBW babies. The aim of the present study was to develop early detection instruments of low birth weight based on risk factors.

Materials and Methods

This research was mixed methods research using a sequential explanatory study design (Ivankova et al., 2006). The sequential explanatory study design is characterized by two distinct phases: a quantitative data collection phase and an analysis phase, followed by a qualitative phase. The purpose of the qualitative phase is to help explain or elaborate the quantitative results obtained in the first phase (Creswell & Creswell, 2018; Ivankova et al., 2006). For this study, the first phase consisted of analyzing routinely collected patient data to map variations between hospitals, followed by focus groups with health experts to gain their perspective on the reasons for variation. A mixed methods approach was used to engage health professionals to reflect on their own data and identify explanations for variation, and in turn, implement quality improvement initiatives to address this. Participating hospitals are actively involved in the partnership with researchers and have agreed that this is a priority area for investigation.

Qualitative phase

The qualitative phase of this study was carried out to create an instrument that could predict LBW using a descriptive approach through discussion with the experts. This phase was conducted to summarize and determine the corresponding score of each factor that could lead to LBW in infants.

Participants and settings

Study population consisted of health experts to gain their perspective or the reasons for variation that arose from collected patient data. Focus group discussion with the experts was conducted in 2021 and located in Health Polytechnic of the Surabaya Ministry of Health.

Data Collection

Data were collected through in-depth semi-structured interviews with midwives, obstetrics-

Table 1. Risk Factor Score Based on Risk Factor Improvement

Risk Factor	OR	Score
There is a history of giving birth to LBW before	74.395	10
Mother works (make a living)	15.557	2
Current maternal parity status: Primipara (one delivery) or grande multi-para (≥5 times)	13.877	2
Gestational age at delivery <37 weeks	9.952	2
Gemeli Pregnancy	7.203	1
Mother's last education < high school / equivalent	2.756	1
In this pregnancy experiencing pre-eclampsia	2.532	1
In this pregnancy, maternal HB levels < 8 g/dl (TM 1 and 3) or < 10.5 g/dl (TM 2)	1.280	1
Have a history of Chronic Hypertension	1.268	1
Have a history of pre-gestational diabetes mellitus	1.163	1
Total score		**22**

gynecology specialists, and pediatricians. Sixteen events of 90-minutes FGD were conducted and attended by 20 physicians, each with separated sessions for medical and midwifery staffs at each of the three participating hospitals. FDG was aimed to summarize all knowledge about early detection of LBW based on mother's risk factors. Participants were recruited via email invitations, distributed by maternity managers at each participating hospital to all doctors and other health professionals, consent of agreement was also included. Using an inductive approach, FGD was manifested by systematical guided conversations to develop an understanding of local cultures, practices, processes, problems, and challenges that can help explain any variations identified in hospitals (Turner et al., 2021). After the presentation of previous study findings, the focus group began with open-ended questions such as *"What do you think about these findings?", "Are you surprised by these findings – why or why not?", "How can we explain this variation from your point of view?"*. These questions were used to explain the perspectives and experiences of the participants and identify important issues (Mohamad & Despois, 2022; Mohamed et al., 2022; Turner et al., 2021). These broad questions generated conducive discussion, interspersed with occasional encouragement from the facilitator to seek clarification or explore observations deeply. The focus groups were audio-recorded, facilitated by the lead author and resumed by the second researcher. Data of the interviews were analyzed using a conventional qualitative content analysis method. In this qualitative study sample size was unsettled, thus sampling was continued until data saturation occurred.

Data Analysis

Data were analyzed inductively by two investigators using Word (Luo & Lim, 2022). It involved an ongoing, recursive process of reading, discussing and reflecting on the collected data, followed by coding using Microsoft Word to identify similarities, inconsistencies, tensions and ambiguities (Turner et al., 2021). Coding consisted of three phases 1) an initial phase of labelling each data segment, 2) a focused phase selecting the most significant initial codes, to sort and synthesize the large dataset collected, and 3) a theoretical integration phase to restore coherence to the fractured story. Results of the discussion were analyzed in terms of a correlation between presumed risk factor and LBW using odds ratio; any result that yielded odds ratio more than one was considered a significant factor and thus added to the previously made instrument, followed by determining the score of each indicator based on the odds ratio score.

Quantitative Phase

Study design

This phase of the study was conducted to test the effectiveness of early detection LBW using our newly developed instrument. Quasi-experimental approach was conducted between October 31, 2021 and 1 November, 2021 in three participating general hospitals from two health districts in Surabaya Indonesia. Research was conducted by collecting data of delivery including both the outcome (LBW or non-LBW) and risk factor related to it, determining their correlation using bivariate statistical analysis.

Participants and data collection

Population used in this study were pregnant women that had visited in the three participating general hospitals from two health districts in Surabaya Indonesia; we used purposive sampling technique to obtain patient data from records and included 321 women who delivered between 31 October, 2021 and 1 November, 202. Data were recorded by midwives and doctors in an electronic records system during pregnancy, birth, and the immediate postpartum period. Data obtained e included maternal demographic and pregnancy characteristics, information on pre-existing and

Table 2. Distribution of Respondents Based on Risk Factors with a Large Sample (n=321)

Criteria	LBW		NOT LBW		Total	
	n	%	n	%	n	%
Mother's Age at Childbirth (years)						
20 or >35	21	35.6	38	64.4	59	100
20 – 35	105	40.1	157	59.9	262	100
Baby Gender						
Man	68	38.2	110	61.8	178	100
Woman	58	40.6	85	59.4	143	100
How to give birth						
Spontaneous	42	28.6	105	71.4	147	100
SC	84	48.3	90	51.7	174	100
Place of Delivery						
Public health center	2	7.1	26	92.9	28	100
Hospital	116	41.9	161	58.1	277	100
Maternity Clinic	8	50	8	50	16	100
ANC						
Public health centre	25	25	75	75	100	100
Hospital	83	43.7	107	56.3	190	100
Maternity Clinic	18	58.1	13	41.9	31	100
History of LBW Birth						
Not	86	30.6	195	69.4	281	100
Yes	40	100	0	0	40	100
Job status						
Doesn't work	68	28.9	167	71.1	235	100
Working	58	67.4	28	32.6	86	100
Parity						
Primipara	72	55	59	45	131	100
Multipara	54	29.2	131	70.8	185	100
Grande multipara	0	0	5	100	5	100
Gestational Age						
< 37 Weeks	40	83.3	8	16.7	48	100
37 Weeks	86	31.5	187	68.5	273	100
Gemelli/Double Pregnancy						
Not	125	39.3	193	60.7	318	100
Yes	1	33.3	2	66.7	3	100
Mother's Last Educational History						
Elementary	5	14.7	29	85.3	34	100
junior high school	14	51.9	13	48.1	27	100
High school/equivalent	107	41.3	152	58.7	259	100
Diploma/S1	0	0	1	100	1	100
PreEclamsia						
Not	122	39.5	187	61.5	309	100
Yes	4	33.3	8	28.6	12	100

Cont. Table 2. Distribution of Respondents Based on Risk Factors with a Large Sample (n=321)

Criteria	LBW		NOT LBW		Total	
	n	%	n	%	n	%
Anemia						
Not	121	38.5	193	60.5	314	100
Yes	5	71.4	2	70	7	100
History of Chronic Hypertension						
Not	123	39.5	188	60.5	311	100
Yes	3	30	7	100	10	100
History of Pre Gestational Diabetes						
Not	126	39.5	193	60.5	319	100
Yes	0	0	2	100	2	100

current medical and obstetric conditions, antenatal and intrapartum care and birth outcomes (LBW or non-LBW). The instrument used to detect the incidence of LBW was arranged based on the predictor index of risk factors from previous step.

Data analysis

Collected data were analyzed its correlation using bivariate analysis with significance value of p<0.05, followed by calculation of cut-off point using receiver operating characteristic (ROC).

Ethical clearance

Ethics approval was given by the Research Ethics Committee of the Health Polytechnic of the Surabaya Ministry of Health Number: No. Etik: No.EA/1181/KEPK-Poltekkes_Sby/V/2022.

Results

Analysis of qualitative data

From the result of sixteen events of our FGD, four indicators were added in our newly developed instrument; 1) gemelli pregnancy, 2) in this pregnancy, maternal HB levels < 8 g/dl (Trimester 1 and 3) or < 10.5 g/dl (Trimester 2 and 3) have a history of chronic hypertension, and 4) have a history of pre-gestational diabetes mellitus. As shown in Table 1, 10 consecutive values of odds ratio from the highest to lowest indicators were 74.395, 15.557, 13.877, 9.952, 7.203, 2.756, 2.532, 1.280, 1.268, and 1.163. Any value of odds ratio greater than one is considered as a significant finding. Data were then analyzed further to determine the score based on the odds ratio value, using five standardized steps: 1) determine the lowest peak of odds ratio score (1.163), 2) determine the highest peak of odds ratio score (74.395), 3) calculate the class range between those two scores (73.232), 4) calculate the class interval by dividing the class range with the sum of indicators (7.323), 5) determine each indicator's score value based on the previous interval and odds ratio value; each multiple of interval that was previously calculated (7.323) is considered as a score of 1.

Analysis of quantitative data

The instrument was tested on 321 samples; it was able to detect 111 (88.1%) cases from a total 123 (38.3%) cases of LBW (p=0.000). Cut-off point determination used Receiver Operating Characteristic (ROC) curve, any score greater than 3 was predicted with LBW incidence (AUC=0.952, 95% CI 0.923-0.973). Based on Table 2, it shows that the proportion of LBW was much greater in the age group of 20-35 years than the other groups, much greater in female infants, much greater in SC, and much greater in those who born in the clinic and performing ANC at the clinic. Moreover, the proportion of LBW is mostly found in mothers who had a history of low birth weight, working mothers, primipara, gestational age <37 weeks, pregnant with gemelli, junior high school education, not having pre-eclampsia, experiencing anemia during pregnancy, experiencing chronic hypertension, and not suffering from hypertension or pre-gestational diabetes mellitus.

Discussion

Identification of risk factors for LBW in pregnant women is very useful in prioritizing treatment for high-risk women and allows early intervention. Previous LBW history, premature gestational age < 37 weeks, low HB levels, maternal occupation/career, primiparous pregnancy, educational status, pre-eclampsia, chronic hypertension, pregestational diabetes mellitus, and gestational diabetes are risk factors that are strongly associated with the high incidence of LBW infants, which will be discussed in this section.

Previous LBW history

This is one of the most important predictors of LBW or low birth weight, with the finding that 40

out of 40 (100%) samples with a history of previous LBW experienced LBW in the current birth. This finding is in line with other studies which say that previous LBW birth history also affects subsequent pregnancies (Nair & Devi, 2015). Based on birth records (n=98,776) reported on the electronic registration system of vital statistics in Nebraska from 2005 to 2014, mothers with a history of LBW were more likely to experience recurrence than those without a history of LBW (Su et al., 2018). Identifying mothers who are at risk of experiencing LBW in the future is very helpful in carrying out early detection and immediate treatment.

Gestational age at delivery <37 weeks

The findings were 40 out of 48 (83.3%) samples with a history of preterm pregnancy, which is the second most common risk factor in this study after a previous history of pregnancy with LBW. This can be associated with a period of fetal growth that is not yet fully mature. The findings of this study revealed a strong association between LBW and gestational age less than 37 weeks. According to a recent study in Surabaya, 30.48% of births were categorized as preterm pregnancies, much higher than in developed countries (1.8%-2.1%). This is also related to mothers aged 14–19 years who have not yet fully matured in their reproductive organs (Wibowo et al., 2022). Preterm pregnancy also increases the likelihood of LBW 4.1 times higher than term pregnancy (DeMarco et al., 2021). In general, in the third trimester, the ideal weight gain target for pregnant women and babies every week is around 200 grams, with the decreasing gestational age due to preterm pregnancy, the baby's weight at birth will certainly be lower than it should be.

In this pregnancy, maternal HB levels < 8 g/dl (TM 1 and 3) or < 10.5 g/dl (TM 2)

A total of 5 out of 7 (71.4%) samples with anemia experienced births with LBW. These findings are in line with the cross-sectional study by Kumari et al. (n = 515), which said that anemia in pregnant women can cause preterm labor followed by LBW. Another study also mentions cases of anemia in pregnant women with 90% of premature deliveries (Mohamed et al., 2022). The association between Hb levels and LBW can be explained by poor gestational nutritional status due to uteroplacental circulation disorders that cause adverse pregnancy outcomes.

Current maternal parity status

Parity is defined as the number of children born either live or stillborn to a mother. In this study, it was found that 72 out of 131 (55%) samples with primiparous pregnancies had LBW births. Another study states that babies born to nulliparous women are more likely to experience LBW due to various factors (Patel et al., 2021). The average birth weight of babies increased up to the third parity, but with a smaller difference (Hinkle et al., 2014). Similar findings were also published by Borah and Agarwalla (2016) (n = 450) . Recent studies have shown that the experience or incomplete feedback of physiological changes after the first pregnancy provides a better facilitative environment in the uterus in subsequent pregnancies, including uteroplacental blood flow. In addition, other studies mention that there are structural factors that limit the capacity of the uterus in the first pregnancy (Hinkle et al., 2014).

Mother's last education < high school / equivalent

A total of 14 of 27 (51.9%) mothers with LBW pregnancies had a history of education at the elementary level, followed by a history of education at the high school level as many as 107 of the 259 (41.3%) sample. Educational factors are identified as one of the important factors in determining the level of maturity of a mother in understanding and solving health problems; women who have higher education will be more concerned about their health during pregnancy compared to those with low education. Women with low education tend to be less concerned about their own health because they think pregnancy is a natural thing, so that complications during pregnancy are difficult to detect early because these women tend not to have pregnancy visits. This is in line with research in Nepal, Iran and Africa, which says that education and knowledge are important factors that can reduce the incidence of LBW. These findings are also in line with studies in Ethiopia, Kenya, and Nepal and Africa (Bansal et al., 2019; Momeni et al., 2017; Moreira et al., 2018; Muchemi et al., 2015; Tessema et al., 2021). Literacy often links good knowledge of nutritional practices with health-seeking behavior during pregnancy, which can affect birth outcomes. Education determines many attitudes and actions in dealing with various problems, including food arrangements for pregnant women to prevent the emergence of LBW. From the description above, it can be concluded that a low level of knowledge is a risk factor for LBW.

Pre-eclampsia, chronic hypertension, and pre-gestational diabetes mellitus

A total of 7 out of 24 (29%) samples with a history of chronic disease had a pregnancy with LBW. Maternal disease and obstetric complications during pregnancy cause LBW because it increases the risk of preterm delivery and poor fetal growth. Studies have shown that maternal blood pressure level is associated with neonatal birthweight. This study is supported by previous research which stated an association between gestational hypertension or pre-eclampsia and the increased risk of LBW. The overall incidence of LBW was 2.25%. The incidences of LBW were 3.58% and 6.02% for gestational hypertension and pre-eclampsia group, relative to 2.11%/5.68% and 2.16%/5.74% for normal group (Liu et al., 2021). The early onset of gestational hypertension/pre-eclampsia appeared to be a relatively more detrimental exposure window

for both LBW.

Gemelli pregnancy

In this study, it was found that 1 out of 2 samples with smooth pregnancies experienced LBW (33.3%); other studies stated that having LBW pregnancies was one indicator of the occurrence of LBW. In addition, the findings in this study were lower when compared to global studies which estimated 16.7% (Tessema et al., 2021). This can happen due to demographic, social and economic conditions and healthcare systems that are different from other countries which have a higher percentage of LBW births with a history of grace.

Conclusion

The study highlights the potential of the newly developed instrument in predicting LBW, which can significantly benefit healthcare workers and policy makers. Early detection of LBW can lead to improved care for at-risk infants, positively influencing their health outcomes. However, additional research is needed to determine the best timing for using the instrument to maximize its effectiveness in reducing LBW incidence and promoting healthier pregnancies.

Declaration of Interest

None.

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Data Availability

None.

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Cross-Culture Adaptation and Validation of Knowledge, Attitude and Practice Regarding Disaster Preparedness among Community in Indonesia

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Abstract

Background: At the time of the research, there were only a limited number of instruments accessible for recognizing the knowledge, attitude, and behavior of the Indonesian population concerning disaster preparedness.
Purpose: The goal of this study was to modify and evaluate the reliability and uniformity of a survey that individuals can complete on their own, focusing on their knowledge, attitude, and behavior related to disaster preparedness.
Methods: The translation of this tool into Bahasa Indonesia went through four phases: first translation, back-translation by experts, pre-testing, and cognitive interviews. The evaluation of the tool's accuracy involved a study with 250 volunteers using a cross-sectional approach. The validity of the questionnaire was checked based on its content and structure, and its reliability was measured by looking at internal consistency and stability (Cronbach's alpha).
Results: The CVI scores for knowledge, attitude, and behaviors ranged from 0.80 to 1.00. Regarding knowledge, the exploratory factor analysis (EFA) outcomes indicated the presence of two factors with eigenvalues surpassing 1.0, collectively explaining 71.4% of the total variance. The loading factor for 25 items was observed between 0.34 and 0.65, within the acceptable threshold of 0.3. In terms of attitude, the EFA results revealed a single factor with an eigenvalue exceeding 1.0, accounting for 86.2% of the total variance. The loading factor for 18 items ranged from 0.30 to 0.50. Similarly, for behaviors, the EFA findings displayed the existence of two factors with eigenvalues greater than 1.0, explaining a cumulative 79.7% of the total variance. The loading factor for 22 items ranged from 0.30 to 0.60. The Cronbach's alpha values for knowledge regarding earthquake and tsunami preparedness stood at 0.763, for attitude it was 0.736, and for behaviors, it was 0.760.
Conclusion: The recently implemented scale designed to assess the knowledge, attitude, and behavior of communities regarding disaster preparedness has been verified to possess satisfactory validity and reliability, making it suitable for survey applications within Indonesia.

Keywords: attitude; cross-culture adaptation; disaster preparedness; Indonesia; knowledge; practice; validation

Introduction

Disasters represent intricate occurrences that encompass physical, emotional, cultural, and political dimensions, often straying from established patterns or recognized limits (World Health Organization, 2007). Both natural and human-induced disasters have brought about impacts on health, mortality, environmental integrity, property loss, and psychological well-being (Coleman, 2006; Glasser & Guha-Sapir, 2016; United Nations Environment Programme, n.d.). The degradation of natural resources that serve as

protection against disasters is exacerbated by both the growth of populations in environmentally delicate areas and the impact of climate change (Levac et al., 2012; Maurice, 2013; Mileti, 1999). Furthermore, the issue is compounded by the increasing populace residing in high-risk locales like coastal regions and flood-prone river basins (Maurice, 2013). The forces of globalization and population density expose more individuals to potential hazards (Maurice, 2013), encompassing threats such as human-induced events like terrorism and technological calamities (Godschalk, 2003). When aggregated, these elements heighten the vulnerability to disasters, consequently leading to augmented illness and loss of life within the general population.

According to the World Health Organization (2014), the majority of fatalities occurring in the midst of a disaster happen during the pre-hospital phase, which refers to the time before a patient reaches a healthcare facility. Pre-hospital care is administered at the accident site or during transportation to a hospital. Prioritizing early intervention is crucial to mitigating the consequences of trauma (National Agency for Disaster Management, 2018). In 2015, the World Health Organization (WHO) advocated for public education in essential techniques to enhance personal preparedness, particularly in regions susceptible to communal vulnerabilities. Education efforts should be concentrated in areas with the greatest impact, ensuring that all members of the community are equipped with the knowledge to be adequately prepared (WHO, 2015).

Disaster preparedness hinges on actions driven by knowledge that take into account the health and safety risks posed by disasters (Sutton & Tierney, 2006). People's views and actions in terms of disaster readiness can be influenced by what they know (Zhong et al., 2020). Ensuring that communities have sufficient information, attitudes, and skills related to disaster preparedness is crucial, but it's essential to evaluate their current readiness level before creating training programs (Bahrami et al., 2014b, 2014a).

Although there are limited tools available to evaluate community awareness, attitudes, and behaviors pertaining to disaster preparedness (Delaney et al., 2018; Subandi et al., 2019), during the study's timeframe, there were no valid instruments accessible for use within the Indonesian population (Paramita et al., 2016). Despite the significant volume of literature on spontaneous and coordinated volunteer efforts during disasters, minimal research has been directed toward comprehending the disaster system and explicitly involving volunteers in disaster preparedness efforts (Quarantelli, 1984). In light of the current situation, the aim of this research was to modify and evaluate the trustworthiness and consistency of a survey that individuals can fill out on their own. This survey focuses on understanding people's knowledge, attitude, and actions related to disaster preparedness.

Method

Instrument

A survey was created to gauge understanding, outlook, and conduct concerning disaster preparedness (Songlar et al., 2019). The survey comprised four distinct sections: introductory details about the participant; earthquake and tsunami knowledge (25 items); earthquake and tsunami preparedness attitude (18 items); and an assessment of personal behaviors during earthquake and tsunami scenarios (22-item checklist). In its initial form, the Cronbach's α values for knowledge, attitude, and behaviors were 0.83, 0.75, and 0.75, correspondingly (Songlar et al., 2019).

Translation process

This tool underwent a translation process into Bahasa Indonesia through a series of four steps: initial translation, back-translation by an expert group, pre-testing, and cognitive interviews. The ultimate goal was to acquire a definitive version of the instrument in the language of each target country or culture while maintaining conceptual equivalence (WHO, 2019). The initial phase of adaptation involved forward translation, where two bilingual translators (one holding a PhD from a foreign university (T1) and the other lacking clinical experience (T2)) generated distinct translations of the Indonesian version. The translations were then combined, addressing any disparities found in the translator's report, resulting in a merged translation (referred to as "T-12").

In the next step, the questionnaire was translated back into English by a separate translator who used the T-12 version, without knowing the original English version. This back-translation was a collaborative effort between two native speakers. The fourth stage involved forming an expert panel made up of psychometricians, medical professionals, linguists, and bilingual interpreters. This panel identified four crucial areas where the English and Indonesian versions needed to match: semantic equivalence, linguistic equivalence, experiential equivalence, and conceptual equivalence. They used a five-point Likert scale to assess both the clarity of the language (with 5 indicating perfect readability and comprehension, and 1 indicating complete unreadability and unintelligibility) and the cultural relevance (with 5 denoting complete cultural relevance and 1 indicating no cultural relevance). This categorization framework served to assess the overall clarity of items and their cultural pertinence across all respondents. The recorded values for linguistic clarity were 88.2%, while those for cultural relevance were 92.55%.

Validity of questionnaire

The questionnaire's validity was assessed concerning content and construct validity, while its reliability was appraised through measures of internal consistency and stability, utilizing

Table 1. Reliability Alpha Cronbach's

Instrument	Total item	Cronbach alpha
Knowledge about earthquake and tsunami preparedness	25	0.763
Attitude towards earthquake and tsunami preparedness	18	0.736
Behavior in earthquake and tsunami preparedness	22	0.760

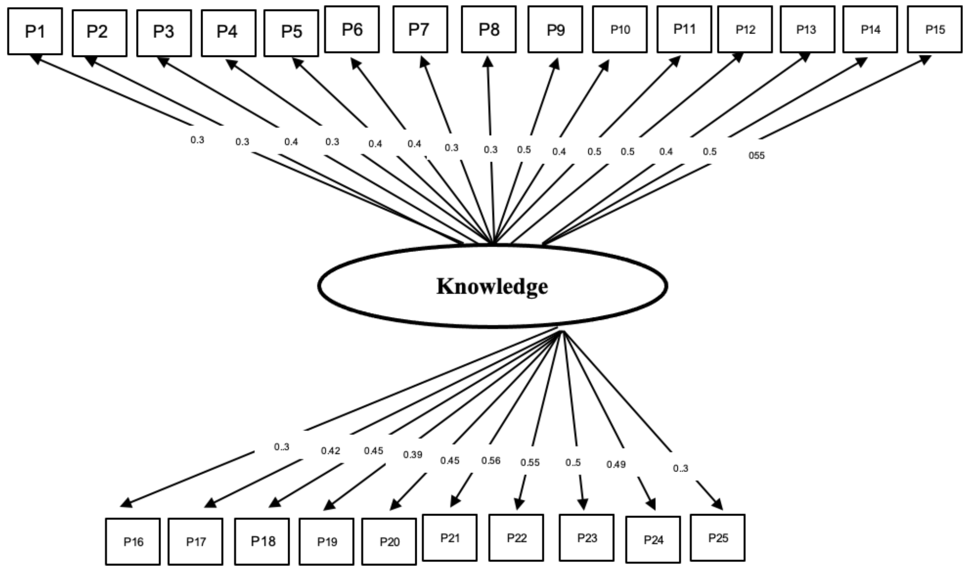

Figure 1. Confirmatory factor analysis for knowledge

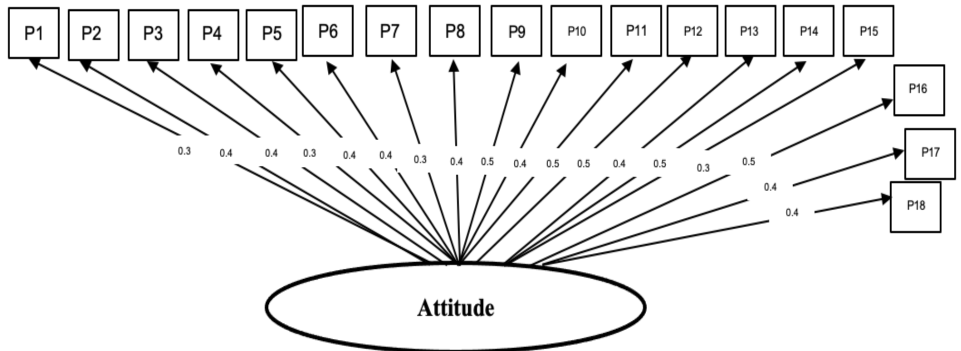

Figure 2. Confirmatory factor analysis for attitude

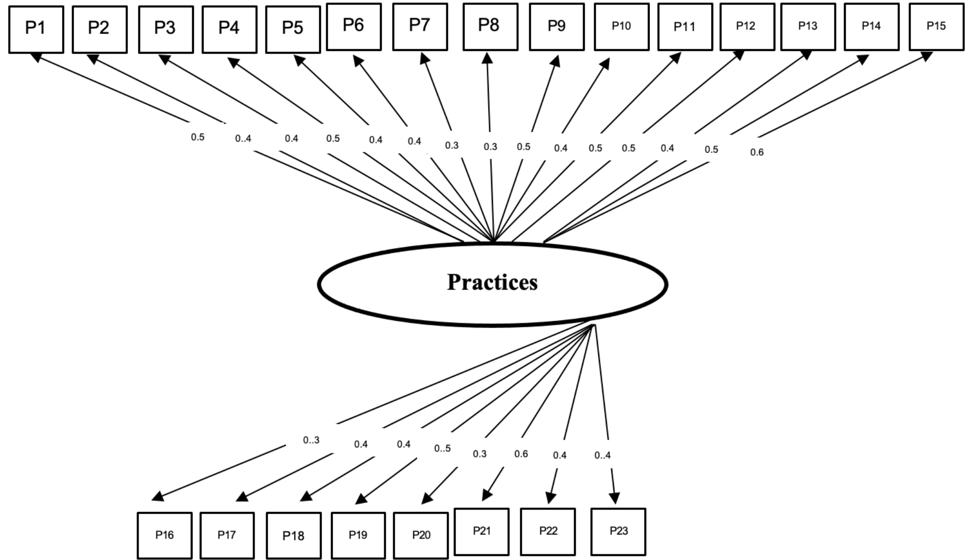

Figure 3. Confirmatory factor analysis for behaviors

Cronbach's alpha coefficient.

Content validity

The content validity was assessed by considering the instrument's relevance, appropriateness, and linguistic suitability. Expert reviewers were invited to evaluate the questionnaire, assigning scores to each item. The scoring criteria were as follows: A scoring system was used to assess the items in the evaluation process. An item could receive 1 point if it was found to be unacceptable and needed to be removed, 2 points if it was considered potentially inappropriate or irrelevant, requiring significant changes, and 3 points if the items were seen as reasonable, needing only minor adjustments. After the Expert Committee's review, the Content Validity Index (CVI) was calculated by adding up the assigned points for each element and then dividing that sum by the number of experts (Tuthill et al., 2014). Subsequently, the instrument would be improved based on the CVI scores and the overall input from the experts (Bolarinwa, 2015). Aiken's V formula was used to compute the CVI.

Construct validity

For evaluating the construct validity of the questionnaire through exploratory factor analysis, the sufficiency of the sample was assessed utilizing the Kaiser-Meyer-Olkin (KMO) technique. An acceptable sample adequacy was confirmed if the KMO value exceeded 0.6, in line with the criteria set by Kaiser and Rice in 1974. In order to ascertain construct validity, the questionnaire was administered to a group of 20 individuals. Subsequently, the Bartlett's sphericity test was employed to determine whether the obtained matrix significantly deviated from zero. Based on the results, the utilization of factor analysis was deemed justifiable. Once the feasibility of factor analysis was confirmed, the questionnaire's constructs were determined by assessing Eigenvalues (Kaiser values) and scree plots.

Reliability

Cronbach's alpha is a measure of how well a set of items gauges a particular concept. Ideally, the Cronbach's alpha should be higher than 0.7 (Enderlein, 1988; Rebmann & Mohr, 2008). In this study, we gave the questionnaire to 250 volunteers to calculate the Cronbach's alpha. After that, we used SPSS software, version 23 (IBM Corp, Armonk, NY), for data analysis.

Procedure

The Ethics Committee associated with the university approved the ethical aspects of this research. Potential participants were clearly told that their participation was optional, and the confidentiality of their data would be ensured. Following the acquisition of necessary authorizations from national and local administrative bodies, the researchers formally presented the approval letter to the participants. They introduced themselves and elucidated the research goals. Later on, individuals who showed a desire to participate were chosen, with the understanding that they had the right to withdraw from the study whenever they wished. All individuals who engaged in the study had obtained clearance from the Ethics Committee (approval reference: 81-a/KEPK.UF/IV/2022).

Results

The CVI scores for knowledge, attitude, and

Supplementary Table 1. CVI for knowledge of earthquake and tsunami preparedness

Item	Examiner 1		Examiner 2		Examiner 3		Examiner 4		Examiner 5				
	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	∑s	V	
Knowledge													
1	4	3	4	3	4	3	4	3	4	3	15	1	Valid
2	4	3	4	3	4	3	4	3	4	3	15	1	Valid
3	4	3	4	3	3	2	3	2	3	2	12	0,8	Valid
4	4	3	4	3	4	3	4	3	4	3	15	1	Valid
5	4	3	4	3	4	3	4	3	4	3	15	1	Valid
6	4	3	4	3	4	3	4	3	4	3	15	1	Valid
7	4	3	4	3	4	3	4	3	4	3	15	1	Valid
8	4	3	4	3	4	3	4	3	4	3	15	1	Valid
9	3	2	4	3	4	3	3	2	3	2	12	0,8	Valid
10	4	3	4	3	4	3	3	2	4	4	15	1	Valid
11	4	4	4	3	4	3	4	3	3	2	15	1	Valid
12	4	3	4	3	4	3	4	3	4	3	15	1	Valid
13	4	3	4	3	4	3	4	3	4	3	15	1	Valid
14	4	3	4	3	4	3	4	3	4	3	15	1	Valid
15	4	3	4	3	4	3	4	3	4	3	15	1	Valid
16	4	3	4	3	4	3	4	3	4	3	15	1	Valid
17	4	3	4	3	4	3	4	3	4	3	15	1	Valid
18	4	3	4	3	4	3	4	3	4	3	15	1	Valid
19	4	3	4	3	4	3	4	3	4	3	15	1	Valid
20	4	3	4	3	4	3	4	3	4	3	15	1	Valid
21	4	3	4	3	4	3	4	3	4	3	15	1	Valid
22	4	3	4	3	4	3	4	3	4	3	15	1	Valid
23	4	3	4	3	4	3	4	3	4	3	15	1	Valid
24	4	4	4	3	4	3	4	3	3	2	15	1	Valid

behaviors varied between 0.80 and 1.00, as depicted in Supplementary Tables 1, 2, and 3.

Construct validity

We assessed the construct validity using a cross-sectional approach, involving a consistent sample of 250 volunteers. The validation process for the measurement tool included exploring the factor structure of its 65 items through exploratory factor analysis (EFA). The results of the EFA showed that all items were valid. In terms of knowledge, the EFA revealed two significant factors with eigenvalues greater than 1.0, together explaining 71.4% of the total variability. The loading factor for 25 items ranged from 0.34 to 0.65, meeting the valid threshold of 0.3, as specified by van de Velde et al. in 2011. For attitude, the EFA findings indicated one factor with eigenvalues exceeding 1.0, accounting for a total variance explanation of 86.2%. The loading factor for 18 items varied between 0.30 and 0.50. In the context of behaviors, the EFA results revealed the presence of two factors with eigenvalues above 1.0, collectively accounting for 79.7% of the total variance. The loading factor for 22 items was observed within the range of 0.30 to 0.60.

The findings from the confirmatory factor analysis (CFA) revealed that the knowledge factor had a value of I2 = 65.04, with degrees of freedom (df) at 45, and a p-value of 0.021. Despite the chi-square test showing significant results, suggesting a mismatch between the model and the data, the Root Mean Square Error of Approximation (RMSEA) was 0.058, indicating a reasonably good fit within a probability range of 0.05 to 0.089. The same pattern was observed for attitude, where the CFA outcomes showed I2 = 66.23, df = 47, p-value of 0.027. Despite significant results in the chi-square test, the RMSEA value was 0.061, signifying a well-fitting model within a probability range of 0.05 to 0.090. Similarly, for behaviors, the CFA findings indicated I2 = 65.44, df = 49, p-value of 0.031. Again, the chi-square test demonstrated significance, implying a model-data mismatch, but the RMSEA value of 0.061 indicated a suitable fit with a probability from 0.05 to 0.085. These results are illustrated in Figures 1, 2, and 3.

Supplementary Table 2. CVI for Attitude of Earthquake and Tsunami Preparedness

Item	Examiner 1		Examiner 2		Examiner 3		Examiner 4		Examiner 5				
	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	∑s	V	
Attitude													
1	4	3	4	3	4	3	4	3	4	3	15	1	Valid
2	4	3	4	3	4	3	4	3	4	3	15	1	Valid
3	4	3	4	3	4	3	4	3	4	3	15	1	Valid
4	4	3	4	3	4	3	4	3	4	3	15	1	Valid
5	4	3	4	3	4	3	4	3	4	3	15	1	Valid
6	4	3	4	3	4	3	4	3	4	3	15	1	Valid
7	4	3	4	3	4	3	4	3	4	3	15	1	Valid
8	4	3	4	3	4	3	4	3	4	3	15	1	Valid
9	3	2	4	3	4	3	3	2	3	2	12	0,8	Valid
10	4	3	4	3	4	3	3	2	4	4	15	1	Valid
11	4	3	4	3	4	3	4	3	4	3	15	1	Valid
12	4	3	4	3	4	3	4	3	4	3	15	1	Valid
13	4	3	4	3	3	2	3	2	3	2	12	0,8	Valid
14	4	3	4	3	4	3	4	3	4	3	15	1	Valid
15	4	3	4	3	4	3	4	3	4	3	15	1	Valid
16	4	3	4	3	4	3	4	3	4	3	15	1	Valid
17	4	3	4	3	4	3	4	3	4	3	15	1	Valid
18	4	3	4	3	4	3	4	3	4	3	15	1	Valid

Reliability

The reliability of the three instruments was found to be satisfactory, as demonstrated in Table 1. Specifically, the Cronbach's alpha coefficient for earthquake and tsunami preparedness knowledge was 0.763, for attitude it was 0.736, and for behaviors it was 0.760.

Discussion

The initial step towards earthquake and tsunami preparedness involved discerning the community's actual understanding and recognition of the subject. To effectively design and execute educational curricula and ongoing programs for disaster preparedness, a measuring scale that encompasses knowledge, attitude, and behavior is indispensable. Such endeavors hold potential for enlightening the general public about appropriate responses during challenging circumstances. This study stands out as one of the pioneering efforts to employ a validated questionnaire in appraising community knowledge, attitudes, and behaviors related to disaster preparedness.

The utilization of confirmatory factor analysis serves as a rigorous approach for scale validation. This validation investigation underscored the questionnaire's commendable internal consistency. Exploratory factor analysis brought to light distinct factors, each encapsulating a shared conceptual essence, even though the items within these factors gauged diverse concepts. Furthermore, the significant correlations between items within each factor validated their cohesion. Typically, a good test has an internal consistency of 0.7 or higher. In our research, Cronbach's alpha reached a level considered satisfactory. Furthermore, our exploratory analysis identified variables that explain more than 70% of the variability. It's suggested to keep extracting items until at least 60% of the variance is achieved, as recommended by Cecchetto & Pellanda (2014) and Kheirollahpour & Shohaimi (2014). As a result, the variance explained by these factors in our study is considered acceptable.

The survey employed in this research involved self-reporting regarding community readiness concerning knowledge, attitudes, and behaviors related to disaster preparedness. Consequently, it holds potential to serve as a standardized tool in upcoming investigations for assessing earthquake and tsunami responsiveness. Furthermore, health administrators and policymakers could utilize this instrument to gain insights into community dynamics. Insufficient preparedness within the community could hinder effective disaster response, potentially resulting in adverse outcomes. Enhanced readiness correlates with reduced mortality rates and mitigated severity of challenges. Notably, this questionnaire boasted comprehensiveness, as it encompassed a broad spectrum of aspects pertaining to knowledge, attitude, and behavior of disaster preparedness.

Supplementary Table 3. CVI for Behavior of Earthquake and Tsunami Preparedness

Item	Examiner 1		Examiner 2		Examiner 3		Examiner 4		Examiner 5				
	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	score (R)	S=R-Lo	∑s	V	
Behavior													
1	4	3	4	3	4	3	4	3	4	3	15	1	Valid
2	3	2	4	3	4	3	3	2	3	2	12	0.8	Valid
3	4	3	4	3	4	3	3	2	4	4	15	1	Valid
4	3	2	4	3	4	3	3	2	3	2	12	0.8	Valid
5	4	3	4	3	4	3	4	3	4	3	15	1	Valid
6	4	3	4	3	4	3	4	3	4	3	15	1	Valid
7	4	3	4	3	4	3	4	3	4	3	15	1	Valid
8	4	3	4	3	4	3	4	3	4	3	15	1	Valid
9	3	2	4	3	4	3	3	2	3	2	12	0.8	Valid
10	4	3	4	3	4	3	3	2	4	4	15	1	Valid
11	4	3	4	3	4	3	4	3	4	3	15	1	Valid
12	4	3	4	3	4	3	4	3	4	3	15	1	Valid
13	4	3	4	3	3	2	3	2	3	2	12	0.8	Valid
14	4	3	4	3	4	3	4	3	4	3	15	1	Valid
15	4	3	4	3	4	3	4	3	4	3	15	1	Valid
16	4	3	4	3	4	3	4	3	4	3	15	1	Valid
17	4	3	4	3	4	3	4	3	4	3	15	1	Valid
18	4	3	4	3	3	2	3	2	3	2	12	0.8	Valid
19	4	3	4	3	4	3	4	3	4	3	15	1	Valid
20	4	3	4	3	4	3	4	3	4	3	15	1	Valid
21	3	2	4	3	4	3	3	2	3	2	12	0.8	Valid
22	4	3	4	3	4	3	4	3	4	3	15	1	Valid

Although this study possesses notable strengths, it also presents certain limitations. To begin with, the utilization of a convenience sample drawn from communities within three public health institutions in Banten might not offer a comprehensive representation of the entire nation. For forthcoming investigations, it would be advisable to employ the scale with larger sample sizes derived from public health facilities across various Indonesian provinces. Another limitation stems from the potential ambiguity surrounding the roles of the community and volunteers in disaster preparedness, which could potentially impact participants' responses to the questionnaire items.

Conclusion

To sum up, our recently introduced measuring tool for assessing community knowledge, attitudes, and behaviors in disaster preparedness has demonstrated satisfactory validity and reliability for survey application in Indonesia. Establishing foundational insights into community preparedness levels could assist health policymakers in formulating nurse training programs and integrating them into program and curriculum development.

Authors' contribution

All authors conceptualized and analyzed data and drafted the paper and critical revised the paper.

Declaration of competing of interest

The authors declare that they have no conflict of interests.

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Data Availability

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

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Couple-based interventions for secondary and tertiary prevention of intimate partner violence: A systematic review of randomized controlled trials

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Abstract

Background: Intimate partner violence (IPV) is the most tragic form of gender inequality and has devastating effects on women worldwide. A couple/family-based intervention approach has been developed and tested to address obstacles preventing intimate partner violence.
Purpose: This review aimed to examine couple-based interventions for secondary and tertiary intimate partner violence prevention.
Methods: The researcher searched the electronic databases ProQuest, Scopus, PubMed, Science Direct, SpringerLink, and Taylor & Francis for relevant articles. This review includes English/Indonesian research articles published between 2012 and 2022. This study reviewed various types of secondary and tertiary intimate partner violence prevention interventions and their effectiveness in reducing the incidence of intimate partner violence against women. Risk of bias assessment was performed used A Revised Cochrane Risk of Bias Tools for Randomized Controlled Trial (RoB 2).
Results: From the search findings, 1,819 articles were found, of which fifteen were included in the review, comprising twelve secondary preventive interventions and three tertiary prevention interventions make up these fifteen articles. Couple-based interventions for secondary prevention include gender transformative interventions, enhancing relationships with partners, bolstering the family economy, and encouraging men's participation in women's reproductive health and parenting. Cognitive-behavioral therapy predominates interventions for tertiary prevention to eliminate risk factors.
Conclusion: This article recommends using couple-based interventions under the population's inherent risk factors and pays close attention to the safety of the implementation process.

Keywords: couple-based intervention; couple therapy; intimate partner violence; violence against women

Introduction

Violence against women is a significant public health issue, affecting an estimated 30% of women worldwide (World Health Organization, 2021). The most prevalent form of violence against women throughout the world is intimate partner violence (IPV). IPV is the most tragic form of gender inequality and has devastating effects on women worldwide (Simons & Sutton, 2021). According to the systematic review conducted by Sardinha et al. (2022), which analysed global, regional, and national prevalence estimates of intimate partner violence against women, approximately 27% of women worldwide between the ages of 15 and 49 experience physical or sexual violence conducted by their husbands or intimate partners. IPV is a traumatic experience with significant adverse effects on its victims; hence, the global prevalence of IPV is cause for concern.

Femicide, or the intentional killing of women due to gender inequality, is a tragic consequence of IPV (United Nations Office on Drugs and

Crime, 2018a). There are at least 50,000 domestic violence cases globally, of which 30,000 victims were murdered by their husbands or ex-husbands (United Nations Office on Drugs and Crime, 2018a, 2018b). Besides death, IPV is also associated with depression and severe mental disorders in female survivors (Chandan et al., 2020); repeatedly abused female victims of IPV are more likely to suffer from depression, severe anxiety, and PTSD (Swartout et al., 2012).

Efforts must be implemented to prevent violence against women to reduce the various losses associated with IPV. Intimate partner violence prevention interventions fall into three categories: primary, secondary, and tertiary (García-Moreno et al., 2015; Kirk et al., 2017; Murray & Graybeal, 2007). According to the three types of literature, primary prevention in IPV is an action to prevent the first incident of IPV. This prevention is carried out in groups that are not at risk or in groups of women who have never experienced violence. Secondary prevention focuses on high-risk groups experiencing IPV, and aims to detect IPV early and prevent an existing incident from escalating. The third criterion, tertiary prevention, is aimed at female victims of IPV (women at high risk of repeated IPV) so they do not suffer from death, disability, depression, and other fatal consequences. Primary prevention is necessary to reduce instances of IPV over time. However, secondary and tertiary prevention is urgent since they are acute, and it takes a long time to alter deeply rooted social beliefs (Kirk et al., 2017).

Awolaran et al. (2022) conducted a systematic review of several studies on personal/individual interventions for preventing IPV against women. These interventions for women include counselling, advocacy, provision of shelter, psychoeducation, training, and economic empowerment (Awolaran et al., 2022). The literature review recommends interventions that improve the quality of relationships with partners to reduce the incidence of IPV.

This indicates that we must begin focusing on partner/family interventions to prevent and mitigate IPV (Dunkle et al., 2020). To address obstacles in preventing IPV cases, a couple/family-based intervention approach has been developed and tested (Keilholtz & Spencer, 2022). This approach raises concerns about the safety of victims due to forced reconciliation and demands shared accountability (Armenti & Babcock, 2016); however, if this intervention is managed responsibly, it has the potential to reduce the frequency and severity of partner violence (Dunkle et al., 2020). Moreover, several previous studies have shown that victims no longer face a high risk of experiencing IPV when they involve their partners in addressing IPV jointly (Stith et al., 2011). This fact is supported by research by Karakurt et al. (2016) which demonstrates that couple therapy can reduce or eliminate instances of violence, particularly among couples who experience situational violence. Therefore, this review will identify couple-based interventions for secondary and tertiary IPV prevention.

Methods

Design

Based on the Population, Interest, and Context (PICo) format, the clinical question in this review focuses on, for women at high risk for intimate partner violence (P), what are the family/couple-based interventions (I), employed for secondary and tertiary intimate partner violence prevention (Co)? This systematic review has been registered in Prospero with ID Number CRD42023406278.

Search Method

This systematic review was limited to English/Indonesian research articles published between 2012 and 2022. Researchers located articles by using ProQuest, PubMed, ScienceDirect, Scopus, SpringerLink, and Taylor & Francis databases. Researchers searched for relevant articles by using the Boolean operators "OR" and "AND" in conjunction with the following keywords: ("intimate partner violence" OR "domestic violence" OR "domestic abuse" OR "intimate partner abuse" OR "violence against women") AND ("couple therapy" OR "couple-based intervention" OR "family intervention"). Researchers identified and evaluated relevant articles based on the titles and abstracts of the research. The researchers then reviewed compliance with the inclusion criteria by reading the full text of the articles that had been screened. If it was discovered that the number of articles that met the criteria varied after the selection process, the researchers engaged in discussions until a consensus was reached.

Inclusion and exclusion criteria

This systematic review's eligibility criteria were randomized controlled trials (RCTs), research on couple/family-based interventions for women at high risk of IPV, and the study's location in any country. The exclusion criteria for this systematic review included research in which the participants were homosexual couples and/or unmarried teenage couples/couples who did not live together. Reduction in the frequency and/or severity of violence experienced by women was the outcome assessed in this systematic review. The selection of studies for this systematic review is guided by PRISMA guidelines 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analysis 2020). The selection of these studies is depicted in Figure 1's chart.

Data extraction

This systematic review examined the effectiveness of various interventions for the secondary and tertiary prevention of IPV in reducing the frequency and/or severity of IPV. Consequently, the data

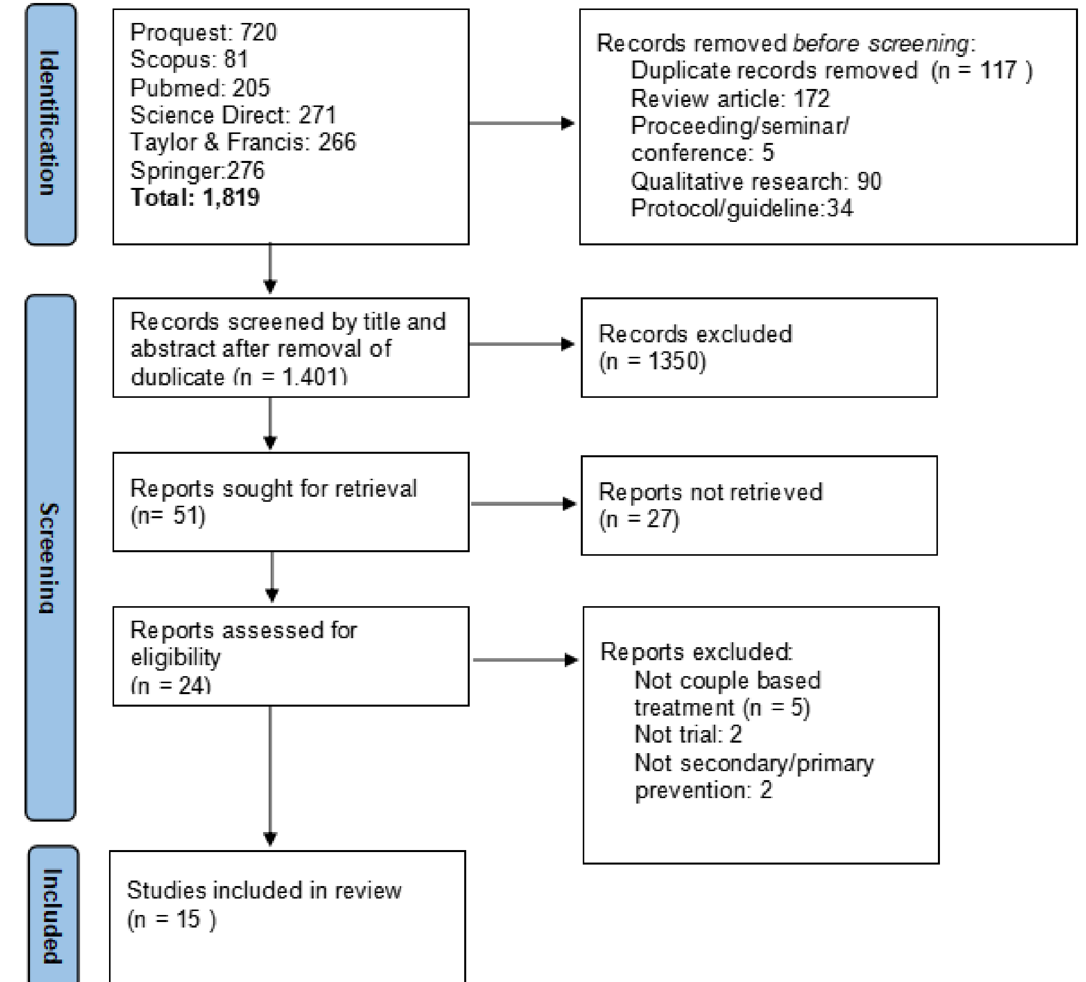

Figure 1. PRISMA Flow Diagram

extracted for this systematic review included study location, characteristic of participants, intervention descriptions, duration, research outcomes instrument, and security protocol.

Quality Appraisal

The authors also assessed the risk of bias in each study used A Revised Cochrane Risk of Bias Tools for Randomized Controlled Trial (RoB 2). The reason for adopting RoB 2 in this review is that all included studies are RCTs.

Results

In this systematic review, fifteen research articles met the inclusion criteria. Twelve articles are couple-based secondary prevention intervention studies aimed at populations at high risk for or who have experienced mild to moderate IPV. The remaining articles concentrate on couple-based interventions for victims of moderate to severe IPV (tertiary prevention). Table 2 summarizes the description of each study.

Population, geography, and research sample Nine of the fifteen studies were conducted in Sub-Saharan Africa, including three in Rwanda and six in Ethiopia, Zambia, Burkina Faso, Nigeria, Tanzania, and Côte d'Ivoire. The location of one study was in Iran, two studies in India, and five additional studies were conducted in the United States. The majority of female and male research participants in sub-Saharan Africa had low levels of education and low socioeconomic standing (Chatterji et al., 2020; Doyle et al., 2018; Dunkle et al., 2020; Gupta et al., 2013; Halim et al., 2019; Ismayilova et al., 2018; John et al., 2022; Sharma et al., 2020).

Research Intervention

Twelve papers examined couple/family-based secondary violence reduction approaches. Eight studies performed gender transformation interventions (Chatterji et al., 2020; Doyle et al., 2018; Dunkle et al., 2020; Gupta et al., 2013; Halim et al., 2019; John et al., 2022; Raj et al., 2016; Schumm et al., 2018); interventions aimed at enhancing the quality of romantic relationships (Bradley et al., 2012; Chatterji et al., 2020; Doss et al., 2020; Dunkle et al., 2020; John et al., 2022;

Table 1. Risk of Bias Assessment used RoB 2

Author (years)	Ran-domi-za-tion Process	Ran-domi-za-tion Process (point 1b for cRCT)	Deviations from the intended interven-tions	Missing outcome data	Mea-sure-ment of the outcome	Selection of the reported result	Overall Bias
Dunkle et al. (2020)	SC	Low	Low	Low	Low	Low	SC
Doyle et al. (2018)	Low		Low	Low	Low	Low	Low
Raj et al. (2016)	SC	SC	Low	Low	Low	Low	High
Sharma et al. (2020)	Low	Low	Low	Low	Low	Low	Low
Ismayilova et al. (2018)	High	Low	Low	Low	Low	Low	High
John et al. (2022)	Low	Low	Low	Low	Low	Low	Low
Chatterji et al. (2020)	Low	Low	Low	Low	Low	Low	Low
Doss et al. (2020)	SC		Low	Low	Low	Low	SC
Gupta et al. (2013)	Low		Low	Low	Low	Low	Low
Halim et al. (2019)	Low	Low	Low	Low	Low	Low	Low
Bradley et al. (2014)	Low		Low	Low	Low	Low	Low
Taft et al (2016)	Low		Low	Low	Low	Low	Low
Murray et al. (2020)	Low		Low	Low	Low	Low	Low
Babaheidarian et al. (2021)	SC		SC	Low	Low	Low	High
Hartmann et al. (2021)	SC		Low	Low	Low	Low	SC

Note: SC (some concern), cRCT (clustered randomized controlled trial)

Salivar et al., 2020; Sharma et al., 2020; Taft et al., 2022; Taft, Macdonald et al., 2016); campaigns for the prevention of violence with community partners (Chatterji et al., 2020; Dunkle et al., 2020); and instructing fatherhood and male participation in the reproductive health of women as partners (Babaheidarian et al., 2021; Doyle et al., 2018; John et al., 2022; Raj et al., 2016; Sharma et al., 2020).

Several studies integrated partner interventions with individual interventions, such as safe housing provision (Doyle et al., 2018), economic strengthening interventions (Gupta et al., 2013; Halim et al., 2019; Ismayilova et al., 2018), and livelihood development (Ismayilova et al., 2018).

The following three articles conduct couple-based tertiary IPV prevention intervention studies. Most tertiary prevention strategies, such as cognitive-behavioral therapy, aim to eliminate factors that can trigger IPV; thus, spouses quit drinking alcohol (Hartmann et al., 2021) and consuming drugs (Murray et al., 2020). Meanwhile, another study counsels pregnant women and their partners or families to prevent IPV. More detailed explanation is summarized in Table 2.

Research Result

Only Bradley et al. (2012), Raj et al. (2016), Chatterji et al. (2020) and Sharma et al. (2020) demonstrate the ineffectiveness of couple-based interventions in reducing the overall violence dimension.

Risk of Bias

Risk of bias assessment in this review used A Revised Cochrane Risk of Bias Tools for Randomized Controlled Trial (RoB 2) developed by Sterne et al. (2019). We evaluated six domains in

Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Secondary Prevention Intervention						
Dunkle et al. (2020)	Rwanda	The participants were a married couple who resided in Rwanda and participated in village savings and loans.	The interventions of Indashyikirwa include intensive participatory training with partners on gender equality, improving/improving communication, conflict management, and improving relationships with partners; community-based activism with partners to campaign for the prevention of IPV in the community; and the provision of safe homes).	The total duration of the intervention was roughly 2.5 years (20 sessions).	Physical/sexual violence that assessed using WHO violence against women tools at baseline, 12, and 24 months post baseline.	This research's professional counsellor was present to alleviate distress during the intervention. All deaths and significant adverse events discovered among participants during the follow-up data collection were investigated. In addition, the interview process was conducted separately with female and men participants.
Doyle et al. (2018)	Rwanda	Rwandan married/ living couple with children under five, ages 21 to 35, residing in Rwanda.	Men are engaged in maternal and child health through a structured curriculum of fifteen sessions. Session topics include gender equality, fatherhood, communication with partners, IPV prevention, parenting, and men's participation in maternal reproductive health.	Men who participated in the Bandebereho intervention were required to attend 15 sessions (totalling approximately 45 hours), on the other hand, their partners were required to attend 8 sessions. (approximately twenty-four hours total).	Physical violence that assessed using WHO-multi-country study and emotional violence that assessed using instrument that developed by the researcher. The assessment conducted in baseline, 9 and 12 months after intervention.	The interview process was conducted separately with female and men participants. The male participant did not notice any questions regarding violent experiences in the female participants' questionnaire. The participants were also given the study team's contact number to ensure their safety.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Raj et al. (2016)	Rural Maharastra, India.	A couple between 18 and 30 who have lived together for three months speak Marathi. Location for research in rural Maharastra, India.	Health professionals provide three sessions of gender equity (GE) counselling and family planning (FP) services as part of CHARM. The male participants received counselling and education in the first two sessions related to FP and GE material. In the third session, the men and their partners returned to counselling and education regarding FP and GE.	The intervention was administered in three monthly sessions, lasting between 20 and 40 minutes. Then follow-up was carried out at 9 and 18 months.	IPV that assessed by India's Demographic and Health Survei in baseline, 9, and 18 months after intervention.	Not explicitly mentioned
Sharma et al. (2020)	Rural Ethiopia	18-49-year-old married or cohabiting couples residing in an Ethiopian settlement.	In the context of a coffee ceremony, the Unite for a Better Life (UBL) programme is a participatory intervention related to gender transformation and strengthening relationships with partners (traditional Ethiopian forum). This program's curriculum consists of fourteen interactive and skill-building sessions.	The total intervention time is 38 hours (14 sessions).	Physical and emotional violence that assessed using WHO multicountry study and sexual violence that assessed using questionnaire developed by the authors. The assessment performed at baseline and 24 months post baseline.	The interview process was conducted separately with female and men participants. The male participant did not notice any questions regarding violent experiences in the female participants' questionnaire.
Ismayilova et al. (2018)	Burkina Faso.	Couples/households with children aged 10 to 15 categorised as impoverished (lowest level of poverty) based on the Participatory Wealth Ranking (PWR) are legally married.	Interventions for women's economic empowerment include training in financial management, village cooperative savings/loan savings, start-up capital grants to launch and expand businesses, and mentoring for livelihood development. The family coaching intervention in the Trickle Up Plus group is an additional economic strengthening intervention. This intervention has components of gender equality and awareness of family members regarding women's reproductive health issues and the prevention of IPV.	These interventions last between 35 and 45 minutes, and each session lasts approximately five months.	Physical violence that assessed using Women's Status Module and Domestic Violence Module that assessed at baseline and a year post baseline.	This study's evaluator had been trained to assure the participants' safety. The evaluator provided the phone number of the local authority at the Ministry of Social Action if they discovered severe physical violence among the participants.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
John et al. (2022)	Ibadan, Nigeria.	In particular communities in Ibadan, Nigeria, women between 18 and 35 live with their partners.	The GS intervention in the first group (GS arm) consisted of four sessions to increase gender equality knowledge and critical awareness. In addition, this intervention provides instruction in conflict resolution, negotiation, and communication. In three sessions, the intervention in the second group (GSFL arm) consists of the intervention in the first group (GS arm) plus financial literacy and household budget management interventions. Interventions in the third group were GS interventions, household financial literacy, and contraceptive counselling.	The study intervention was carried out for more than six weeks. Each session is two hours long, and each session is held weekly. .	Physical, emotional, and sexual violence that assessed using WHO's Multi-Country Study on Women's Health and Domestic Violence Against Women at baseline and 6 months post baseline.	The interview process was conducted separately with female and men participants. The author inquired about the violent experiences of the female participants; however, they did not ask the same question of the male participants.
Chatterji et al. (2020)	Rwanda	Individuals aged 18 and 49 have been in a relationship for at least six months and have never received Indashyikirwa intervention.	Indashyikirwa is a 21-session curriculum for couples that encourages healthy relationships, enhances couple communication, and reduces male dominance and violence.	This intervention spanned twenty sessions and two and a half years.	Physical, emotional, and sexual, and economic abuse that assessed using WHO violence against women tools at baseline, 12, and 24 months post baseline.	The interview process was conducted separately with female and men participants. The author inquired about the violent experiences of the female participants; however, they did not ask the same question of the male participants.
Doss et al. (2020)	The United States	Couples with low incomes in the United States	ePREP. The intervention group completed six hours of online content. This intervention's weekly online content focuses on communication skills, commitment, and partner activities. OurRelationship. couples in the OurRelationship group complete seven-hour programmes designed to help them focus on, comprehend and resolve relationship issues. Couples complete most of the activity independently before coming together for a structured conversation to conclude each phase. The OurRelationship program's facilitators employ IBCT techniques, such as integrated detachment, emphatic joining, and problem-solving.	This intervention was conducted for six weeks, one to two hours per week.	IPV that assessed using National Domestic Violence Hotline at baseline and 6 months post baseline.	This study excluded participants who indicated experiencincing severe domestic violence.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Gupta et al. (2013)	Côte d'Ivoire, West Africa	Female over >18 who has never received a Village Savings and Loans Associations (VSLA) programme and has a partner who has been in a relationship for at least a year.	The VSLA intervention, or village savings and loan association, is a programme that enables women to save money, borrow money at low-interest rates, and gain access to emergency or social funds. The GDG intervention is a couple-based intervention that aims to raise awareness about the role of women in the household, gender equality in relationships, and financial goals and decisions.	This intervention consists of eight sessions over four months (every two weeks), each lasting between 1.5-2.5 hours, for a total duration of 12-20 hours.	Physical/sexual violence that assessed using the WHO Multi-Country study on Women's Health and Domestic Violence at baseline and a year post baseline.	The interview process was conducted separately with female and men participants.
Bradley et al. (2014)	The United States	Couple that committed to relationshp at least a year, aged >18 years, experienced mutual physical and psychological aggression, had at least one biological child aged <12 years old, low income couple.	CHRP intervention encouraged couple to have discussions about relationship problems and exposed to presentation of evidence based information to enlighten them about communication skill and helahty relationship.	This intervention had 22 weekly sessions, two hours per session. Total duration was 44 hours.	Intimate partner violence that assessed using The Conflict Tactics Scale (CTS-2) at baseline, and 6, 12, and 18 months after intervention.	This study excluded participants who indicated experiencing severe domestic violence. . The study's facilitators were trained to ensure the safety of each participant during the research process.
Halim et al. (2019)	Tanzania	Women aged more than 18 years old with their partner and lived together in Tanzania	All women in the treatment group and control received economic empowerment program (saving and loan), bussiness training, financial literacy, violence and HIV prevention. Whereas, men in control group did not receive any kind of treatment. Men in intervention 1 arm obtained gender transformative training via male peer group and men in intervention 2 arm obtained the treatment in intervention 1 arm plus community gender dialogue that involved local leader.	Gender transformative training via male peer group has conducted in 22 sessions in total duration 24 hours. Then, total duration of community gender dialog was 6-8 hours that completed in two days.	Physical, emotional, and sexual, and economic abuse that assessed used the WHO's Multi-Country Study on Women's Health and Domestic Violence against Women at baseline and three months post intervention.	The interview process was conducted separately with female and men participants.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Taft et al. (2016)	The United States	A male veteran/military member and his partner, over 18, were assigned to manage the United States conflict in Iraq or Afghanistan. The couple lived together and reported experiencing relationship distress. One of the partners reported psychological violence above the 75th percentile of the Revised Conflict Tactics Scales questionnaire (CTS2) Psychological Aggression Subscale.	SAH-C is a trauma-informed cognitive-behavioural group therapy that addresses difficulties in processing social information correlated with IPV. This group therapy focuses on topics such as trust, intimacy, and control pertinent to relationship distress and may have been triggered by trauma. Each group receives a brief overview of a variety of topics along with interactive exercises designed to strengthen skills and group cohesion. The following session included psychoeducation regarding sexual aggression. Then, between sessions, groups must complete tasks/activities with their partners to increase intimacy, decrease violence, and improve the session-learned skills..	This intervention is administered 10 times weekly for two hours per session, for 20 hours.	Physical/psychological violence that assessed using Revised Conflict Tactics Scales (CTS2) at baseline, immediately after intervention, 6, and 12 months after intervention.	Not explicitly mentioned
Tertiary prevention intervention						
Murray et al. (2020)	Zambia	In Zambian couples older than >18, female partners report moderate to severe physical/ sexual violence (as measured by the Severity of Violence Against Women Scale [SVAWS] score). In contrast, male partners engage in harmful alcohol abuse.	CETA comprises nine interventions that rely heavily on CBT: engagement, introduction/psychoeducation, safety, reducing drug/addictive substance use, cognitive coping, restructuring, problem-solving, behavioural activation, relaxation, and exposure (live and imaginary). The two additions to CETA are, in brief, the use of addictive substances/alcohol and safety from violence.	Nine untul twenty four hours of total intervention time (90-60 minutes per session). 6-12 sessions per week, depending on participant needs)	Physical/psychological violence that assessed using SVAWS physical/sexual violence subscale at baseline, 4-5 months after intervention, 12 and 24 months post baseline.	Intervention and control group obtained monthly safety check-in phone calls from the study team.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Babaheidarian et al. (2021)	Sahneh City, Iran	Pregnant women and their partners/ families, including pregnant women who have experienced moderate-to-severe violence, have lived together for at least one year. Location of research in Sahneh City, Iran	This study's intervention consisted of three 45-minute sessions of counselling provided to pregnant women and their partners/family members. The content of the counselling materials is derived from the responses to the questionnaire. The first session discussed the effects of IPV on pregnancy, factors that can cause violence, efforts to reduce violence, empowering families to solve life's problems, promoting effective communication, stress management, and behaviours that enhance marital and sexual relations.	Total intervention duration: 2 hours and 15 minutes (3 sessions).	IPV that assessed using the questionnaire of domestic violence against women of Mohseni Tabrizi et al. at baseline, one, and four months after intervention.	Before and after the study, participants assessed the associated risks and complications due to the research intervention. Based on the assessment findings, participants would be excluded from the trial and referred to other services if the study team had any concerns regarding the high risk of adverse events resulting from participation. The research team contacted the participants frequently to ensure no adverse events occurred during the study. After the study, all participants would meet with the psychiatrist for an assessment of their mental health.

Cont. Table 2. Description of study

Author (year)	Location	Participant	Intervention	Duration	Measurement and follow up interval	Security Protocol
Hartmann et al. (2021)	Jaya Nagar, Bengaluru, India	18-to-40-year-old married couples in which the male partner is an alcoholic abuser, and the female partner has experienced physical, psychological, or sexual partner violence.	Incentive Group Men in the incentive group were required to blow into a breathalyser twice daily for four weeks and were compensated for each negative BrAC score. During orientation, couples learn that their commitment to abstaining from alcohol determines their eligibility for rewards. Participants are provided with a goal-setting activity in which they allocate educational, personal, and business savings incentives Incentive and BCT Group This intervention involves BCT therapy partners. Four weekly BCT sessions on alcohol use and communication are offered. BCT sessions were initiated two weeks after the beginning of the incentive programme for men in order to reduce and stabilise men's drinking habits. After each session, the couple is assigned a house task, such as a "daily trust contract", in which the man must inform his partner that he is attempting to abstain from alcohol, and her partner must assure her of his unwavering support.	This study last approximately four weeks.	IPV that assessed using Indian Family Violence and Control Scale (IFVCS) at baseline dan four months after intervention.	The participant would obtain counselling sessions with professional staff suppose they were indicated to be experiencing distress during the intervention. The study team also frequently contacted the participants to ensure their safety.

risk of bias assessment which are displayed in Table 1.

Discussion

Most research on couple-based interventions for the secondary prevention of IPV is based on population-level risk factors. In countries with solid patriarchal cultures, such as Sub-Saharan African nations, India, and Iran, gender equality and gender norm education/counselling interventions were conducted (Chatterji et al., 2020; Doyle et al., 2018; Dunkle et al., 2020; Gupta et al., 2013; Halim et al., 2019; John et al., 2022; Raj et al., 2016; Schumm et al., 2018). This is consistent with the findings of OlaOlorun and John (2021) which determined that gender equality education (gender transformative intervention) for married couples in Nigeria could substantially increase women's participation in household decision-making. Increasing women's participation in household decision-making decreases their risk of experiencing partner violence (Ebrahim & Atteraya, 2019).

In regions where most of the population has a low socioeconomic status, secondary prevention also includes interventions aimed at transforming gender roles and bolstering the local economy. This systematic review of economic strengthening interventions focuses exclusively only for women (Gupta et al., 2013; Halim et al., 2019; Ismayilova et al., 2018) or women with their partners (John et al., 2022). Economic strengthening interventions that target women only seek to increase women's autonomy (Ismayilova et al., 2018). Economically powerless women are vulnerable to IPV since they rely on their husbands and are typically unable to stop IPV (Mishra et al., 2014; Pineda et al., 2023). Moreover, economic strengthening interventions for couples aim to reduce the likelihood of IPV resulting from household conflicts (John et al., 2022). Research by Mishra et al. (2014) explained that husbands are stressed and frustrated by their families' poor socioeconomic conditions, and, as a result, they resort to violence

against their wives. This is supported by Stöckl et al. (2021) who found that family financial security may reduce IPV. Economic empowerment of the family is essential for managing finances and attaining financial security. However, the articles by Bradley et al. (2012) and Doss et al. (2020) reviewed in this systematic review did not provide economic strengthening interventions for low-income couples. This was because the research focused on interventions to improve the quality of relationships due to family economic difficulties.

Couple-based interventions for secondary prevention of IPV that focus on improving the quality of relationships are found in the research by Bradley et al. (2012), Doss et al. (2016), and Taft et al. (2016). These studies only used relationship quality improvement interventions since the participants were couples at high risk of experiencing relationship distress. Research by Antle et al.(2011) proved that interventions that focused on promoting healthy relationships correlated with a decrease in the incidence of IPV.

Several studies have combined healthy relationship promotion with gender transformation interventions (Doyle et al., 2018; Dunkle et al., 2020; Halim et al., 2019; John et al., 2022; Salivar et al., 2020; Sharma et al., 2020). Relationship dissatisfaction is prevalent among participants with low socioeconomic status who reside in regions with a strongly patriarchal culture. Based on research by LaMotte et al. (2018), relationship-strengthening interventions are required because the lower the quality of the couple's relationship, the higher the risk of one partner experiencing IPV (LaMotte et al., 2018). The three primary causal factors most frequently cited by the sample (LaMotte et al.,2018; Tubalawonya et al.,2019) are poor communication, lack of mutual trust with partners, and difficulty managing family finances. This addresses the significance of the content about effective communication, conflict management, and financial literacy that was reviewed in several studies in this review (Chatterji et al., 2020; Doyle et al., 2018; Dunkle et al., 2020; John et al., 2022; Salivar et al., 2020; Sharma et al., 2020).

In addition, there are interventions involving men in reproductive health and parenting to reduce the frequency of IPV (Babaheidarian et al., 2021; Doyle et al., 2018; John et al., 2022; Raj et al., 2016; Sharma et al., 2020). This is consistent with Haryanto's (2018) research, which demonstrated that interventions involving men in women's reproductive health and child care increased knowledge and positively correlated with changes in men's attitudes and behavior. Changes in men's attitudes and behaviors result in egalitarian relationships, increasing relationship satisfaction and child care and decreasing IPV in Indonesia (Haryanto, 2018).

Sharma et al. (2020) conducted research that resulted in gender transformative interventions and improved relationships for their participants. However, this intervention had no significant effect on reducing IPV incidence. The majority of male and female participants (> 70%) in this study had never received a formal education. These characteristics match those of the participants in the studies conducted by Gupta et al. (2013) and Ismayilova et al. (2018). That research by Gupta et al. (2013), Ismayilova et al. (2018) and Sharma et al. (2020) did not affect reducing physical violence between partners suggests that gender transformative interventions and improving the quality of relationships are insufficient to reduce the incidence of IPV among populations with low educational attainment. Interventions to strengthen the family economy must be implemented concurrently with gender-transformative interventions and promote healthy relationships for populations with predominantly low levels of education (Matjasko et al., 2018). Studies by Gupta et al. (2013) and Ismayilova et al. (2018) did provide participants with economic strengthening interventions. However, this intervention was only provided to women on an individual basis. It did not involve partners as a family, even though research indicates a correlation between an increase in a husband's education and income and a decrease in physical violence in relationships (McCloskey et al., 2016; Stöckl et al., 2021). Besides that, for women who live in a patriarchal environment, economic strengthening interventions that only engage women increase the number of IPV since the male spouse experiences feeling threatened by financially independent women.

This explanation can also strengthen findings by Chatterji et al. (2020). Chatterji et al. (2020) and Dunkle et al. (2020) carried out the Indashyikirwa intervention in at-risk groups; however Chatterji et al. (2020) found that the intervention had no significant impact on reducing IPV, whereas Dunkle et al. (2020) found that the intervention significantly reduced IPV. In Chatterji et al.'s (2020) analysis of the characteristics of the participants, it was discovered that the majority (more than 50%) of the participants were women, who are the backbone of the family or responsible for meeting daily needs. In contrast to the research conducted by Dunkle et al. (2020), which was dominated by husbands who contribute to the family's economic well-being, this study was dominated by wives who contribute to the family's economy. Based on these characteristic, Chatterji et al. (2020) concluded that their study participants had a higher risk factor for violence since the majority of husbands were unemployed or financially insecure. This can be considered that interventions to strengthen the family economy involving couple (husbands and wives) can be added to Indashyikirwa.

Tertiary prevention interventions include cognitive-behavioral therapy and counselling. Cognitive-behavioral therapy in tertiary prevention

aims to eliminate risk factors for IPV associated with perpetrators while retaining the participation of partners. This systematic review administered cognitive behavioral therapy to violent offenders who reported substance abuse and alcoholism (Hartmann et al., 2021; Murray et al., 2020). This is consistent with the findings of Easton and Crane (2016) who concluded that cognitive-behavioral therapy interventions to overcome alcohol and drug addiction had a positive effect on reducing the incidence of IPV.

Couples-based interventions can be undertaken in developed and developing countries. However, each country has obstacles to implementing couple-based secondary and tertiary prevention interventions. In developing countries, a potential challenge is the strong patriarchal culture that causes women to fear social stigma should they request and receive interventions from formal institutions (Goodson & Hayes, 2021; Pioske, 2017). In addition, there is a limited number of available services offering interventions in developing nations (Asay et al., 2016). A possible challenge in developed countries is that women who are victims of violence are more inclined to seek assistance and leave their partners due to contemporary culture (Asay et al., 2016), making it challenging to promote couple-based interventions.

The topic of couple-based interventions in developing countries should be dominated by gender equality, economic strengthening, and women's empowerment. As pertains to developed countries, additional study on the causes and risk factors of intimate partner violence is required to determine the appropriate content of couple-based interventions.

Additionally, the safety aspects of couple-based secondary and tertiary prevention interventions must be considered. This aspect of safety must be investigated further; thus, practitioners who administer couple-based interventions can consider the safety of IPV victims. All safety protocols used in the studies of this review are compiled in Table 2. The security aspects that have been carried out by researchers in the articles in this study are in line with the recommendations in the study by Babcock et al. (2017) which recommended couple-based interventions only for couples who experience situational violence, including: 1) Violence resulting from poor quality relationships, with a low chance of physical violence; 2) Spouses do not engage in substance misuse or suffer from mental problems that can enhance the physical violence risk; 3) Violent offenders who accept responsibility for the violence they perpetrate without blaming their partners; 4) Violence that occurs from an incapacity to adapt to a given circumstance, as opposed to a desire for power and control. This aspect is being considered by researchers/academicians and practitioners; thus couple-based treatments, particularly in tertiary prevention, are conducted infrequently in either research or health services.

Limitations

This review's search was restricted to English and Indonesian, which may have contributed to language bias. However, we conducted a literature search across six reputable databases to compile as many relevant articles as possible. Another limitation is that most included articles in this review had either some concern or a high risk of bias due to randomization, blinding, and the absence of an active placebo. Consequently, the bias assessment of each article was described using Cochrane RoB 2.

Conclusions

Regarding safety, this systematic review concluded that couple-based interventions are practical. The effectiveness of these interventions will increase if they are based on risk factors, such as gender transformative interventions for populations with strong patriarchal cultures, relationship-strengthening interventions for populations at risk of experiencing relationship distress, and family economic strengthening interventions for populations with low educational and socioeconomic status. However, a single intervention is insufficient to reduce/prevent IPV; combining multiple interventions will strengthen the effectiveness of these interventions. Couple-based interventions in tertiary IPV prevention require a higher level of expertise due to cognitive behavioral therapy, which only experts or certified practitioners can perform. Tertiary prevention interventions are risky; therefore, a qualified security protocol is required. These interventions must also consider security aspects, such as establishing a safe house that IPV victims can access, providing resources for victims to seek assistance, and regularly contacting them to ensure their safety. In addition, the researcher suggests additional research to compare the effectiveness of family-based interventions involving partners and other family members, as this research is limited.

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