to their patient's needs, as well as the patients' immediate expressions of acceptance for their nurses. As a result, patients remembered nurses even after they were discharged and chose to readmit to the same ward in the same hospital.

In addition, the way that nurse participants described the meaning of aesthetics in nursing practice depended on their understanding of what was aesthetics in their care and how they implemented it based on the context and cultural appropriateness. In this study, aesthetics in nursing practice was not only understood as physical beauty or neatness inherent in a nursing act, but also through the wholeness of their nursing care, involving physical presence and way of communication. For example, for Indonesian nurses, asking about patients' families while inserting an IV fluid was perceived as an aesthetic act in their care, making the patient feel caring. Therefore, the Indonesian tended to ask and talk about family and personal life as an expression of caring for others.

This study applied qualitative design by combining interviews with drawing to understand the meaning of aesthetics in nursing practised by nurses in Indonesia. Allowing nurse participants to express in an aesthetic form, particularly drawing, made a bigger chance for participants to convey their experience and for researchers to explore the phenomenon.

Implications of this study

Aesthetics in nursing is practised by Indonesian nurses in various ways, not limited to the beauty or tidiness of a nursing action but reflected in the whole nursing process. The findings of this study were expected to inform other nurses in Indonesia and other countries as well on how to implement aesthetics in their practice. In addition, the findings also were expected to inform nurse educators to include and emphasise aesthetics in nursing in the curriculum so that nursing students can learn.

Limitation

In this study, all participants were female nurses, so both genders had no representation. Before approaching the participants, we explained the eligible criteria and study procedures to the head nurses and contacted those who agreed to participate in our study. However, only female nurses agreed to be contacted to participate in our research. Therefore, future research to examine aesthetics in nursing practice from the perspective of male nurses was suggested.

Recommendations for future research

Aesthetic expressions such as drawing provided opportunities for the participants to express their experiences beyond words. For future work, allowing patients to describe their experience receiving nursing care through aesthetic expressions is recommended. In addition, future studies involving male nurses regarding how they implemented aesthetics in nursing practice are also recommended.

Conclusion

This study described the meanings of aesthetics in nursing practice as experienced by nurses in Indonesia. Findings revealed that aesthetics in nursing practice by nurses in Indonesia could be described as *engaging in caring for persons with a heart full of sincere compassion through distracting the patients from any unpleasant sensation and allowing them to experience joyful time inside a sympathetic place of care.* Furthermore, these findings could be used to inform nurses of various ways in applying aesthetics in practice to enhance both the nurses' and patients' satisfaction from providing and receiving care.

Declaration of Conflicting Interest

None to declare.

Authors' Contributions

All listed authors meet the authorship criteria, and that all authors are in agreement with the content of the manuscript.

Authors' Biographies

Feni Betriana, S. Kep, Ns, MNS is a Former Lecturer, Department of Nursing, Fort de Kock University, Bukittinggi, Indonesia.
Waraporn Kongsuwan, RN, PhD is an Associate Professor, Faculty of Nursing, Prince of Songkla University, Hat Yai, Thailand.
Rina Mariyana, S. Kep, Ns, M. Kep is a Lecturer, Department of Nursing, Fort de Kock University, Bukittinggi, Indonesia.

Data Availability

The datasets generated during and/or analysed during the current study are not publicly available due to ethical restrictions but are available from the corresponding author on reasonable request.

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Determinants of latent tuberculosis infection among nurses at public health centers in Indonesia

Check for updates

Meira Erawati* and Megah Andriany

Department of Nursing, Faculty of Medicine, Universitas Diponegoro, Indonesia

*Corresponding author:
Meira Erawati, Dr, RN
Faculty of Medicine, Universitas Diponegoro
Jl. Prof. Soedarto, SH, Tembalang,
Semarang, Central Java, Indonesia, 50275
Tel +6224 76480919
Fax +6224 76480919
Email: mei_ra7@fk.undip.ac.id

Abstract

Background: The incidence of latent tuberculosis among healthcare workers, especially nurses, at public health centers in Indonesia has been increased. Therefore, factors related to the tuberculosis incidence need to be further investigated.

Objective: This study aimed to identify the determinants of latent tuberculosis infection among nurses at public health centers in Indonesia.

Methods: This non-experimental, cross-sectional study included 98 nurses. Data on the determinants of latent tuberculosis infection were collected using validated questionnaires, and the infection status was confirmed by Interferon Gamma Release Assay or IGRA test. Logistic regression was used for statistical analysis, with a significance level of $p < 0.05$.

Results: Health facilities for tuberculosis transmission prevention were available in all public health centers (100%). Protocols for preventing tuberculosis transmission including occupational health and safety training (OR = 13.24, 95% CI [2.29–58.55]; $p = 0.001$), handwashing after contact with patients or specimens (OR = 20.55, 95% CI [4.23–99.93]; $p = 0.000$), and wearing of medical masks (OR = 9.56, 95% CI [1.99–45.69]; $p = 0.005$) were found to be significant determinants of latent tuberculosis infection among nurses.

Conclusion: The availability of protective equipment and implementation of health protocols among nurses at public health centers are the main determinants of latent tuberculosis infection. Hence, they should be maintained by all nurses to prevent the spread of tuberculosis.

Keywords

Background

Globally, tuberculosis (TB) infected approximately ten million people in 2019 and caused the death of 1.2 million people with HIV-negative status. This incidence mostly occurred in Southeast Asia, Africa, and the Western Pacific (World Health Organization, 2020a). In Indonesia, TB incidence reached 845,000 cases in 2018; thus, Indonesia ranked third in countries with the highest incidence of TB worldwide after India and China (World Health Organization, 2020b). A year later, Indonesia had a high burden status for TB incidents and stood in the top three countries for TB, TB/human immunodeficiency viruses, and multidrug-resistant TB (World Health Organization, 2019). One of the Indonesian provinces with a relatively high TB incidence was Central Java (Indonesian Ministry of Health, 2018b), located on Java island with a population density of 1,060/km² (Central Statistics Agency of Central Java, 2019). Given this population density, TB cases further increased in Central Java, reaching 143.57 per 100,000 population in 2018 (Department of Health of Central Java, 2018).

In Indonesia, public health centers are the first-level health service centers that provide care for patients with TB. The Ministry of Health Regulation No. 67 of 2016 states that these public health centers should implement programs for controlling TB, including identifying new patients, providing medication, compiling case reports, and referring to a higher level of health service facilities (Indonesian Ministry of Health, 2016). Nurses and other healthcare workers who make either direct or indirect contact with patients provide these TB services (Nathavitharana et al., 2017).

TB transmission can occur from patients to nurses who provide care through the airborne route. Among all healthcare professionals, nurses have the highest risk of infecting TB (Wang et al., 2018). Patient–nurse transmission can occur in the room where the nurses serve the patients. The risk of infection increases if nurses do not wear standardized personal protective equipment (PPE). Hence, the availability of personal protective facilities for nurses is vital when interacting with patients and sputum specimens (Diel et al., 2020). Unfortunately, PPE is not always available in all health facilities, and its use is prioritized only in high-risk situations (Chughtai & Khan, 2020).

The knowledge of healthcare workers, including nurses, is related to their behaviors, affecting the risk size of TB infection (Alotaibi et al., 2019). Training on TB management can increase the knowledge and self-efficacy of nurses in managing patients with TB (Akande, 2020). Bacillus Calmette–Guérin (BCG) vaccination, as recommended by World Health Organization (WHO), also increases a person's immunity, thereby reducing the risk of TB infection. This vaccination also applies to healthcare workers who provide services to patients with TB. BCG revaccination significantly strengthens the body's response to producing Th1/Th17 as an antimycobacterial cytokine (Rakshit et al., 2019).

Along with making disease prevention facilities available in healthcare service centers, health protocols for preventing TB transmission also needs to be strictly implemented. For example, using soap or hand sanitizer for handwashing effectively reduces the risk of TB transmission. The frequency of handwashing also determines the degree of TB transmission risk (Han, 2018). In addition, wearing medical masks protects someone from TB transmission. The use of a medical mask that consists of three cloth layers effectively prevents TB transmission by up to 56% (Dharmadhikari et al., 2012). The use of N95 respirators shows the same effect as medical masks in preventing airborne infection spread. However, the N95 respirators are more advantageous because they filter minute microorganisms and offer a lower leakage rate than medical masks (Smith et al., 2016). Other Personal Protection Equipment (PPE) forms frequently used by healthcare workers to prevent respiratory infections include face shields and medical gloves. However, PPE is not always available in many healthcare facilities, and its use is limited to high-risk situations. Face shields should be used with other available PPEs because face shields alone cannot withstand aerosol penetration from the side directions. More precisely, face shields are used for protection in addition to medical masks (Roberge, 2016).

Tuberculosis transmission from patients to nurses does not necessarily cause serious symptoms. Nurses generally do not show any clinical symptoms, making bacterial exposure unrecognizable. This condition is known as latent TB (World Health Organization, 2016). If not handled properly, latent TB may eventually develop into an active state. In Semarang, the incidence of latent TB among healthcare workers reached 24% in 2019, mostly affecting nurses. This statistic shows the magnitude of the risks that nurses encounter when caring for patients. Several demographic factors have already been identified as risk factors of latent TB infection among nurses and healthcare workers (Erawati & Andriany, 2020); however, other determinants, such as healthcare facility availability and health protocol implementation among nurses, to prevent latent TB infection remain unexplored. Thus, this study aimed to identify the determinants of latent TB infection among nurses at public health centers in Indonesia.

Methods

Study Design

A non-experimental cross-sectional study was conducted to identify the prevalence ratio of TB among nurses in public health centers in Semarang, Indonesia.

Participants

The Health Office of Semarang oversees 37 public health centers, all of which provide TB services for patients. However, only 34 public health centers were included in this study; the other three did not confirm their availability. Using a total sampling technique, 98 nurses were recruited as respondents. The inclusion criteria were nurses working at public health centers in Semarang, providing direct or indirect TB patient care, aged over 20 years, and having working experiences for at least six months.

Instruments

The researchers used two types of data collection tools: the questionnaire and interferon-gamma release assays (IGRA). The questionnaire was used to collect demographic data, PPE availability to protect disease transmission, TB prevention programs in the workplace, and nurses' health protocols to prevent TB transmission. The question items on the demographic data questionnaire were adopted from a previous study in Indonesia by Erawati and Andriany (2020), while items regarding PPE availability to protect disease transmission, TB prevention programs in the workplace, and nurses' health protocols to prevent TB transmission were adopted from the Regulation of the Minister of Health of the Republic of Indonesia Number 67 of 2016 concerning the control of tuberculosis (Indonesian Ministry of Health, 2016).

The demographic data contained questions about age, sex, academic degree, and work duration, presented in the form of multiple-choice questions. Questions about PPE availability to protect disease transmission consisted of five items, while questions about TB prevention programs in the workplace and nurses' health protocols to prevent TB transmission consisted of six items. The questionnaire could only be answered with "yes" or "no." The researchers only adopted the questionnaires, so a pilot testing was conducted among 32 TB healthcare workers, including 20 physicians and 12 laboratory technicians at health centers. The results indicated that the questionnaires were valid (r = 0.393–0.568 [per question] greater than the r-table [0.349]) and reliable (Cronbach's α = 0.74).

Furthermore, the IGRA test aimed to confirm whether the respondents suffered from latent TB infection or not. This test was chosen with the consideration that the test result was not affected by BCG vaccination (Jaime et al., 2019). In addition, it showed higher specificity (97%–99%) than the tuberculin skin test (Eralp et al., 2012; Napoli et al., 2017).

Data Collection

The survey team for data collection consisted of two researchers, one nursing student, and two laboratory technicians. Before collecting data, this team held discussions to achieve uniform perceptions and submitted a research permit to the Head of the Semarang Health Office. After the permission was granted, the researchers confirmed with the public health centers for their participation, as well as with the survey team members and the persons in charge of the public health centers regarding the time of data collection and the number of respondents involved in the study. The laboratory technicians and researchers attended the public health centers at the agreed time. The researchers requested the respondents to complete the questionnaire and check it to

ensure completeness. If unanswered questions were found, the researchers asked the respondents to complete the answer at that time.

After questionnaire completion, the laboratory technician extracted 4 ml of venous blood from each respondent for laboratory examination. The blood was stored in a heparinized tube to prevent clotting. The blood specimens were then sent to Kimia Farma Clinical Laboratory for IGRA analysis following the laboratory protocols.

Positive results of the IGRA test indicated latent TB infection, whereas negative results indicated no latent TB infection. The results of the IGRA test were submitted privately to the head of each public health center to maintain confidentiality. Subsequently, the respondents were directly informed of their IGRA test results in person.

Data Analysis
The completed questionnaires were arranged according to the public health centers' names where the respondents worked. The data were entered into Excel (Widows 10) and analyzed using univariate analysis in the form of a single-frequency distribution table. Multivariate analysis using logistic regression was also done with a significance level of $p < 0.05$. The IBM SPSS statistics 20 was used for analysis.

Ethical Considerations
The research ethics committee of the Department of Nursing, Faculty of Medicine, Universitas Diponegoro, Indonesia, approved this study (No. 42/EC/KEPK/D.Kep.VI/2019, dated 18 June 2019). The respondents' rights based on the Declaration of Helsinki were remained protected throughout the study period. This study obtained permission from the head of the Semarang Health Office prior to collecting data from August to October of 2019. All respondents provided informed consent for study participation.

Results

This study included 98 eligible nurses as respondents, who all came from 34 public health centers in Semarang, Indonesia. Inpatient facilities were found in 10 (29%) public health centers, and 19 (50%) had achieved an intermediate level of accreditation. In addition, as an effort to prevent disease spread, all public health centers (100%) provided PPE, including medical masks, handwashing sinks, hand sanitizers, medical gloves, and medical and nonmedical trash bins.

Table 1 Demographic data and the implementation of TB transmission prevention protocols by nurses

Variable	N	%	Mean ± SD	p-value
Age			37.17 ± 9.55	0.771
≤35 years	52	53		
>35 years	46	47		
Sex				0.606
Male	38	39		
Female	60	61		
Educational degree				0.664
Diploma	60	61		
Postgraduate	38	39		
Work duration			12.75 ± 9.94	0.483
≤10 years	53	54		
>10 years	45	46		
Training in tuberculosis patient management				0.346
Yes	60	61		
No	38	39		
Occupational health and safety training				0.940
Yes	69	70		
No	29	30		
Handwashing before contact with patients or specimens				0.379
Yes	62	63		
No	36	37		
Handwashing after contact with patients or specimens				0.805
Yes	69	70		
No	29	30		
Wearing a medical mask every contact with patients or specimens				0.104
Yes	70	71		
No	28	29		
Wearing medical gloves every contact with patients or specimens				0.771
Yes	46	47		
No	52	53		

SD, standard deviation

Table 1 summarizes the demographic data and the implementation of TB transmission prevention protocols by nurses. The majority of the respondents were younger than 35 years (53%; mean score: 37.17 ± 9.55 [min–max = 23–56]),

were female (61%), and achieved a diploma degree (61%). More than half of the respondents have worked for more than ten years (12.75 ± 9.94), attended training in TB patient management (60%), and attended occupational health and

safety training (70%). Furthermore, 63% and 70% of the respondents washed their hands before and after contact with patients or specimens, respectively. During contact with patients or specimens, 71% of the respondents used medical masks, and 47% used medical gloves.

Table 2 presents the IGRA test results of the respondents. Of the 98 respondents, 24 (25%) showed a positive IGRA result.

Table 2 IGRA test results on nurses

IGRA test	N	%
Negative	74	75
Positive	24	25

Table 3 Distribution of respondents based on the determinants and IGRA test

Determinant	IGRA Test		Total (%)	OR (95% CI)	p-value
	Positive	Negative			
Age				2.22 (0.540–9.123)	0.269
≤35 years (ref)	10	42	52		
>35 years	14	32	46		
Sex				2.62 (0.415–16.553)	0.306
Male (ref)	1	37	38		
Female	23	37	60		
Educational degree				0.92(0.224–3.746)	0.903
Diploma (ref)	14	46	60		
Postgraduate	10	28	38		
Training in tuberculosis patient management				1.59(0.436–5.791)	0.483
Yes (ref)	12	48	60		
No	12	26	38		
Occupational health and safety training				13.24(2.994–58.553)	0.001**
Yes (ref)	10	59	69		
No	14	15	29		
Washing hand before contact with patients or specimens				1.52(0.385–5.964)	0.552
Yes (ref)	14	48	62		
No	10	26	36		
Handwashing after contact with patients or specimens				20.55(4.225–99.928)	0.000***
Yes (ref)	10	59	69		
No	14	15	29		
Wearing a medical mask every contact with patients or specimens				9.56(1.999–45.691)	0.005*
Yes (ref)	3	76	70		
No	21	7	28		
Wearing medical gloves every contact with patients or specimens				3.85(0.741–19.978)	0.109
Yes (ref)	17	29	46		
No	7	45	52		

Note: multivariable logistic regression was performed to analyze the data. (*) p-value = 0.005, (**) p-value = 0.001, (***) p-value = 0.000. CI, confidence interval; IGRA, interferon-gamma release assay; OR, odds ratio

Table 3 shows that some implementations of TB transmission prevention protocols that are potential as determinants of latent TB infection among nurses are attending training on occupational health and safety (OR = 13.24, 95% CI [2.994–58.553]; p = 0.001), washing hands after making contacts with the patient/patient's specimen (OR = 20.55, 95% CI [4.225–99.928]; p = 0.000), and wearing a medical mask when making contacts with the patient/patient's specimen (OR = 9.56, 95% CI [1.999–45.691]; p = 0.005).

Discussion

This present study focused on identifying potential determinants of latent TB infection among nurses at public health centers in Indonesia. Results showed that 34 public health centers in Semarang provided health services for patients with TB, and 29% had inpatient facilities. These 34 public health centers had provided various facilities for preventing TB transmission and other infectious diseases. These facilities included masks, handwashing sinks, hand sanitizers, medical gloves, and medical and nonmedical trash bins. These study results are in line with a previous study by (Honda & Iwata, 2016), which reported that the availability of healthcare facilities is necessary to prevent the transmission of an infection from the patients to healthcare workers, or vice versa via airborne or droplet route. The provision of PPE and facilities for healthcare workers in Indonesia has been structurally managed according to the Regulation of the Minister of Health No. 31 of 2018, which concerns the application of medical facilities, infrastructure, and devices. With its implementation on all fronts, the availability of PPE for healthcare workers who provide care for patients with TB can be adequately fulfilled (Indonesian Ministry of Health, 2018a).

The medical mask is one of the PPEs that should be available in all TB healthcare facilities. Patients with TB are

advised to use a medical mask (Dharmadhikari et al., 2012) to ensure the prevention of transmitting the disease to other people, especially when coughing (World Health Organization, 2019). In addition, the N95 respirator is a type of mask recommended for healthcare workers, including nurses who care for patients with confirmed or even suspected TB (Smith et al., 2016). Visitors are also advised to use the N95 respirator when in a closed room with infectious cases.

One of the prominent principles of TB patient care is the availability of handwashing sinks and closed trash bins at public health centers. WHO recommends that patient care procedures should be performed in a clean or hygienic environment that facilitates the practice of prevention and control of healthcare-associated infection, antimicrobial resistance, infection prevention and control, and water, sanitation, and hygiene. To meet this recommendation, health centers should make the materials and equipment for proper hand hygiene available during treatment (World Health Organization, 2019).

TB Transmission Prevention Protocols

The factors affecting the success of TB transmission prevention and control are not only determined by the availability of facilities but also healthcare workers' behaviors to follow the established prevention protocols.

In this study, most of the nurse participants who provided care to patients with TB had received training on TB patient management, consistent with a previous Chinese study in which most respondents had received training on TB patient management before direct contact with patients (Chen et al., 2019). This training is a prerequisite for nurses who provide TB services. The training aims to improve the triage ability of nurses so that they can determine whether a patient needs isolation or not, as well as increase their ability to reduce TB infection spread and protect themselves against this transmission (World Health Organization, 2019). Hopefully, with all this knowledge, nurses can provide quality and safe health services for themselves and their patients.

Handwashing before and after contact with patients with TB or TB specimens has been regularly practiced by up to more than 60% of the nurses. This result reflects one of the mandatory protocols in nursing care implementation (Malliarou et al., 2013). Therefore, every nursing action provided to patients should always begin and end with handwashing.

Moreover, 71% of the respondents used medical masks every time they made contact with patients or their specimens. Although healthcare workers who serve patients with TB are obliged to wear medical masks, many find it inconvenient, consistent with a previous study. According to this previous study, healthcare workers did not use masks properly, especially the N95 respirator masks, because of several factors, such as hairstyle (46.4%), makeup (42.9%), high ambient temperature (60.7%), and communication problems (65.7%) (Kerr & Mbhele, 2019). Healthcare workers use other types of masks, such as the medical mask, a three-layer mask that can filter out droplets. However, the N95 respirator mask can withstand droplets and filter out airborne particles compared with the medical mask (Ippolito et al., 2020). With such advantages, healthcare workers in areas with a high burden of TB are recommended to utilize the N95 respirator. Nowadays, wherein the coronavirus disease 2019 (COVID-19)

pandemic exhibits a high rate of transmission, respirator use among healthcare workers is a huge investment that saves costs by maintaining the safety of the healthcare workers, including nurses (Mukerji et al., 2017).

Meanwhile, 47% of the respondents used medical gloves during patient or specimen contact. The use of medical gloves to prevent infection transmission comes along with handwashing (Andersen, 2019). Therefore, the use of medical gloves is obligatory for all healthcare workers, especially when performing actions that require direct contact between nurses, physicians, or other healthcare workers and patients or patient specimens. Especially, donning medical gloves is required when performing sterilized procedures and having direct contact with blood, body fluids, injured skin, or mucous membranes of patients with TB (World Health Organization, 2012b).

Latent TB Infection Determinants Among Nurses

The IGRA test was positive in 24 (25%) respondents, indicating that the prevalence of latent TB infection among nurses is relatively high. This result is in line with a previous study conducted in Victoria, Brazil, wherein latent TB infection was highly prevalent among healthcare workers in the city (Lacerda et al., 2017). Considering the high prevalence of latent TB infection among healthcare workers, a periodic screening program is essential as the basis for developing infection prevention programs in healthcare workers (Lacerda et al., 2017). The high rate of TB transmission from patients to nurses may occur during home visits (Pan et al., 2016) and in some risky units, such as general medical outpatient waiting and consulting rooms, X-ray department waiting room, respiratory medicine outpatient, and TB clinic waiting room, respiratory medicine outpatient consulting room, and general medical and respiratory medicine outpatient waiting room (Escombe et al., 2019). Bacterial transmission from patients to nurses and other healthcare workers can be minimized through simple architectural modifications to the existing infrastructures to improve natural ventilation in these spaces and density control using mathematical modeling to estimate the reduced risks of TB transmission (Escombe et al., 2019).

According to the current study's multivariate regression analysis, several determinants of latent TB infection were statistically significant. Occupational health and safety training, handwashing after contact with patients or specimens, and medical mask-wearing were the determinants of latent TB infection among nurses. In line with the IGRA test results, these determinants were demonstrated to be significant.

In this study, occupational health and safety training was a determinant of latent TB infection for nurses. Nurses who have not received such training are 13 times more likely to suffer from latent TB infection than those who have attended this training. Therefore, the success of the training should be evaluated individually and developed to prevent and overcome patient management errors (Houghton et al., 2020). Furthermore, how these knowledge and skills are practiced in everyday life is highly influenced by many factors. Some factors that affect healthcare workers' behaviors in complying with the appropriate PPE protocols include the use of relevant guidelines and how these guidelines are communicated. Other factors include support from managers, workplace cultures,

training, physical space, access and trust in PPE, and the desire to provide good care for patients (Beam et al., 2011).

In general, the behaviors of nurses in using PPE when interacting with patients remained favorable. Handwashing was identified as one of the significant determinants of latent TB infection among nurses in public health centers. It can prevent disease transmission from patients to nurses or vice versa (Mathur, 2011) and should be performed 1–2 minutes before and after nursing or medical intervention (World Health Organization, 2012a). Handwashing with soap and water kills microorganisms more effectively than water alone (Burton et al., 2011); however, hand-rubbing with alcohol provides similar protection to handwashing with soap and water (Nasution et al., 2019).

Furthermore, 60% of the respondents wore medical masks, and the habit of using PPE showed to be statistically significant as a determinant of latent TB infection. These results align with a previous study, which reported that the frequent habit of using PPE by healthcare workers is appropriate (Engelbrecht et al., 2016). Healthcare workers must implement good health protocols to prevent TB transmission when caring for their patients. Medical masks and gloves made of latex are effective PPEs against the spread of respiratory diseases and other infections (Chughtai & Khan, 2020).

However, this study has two potential limitations. First, respondents' habits in implementing health protocols were assessed using a questionnaire, suggesting a potential data bias. Second, data were collected only from a single province in Indonesia; therefore, the findings may not be generalized to the entire nursing community.

The implications of this research can be used as a basis for policymaking in improving nurses' safety when caring for patients with TB, especially during the COVID-19 pandemic, where the risk of TB transmission increases among nurses. Further research may explore other determinants of latent TB infection, such as environmental factors and agents. Regarding the host factor, data on the behaviors of nurses can be collected by direct or peer observation.

Conclusion

In general, all public health centers have provided PPE for nurses who care for patients with TB. However, the prevalence of latent TB infection among nurses remains high (25%). Occupational health and safety training, handwashing after patient or patient specimen contact, and wearing a medical mask during patient or patient specimen contact were the determinants of latent TB infection among nurses at public health centers in Semarang, Indonesia.

Declaration of Conflicting Interest

The authors declare that they have no conflict of interest in this study.

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Authors' Contributions

ME and MA conceptualized the article, conducted the data gathering, analyzed the data, and developed the manuscript equally. All authors agreed with the final version of the manuscript to be published, and they were accountable for all aspects of the work.

Authors' Biographies

Meira Erawati, Dr, RN is a Lecturer of Maternal and Child Nursing Division, Department of Nursing, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia.
Megah Andriany, Ph.D, RN is a Lecturer of Community and Family Nursing Division, Department of Nursing, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia.

Data Availability

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

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Exploring the issues, practices, and prospects of family planning among married couples in Southern Philippines

Sittie Mairah H. O. Ali, Ashley A. Bangcola* , **and Athena Jalaliyah Derico Lawi**

Mindanao State University – Marawi City, Philippines

*Corresponding author:
Dr. Ashley A. Bangcola, RN, MAN, DScN
Mindanao State University – Marawi City
Block. 446 Zone 10 Purok 24 Brgy. Maria
Christina Iligan City, Philippines 9200
Phone: +639-177-101-258
Email: ashley.bangcola@msumain.edu.ph

Abstract

Background: Nurses are involved in all aspects of health, including reproductive health. They play a fundamental role in family planning and are often designated as point persons in family planning-related concerns. In order to provide effective counseling on family planning, the nurse must understand issues, practices, and prospects of family planning among married couples in their community.

Objective: This exploratory multiple case study investigates family planning issues, practices, and prospects among couples in a municipality located in Southern Philippines.

Methods: Ten married couples of varying characteristics were interviewed to elicit their perspectives on family planning practices. The data were analyzed using coding transcriptions and thematic analysis.

Results: Five sub-themes emerged under the theme of Family Planning Issues: family planning as a burden; fear of side effects; peer-driven contraceptive choice; family planning as a social stigma; family planning as a sin. Two sub-themes emerged under the theme of Family Planning Practices: knowledge of family planning commodities; availability and acceptance of the contraceptive method. Finally, two sub-themes also emerged under the theme of Family Planning Prospects: family planning as a financially beneficial practice; prospects on family planning depend on husband's acceptance.

Conclusion: These sub-themes were also distinguished by their similarities and differences based on the four parameters identified, including age, sex, financial status, and educational attainment, which aided in the development of recommendations that could be implemented in the local community. The results of this study especially have a bearing on nurses and their role in the family planning process. Nurses play a fundamental role in guiding community members and families toward health and wellness. Thus, it is crucial for nurses to understand family planning issues underpinning their community so they can better exercise their role.

Keywords

family planning; reproductive health; nursing; case study; Philippines

Background

The family, as the basic unit of society, plays an important role in maternal and child health care services. Maternal and child health care services include family planning as a critical strategy. Family planning has become a contentious issue all over the world (Anyanwu et al., 2013). Despite this, it was regarded as one of the ten greatest public achievements of the twentieth century. Individuals were able to achieve desired birth spacing and family size thanks to the availability of family planning services, which also contributed to improved health outcomes for infants, children, women, and families. Despite the positive impact that family planning has had on society, a number of issues have arisen over the years.

The results of this study especially have a bearing on nurses and their role in the family planning process. According to the Philippine Department of Health (2017), the designated family planning point persons in the country are usually Chief Nurses. Meanwhile, a study on public health nurses' role in family planning (Smith, 1968) provides some basic principles in public health nursing, which serve as a guide to the involvement of nurses in family health planning. Firstly, public health nursing is an established community activity. Secondly, health education and counseling for patients, families, and the community are integral in public health nursing. Lastly, the nurse should be professionally prepared to function as a health worker in the community. As community workers, as healthcare providers, nurses play a fundamental role in guiding members of the community and families toward health and wellness. They are involved in all aspects of health, including reproductive health. Thus, it is crucial for nurses to understand family planning issues underpinning their community so they can better exercise their role.

During the ICPD+25 Nairobi summit, held in Kenya in November 2019, the Philippine government reaffirmed its commitment to ensuring "universal access of all Filipinos to reproductive health care and services, including family planning information and services," in accordance with the 2030 Sustainable Development Goals (Philippine Department of Health, 2017).

In the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), formerly known as the Autonomous Region in Muslim Mindanao (ARMM), it was discovered that 18% of married women aged 15-49 had an "unmet need for family planning." (Philippine Department of Health, 2014). This means that they wanted to stop or delay childbearing but were unable to use any form of contraceptive. BARMM is a Muslim-majority autonomous region in a predominantly Christian-majority country, the Philippines. As such, religion has a heavy influence on social norms.

Various Fatwah (legal opinion or ruling issued by an Islamic scholar) on family planning were developed as guides in dealing with family planning issues and dilemmas. The availability of family planning services is influenced by various Fatwah. It is sometimes regarded as a major impediment to practicing family planning, particularly in Muslim areas where health centers are located a long distance away from the community. The number of dropouts in family planning acceptors had become a dilemma in Lanao del Sur, particularly in the municipality of Calanogas, where the study was conducted. This study was thus undertaken to discover the common issues, practices, and prospects regarding family planning in the municipality of Calanogas to formulate culturally sensitive recommendations so that family planning services in rural areas may be promoted more effectively. This study aimed to investigate the different issues, practices, and prospects regarding family planning among the participants – to generate themes based on the common and differing experiences of the couples who were the respondents of the study.

Methods

Study Design

A multiple case study design approach guided this study, which was carried out using qualitative research methods and thematic analysis. The qualitative research method was especially useful because it allowed the researchers to delve deeper into the issues, practices, and prospects for family planning services (Scheyvens, 2014). The research was carried out in the municipality of Calanogas. It is a landlocked municipality in the southern part of the Philippines. The majority of Calanogas' residents have converted to Islam.

Participants

The sampling method used in this study was purposive sampling. Purposive sampling is a non-probability sampling in which the researchers select a sample based on population characteristics and study objectives. These chosen respondents were screened using the criteria. As a result, five couples or ten respondents participated. No couples dropped out of the study.

Data Collection

A pilot study was conducted with two married couples living in the community. The interview was audio-recorded. The results were used to refine the questionnaire further. The two married couples were not used as respondents for the main study, and errors in the pilot study were rectified during the main study.

Because this study was based on qualitative research and an exploratory case study, the researchers and interviewer conducted individual interviews with the participants. The interviews were semi-structured and guided by an interview guide. In addition, an interview guide covering specific topics related to the research questions was created. The wording and order of the questions were designed to appeal to both female and male respondents (Bryman, 2012). Only one interview was conducted per couple with no-repeat interviews.

Data Analysis

Transcripts were coded in the order in which they were conducted, in batches of two couples at a time, allowing the researchers to reflect and edit the interview questions. The researchers read through the materials several times to become acquainted with the findings. Thematic analysis was used to analyze the data gathered from respondents.

Coding was used to assist the researchers in understanding the respondents' perspectives and analyzing their combined points of view. During the research process, codes were created based on the data for the purpose of analyzing the data (Urquhart, 2012). Coding was done both manually and on a computer. Themes were then generated from the data.

Trustworthiness

To ensure trustworthiness, the researchers discussed among themselves and experts to ensure no bias in developing the themes. Both researchers were females, one a nursing student, while the other has a Master's and Doctoral degree in Nursing and had prior experience validating research instruments and conducting thematic analysis. The researchers acknowledged that they could identify with the participants, so they ensured they did not impose their values or opinions on the participants during the interviews. The researchers and the hired interviewer who was instructed did not prompt any answers from the participants and recorded their responses as is. The researchers were able to put aside their own understanding of the subject of investigation.

The researchers hired a male interviewer to eliminate as much bias during the interview as possible. One of the researchers and the male interviewer conducted the interviews, while both researchers also acted as the coders. Initial themes were also evaluated by researchers and further refined. Member checking was employed for respondents to validate the initial data gathered and see if they agreed with the themes generated. Themes were also conveyed to them using the local language.

Ethical Consideration

Written informed consent was obtained from all the participants of the study. Ethical Clearance was provided by the Ethics Review Committee of the Mindanao State University-College of Health Sciences. No relationship between the researchers and the respondents existed prior to

the study. Before the interview, researchers and interviewers disclosed and explained the purpose of the study in a language understandable to the respondents.

The couples were interviewed separately so that they could express their own opinions and avoid relying on their partners. To ensure the participants' privacy and confidentiality, each participant was interviewed once for at least 20-30 minutes in a secluded area within their home where only the researchers, the hired interviewer, and one other participant interacted. All of the interviews were either audio-recorded or transcribed. All the research participants were asked to sign an informed consent form that included a cover letter and information sheet outlining everything about the study. The researchers or an interpreter explained the meaning and implications of the consent letter in a language that they could easily understand. They were informed that their participation in the research was voluntary, and refusal to participate would involve no penalty or loss of any benefits to which they were otherwise entitled. The informed consent clearly stated that they were free to withdraw from the research or terminate the interview at any time should they feel uncomfortable continuing to be part of the research.

Results

Characteristics of the Participants
The married couples interviewed and who voluntarily participated in this study were all multipara (couples with two or more children) aged 25 years and older. Three couple partners among the participants used family planning methods such as Pills and DMPA, while the remaining two couple partners did not use any method.

Thematic Findings
Three main themes, including sub-themes, emerged from the analysis: 1) Issues on Family Planning (family planning as a burden; fear of side effects; peer-driven contraceptive choice; family planning as a social stigma; family planning is a sin), 2) Practices on Family Planning (knowledge of family planning commodities; availability and acceptance of contraceptive method), and 3) Prospects on Family Planning (family planning as a financially beneficial practice; prospects on family planning depends on husband's acceptance).

Theme I: Issues on Family Planning
Sub-theme 1: Family planning as a burden
With respect to age, based on the results, it would seem that the older the participant, the less they viewed family planning as a burden. This is supported by statements from the respondents in response to the question, "How can people here in X access family planning services and modern contraceptives? What choices are available? Is it easy/difficult to access?":

"Family planning is not necessarily a burden; it is entirely up to you, but there are a variety of methods available." (P3)

In contrast, a younger respondent had this to say:

"Family planning is a burden because it prevents me from having sexual pleasure with my wife. An example is a condom." (P9)

With respect to sex, the results showed that three out of five male participants viewed family planning as a burden, indicating that the male sex had a greater likelihood of considering family planning as a burden. This is supported by the following statement in response to the question, "What do you think about contraceptives (modern/natural)?":

"That is why I stopped using family planning; it became too difficult for me to put on the condom while we were doing the activity." (P8)

In contrast, three out of five female participants did not consider family planning to be a burden.

"Family planning is not a burden for me; it may be for others, but it is not a burden for me." (P1)

Meanwhile, financial status did not seem to impact differing views as to whether or not family planning was a burden. This result may be because family planning commodities could be obtained free at health centers, making them accessible regardless of financial status.

Finally, with respect to educational attainment, results would show that the higher the educational attainment of the participants, the lower the likelihood of considering family planning as a burden, as shown by these contrasting statements in response to the question "Do you and your partner have the same opinion on contraceptives? What are your opinions?":

"I graduated from college, but I never consider family planning to be a burden; what burdens me is the fact that I am unable to provide for my children's needs. (P8)

"I never went to school, so I never participated in family planning because it was a burden to me; I would rather focus on my children than on birth control." (P5)

Sub-theme 2: Fear of side effects
The fear of side effects in family planning differed according to the age of the participants. The younger the participants, the more they feared contraceptive side effects. In contrast, the older the participant was, the less likely they feared side-effects, as evidenced by the following statements in response to the question "Do you think that men and women have the same opinion on contraceptives? Why/How different/same? Who takes responsibility for contraceptives? How are men/women involved in contraceptives (obtaining, control)?":

"I was afraid to use contraceptives because they were said to be insoluble in the abdomen." (P4)

"Nothing, I have never experienced any side effects, and I have no fear of them, as there are already a large number of people engaged in family planning." (P3)

With respect to sex, it was found that four out of five female participants demonstrated an absence of fear of side effects, meaning only one female respondent indicated a fear of side effects.

"I am not afraid of adverse consequences on family planning; my husband simply does not want me to embrace a method." (P5)

In contrast, two out of five total male participants expressed fear of side effects. With respect to financial status, it was found that unemployed participants were more afraid of side effects than employed participants.

"I was worried about the side effects of family planning because one of my Buldon neighbors had the procedure." (P4)

Meanwhile, as to educational attainment, it was revealed that participants who had completed college or high school had no fear of family planning side effects. In contrast, participants who had never attended school had more fear of family planning side effects. The following are some supporting statements:

"I am a high school graduate, I am aware of what they say about family planning, and I have never been afraid of side effects." (P7)

"Yes, I did not attend school and had limited knowledge about family planning; I am afraid there are a lot of hearsays about the adverse effects of family planning." (P4)

Sub-theme 3: Peer-driven contraceptive choice

This study showed no correlation between the participants' ages and the peer-driven contraceptive choice issue in family planning. Out of a total of ten couple participants, eight of them, regardless of their age, expressed their belief that they were not motivated by environmental pressures.

Similarly, the results would show that majority of the participants, seven out of ten total participants, regardless of sex, had never been pressured with their contraceptive choice. This is supported by the following statement in response to the question "Are contraceptives something which you would talk about with friends, family, neighbors, etc.? (Why/why not?).":

"We made no disclosures about our decision to anyone, including our immediate families, and our neighbors' contraceptive choices have no bearing on us as a couple." (P7/M)

However, with respect to financial status, it was revealed that participants who were unemployed or self-employed were more affected than those who were employed by peer-driven contraceptive choice, as evidenced by the following statements in response to the question "Who do you talk about contraceptives or family planning services with?":

"My siblings advise me to practice family planning because they believe I am incapable of meeting my family's needs." (P7)

With respect to educational attainment, the study discovered no significant differences or similarities between peer-driven contraceptive choice and family planning.

Sub-theme 4: Family planning as a social stigma

With respect to age, it was found that the younger the participant, the higher the likelihood of them considering family planning as a social stigma.

"I am unable to accept family planning; our neighborhood has a history of discriminating against those who use it, and I do not wish to be ruined by them." (P9)

This study also established a link between the participants' sex and the issue of social stigma associated with family planning. Among the female participants, all five female respondents experienced social stigma, possibly due to the Meranao and Muslim communities' conservative culture. They did not want to be known as having accepted family planning methods. The following is a common statement made by these female participants:

"I'm afraid to tell my family or neighbors about my contraceptive use for fear of becoming the talk of our town. The majority of my neighbors are opposed to family planning." (P2)

In contrast, two of the five male participants indicated that social stigma was not a barrier to family planning practice, while the remaining three male participants said that social stigma was a factor in their inability to use a method.

In terms of the participants' financial situation, the study established no differences or similarities between their financial situation and the issue of social stigma in family planning. Additionally, this study revealed a correlation between participants' educational attainment and family planning as a source of social stigma. As a result, it would seem that the higher the educational attainment of a participant, the less the likelihood they had of being impacted by social stigma in their decision of whether or not to use family planning. The contrasting statements in response to the question, "How would you respond if someone were asking for your advice on family planning?" below would support such inference.

"I am not afraid to use family planning; this is my life, and regardless of what they say, I will not let it affect me. (P3)

"Family planning is difficult; once someone learns about it, they will gossip behind your back. As a result, I will refrain from using family planning." (P10)

Sub-theme 5: Family planning as a sin

Religion played an essential role in dealing with contraceptive issues. Because this study was conducted in Calanogas, one of the municipalities of Lanao del Sur in Southern Mindanao, the majority of the residents practiced Islam. Some adherents of Islam oppose the use of contraception, but as different studies and *Fatwah* on family planning proliferated, they gradually learned the importance of family planning.

Despite this, participants in this study expressed a variety of opinions on the subject. According to the findings of this study, the younger the participant, the more they saw family planning as a sin. This result was supported by the following statements in response to the question, "Does your religion hinder you from accepting family planning methods? (Why or why not?).":

"I am still young, but I already know that family planning is a sin against God." (P7)

In contrast, the older the participant, the less they believed family planning was a sin. It was exemplified by the following statement:

"Family planning is not a sin in God's eyes; the worst sin is having a large number of children but being unable to meet their basic needs; this is the major sin." (P3)

Only one out of five male participants held the opinion that accepting family planning might be a sin to God and forbidden in Islam, but for this participant, it would be between him and God only, and he would praise God and ask for forgiveness by doing such act. On the other hand, the majority of female participants expressed a positive attitude toward family planning issues. According to them, their religion would not prevent them from using any method of contraception as long as they had a mutual understanding with their husband.

One female participant had this to say:

"I do not believe Islam will prevent me from using contraception because all I can think about is how I will care for my children. I would not be able to care for them if I do not use contraception." (P1)

In terms of financial status, no differences among the participants' views on the issue of family planning as sin were discovered. In terms of educational status, no disparity was also found, as regardless of whether the participant had high educational attainment or not, either way, the respondent was likely to view family planning as a sin in either case.

Theme 2: Practices on Family Planning
Sub-theme 1: Knowledge of family planning commodities
Modern family planning methods include a variety of forms, the majority of which can be practiced by women rather than men. According to the Department of Health (DOH) (2001:19), in order to have complete information on a contraceptive method, one must know how to use the method and where to obtain supplies. There were only two methods that men could use: the condom and the withdrawal method. As a result, it could be one of the reasons why men were uninterested in family planning. It was also why some men were unaware of the commodities that could be used in family planning because females were usually in charge of using them.

As to age, it was found that the older the participant, the higher the knowledge they had about family planning. This phenomenon is supported by the following statements in response to the question, "What kinds of contraceptives are you using/have used before (modern/natural)? Why did you decide to use that method?":

"I am familiar with a variety of contraceptive methods, including pills, injections, and implants. They claim that implants are effective because they extend the time between pregnancies by up to five years." (P3)

Another finding from this study was that the younger the participants, the less knowledge they had about family planning commodities. This is supported by the following statement:

"I am not sure about that; I have never heard of such family planning products. (P4)

Four out of five female respondents were aware of the different planning methods. In contrast, two out of the five male participants had limited knowledge of family planning or family planning commodities. Rather than using any method, they usually answer about controlling themselves or abstaining from sexual activity.

"I am unaware of family planning commodities; however, if I do not wish for my wife to become pregnant, I am exercising self-control." (P10)

There was no correlation found between the respondents' financial status and knowledge. Meanwhile, it was found that the higher the participants' educational background, the more knowledge they possessed about family planning.

Sub-theme 2: Availability and acceptance of the contraceptive method
The Philippine Department of Health (2014) stated in its objectives for promoting high-quality contraceptive services that counseling must take place in a private and comfortable setting while maintaining confidentiality. Following counseling, clients should be satisfied with the method of contraception they selected. They must understand how to use the method, the expected side effects, what to do if they encounter difficulties, and when follow-up is necessary. Couples must be aware of where and when to obtain commodities in order to practice family planning. Generally, couples in Calanogas can receive family planning commodities from Barangay health stations or rural health units. Couples could obtain any commodities for free and be counseled following their visit to the mentioned health facilities.

It was found that the older the participants, the greater their likelihood of accepting contraceptive methods. On the other hand, the younger the participants, the lower the likelihood of accepting contraceptive methods. The following statements in response to the question "Do you and your partner have the same opinion on contraceptives?" substantiates these findings:

"I accepted contraceptive method because it helped me in spacing my pregnancy, and I can take care of my children well" (P1/F/30)

The following is a younger participant's statement regarding the acceptance of contraceptive methods:

"I cannot accept contraceptive method because I want to have more children." (P9/M/25)

Another significant finding in this study was the correlation between participants' sex and their acceptance of contraceptive methods. In terms of the number of participants, males and females had similar views on the acceptance of family planning, but when considering their sex, females were more accepting of contraceptive methods than men. The following statement may be relevant to this data:

"I want to accept contraceptive method, but my husband does not want me to." (P4/F)

Another statement about this occurrence came from the male's perspective:

"I do not want my wife to accept any method; if she does, I will divorce her and remarry someone else." (P10/M)

It was demonstrated in the above statements the dilemma that couples may face in relation to their family planning practices. Therefore, these findings must be taken into consideration and addressed in all family planning programs and activities.

In terms of financial status, no similarities or differences were discovered, as this study was based on the participants' perspectives, not their numbers.

In terms of educational attainment and its relationship to contraceptive method acceptance, participants with a higher level of education were more likely to accept contraceptive methods. It was backed up by the following assertions:

"Here, as a college graduate, we understand family planning well; it benefits me greatly, especially when I am unable to meet the needs of my children due to unplanned pregnancy or insufficient time to conceive. (P8/M/College)

On the other hand, the lower the participants' level of education, the less likely they are to accept contraceptive methods. The following statements support this inference:

"To be honest, I am not interested in accepting methods. I will do whatever I can for my children." (P5/F/No Schooling)

"I am not sure where we can obtain these methods, and I am not interested in them because we're not using them." (P10/M)

Theme 3: Prospects on Family Planning

This theme examined the current state and prospects of family planning use among couples in Calanogas, Lanao del Sur. Among the aspects discussed were issues surrounding family planning practices and family planning practices themselves.

Sub-theme 1: Family planning as a financially beneficial practice

There was no disparity found with respect to age. Meanwhile, for sex, one of the female participants expressed the following views on the future of family planning practices in response to the question "What do you think the general opinion is towards contraceptives? Why? Is it different between different people? How? Women/women, men/men, older/younger? (Why? What could be the reasons?).":

"Family planning can be beneficial to us, particularly those of us who are struggling to make ends meet. I am a simple housewife, and my husband is a simple farmer. Thus, if we practice family planning, there is a chance that we will be able to plan our children properly. However, I am unable to do so because my husband does not wish for me to accept the method." (P4/F)

It would seem that the idea that men also have an impact on women's reproductive health through their partners holds true within the local context, as shown by the results of this study. No notable findings were found with respect to financial status or educational attainment.

Sub-theme 2: Prospects on family planning depend on husband's acceptance

Men's involvement in family planning practices was the study's central theme. When the participants considered their reasons for practicing family planning, they always included their husbands. Whether they accepted a method or not, their husband would always be involved in their birth spacing decisions. Thus, men's involvement in family planning may present more valuable opportunities and challenges for family planning practices in the future. A prevalent view among male participants was summarized as follows in a statement in response to the question, "Do you think that men and women have the same opinion on contraceptives? Why/How different/same? Who takes responsibility for contraceptives?":

"My wife has always assumed responsibility for family planning through the use of a method. I am not participating in any family planning activities because they are intended for women and not for men. Additionally, I don't have time to listen because I'm constantly out earning money for my family." (P10/M)

According to the scenario outlined above, there would be additional points to discuss in this study. Couples may not be constrained in their approach to birth spacing, but they may face difficulties in making decisions that affect their emotional state and relationship with their partners. No notable findings were found with respect to age, financial status, or educational attainment under this theme.

Discussion

The findings would show that the ten couples exhibited distinct tendencies in relation to their family planning practices and choices, influenced by their educational attainment, age, and gender. The social stigma and family planning as sin were identified as sub-themes. It can be inferred that the respondents were subjected to a great deal of stigma because of misinformation. From the respondents' perspective, they were aware of the methods but lacked the courage to use them due to the stigma associated with family planning. Several of them expressed interest in the final judgment on the use of family planning and its Fatwah in Muslim Mindanao.

Religion has regularly been found to play a role in influencing contraception use and fertility control. Empirical research from Asian countries suggests that putting sanctions on the use of birth control, particularly fundamentalist Islamic religious views, has a significant impact on the fertility behavior of women (David & Atun, 2014). Research would show that higher fertility and unintended pregnancies were attributed to the lower levels of power and autonomy afforded to Muslim women (Morgan et al., 2002). Bhagat and Praharaj (2005) expound on how socioeconomic variables influence fertility levels between Hindus and Muslims and examine the explanations from political and economic perspectives. They stated that there was a higher unmet need for family planning among Muslims, and they availed fewer services from government sources even in rural areas. Muslims were poorer and more illiterate, and the practice of family planning was low among Muslims. It was also found that Muslims used more spacing and traditional methods compared to non-Muslims.

In contrast to the above results, in this study, it was found that according to the respondents' perspectives, religion did not pose a barrier to family planning practices. However, some respondents emphasized how, in the past, Muslims were fearful of accepting family planning because the majority of them were unaware of the Fatwah or Islamic teachings on family planning.

Regarding the respondents' ages, studies indicate that contraceptive use among married women peaks between the ages of 35 and 39 and is lowest between the ages of 15 and 19 (Westoff, 2006). Studies showed a relationship between women's age and contraception use for spacing and limiting

birth (Keenan et al., 2005; Connell, 2013). The younger women were less likely to use contraceptive methods for spacing births because they still wanted to have more children. As women get older, they tend to use contraceptive methods for limiting birth. The women reached their desired number of children as their age increased, which might lead them to think about limiting childbirth. The use of contraception for determining birth usually peaks in the late thirties to the early forties (Lethbridge, 1990).

Similarly, findings in this study would show that the older the respondent, the more receptive they were to family planning issues. Educational attainment also had an effect on family planning issues in that the higher the educational attainment of the respondent, the more they understood the importance of family planning in their daily lives. A study done by Kaur and Pattanaik (2005) discussed the impact of education on family welfare programs in rural areas. The results concluded that education, communication, and motivation positively affect the acceptance of modern family planning methods and immunization of pregnant women and children. It was found that educating women has a greater impact on immunization while communication has a greater impact on the adoption of family planning methods. Four out of ten participants did not complete their education, and several did not have any education at all. It can be inferred that these participants were not fully aware of the use and value of any contraceptive method.

The method of choice was determined by the number of methods available on a regular basis and their availability. Individuals and couples must choose a method because they go through many stages. As their needs and values shift, they may transition from wanting to postpone childbearing (to space pregnancies) to finally terminating childbearing (Bongaarts & Bruce, 1995).

The findings revealed that some of the participants were aware of the methods used in family planning, while others were not. According to the points raised during the face-to-face interview, the majority of the participants were more aware of modern methods of family planning than traditional methods. Contraceptive methods were traditionally divided into two types: modern and traditional methods. Parts of Hubacher and Trussell (2015)'s definition of modern contraceptives were used in this study. Thus, modern methods are contraceptives in which a person uses a hormonal or non-hormonal product or undergoes a medical procedure to hinder or prevent reproduction from sexual intercourse (Hubacher & Trussell, 2015).

In the Philippines, the prevalence of modern contraceptives had increased from 39 percent in 2013 to 45 percent in 2016 (Philippine Department of Health, 2017). This means that almost 5.7 million women were current users of modern contraceptives. The most common methods were contraceptives developed for women, such as Pills, sterilization, and IUD. Even though 89 percent of the population approved of modern contraceptives, the different aspects of sexual reproductive health had been widely debated (Lim et al., 2015). Authors have emphasized the importance of a rights-based approach when providing individuals with contraceptive options. It can help individuals find a method that aligns with their needs, crucial for an informed choice (Cates et al., 2014).

The study results suggest that one of the most promising prospects for the future of family planning was the involvement of males in family planning activities. Despite their active participation, females or wives could not act without the mutual support of males or husbands. Women are often targeted for information in family planning initiatives. However, they may not be the major decision-makers when it comes to contraception use. Studies have shown that negative beliefs on contraception, such as how it makes men less "manly" or that using contraception causes infertility, have been proven to create barriers to contraceptive access and use. As a result, these beliefs could reduce men's use of contraception and support for other family planning methods (Croce-Galis et al., 2014).

In many countries, family planning had the goal of eradicating poverty. However, over the years, the relationship between population and poverty has been debated, and a consensus was emerging that rapid population growth could increase the sheer number of poor people in rural health areas.

Implications of the Study

The study sheds light on the local contexts in which family planning issues, practices, and prospects exist while also emphasizing the critical and complex role of men in family planning. The underlying issues that have been identified as contributing to negative perceptions of family planning include a lack of accurate information leading to fear of side effects, insufficient skills in partner discussion and communication, a negative attitude toward modern methods, and opposition from peers and communities. Additionally, economic and social factors contribute to the lack of acceptance of family planning programs. According to the study, negative attitudes toward family planning could be attributed to low educational attainment, social-cultural values associated with large family sizes, economic concerns, and the social stigma associated with women who use family planning. The researchers observe from the study's findings that many participants believe family planning is a sin and that only natural family planning methods are acceptable in Islam. Religious leaders are influential figures in society who shape public opinion. They are consulted on all daily life issues, including contraception. Therefore, it is critical for this influential group to have accurate Islamic views on family planning.

The study has also revealed other misconceptions held by men on family planning. The desire for a larger family size may be the primary reason for Calanogas' low uptake of family planning services. The perception that family planning is a female concern, despite the fact that men take the lead in decision-making, is a critical finding that necessitates programmatic shifts to increase men's positive engagement in family planning programs. It is critical to understand men's perceptions and attitudes in order to design effective family planning programs.

The importance of education cannot be overstated. Governments at the national, regional, and local levels must invest in family planning education to empower women to make informed decisions. The findings of this study can be used to develop culturally appropriate approaches to engaging men, challenging negative social norms, and fostering positive social change in order to improve family planning uptake.

Nurses have always traditionally had a central role in the family planning process and the promotion of reproductive health. Furthermore, the role of the nurse in family planning has also taken on new depth. They have become involved in all levels of family planning, such as in the development and promotion of programs, as well as in its implementation and health counseling with members of the family. The results of this study can thus be helpful for nurses as they fulfill their multi-faceted roles. Nurses can consider the importance of properly educating and involving husbands in the family planning process. They can assuage concerns with respect to perceived side-effects and be an easily accessible source for information and resources, capable of guiding couples on where they can find family planning essentials. Furthermore, they can counsel couples on finding the family planning method best suited to them in consideration of their circumstances and level of acceptance. Spiritual nursing care also has a role to play considering implications in this study which link the level of family planning acceptance to religion.

Limitation

The primary objective of the present study was to examine various family planning cases. It emphasized men's and women's voices in describing their views and opinions about family planning by distinguishing the family planning issues, practices, and prospects from the four study parameters of age, sex, educational attainment, and financial status. This study did not cover other problems and parameters. Another limitation is the sample size. The empirical evidence in this research is restricted to one municipality in southern Mindanao, wherein the opinions of ten select married couples were studied in interview sessions.

Conclusion

As attitudes toward family planning and desired family size change, an increasing number of women and couples will seek family planning services. Addressing family planning concerns will assist in meeting these needs and ensuring that women and couples can achieve their childbearing and reproductive health goals.

Declaration of Conflicting Interest

The authors declare no conflict of interest in this study.

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Authors' Contributions

SMHOA is the primary author of the study. She formulated the research problem and data analysis. She also carried out the data collection and drafting of the final manuscript. AB and AJDL are the co-authors of the study. They served as advisers and contributed to the conceptualization of the research problem. AB conducted the statistical treatment of the data while AJDL participated in the data analysis.

Authors' Biographies

Sittie Mairah H. O. Ali is currently connected to Integrated Provincial Health Office in Lanao del Sur, graduated Master of Arts in Nursing major in Nursing Administration from the Mindanao State University - Main Campus Marawi City, a frontline health worker in the community serving the public with utmost integrity and perseverance. Her research interests include maternal and child health, family planning, nursing administration, climate change, public administration, and public health.

Dr. Ashley Ali Bangcola is a holder of a Doctor of Science in Nursing degree major in Gerontology Nursing from the Cebu Normal University in the Philippines. She graduated with a Master of Arts in Nursing major in Nursing Administration from the Mindanao State University in 2011. She is an Associate Professor at the Mindanao State University – College of Health Sciences and the current Research Coordinator of the same. Her research interests include gerontology nursing, nursing education, maternal and childcare, nursing administration, spiritual health care, and mental health.

Dr. Athena Jalaliyah Derico Lawi is a Nurse Educator who has finished a Bachelor of Science in Nursing at the Mindanao State University College of Health Sciences. She completed Masters in Nursing and Master of Arts in Nursing Major in Medical-Surgical Nursing at the Liceo de Cagayan University, Cagayan De Oro City, and Doctor of Philosophy Major in Educational Planning and Management at the Mindanao University of Science and Technology-now University of Science and Technology of Southern Philippines In Cagayan De Oro City. She is now the Chairman of the Nursing Department of the MSU College of Health Sciences.

Data Availability

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

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Nursing diagnoses in hospitalized patients with COVID-19 in Indonesia

Check for updates

Nur Hidayati[1] , **Farhan Hadi[1]**, **Suratmi[1]** , **Isni Lailatul Maghfiroh[1]** , **Esti Andarini[2*]** , **Henri Setiawan[3,4]** , **Yudisa Diaz Lutfi Sandi[5,6]**

[1] Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Lamongan, Indonesia
[2] School of Nursing, Southern Medical University, Guangzhou, China
[3] School of Nursing, Fujian Medical University, Fujian, China
[4] Department of Nursing, STIKes Muhammadiyah Ciamis, West Java, Indonesia
[5] Department of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan
[6] Department of Nursing, Akademi Keperawatan Pemerintah Kabupaten Ngawi, East Java, Indonesia

Abstract

*Corresponding author:
Esti Andarini, S.Kep., Ns., M.Kep.
Southern Medical University, No.1023-1063
South Shatai Road, Baiyun District,
Guangzhou City, Guangdong Province, PR
China, 510515
Tel: +8615521024025
Email: andarini.ea@gmail.com

Background: The COVID-19 pandemic has become a global public health issue, and the roles of nurses are very much needed in providing nursing services in the current situation. The enforcement of appropriate nursing diagnoses for patients with COVID-19 is also fundamental in determining proper nursing care to help the patients achieve maximum health.

Objective: This study aimed to describe and analyze nursing diagnoses in patients with COVID-19 treated in the isolation rooms and ICUs.

Methods: This study used a secondary data analysis from hospital medical record data of patients with COVID-19 from early December 2020 to the end of February 2021. Data were selected using a cluster random sampling technique and analyzed using descriptive statistics.

Results: The results showed that the signs and symptoms of the patients with COVID-19 that often appeared were fever, cough, shortness of breath, and decreased consciousness. The common nursing diagnoses in the hospitalized patients with COVID-19 were hyperthermia, ineffective airway clearance, gas exchange disorder, self-care deficit, spontaneous ventilation disorder, spontaneous circulation disorder, knowledge deficit, and shock risk.

Conclusion: This study offers an insight into nursing practices in the hospital setting, which can be used as a basis for nurses to perform complete nursing assessments and nursing diagnoses during the pandemic.

Keywords

Background

The COVID-19 has become a public health issue and has attracted worldwide attention (Deng & Peng, 2020). On 30 January 2020, World Health Organization (WHO) has declared the COVID-19 pandemic as a public health emergency for international concern (GÜNer et al., 2020). The COVID-19 infection can cause mild to severe Acute Respiratory Infection (ARI) and even acute respiratory distress syndrome, sepsis, and septic shock (Huang et al., 2020; Roudsari et al., 2020). The symptoms that arise in patients with COVID-19 are fever, cough, runny nose, shortness of breath, headache, weakness (malaise), muscle ache, nausea/vomit, abdominal pain, and diarrhea (Tsai et al., 2021). For patients with mild symptoms, hospitalization is not necessary unless there is a concern that it will worsen rapidly, according to medical consideration. However, some of the treated patients (15%) will experience severe illnesses who require oxygen therapy, about 5% will be admitted to the ICU, and some will have to be put on a mechanical ventilator, with severe pneumonia as the most common diagnosis for severely ill patients with COVID-19 (Rasmussen et al., 2020).

As one of the front-line elements of health workers, nurses are required to provide excellent health services (Sholihah, 2020; Rony et al., 2021). One study stated that nurses have an essential role in handling this pandemic, as 75% of medical personnel are nurses who directly provide nursing care for every patient infected with COVID-19 (Li et al., 2020). Nursing care is a series of nurse interactions with clients and their environment in achieving the goal of meeting clients' needs based on nursing diagnoses, nursing interventions, and expected outcomes (Carpenito-Moyet, 2009).

Nursing diagnoses are vital in determining proper nursing care to help clients achieve optimal health (González Aguña et al., 2021). A nursing diagnosis is a clinical assessment of the experience or response of an individual, family, or community to a health problem, to the risk of a health problem, or a life process. Establishing a nursing diagnosis is a systematic process consisting of three stages: data analysis,

problem identification, and diagnosis formulation (Tim Pokja SDKI DPP PPNI, 2017). Nursing diagnoses that are widely adopted based on the results of assessments and responses given by patients with COVID-19 are anxiety related to unknown disease etiology, ineffective breathing pattern associated with shortness of breath, hyperthermia associated with increased metabolic rate, infection associated with the failure to avoid pathogens caused by COVID-19 exposure (Dewi et al., 2020). The enforcement of nursing diagnoses in Indonesia refers to the Indonesian Nursing Diagnosis Standards (IDHS). The IDHS is a benchmark used as a guideline for establishing nursing diagnoses to provide safe, effective, and ethical nursing care (Tim Pokja SDKI DPP PPNI, 2017).

The total number of positive patients with COVID-19 in the world as of August 2020 reached 20,388,408 people, which was accumulated from positive patients being treated, positive patients who recovered, and positive patients who died. In Indonesia, the total number of positive patients with COVID-19 as of January 2021 was 1,066,313 people, with 862,798 recovered and 29,729 deaths (Wijaya & Yulianto, 2021). Data collected from the medical records at the Semen Gresik Hospital in January and February 2021 showed 259 patients in the COVID-19 isolation rooms and 48 patients in the COVID-19 ICUs.

In 2014, Semen Gresik Hospital was a private hospital accredited at the plenary level by KARS Team (Hospital Accreditation Committee). During the COVID-19 pandemic, patients with COVID-19 were treated in the isolation rooms and the COVID-19 ICUs at Semen Gresik Hospital. The isolation rooms can accommodate 52 people, while the COVID-19 ICUs can accommodate 14 people. During the pandemic, Gresik City, where the study was conducted, had the highest COVID-19 prevalence in East Java. However, it is noteworthy that nursing diagnoses for each patient with COVID-19 can be different. Therefore, this study aimed to describe and analyze nursing diagnoses in patients with COVID-19 hospitalized in the isolation room and ICU room at the Semen Gresik Hospital, East Java, Indonesia.

Methods

Study Design and Setting
This study used a secondary data analysis from the Semen Gresik Hospital medical record data of patients in isolation rooms and ICUs from December 2020 to February 2021. The study was conducted from April to June 2021.

Samples
A total of 500 patients with COVID-19 from December 2020 to February 2021, with 407 patients treated in the isolation rooms and 93 patients in the ICUs. The number of the medical records was calculated using the Slovin formula (Nursalam, 2015) as the following: $n = 500/[1+500(0.05)^2] = 222.2$, rounded up to 222 patients with COVID-19. Cluster random sampling was used to select the samples, as described in Figure 1. The inclusion criteria of the samples were patients' data who were confirmed positive for COVID-19 through the PCR Swab test and hospitalized in the isolation rooms and ICUs at the Semen Gresik Hospital during December 2020 and January 2021. The exclusion criteria were patients' data who were confirmed positive for COVID-19 through a PCR swab test in outpatient services and/or the data of patients with COVID-19 who were hospitalized in the isolation rooms of the hospital without a PCR swab test.
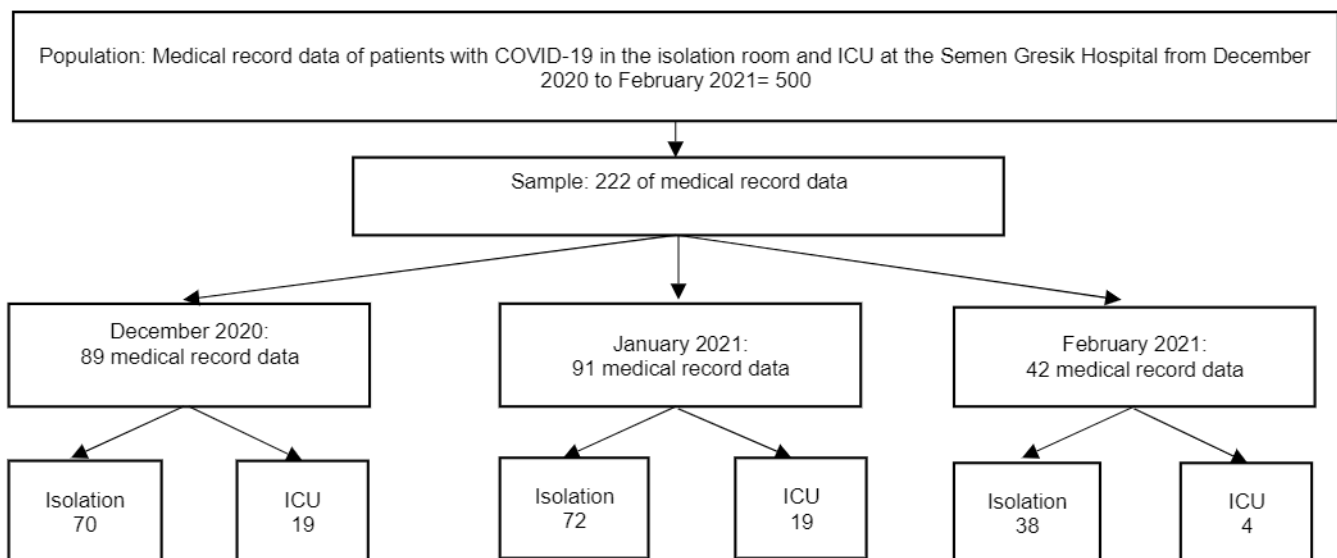
Figure 1 Cluster sampling scheme

Data Collection
The researchers directly collected the data of the patients who had been treated in the COVID-19 isolation rooms and ICUs and excluded the patients' names who did not meet the inclusion and exclusion criteria. The names of patients who met the criteria were recorded sequentially according to the date of admission and put the samples' names in folded pieces of paper into the box and randomly selected. The researchers took the medical record data for patients with COVID-19 gradually, i.e., ten medical records every day. After the number of samples has met the quota target, the results of recording nursing diagnoses were tabulated and analyzed descriptively.

Instrument

The instrument used for the nursing diagnosis variable for patients with COVID-19 was the recapitulation sheet of signs and symptoms of the patients obtained from the patient's medical record data of the hospital.

Data Analysis

Data were analyzed using descriptive statistics.

Ethical Consideration

This study was ethically approved by the Ethics Committee of Universitas Muhammadiyah Lamongan with No.068/EC/KEPK-S1/03/2021 on 30 March 2021.

Results

The total sample of this study was 222 medical record data of patients with COVID-19 consisted of 180 patients treated in the isolation rooms and 42 patients in the ICUs. Table 1 shows that most of the patients with COVID-19 were aged 20-60 years (75.7%), with the majority working as private employees (28.4%), and the least being doctors and police with the same number of 0.4%. In addition, nearly half of patients with COVID-19 (49.1%) had a senior high school education, while some of them (29.3%) had an undergraduate degree.

Table 2 shows that almost all patients with COVID-19 have pneumonia treated in the isolation rooms or the ICU.s As many as 62.2% of patients had comorbidities, including Diabetes Mellitus, hypertension, coronary heart disease, stroke, Acute Renal Failure, Chronic Renal Failure, hepatitis, Cancer, Post-op Sectio Caesarea, Gastritis, and Gastroenteritis. However, almost all patients (97.8%) in the isolation rooms had recovered, more than the recovered patients in the ICUs.

Furthermore, based on Table 3, the most common signs and symptoms experienced by patients with COVID-19 in the isolation rooms was fever with a temperature of more than 37.5°C (55%). In contrast, the most common signs and symptoms experienced by the patients in the ICUs was shortness of breath (93.3%).

Table 1 Sociodemographic characteristics of patients with COVID-19

Variables	n	%
Age		
0 - 1 years old	0	0
2 - 10 years old	4	1.8
11 - 19 years old	4	1.8
20 - 60 years old	168	75.7
> 60 years old	46	20.7
Gender		
Male	130	58.6
Female	92	41.4
Occupation		
Farmer	29	13.1
Civil servant/teacher	28	12.6
Entrepreneur	25	11.3
Private sector employee	63	28.4
School college student	20	9.0
Housewife	32	14.4
Unemployed	20	9.0
Doctor	1	0.4
Nurse	3	1.4
Police	1	0.4
Education		
No school	0	0
Elementary school	10	4.5
Junior high school	14	6.3
Senior high school	109	49.1
Academy	24	10.8
Bachelor degree	65	29.3

Table 2 Comorbidity and prognosis profile

Variables	Isolation Room		ICU	
	n	%	n	%
Pneumonia				
Yes	176	97.8	42	100
No	4	2.2	0	0
Comorbidity				
Yes	112	62.2	42	100
No	68	37.8	0	0
Prognosis				
Death	4	2.2	20	47.6
Recovery	176	97.8	22	52.4

Table 3 Clinical manifestation profiles

Signs and Symptoms	Isolation Room		ICU	
	n	%	n	%
Fever, temperature >37,5° C	99	55	21	47.7
Phlegm cough/dry cough	88	48.8	38	86.3
Shortness of breath, respiration > 20 x/minute	68	37.8	41	93.3
SPO_2 decreased <90%	64	35.6	40	90.9
Wheezing	56	31.1	20	45.5
Having no idea on the change process of the disease	50	27.8	14	31.8
Having no idea of the treatment procedures for COVID-19	50	27.8	14	31.8
Did not aware having the disease	47	26.1	16	36.3
PO2 decreased < 83 %	40	22.2	36	79.5
SaO_2 decreased 85% - 90%	38	21.1	31	70.45
Excessive sputum	32	17.8	18	40.9
Dry rhonchi	25	13.9	8	18.1
Abnormal blood Ph	25	13.9	28	63.6
PCO_2 increased	12	6.6	16	36.3
Unable to take a shower	11	6.1	36	79.5
Unable to go to the toilet	11	6.1	36	79.5

Table 3 (Cont.)

Unable to change clothes	8	4.4	36	79.5
Unable to feed themselves	8	4.4	15	34.1
Unable to make up their own	8	4.4	15	34.1
Heartburn	6	3.3	0	0
Decreased consciousness/unconscious	3	1.7	21	47.7
Diarrhea	3	1.7	0	0
SaO₂ <85%	3	1.7	21	47.7
Pulse Frequency <50 x/minute	3	1.7	21	47.7
Breath Frequency < 6x/minute	3	1.7	21	47.7
Systolic Pressure < 60 mmHg	3	1.7	21	47.7
Nausea, Vomit	2	1.1	0	0
Pain in surgical site	2	1.1	0	0
Pulse Frequency >150x/minute	1	0.6	0	0
Anosmia	0	0	0	0

Hyperthermia (55.0%) was the most common nursing diagnosis in patients with COVID-19 treated in the isolation rooms, followed by ineffective airway clearance (38.3%). Meanwhile, the gas exchange disorder (90.9%) was the most common nursing diagnosis found in patients treated in the ICUs, followed by self-care deficit (81.8%), ineffective airway clearance (75.0%), and spontaneous ventilation disorder (56.8%) (**Table 4**).

Table 4 Data distribution of nursing diagnoses for patients with COVID-19

Nursing diagnoses in the isolation rooms	*n*	%
Hyperthermia	99	55.0
Ineffective airway clearance	69	38.3
Gas exchange disorder	45	25.0
Knowledge deficit	24	13.3
Spontaneous ventilation disorder	18	10.0
Self-care deficit	11	6.1
Acute pain	8	4.4
Shock risk	3	1.6
Diarrhea	3	1.6
Spontaneous circulatory disorder	2	1.1
Nausea	2	1.1
Risk of ineffective cerebral perfusion	1	0.6
Risk of nutritional deficit	1	0.6
Nursing diagnoses in the ICUs		
Gas exchange disorder	40	90.9
Self-care deficit	36	81.8
Ineffective airway clearance	33	75.0
Spontaneous ventilation disorder	25	56.8
Hyperthermia	21	47.7
Spontaneous circulatory disorder	21	47.7
Shock risk	21	47.7
Knowledge deficit	16	36.3

Discussion

Signs and Symptoms in Patients with COVID-19 Treated in the Isolation rooms and ICUs

Fever (temperature > 37.5°C) is the most common sign and symptom in COVID-19 patients in the isolation rooms. This is caused by an increase in the body's metabolic rate in response to viral infection. Fever symptom was higher in the isolation room than in the ICUs because, while in the isolation rooms, it was still in the initial phase of the disease process. As explained by Li et al. (2020), patients with COVID-19 will experience fever symptoms for three to seven days. Fever is the most dominant symptom; 43.8% of cases occurred the moment when patients were admitted to the hospital, and it increased to 88.7% during hospitalization (Guan et al., 2020).

Complaints of coughing and shortness of breath are more common in the ICUs than in the isolation rooms because the treatment in the ICU is follow-up care for the patients' condition who is deteriorating. Coughing and shortness of breath caused by viruses spread and invaded through the respiratory mucosa, triggering a series of immune responses and inducing cytokines that lead to changes in immune components, such as peripheral blood leukocytes and lymphocytes (Jafarzadeh et al., 2020; Zhang et al., 2020; Khan et al., 2021; Vale et al., 2021). The virus stimulates plasma cells to produce Immunoglobulin E (IgE). IgE will then attach to mast cell wall receptors called sensitized mast cells (Motta Junior et al., 2020; Ando & Kitaura, 2021). Sensitized mast cells will degranulate and release a number of mediators such as histamine and cytokines (Khan et al., 2021). These mediators cause an increase in capillary permeability resulting in mucosal edema, increased mucus production (Persson, 2021). Guan et al. (2020) also stated that coughing is a second-order problem after fever.

The decrease in oxygen saturation (SPO₂) was almost partially experienced by patients with COVID-19 in the isolation rooms and the ICUs. Mejía et al. (2020) stated that 90.9% of patients experienced a decrease in oxygen saturation. While Thille et al. (2013) noted that the decreased oxygen saturation could reach 87% due to diffuse alveolar damage, resulting in ARDS. However, the infection causes simple local interstitial edema, particularly localized at the interfaces between lung structures with different elasticity, where stress and tension are concentrated. Due to the increased pulmonary edema, loss of surfactant, and excessive pressure, alveolar collapse occurs, and part of the cardiac output releases fluid from the non-aerated lung tissue, resulting in pulmonary shunts (Waters et al., 2012).

In the analysis data of blood gas, our study showed that patients with COVID-19 in the ICUs and isolation rooms experienced a decrease in PO2, decrease in SaO2, increase in PCO2, and abnormality of blood pH. In addition, the ICU patients had a higher chance of experiencing an imbalance of gas components in the blood because they have advanced Acute Respiratory Distress Syndrom (ARDS) condition. In

addition, the symptoms of decreased consciousness were found in the isolation rooms and the ICUs. Patients with COVID-19 with ARDS will experience hyperactivation of CD4 and CD8 lymphocytes (Kang et al., 2020). This leads to an increase in pro-inflammatory mediators (cytokine storm) and results in lung damage and the formation of fibrosis tissue so that a malfunction may occur (Fara et al., 2020; Huang et al., 2020).

This study also found no signs and symptoms of anosmia either in the isolation rooms or in the ICUs, although studies stated that the patients with COVID-19 may experience anosmia or olfactory dysfunction that arises due to the changes in smell conduction because of the inflammatory process damaging cells in the nasal epithelium or nasal mucosa required for normal olfactory function (Izquierdo-Dominguez et al., 2020; Kanjanaumporn et al., 2020). Besides, a small number of patients in the isolation room had diarrhea, which is in line with D Amico et al. (2020) stated that 3% of patients with COVID-19 showed signs of diarrhea. Viruses cause infections in the digestive system because they release more viruses in the intestines which last longer than in the respiratory tract, causing gastrointestinal symptoms (Ye et al., 2020). Another mechanism that may occur is that the systemic inflammatory response can develop into a Systemic Inflammatory Response Syndrome (SIRS) condition, in which a cytokine storm can directly cause damage to the intestinal epithelium (Uzzan et al., 2020).

Nursing Diagnoses for Patients with COVID-19 in the Isolation Rooms and ICUs

There are 13 nursing diagnoses in the isolation rooms and eight diagnoses in the ICUs. All diagnoses in the ICUs are the same with some diagnoses in the Isolation rooms, including hyperthermia, ineffective airway clearance, gas exchange disorder, knowledge deficit, spontaneous ventilation disorder, self-care deficit, shock risk, and spontaneous circulatory disorder. Each nursing diagnosis is mostly based on the signs and symptoms of the patients, and we describe each diagnosis briefly for clarity.

The most common diagnosis was hyperthermia. The signs and symptoms of hyperthermia include fluctuating fever. Moller et al. (1989) stated that hyperthermia is associated with an increase in the body metabolic rate and the process of infection.

The diagnosis of ineffective airway clearance was determined by coughing complaints. It is associated with airway hypersecretion, retained secretions, or an infectious process (Guan et al., 2020). Some patients had a cough with phlegm that was difficult to come out, and some patients had a dry cough, accompanied by shortness of breath. Dry rhonchi or wheezing was also found, and this finding is supported by Guan et al. (2020); Gulati et al. (2020). The ineffective airway clearance is related to the airway hypersecretion and the infectious process (Tim Pokja SDKI DPP PPNI, 2017; Barros et al., 2020; González Aguña et al., 2021; Nascimento et al., 2021).

The nursing diagnosis for patients with COVID-19 was the gas exchange disorder. The signs and symptoms found were shortness of breath, abnormal breathing patterns (fast/slow), some had additional breath sounds (wheezing/rhonchi), some patients' consciousness decreased, sometimes had a complaint of dizziness, and decreased oxygen saturation. These findings are consistent with the results of Kang et al. (2020); Mejía et al. (2020). The gas exchange disorder diagnosis is related to the changes in the alveolar-capillary membrane (Petersson & Glenny, 2014; Barbeta et al., 2020; Chen et al., 2020; González Aguña et al., 2021; Ostergaard, 2021).

A small number of patients with COVID-19 experienced a knowledge deficit. Van Scoy et al. (2021) said this was due to the lack of information they received regarding the COVID-19 disease. From the results of this study, the patients showed an attitude of not knowing about the transmission process and the stages of the virus infection process. This finding is supported by a previous study (Gerhold, 2020). Patients did not know clearly the procedure for handling this disease (Zhou et al., 2021), and some patients have tried to refuse treatment in the isolation room. Knowledge deficit may be related to the ignorance of finding information sources or lack of exposure (Dhanani & Franz, 2020; Huynh et al., 2020).

Spontaneous ventilation disorder is the next nursing diagnosis. It was signed by the signs and symptoms of shortness of breath (dyspnea) (Gulati et al., 2020), an increase in PCO2 level (Petersson & Glenny, 2014), a decrease in PO2 level, a decrease in SaO2 (Kang et al., 2020), an increase in the use of accessory expiratory muscles (Ostergaard, 2021). The patients were anxious and had tachycardia. The body will consider viruses that infect the respiratory tract as foreign substances (antigens) (Hashemi & Homayuni, 2017; Batool Janjua et al., 2021; Khan et al., 2021). The binding between antigen and antibody will stimulate the release of chemical mediators such as histamine, neutrophil chemotactic show acting, epinephrine, norepinephrine, and prostaglandins (Matzkin et al., 2019). The increase in chemical mediators will stimulate an increase in capillary permeability, swelling of the airway mucosa (Ostergaard, 2021). Swelling of the airway mucosa will constrict the respiratory tract (bronchus) and shortness of breath (Gulati et al., 2020). It causes a decrease in the amount of external oxygen that enters during inspiration, thereby decreasing oxygen from the blood (Kang et al., 2020; Mejía et al., 2020). If this condition persists, it will result in a decrease in tissue oxygen so that the patient becomes pale and weak (Hunt et al., 2021; Ostergaard, 2021). The diagnosis of spontaneous ventilation disorder is associated with respiratory muscle fatigue (Ostergaard, 2021).

Self-care deficit diagnosis was also identified. It was indicated by the condition of some patients who were unable to go to the toilet on their own, unable to dress, unable to feed themselves, and some are unable to do make-up (Nascimento et al., 2021). General weakness caused by respiratory distress (gas exchange disorder) was known to cause patients to be unable to take care of themselves (Barbeta et al., 2020; Ostergaard, 2021). Studies indicated that the patients with COVID-19 with self-care deficit diagnosis are mostly related to weakness (Liu et al., 2020; Ostergaard, 2021).

The risk of shock was found in a small percentage. This diagnosis was signed by the condition of the patients with decreased consciousness to unconsciousness, decreased systolic blood pressure <60 mmHg, weak pulse <50 beats per minute, decreased respiratory rate, SaO2 <85 percent. This risk of shock is when the body experiences insufficient blood flow to body tissues (Ostergaard, 2021), which leads to life-

threatening cellular dysfunction (Motta Junior et al., 2020; Noris et al., 2020). This shock risk is also related to hypoxemia, sepsis (Alhazzani et al., 2020; Zhang et al., 2020; Ostergaard, 2021; Viana-Llamas et al., 2021). The diagnosis of shock risk is one of the diagnoses that can be applied in patients with COVID-19 with ARDS (Acute Respiratory Distress Syndrome) (de la Rica et al., 2020; Guo et al., 2020).

In addition, another nursing diagnosis of patients with COVID-19 treated was spontaneous circulation disorder. This was the same as patients treated in intensive care with respiratory failure problems due to other diseases (Mejía et al., 2020). When the coronavirus enters and infects the receptor, the virus builds and develops in the upper respiratory tract and lung tissue (Motta Junior et al., 2020; Ostergaard, 2021). The infection causes systemic endothelial dysfunction in COVID-19, which causes hemostasis disorders accompanied by platelet adhesion and aggregation activity, resulting in death due to blood clots in COVID-19 patients (Petrishchev et al., 2020). Furthermore, spontaneous circulation disorder is partly due to a cytokine syndrome that is closely related to a decrease in lymphocyte levels which triggers a significant decrease in CD8+ T cells and is positively correlated with mortality and morbidity rates of COVID-19 patients (Guan et al., 2020; Lu et al., 2020; Debuc & Smadja, 2021). This decrease in circulation has a significant effect on the circulation of nutrient supply for tissue metabolism, which results in a reduction of the distribution of blood circulation, which results in organ damage (Noris et al., 2020; Ostergaard, 2021).

The other nursing diagnoses did not exist in the ICUs, such as acute pain, diarrhea, nausea, risk of ineffective cerebral perfusion, and risk of nutritional deficit. Each diagnosis is explained in the following description.

The diagnosis of acute pain in some patients with COVID-19 in isolation rooms occurred to those with comorbidities, including childbirth by cesarean section, colon cancer, and gastritis. The percentage of this diagnosis was 2.8%. The patients complained of heartburn, lower left abdominal pain, prevalent abdominal pain, and pain in the surgical site. Shanthanna et al. (2020) stated that complaints of pain usually emerged in patients with COVID-19 who had comorbidities. However, there was no complaint of pain in patients with COVID-19 who did not have comorbidities.

Diarrhea and nausea were found in patients with COVID-19 with gastroenteritis. The patients showed symptoms of loose stools and nausea. Diarrhea diagnosis is related to gastrointestinal inflammation and infectious process (D Amico et al., 2020; Wei et al., 2020). The diagnosis of nutritional deficit risk was found in patients with COVID-19 with gastritis and gastroenteritis. Patients showed the symptoms of loose stools, nausea, vomiting, weakness, and some patients complained of weight loss. There was even a decrease in serum albumin level.

The next diagnosis was the risk of ineffective cerebral perfusion found in patients with COVID-19 with concomitant ischemic stroke. The patient showed weakness in half of their limbs, walked a bit shuffling, spoke sluggishly, and the CT-Scan showed a picture of ischemia. SARS-Cov-2 causes a cytokine storm that leads to hypercoagulation and an increase in vascular thrombosis in patients with COVID-19 (Panigada et al., 2020), causing patients with COVID-19 to suffer a stroke, including acute ischemic stroke (Tan et al., 2020). This diagnosis is related to disseminated intravascular coagulation (Panigada et al., 2020; Levi & Iba, 2021).

The risk of ineffective cerebral perfusion diagnosis in patients with COVID-19 had a very low total percentage. The risk of cerebral perfusion appears with indicators such as decreased consciousness, diastolic pressure, syncope, agitation, restlessness, hyperventilation, fever, and cognitive impairment (Tim Pokja SDKI DPP PPNI, 2017). It indicates a lack of oxygen for COVID-19 patients, which results in disruption of oxygen supply in the body (Huang et al., 2020). This regulation disorder causes hypoxic conditions, which refer to values below 40 mmHg in the presence of dyspnea and hyperventilation (Stendardi et al., 2008). The body compensates for hypoxia by increasing ventilation in a minute period, followed by an increase in respiratory rate and tidal volume (Vaporidi et al., 2020). Hyperventilation conditions further cause arterial vasoconstriction, which blocks the blood supply to the cerebral cortex which causes a decrease in consciousness, cognitive impairment, and changes in all forms of response (McHenry et al., 1965; Giannessi et al., 2008). Accurately individuals with COVID-19 represent poor outcomes with comorbid impairment of cerebrovascular hemodynamics due to hypoxia (Brasil et al., 2021). Hypoxic conditions indirectly cause damage to organs, especially the brain, due to lack of oxygen and an inflammatory process. Generally, severe complications are found in patients with COVID-19, such as stroke, hemorrhage, and acute encephalitis, as well as nervous system disorders (Marshall, 2020; Rahman et al., 2021).

A diagnosis of a nutritional deficit risk means that the patients are at risk of experiencing insufficient nutrient intake to fulfill metabolic demands (Hunt et al., 2021; Richardson & Lovegrove, 2021). This diagnosis is related to the inability to absorb nutrients and an increase in metabolic demands (Keller et al., 2017; Richardson & Lovegrove, 2021).

The signs and symptoms of COVID-19 and nursing diagnoses in this study are limited to what was documented in the medical record. There is a possibility that there are data that might not be studied or incomplete, which made the nursing diagnosis not cover the actual condition of the patient. In addition, some nursing diagnoses were difficult to be implemented due to the incomplete data during the assessment.

Conclusion

The most common signs and symptoms in patients with COVID-19 treated in the isolation rooms were fever and cough, while the most common sign and symptom in patients with COVID-19 treated in the ICUs was shortness of breath. Nursing diagnoses in the Indonesian patients with COVID-19 who were treated in the isolation rooms were hyperthermia, ineffective airway clearance, gas exchange disorder, knowledge deficit, spontaneous ventilation disorder, self-care deficit, acute pain, shock risk, diarrhea, nausea, spontaneous circulation disorders, risk of ineffective cerebral perfusion, risk of nutritional deficit. In contrast, nursing diagnoses in patients with COVID-19 who were treated in the ICUs were gas exchange disorder, self-care deficit, ineffective airway

clearance, spontaneous ventilation disorders, hyperthermia, spontaneous circulation disorder, shock risk, knowledge deficit. This study provided information about the nursing diagnoses and the intensive care nursing practice, as well as a resource for patients with COVID-19 caregivers. The role of nurses is critical in performing a comprehensive assessment from the emergency room and reassessment when they are in the room on a regular basis.

Declaration of Conflicting Interest

The authors declare that they have no conflict of interest in this study.

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Authors' Contributions

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Authors' Biographies

Nur Hidayati, S.Kep., Ns, M.Kep is a Lecturer of the Undergraduate Nursing Program, Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Indonesia.

Farhan Hadi, AMd.Kep., S.Kep is a Student of the Undergraduate Nursing Program, Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Indonesia.

Suratmi, S.Kep., Ns., M.Kep is a Head of the Undergraduate Nursing Program, Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Indonesia.

Isni Lailatul Maghfiroh., S.Kep., Ns., M.Kep is a Lecturer of the Undergraduate Nursing Program Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Indonesia.

Esti Andarini., S.Kep., Ns., M.Kep is a Doctoral Student, School of Nursing, Southern Medical University, Guangzhou City, Guangdong Province, PR China.

Henri Setiawan S.Kep., Ners., M.Si.Med is a Doctoral Student, School of Nursing, Fujian Medical University, Fujian, China. He is also a Lecturer, Department of Nursing, STIKes Muhammadiyah Ciamis, West Java, Indonesia.

Yudisa Diaz Lutfi Sandi, S.Kep.,Ns., M.Kep is a Doctoral Student, Department of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan, and a Lecturer, Department of Nursing, Akademi Keperawatan Pemerintah Kabupaten Ngawi, East Java, Indonesia.

Data Availability

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

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Nurse workforce scheduling: A qualitative study of Indonesian nurse managers' experiences during the COVID-19 pandemic

Kartika Mawar Sari Sugianto[iD], **Rr. Tutik Sri Hariyati***[iD], **Hening Pujasari**[iD], **Enie Novieastari**[iD], and **Hanny Handiyani**[iD]

Faculty of Nursing, Universitas Indonesia, Indonesia

***Corresponding author:**
Prof. Dr. Rr. Tutik Sri Hariyati, SKp., MARS
Faculty of Nursing, Universitas Indonesia
Jl. Prof. DR. Sudjono D. Pusponegoro, Kukusan, Kecamatan Beji, Kota Depok, Jawa Barat 16425, Indonesia
Email: tutik@ui.ac.id

Abstract

Background: The increase in COVID-19 cases in Indonesia has resulted in changes in the hospital workflow, including the staffing process and scheduling, especially in the isolation units. Nurse managers are working hard in the scheduling system to ensure high-quality care is provided with the best human resources.
Objective: This study aimed to explore the experiences of nurse managers in managing staff nurses' work schedules during the COVID-19 pandemic.
Methods: A qualitative descriptive design was used in this study. Eleven nurse managers from three COVID-19 referral hospitals were selected using purposive sampling. Data were collected using online semi-structured interviews. Thematic analysis was used for data analysis, and data were presented using a thematic tree. Consolidated criteria for reporting qualitative research (COREQ) checklist was used as a reporting guideline of the study.
Results: Four themes were developed: (i) Nurse shortage, (ii) Strategically looking for ways to fulfill the workforce, (iii) Change of shift schedule, and (iv) Expecting guidance from superiors and compliance from staff.
Conclusion: The lack of nurse staff is a problem during a pandemic. Thus, managing personnel effectively, mobilizing and rotating, and recruiting volunteers are strategies to fulfill the workforce during the pandemic. Using a sedentary shift pattern and sufficient holidays could prevent nurses from falling ill and increase compliance with scheduling. In addition, a staffing calculation formula is needed, and top nursing managers are suggested to provide guidance or direction to the head nurses to reduce confusion in managing the work schedule during the pandemic.

Keywords

COVID-19; nurse managers; staffing; scheduling; workforce; Indonesia

Background

The increase in COVID-19 cases has caused changes in healthcare services, especially in hospitals. The increasing number of confirmed patients has resulted in changes in the treatment workflow in the isolation rooms (Gao et al., 2020), including the use of personal protective equipment (PPE) in direct contact with patients, which has become a challenge among nurses. Another change also occurs in the nurse scheduling because hospitals lack the personnel to handle the patients with COVID-19 (Al Thobaity & Alshammari, 2020). Therefore, adjustments must be made to the workforce composition in nursing shifts (Gao et al., 2020). However, healthcare services mostly require nurses to contact patients directly in carrying out nursing care (Huang et al., 2020).

Undoubtedly, nurses often experience a high workload, which leads them to fatigue, anxiety, and depression (Hu et al., 2020; Marzilli, 2021). This can be an obstacle in managing the work schedule. Asmaningrum et al. (2020) found that nurse managers made personnel arrangements during the pandemic, such as calculating the number, ratio of nurses, and composition. Furthermore, workflow changes were made, such as schedule changes, adding extra holidays, and rotating nurses in the team. In addition, our preliminary study at the Indonesian hospitals revealed that there were changes in nurses' workflow during the pandemic. This was due to nurses being sick and an increase in patients with COVID-19, resulting in frequent changes to the service schedule. Also, changes in the official schedule cause inappropriate schedule patterns, increased workload, irregular working hours, fatigue, and human error. In addition, nurses' workload during the

pandemic became high, so many nurses were exposed to the virus. At the same time, nurse managers needed extra time to organize and change schedules.

A literature review was also carried out in a previous study on nurses' experiences during pandemics and epidemics (Fernandez et al., 2020). It was found that nurses who worked during the pandemic were significantly affected by the unpreparedness of the nursing field in dealing with the current crisis. Indeed, the experience of nurse managers in undergoing this pandemic is significant in exploring how to improve service quality and avoid negative impacts for nurses. However, to our knowledge, a lack of studies discussed this issue in Indonesia; therefore, this study aimed to explore the experiences of nurse managers in managing staff nurses' work schedules during the pandemic. This study will add the body of knowledge in nursing management and administration.

Methods

Study Design

A qualitative descriptive study was conducted to explore the experiences of nurse managers in managing schedules during the COVID-19 pandemic from January to July 2021. Qualitative descriptions are suitable for health research and bring researchers closer to the data about the participants' experiences (Colorafi & Evans, 2016). Consolidated criteria for reporting qualitative research (COREQ) checklist (Tong et al., 2007) was used to report this study.

Participants

Eleven nurse managers from three COVID-19 referral hospitals and different rooms were participated to ensure sample representation and data saturation. The inclusion criteria of the participants were nurse managers, such as heads of the nursing section, heads of installation, or head nurses who were involved in managing the official nurse schedule. The exclusion criteria were team leaders, case managers, and infection prevention control nurses. Purposive sampling was used to select the participants for this study. Purposive sampling is the chosen strategy to provide the necessary information for research needs (Polit & Beck, 2018). Participant recruitment was done by distributing online flyers, WhatsApp captions, and Google Forms links. The researcher contacted those interested in participating and scheduled interviews according to the time agreed upon with the participants.

Data Collection

Data were taken from three COVID-19 referral hospitals in Indonesia. A semi-structured interview guideline was developed by the researchers and validated by senior researchers. The interview guide consisted of six open-ended questions to explore the experience of nurse managers in managing schedules during a pandemic, including *(1) Tell us about your experience in managing work schedules during the COVID-19 pandemic, (2) Tell us about your understanding of managing nurse scheduling, (3) How do you perceive the management of the official schedule during the COVID-19 pandemic? (4) Why do we need to manage nurse schedules during a pandemic? (5) What challenges do you face while*
managing your official schedule during a pandemic? (6) Tell us about your expectations in managing schedules during the COVID-19 pandemic. The probing questions were carried out to encourage participants to provide more information, for example, *how to schedule in a situation of being understaffed while patients continue to increase?* Bracketing was done during the interview process, and this is important to reduce bias that could affect the research objective. Due to the COVID-19 pandemic, the interview was conducted online via the Zoom application for 40–60 minutes.

A digital video recorder in the Zoom was used, and field notes regarding non-verbal expressions during the interviews were also made. Prior to data collection, the essential aspects of the research, such as using a digital recorder, the purpose and benefits of the study, and how long the interview would take, were explained to the participants. Also, informed consent was obtained online from the participants via Google Forms before the interviews.

The interviewer was the first author holding a master's degree in nursing education, an expert in the area of interest, and worked as a nurse manager but in a different setting. The interviewer was also trained in the qualitative approach. Bracketing was done during the data collection and analysis. During the interview, the third author, who holds a Ph.D education with qualitative research expertise, joined as a supervisor. The research team was independent and did not meet with the participants before the interviews to avoid the bias that might influence the participants' responses or data analysis. During the interviews, the participants were not accompanied by anyone. In this study, repeated interviews were conducted only with one participant.

Data Analysis

For the effectiveness and efficiency of the study, the number of participants was adjusted to saturation at the time of the interviews, at approximately 15 people. Data saturation was agreed upon by the two researchers at around 11 interviews. The data were analyzed using thematic analysis, aiming to reach an understanding of the meaning patterns from the descriptions of the participants' life experiences (Sundler et al., 2019). The researchers copied the interviews verbatim into text and then read them through several times. Furthermore, the search for meaning and identification of themes was carried out, and finally, the themes were organized into a meaningful whole (Sundler et al., 2019). The final themes were defined based on process descriptions and presented as a thematic tree. The thematic tree could represent and link all possible faults (final themes and subthemes) (Salleh et al., 2017).

Trustworthiness

Semi-structured per-informant interviews were conducted at different times, hospitals, and rooms to facilitate qualitative research. To increase the reliability of the study, peer reviews were done involving all the research team members at each step during the eight months of the study. In addition, the researchers used WhatsApp to conduct member checks with the participants. The results of a member check validated that the study results were in accordance with the experiences expressed by the participants.

Ethical Considerations

This study followed an ethical review process, and approval was obtained from the hospital ethics committee (Ethical approval number: 008/PEN/KEPK/RSUD CIAWI/III/2021) and the University of Indonesia ethics committee (Ethical approval number: SK-40/UN2.F12.DI.2.1/ETIK 2021). In addition, all participants completed the online study consent form. Data collection was carried out after the participants were informed about the research objectives. It was explained that their participation was voluntary and that they could choose not to complete the interviews without any consequences. Furthermore, the participants were informed of their anonymity and that the data provided would be kept confidential. The participants' names were coded from P1-P11.

Results

Characteristics of the Participants

The age of the participants ranged from 29 to 48 years, and the years of service ranged from 7 to 22 years. Most of the participants were head nurses and holders of a bachelor of science in nursing. Diploma III refers to a three-year nursing program at the college/university level. The hospital names were not presented for confidentiality, replaced with RS P, RS S, and RS C (**Table 1**).

Table 1 Participants' demographic characteristics (*n* = 11)

Characteristics	Description	Number
Age	29–48 years	11
Gender	Male	1
	Female	10
Work Period	6–10	3
	11–15	5
	16–20	2
	More than 20 years	1
Hospital	RS P	3
	RS S	3
	RS C	5
Education	Bachelor of Science in Nursing	7
	Diploma III in Nursing	4
Work Unit	COVID Room	5
	Non-COVID Room	5
	Inpatient Room	1
Position	Head of Installation (Nurse)	1
	Head Nurse	10

Thematic Findings

The thematic tree was used to present the findings of this study, which provides various aspects of the nurse manager's experience with scheduling during a pandemic (see **Figure 1**). Four themes were developed: (i) Nurse shortage, (ii) Strategically looking for ways to fulfill the workforce, (iii) Change of shift schedule, and (iv) Expecting guidance from superiors and compliance from staff.

Theme 1. Nurse Shortage

The reduction in staffing and increased number of patients are obstacles to managing the schedule during the pandemic. The decrease in personnel was due to the number of sick nurses who had to undergo self-isolation. When there is a reduction in staffing, scheduling becomes constrained. The constrained schedule causes nursing care to patients to not be optimal, complaints often occur, and nurses are exhausted. The following are some illustrative excerpts from the participants:

"Since August, we have experienced a decrease in personnel due to self-isolation for three months, so we can say it is difficult to make a schedule because of lack of nurses." (Head of the installation, P2)

"The decrease is due to the increasing number of patients who are also self-isolating. If there is one person in the hospital, it is very influential. It also affects their friends." (Head nurse, P11)

"Nursing care is not maximal; that is the first. The second is that there are many patient complaints, ma'am. Many complain about slow service. Then, many complain that they are called late when they come, ma'am. Then the third thing, of course, fatigue…" (Head of the installation, P2)

Managing schedules is one of the nurse managers' functions related to the staff. Participants realized that managing schedules was the manager's job and were essential because it affected the quality of care. They said:

"...So the function is indeed to regulate, with this schedule, it is okay to arrange your friends per shift so that it is as expected." (Head nurse, P5)

"This is very important, ma'am, because if we make a mistake in managing the schedule of the service, it will automatically affect the quality of care." (Head nurse, P6)

Theme 2. Workforce Scheduling Strategy

The workforce scheduling strategy is challenging. With nurse shortage, the head nurses asked for help from another room and proposed the addition of new personnel, such as adding volunteers to the heads of the installation or nursing managers. The heads of the installation then mobilized the staff by asking for help from a non-COVID-19 room. Also, the rotation of nurses was carried out by the nursing managers in coordination with the head nurses in the units.

"...If there is a shortage of staff, the nurse from the internal medicine room (IMR) or intensive care unit (ICU) will help us. So, every shift, we have assistance from the ICU or the IMR." (Head nurse, P7)

"I checked the schedule first, ma'am, and looked at the number of patients. If the patients were still at a high level, I mobilized the nurses." (Head of the installation, P2)

"We had an incident like that, ma'am, so we had a chance to recruit." (Head nurse, P6)

Subtheme 2.1 Paying attention to competence and composition

In addition to clinical nurse level and competence, staff capabilities need to be considered in scheduling. The head nurses combined the composition of nurses in shifts, such as having senior nurses and volunteers in each shift, and made every effort to have at least a charge nurse and associate nurses.

"Besides the level of Clinical Nurse, I also consider competence..." (Head nurse, P1)

"So, we attempt to have one or two senior volunteers for each shift." (Head nurse, P5)

"Well, for this scheduling, it is the same. The strategy is how to keep the appropriate composition. There is a person in charge and the associate nurses. We share the Primary Nurse the same way." (Head nurse, P6)

Subtheme 2.2: Planning and scheduling

Schedule planning was done regularly, both manually and computerized. The schedule was analyzed by counting the number of nurses in shifts, working hours, and working days. The communication regarding the update of the schedule was carried out through WhatsApp, in which the head nurses

created a WhatsApp group to inform about scheduling changes.

"We make a schedule a week before the 21st of each month. We plan an official schedule." (Head nurse, P6)

"The analysis is for the working hours and working days. For example, how many people are there in the morning shift, how many in the afternoon, how many at night, and some on leave or not." (Head nurse, P11)

"We have a WhatsApp group, for one ward where all the nurses in my room are included in the group, so everyone knows that if there is a change, they will be notified, even though it is scheduled." (Head nurse, P9)
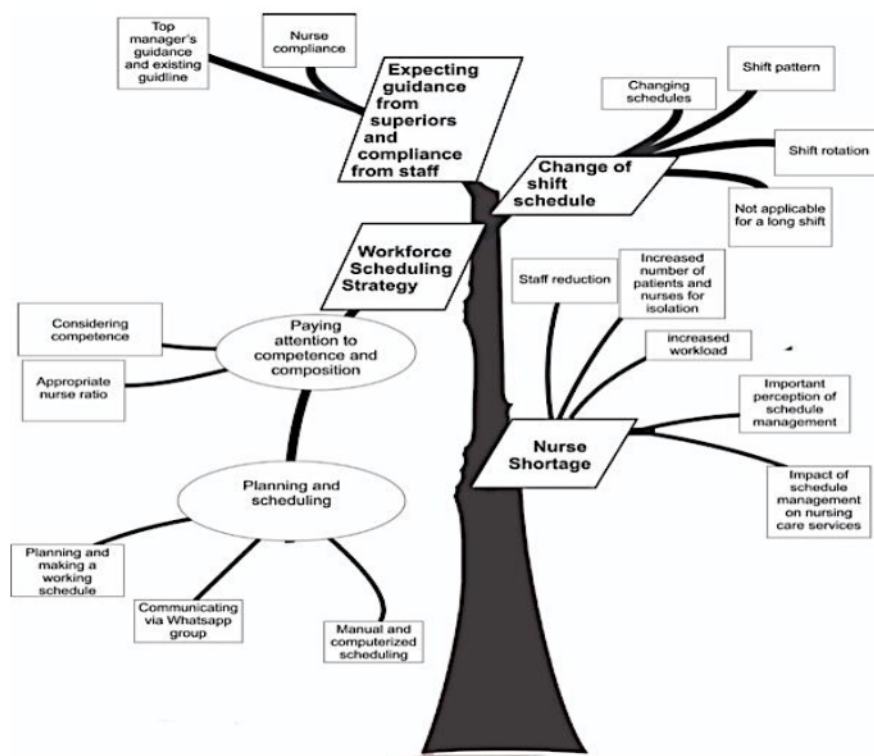

Figure 1 Overview of thematic tree analysis

Theme 3. Change of Shift Schedule

During the COVID-19 pandemic, the nurse shift pattern at the hospital was eight hours in the morning, afternoon, and night. Four participants stated that they did not apply overtime or long shifts during the pandemic and applied for middle shifts. In addition, participants indicated that they used fixed-shift rotations for five working days, but other participants stated that they used shift rotations of six or even eight working days. In certain circumstances where there is a shortage of personnel, nurse managers make changes in the scheduling.

"The schedule for our unit remains the same. It is made up of shifts, morning, afternoon, and evening shifts" (Head nurse, P6)

"...So, to anticipate if someone gets sick in the morning, there is a middle service which backs up the morning service..." (Head nurse, P7)

"So, in the morning and evening, after taking care of them, they are off ...they get a day off." (Head of the installation, P2)

"The schedule pattern after this pandemic is that we use shifts, ma'am, but not long shifts. Only morning and evening shifts." (Head of the installation, P2)

Theme 4. Expecting Guidance from Superiors and Compliance from Staff

The participants stated that policies were needed during the pandemic, especially in the isolation rooms. Schedule management requires guidance and examples. The head nurses wanted the nurses to comply with the service schedule. Using a sedentary shift pattern with three working days and two days off gave nurses rest time and reduced jealousy. According to the participants, using the fixed shift pattern and vacation time could reduce the incidence of nurses being sick.

"Maybe in the isolation unit there needs to be a new policy. How about special scheduling." (Head nurse, P6)

"So, we do not just deliver the official schedule like this, without being guided by examples. I hope that when someone submits the schedule, and we are guided, there is guidance..." (Head of the installation, P2)