(RESEARCH ARTICLE)

Empowering health cadres: Factors influencing knowledge of high-risk pregnancy

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Abstract

Background: Health cadres play a crucial role in delivering health information, particularly concerning the early detection and management of high-risk pregnancies. Health cadres need to have strong knowledge to assist them in detecting, monitoring, and providing appropriate care to high-risk pregnant women. This study aims to analyze the factors influencing the knowledge of health cadres regarding high-risk pregnancies at *Puskesmas* Simomulyo, Surabaya (Simomulyo Public Health Center).

Methods: This study employed an observational analytic cross-sectional design to collect data from health cadres involved in maternal and child health programs. A multistage random sampling technique was used to obtain the sample. Statistical analysis was performed using Spearman's correlation and Chi-Square tests.

Results: Statistical tests on 47 health cadres at *Puskesmas* Simomulyo (Simomulyo Public Health Center) showed that the age factor had a p-value of 0.005, the education factor had a p-value of < 0.001, the employment factor had a p-value of 0.070, and the experience factor had a p-value of 0.014 in relation to cadre knowledge. The majority of respondents were aged 25-40 years, had secondary education, were unemployed, and had less than 5 years of experience as cadres. Most cadres had adequate knowledge about high-risk pregnancies.

Conclusion: This study demonstrates a positive correlation between age and education with the knowledge of health cadres, whereas employment did not show a significant relationship. Experience as a cadre was also associated with increased knowledge. These results support the development of more focused educational and training strategies to enhance the knowledge of health cadres regarding high-risk pregnancies at *Puskesmas* Simomulyo, Surabaya (Simomulyo Public Health Center).

Keywords: Health Cadres; Knowledge; High-Risk Pregnancy; Empowering; Public Health

1. Introduction

The Maternal Mortality Rate (MMR) in Indonesia is still far from the 2030 Sustainable Development Goal (SDG) target of 70 per 100,000 live births. According to the 2017 Indonesia Demographic and Health Survey (IDHS), the MMR remains around 305 per 100,000 live births, which has not yet met the 2024 National Medium-Term Development Plan target of 183 per 100,000 live births. The Infant Mortality Rate (IMR) is also still high, at 24 per 1,000 live births, far from the 2030 SDG target of 12 per 1,000 live births.

In East Java, the MMR decreased from 234.7 per 100,000 live births in 2021 (1)to 93 per 100,000 live births in 2022 (2). However, in *Puskesmas* Simomulyo, maternal and infant mortality rates remain consistent. In 2020, there were 1

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maternal death and 1 infant death, in 2021 it increased to 4 maternal deaths and 4 infant deaths, and in 2022 there were 1 maternal death and 10 infant deaths. In 2023, there were recorded 1 maternal death and 8 infant deaths.

Complications during pregnancy, childbirth, and the postpartum period are the leading causes of maternal and infant mortality. Preventing obstetric complications involves providing protective services and delivering treatment according to medical standards (3). According to the Indonesia Health Profile 2021 (3) maternal and infant deaths are often caused by complications such as hemorrhage, preeclampsia, premature birth, and infections. Early detection of high-risk pregnancies can prevent fatal complications. Comprehensive efforts to reduce Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) require access to quality healthcare services, skilled birth attendance, postpartum care, specialized care, referrals when necessary, and Family Planning (FP) services.

Program Perencanaan Persalinan dan Pencegahan Komplikasi (P4K) has significantly contributed to efforts in reducing Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR). Health cadres, particularly in Surabaya known as KSH (*Kader Surabaya Hebat*), play a crucial role in early detection of high-risk pregnant women. They receive salaries and relevant training to enhance their knowledge and skills. However, there are still many pregnant women who delay antenatal check-ups. This may indicate that the knowledge of cadres regarding early detection of high-risk pregnancies is not yet optimal.

Based on the background, this research aims to analyze the factors influencing the knowledge of health cadres regarding high-risk pregnancies at *Puskesmas* Simomulyo, Surabaya, and to evaluate the relationship between factors possessed by health cadres and knowledge of high-risk pregnancies at *Puskesmas* Simomulyo, Surabaya. This study is expected to contribute to the improvement of knowledge and skills of health cadres, thus aiding efforts to reduce maternal mortality rate (MMR) and infant mortality rate (IMR).

2. Methods

This study uses an analytical observational method with a cross-sectional approach to study the correlation between risk factors at a specific point in time. The study population includes all KSH (*Kader Surabaya Hebat*) at *Puskesmas* Simomulyo in 2024, with a total of 882 individuals. The sample is taken using Multistage Random Sampling technique, with inclusion criteria being health cadres at *Puskesmas* Simomulyo whose areas of responsibility include pregnant women, and a minimum total sample size required is 47 individuals. The independent variables in this study are age, education, occupation, and experience, which are considered to influence the dependent variable, which is knowledge of high-risk pregnancies. Primary data is obtained from questionnaire results, while secondary data comes from the profile of *Puskesmas* Simomulyo, Surabaya.

One-variable quality analysis is conducted to describe the number of cadres based on age categories, education levels, occupations, and experience. Bivariate analysis is then used to observe the relationship between two variables, such as the relationship between age and education with knowledge, which is analyzed using Spearman's correlation. Meanwhile, the relationship between occupation and experience with knowledge is analyzed using the Chi-Square test and the Contingency Coefficient.

3. Results and discussion

The cadre is an individual selected and trained by the community to drive participation in health empowerment (4). In this study, the cadre referred to is the KSH as per Surabaya Mayor Regulation No. 14 of 2022 (5) which explains that KSH is a citizen actively serving the community. Primary data for this research was obtained through the distribution of questionnaires to 47 health cadres (KSH) at *Puskesmas* Simomulyo.

Table 1 Characteristics of health cadres at *Puskesmas* Simomulyo

Characteristics	n	%
Age		
Age < 25 years	3	6.4
Age 25-40 years	26	55.3
Age > 40 years	18	38.3

Education		
Elementary Education	12	25.5
Secondary Education	30	63.8
Higher Education	5	10.6
Occupation		
Unemployed	37	78.7
Employed	10	21.3
Experience		
Less than 5 years	26	55.3
More than 5 years	21	44.7
Knowledge		
Poor	17	36.2
Fair	20	42.6
Good	10	21.3

The research findings show that the largest number of health cadres are in the age range of 20 to 40 years old. Most of them have a secondary education background and are not currently employed. Furthermore, the majority of cadres have less than 5 years of experience as health cadres, with their knowledge level mostly falling into the fair category.

Table 2 The relationship between age and the knowledge of health cadres regarding high-risk pregnancies

Age	Health Cadres' Knowledge About High-Risk Pregnancies								r_s	P value
	Poor		Fair		Good		Total			
	n	%	n	%	n	%	n	%		
Age < 25 years	1	33.3	1	33.3	1	33.3	3	100	0.403	0.005
Age 25-40 years	15	57.7	8	30.8	3	11.5	26	100		
Age > 40 years	1	5.6	1	61.1	6	33.3	18	100		

Based on the Spearman correlation test results, the significance value obtained for the age variable concerning high-risk pregnancy knowledge is 0.005, which is less than 0.05. This indicates a significant relationship between age and high-risk pregnancy knowledge. The correlation coefficient value is 0.403, which is positive and indicates a moderate relationship in the same direction.

Table 3 The relationship between education and the knowledge of health cadres regarding high-risk pregnancies

Education	Health Cadres' Knowledge About High-Risk Pregnancies								r_s	P value
	Poor		Fair		Good		Total			
	n	%	n	%	n	%	n	%		
Elementary Education	10	83.4	1	8.3	1	8.3	12	100	0.505	<0.001
Secondary Education	6	20.0	18	60.0	6	20.0	30	100		
Higher Education	1	20.0	1	20.0	3	60.0	5	100		

The significance value obtained for the education variable in relation to knowledge of high-risk pregnancies is < 0.001, indicating a significant relationship between education and the level of knowledge about high-risk pregnancies. The correlation coefficient value of 0.505 is positive and indicates a strong, positive relationship.

Table 4 The relationship between occupation and the knowledge of health cadres regarding high-risk pregnancies

Occupation	Health Cadres' Knowledge About High-Risk Pregnancies						P value
	Poor		Good		Total		
	n	%	n	%	n	%	
Unemployed	16	43.2	21	56.8	37	100	0.070
Employed	1	10.0	9	90.0	10	100	

Based on the results of the Fisher's Exact test, it can be concluded that the significance value is 0.07, which is greater than 0.05. This means there is no significant relationship between occupation and the level of knowledge about high-risk pregnancies.

Table 5 The relationship between experience and the knowledge of health cadres regarding high-risk pregnancies

Experience	Health Cadres' Knowledge About High-Risk Pregnancies								C	P value
	Poor		Fair		Good		Total			
	n	%	n	%	n	%	n	%		
Less than 5 years	14	53.8	9	34.7	3	11.5	26	100	0.391	0.014
More than 5 years	3	14.3	11	52.4	7	33.3	21	100		

From the table, it can be concluded that the significance value is 0.014 (< 0.05), which means there is a relationship between experience (length of time as a cadre) and knowledge of high-risk pregnancies. The Contingency Coefficient result is 0.391, indicating a weak level of relationship.

The analysis of the questionnaires from 47 health cadres at *Puskesmas* Simomulyo shows significant variation in the level of knowledge regarding high-risk pregnancies. Most health cadres (42.6%) are categorized as having "fair" knowledge in handling high-risk pregnancy cases. This underscores the need for improved training programs to enhance the understanding and awareness of cadres in managing high-risk pregnancy cases.

The majority of health cadre respondents at *Puskesmas* Simomulyo are aged 25-40 years, and there is a significant relationship between age and their knowledge of high-risk pregnancies. Previous studies also support this finding, indicating that as age increases, the knowledge of cadres tends to improve (6) (7) (8) .This is due to extensive life experience and more intensive exposure to health and pregnancy situations over the years of their health practice. Therefore, older health cadres have better knowledge about high-risk pregnancies compared to younger ones.

Most of the respondents at *Puskesmas* Simomulyo have a high school education background. Previous analyses found a significant correlation between education level and the knowledge of health cadres, consistent with findings from (7) (9) (10) (11). However, research by Suhartini and Ahmad (12) showed a lower proportion of knowledge among cadres with basic education. Other factors, such as work experience and access to information, also influence the level of knowledge. Further research is needed to understand more deeply the mechanisms by which education affects the knowledge of health cadres.

Data shows that most health cadres at *Puskesmas* Simomulyo in Surabaya are unemployed. The Chi-Square test with Fisher's Exact showed a significance value >0.05, indicating no significant relationship between occupation and the knowledge of cadres about high-risk pregnancies. This finding is consistent with previous studies, which also found no significant relationship between occupation and the knowledge level of health cadres (7) (8) (13).

In this study, experience refers to the duration someone has served as a health cadre, categorized into two criteria: less than 5 years and more than 5 years. Data indicates that the majority of cadres have less than 5 years of experience. Chi-

square analysis revealed a relationship between experience and cadre knowledge about high-risk pregnancies, showing that the longer the cadre's experience, the better their knowledge tends to be. Previous studies also support this finding, stating that the length of experience as a cadre influences their level of knowledge (13) (14) (15). Experience is defined as the observation and response to previous situations, stored in memory and accompanied by past expectations. Consequently, cadre knowledge develops along with their work experience.

According to the Regulation of the Minister of Health of the Republic of Indonesia No. 8 of 2019 (4) health cadres play a crucial role in empowering communities and improving public health. They mobilize community participation in health programs, promote *Upaya Kesehatan Bersumberdaya Masyarakat* (UKBM), and basic health services, and bridge the gap between the community and healthcare facilities. As health educators, cadres provide education on health issues, disease prevention, healthy lifestyles, and report health problems to the authorized health personnel. In accordance with the Mayor of Surabaya Regulation No. 14 of 2022 (5), the duties of the *Kader Surabaya Hebat* (KSH) include data collection through the "*Sayang Warga*" application, assistance at Integrated Guidance Posts, and Posyandu activities for toddlers. They also promote exclusive breastfeeding, Clean and Healthy Behavior, health protocols, vaccinations, as well as monitoring larvae, disease tracing, and waste sorting. KSH are involved in the development of *Bina Keluarga Balita* (BKB) and *Bina Keluarga Remaja* (BKR) groups, supporting family planning services, COVID-19 prevention, and publicizing government programs through social media.

Pregnant women need support from various parties, such as relatives, partners, friends, and community organizations, to maintain their mental health (16). Social support includes the subjective assessment of others' willingness to provide concrete help when needed. Types of social support include emotional support (listening and providing a sense of security), informational support (advice and guidance), esteem support (boosting the sense of competence), and tangible support (transportation or financial aid) (17). The role of health cadres is vital in providing education, motivation, and assistance to pregnant women from pregnancy to childbirth and postpartum, with the aim of improving the health of both mother and fetus.

High-risk pregnancy is a condition with significant potential complications for both mother and fetus. Obstetric complications account for more than 90% of maternal deaths, particularly in mothers with certain risk factors. About 15% of pregnancies are considered high-risk, requiring early detection for appropriate management (18). High-risk factors, known as the 4Ts, include mothers who are too young or too old, having many children, and having closely spaced pregnancies. These conditions can lead to anemia, prematurity, bleeding, miscarriage, and other serious complications (19). Local governments and communities strive to improve maternal and child health through education, early screening, maternal health services, exclusive breastfeeding facilities, and complete immunization (20).

According to Notoadmojo (2014), knowledge is the result of human perception or understanding of an object through the senses of sight, hearing, smell, taste, and touch. A person's ability to create knowledge is influenced by the intensity of attention and awareness of the object. This knowledge is primarily acquired through hearing and vision (21).

Factors influencing a person's knowledge include education, mass media, occupation, and age. Education enhances skills and personality, while mass media such as television and radio can change or increase knowledge. Jobs that involve interaction with others can also enhance knowledge through scientific reasoning. Although age can affect cognitive ability and thinking patterns, more life experience can enrich one's knowledge (22).

Health cadres are generally chosen by the community and directed to mobilize community participation. Age plays a role in job performance, where older individuals tend to be more responsible, organized, ethical, and meticulous. Educational status also influences understanding, with higher levels of education generally providing better acceptance and comprehension of information. Employment status impacts knowledge as workplace interactions allow for the exchange of knowledge, information, and experience. The experience of cadres can vary depending on the context, where involvement in new activities or training can increase knowledge. Theoretical knowledge gained from formal education can be more effectively applied through practical experience, enabling cadres with strong theoretical knowledge to apply their knowledge well in real situations (23).

This study has several limitations, such as not analyzing all factors that influence the knowledge of health cadres, resulting in less comprehensive conclusions. The causal relationship between the factors studied and the knowledge of health cadres is not adequately explained. The results of the study are difficult to generalize to cadres outside the city of Surabaya due to different working conditions and access to training. It is also important to note that health cadres in Surabaya, especially KSH, receive a relatively high salary compared to cadres in other cities, affecting their motivation and interest in learning. Further research is needed to consider broader factors and use other methods such as in-depth interviews or focus group discussions for a more comprehensive understanding.

4. Conclusion

The majority of health cadres at *Puskesmas* Simomulyo are between 25 and 40 years old, have a secondary education level, are not employed, and have less than five years of experience as health cadres. Most of them have adequate knowledge about high-risk pregnancies. Factors influencing the cadres' knowledge include age, education, and experience (length of service as a cadre), all of which have significant relationships. Conversely, the employment factor does not significantly affect the cadres' knowledge. Additionally, other factors such as incentives or salaries and training facilities may also influence the cadres' knowledge, as these factors can increase the interest and motivation of health cadres in learning and improving their knowledge.

Public Health Center needs to consider various factors related to the health cadres' knowledge when selecting suitable cadres and enhancing their commitment. Variables such as social, economic, cultural factors, Public Health Center policies, and access to information are crucial to consider. This is because the knowledge of health cadres plays a vital role in reducing maternal and infant mortality rates. Therefore, the selection process of cadres should take into account the factors that influence their knowledge. The results of this study should be disseminated to relevant parties to broaden the cadres' knowledge about high-risk pregnancies. This is important so that cadres can perform their roles more effectively and make a greater contribution to public health.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there are no conflicts of interest regarding this study. All authors have contributed to, reviewed, and approved the final manuscript for publication.

Author Contributions

Every author was actively involved in the processes of data collection, screening, and analysis, ensuring a thorough and detailed evaluation of the research findings. All authors have approved the final version of the manuscript, collectively ensuring its accuracy and integrity. They have agreed to the published version, thereby upholding rigorous academic standards and ensuring the work's credibility and reliability.

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Statement of informed consent

Informed consent was obtained from all individual participants involved in the study.

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