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# Factor associated with knowledge of pregnancy danger signs at Trawas Health Center, Mojokerto

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## Abstract

**Background**: The maternal mortality rate in Indonesia remains high and is an unresolved issue to this day. One of the contributing factors is the delay in decisionmaking, often due to a lack of awareness about danger signs that require immediate attention. Recognizing danger signs in pregnancy makes mothers 3.47 times more likely to utilize ANC (Antenatal Care) services, which helps reduce maternal and neonatal mortality rates. The objective of this study is to analyze the factors associated with the knowledge of pregnant women at Trawas Health Center, Mojokerto.

**Method**: The design of this study is a cross-sectional design with an observational analysis approach, involving a population of 328 pregnant women and a sample of 110 pregnant women. Non-probability sampling, specifically quota sampling using a set quota amount. The study was conducted from July to August 2024 at Trawas Health Center in Mojokerto, utilizing primary data collected through a questionnaire for pregnant women. Data were analyzed using chi-square and Spearman tests to examine the relationships between variables.

**Result**: The results of the study, through chi-square, fisher extract test and Spearman tests, showed that age (p = 0.006), education (p = 0.047), and ANC visits (p = 0.049) are related to the level of knowledge about pregnancy danger signs. Meanwhile, occupation (p = 0.344), obstetric history (p = 0.449), and sources of information (p = 0.642) have no relations with the level of knowledge about pregnancy danger signs.

**Conclusion**: Based on the research findings, it was concluded that age, education level, and ANC visits are associated with the level of knowledge about pregnancy danger**.**

**Keyword:** Maternal Mortality; Pregnancy; Pregnancy Complication; Knowlodge; Pregnancy Danger Signs

## 1. Introduction

The results of the Long Form SP2020 show that the Maternal Mortality Rate in Indonesia is 189, meaning there are 189 maternal deaths during pregnancy, childbirth, or the postpartum period per 100,000 live births (6). The factors causing the high maternal mortality rate are divided into two: direct and indirect factors. The direct factors related to maternal death in Indonesia are still dominated by the health condition during pregnancy and childbirth, while the indirect causes are influenced by the “4T” or four conditions, which make it a problem that is difficult to resolve thoroughly, as well as the "3T" or three delays, namely delay in decision-making, delay in referral to healthcare facilities, and delay in receiving treatment from health personnel (7). Delays in decision-making and referring the mother to a referral hospital also occur due to a lack of knowledge regarding danger signs that require immediate attention. Danger signs should not only be understood by the mother but also by family members, especially the main decision-makers. The results of this study are in line with previous studies that stated that the responsibility for decision-making is often carried out by relatives

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or family members (24). Recognizing danger signs of pregnancy makes the mother 3.47 times more likely to utilize ANC (Antenatal Care) and reduce maternal and newborn mortality (21). The level of knowledge about danger signs in mothers can also be influenced by several other factors, such as the low education level of the mother. Mothers with lower education levels tend to feel powerless, while women with higher education have more opportunities to identify pregnancy danger signs. Older age groups also have a better chance of recognizing pregnancy danger signs compared to the 15-19 age group. This younger age group tends to have less experience, while older age groups have more conservative views. Employment is also one of the factors that influence the mother's knowledge of pregnancy danger signs. This is because employment can affect the level of exposure to information and the free time available to access health education (28). One way to recognize these danger signs is through communication, information, and education regarding pregnancy danger signs. Early recognition of danger signs will result in quicker handling, preventing more severe damage or danger. This can happen if the pregnant mother has good knowledge about pregnancy danger signs, so she can take a positive attitude in seeking healthcare services to receive assistance (9).

## 2. Material and methods

The study is an s an observational analytic study with a cross-sectional design. The minimum sample size was calculated using the Lemeshow formula, resulting in 110 respondents. Data collection was conducted from July to August 2024. The data were gathered using a questionnaire consisting of respondent characteristics and a knowledge questionnaire on pregnancy danger signs. The total sample that met the inclusion criteria was 110 pregnant women in the working area of the Trawas Community Health Center. Data analysis was performed using the Chi-Square test, Fisher's exact test, and Spearman's Rho correlation test.

## 3. Results and discussion

### 3.1. Overview of Characteristics of Pregnant Woman

**Tabel 1** Frequency Distribution of Factor Associated with Knowloedge of Pregnancy Denger Signs

| Characteristic | Case | Presentation% |
|---|---|---|
| Maternal Age | | |
| 20-35 years old | 90 | 81.8% |
| <20-≥ 35 year old | 20 | 18.2% |
| Education Level | | |
| Primary education | 16 | 11.8% |
| Secondary education | 63 | 57.3% |
| Higher education | 34 | 30.9% |
| Occupation | | |
| Employed | 35 | 31.8% |
| Unemployed | 75 | 68.2% |
| Obstetric History | | |
| Good obstetric history | 95 | 86.4% |
| Poor obstetric history | 15 | 13.6% |
| Antenatal Care Visit | | |
| Compliant | 99 | 86.4% |
| Non- compliant | 11 | 13.6% |
| Source of Information | | |
| Healthcare providers | 90 | 81.8% |

| | | |
|---|---|---|
| Social Media | 19 | 17.3% |
| Family | 1 | 0.9% |
| Level of Knowledge | | |
| High | 32 | 29.1% |
| Moderate | 24 | 21.8% |
| Low | 54 | 49.1% |
| Total | 110 | 100.00 |

Based on Table 1, it is known that the majority of pregnant women who undergo examinations at the Trawas Health Center are aged 24-35 years, accounting for 81.8%, have secondary education, totaling 57.3%, are unemployed, 68.2%, the majority have high obstetric risk, 13.6%, ANC visits that meet the standards amount to 90%, the majority receive information about pregnancy danger signs from health workers, 81.8%, and have high knowledge regarding pregnancy danger signs, accounting for 49.1%

### 3.2. The relationship between maternal age and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

**Table 2** Chi-square test of the relationship between maternal age and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

| **Maternal Age** | **Knowledge Categories** | | | | | | | | ***P Value*** |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | Moderate | | High | | Total | | |
| | F | % | F | % | F | % | N | % | |
| At risk | 10 | 50.0 | 3 | 15.0 | 7 | 35.0 | 20 | 100.0 | 0.006 |
| Non at risk | 14 | 15.6 | 22 | 24.4 | 54 | 60.0 | 90 | 100.0 | |
| Total | 24 | 21.8 | 25 | 22,70 | 61 | 55.5 | 110 | 100.0 | |

Of the 110 pregnant women sampled, 90 (81.8%) were in the non-risk age group for pregnancy, while the remaining 20 (18.2%) were in the at-risk age group. Based on the statistical test results of this study, it was found that maternal age is associated with knowledge about pregnancy danger signs, with a p-value of 0.006. This indicates a moderate relationship between maternal age and the level of knowledge about pregnancy danger signs.

Maternal age can influence knowledge levels because, as age increases, cognitive abilities and thought processes also improve, leading to better knowledge acquisition. Healthy reproductive age typically occurs between 20-35 years, which is considered the optimal age for pregnancy. During this age, pregnancy is deemed safer, as pregnant women are more capable of understanding and internalizing information about pregnancy dangers (5).

These findings are supported by a study conducted by Vivi at TPMB Sumidyah Ipung in Malang in 2018, which showed a significant relationship between maternal age and knowledge levels about pregnancy danger signs (Vivi et al., 2018). Additionally, a study by Nabil Hajar in the working area of Bandarharjo Health Center, Semarang, in 2023 also found that age significantly influences knowledge about pregnancy danger signs. This study revealed that women aged <20 years and >35 years predominantly have good knowledge (34).

### 3.3. The relationship between maternal education level and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

This study involved 110 samples, of which 16 (11.8%) were mothers with primary education, 63 (57.3%) were mothers with secondary education, and 35 (30.9%) were mothers with higher education. Based on the statistical test results, it was found that the education variable is related to the level of knowledge about pregnancy danger signs, with an RS p-value of 0.047, which is <0.05. Although the analysis showed a weak relationship, it still indicates a significant association between maternal education level and knowledge about pregnancy danger signs.

**Table 3** Spearman's Rho test of the relationship between maternal education level and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

| **Education Level** | **Knowledge categories** | | | | | | | | ***SR (P Value)*** |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | Moderate | | High | | Total | | |
| | F | % | F | % | F | % | N | % | |
| Primary education | 8 | 61.5 | 1 | 7.6 | 4 | 30.7 | 13 | 100.0 | 0.047 |
| Secondary education | 19 | 30.1 | 12 | 19.0 | 32 | 50.7 | 63 | 100.0 | |
| Higher education | 5 | 14.7 | 11 | 32.3 | 18 | 52.9 | 34 | 100.0 | |
| Total | 32 | 24.5 | 24 | 21.8 | | 55.5 | 110 | 100.0 | |

This result is attributed to the fact that the higher the mother's education level, the better her knowledge of pregnancy danger signs. This is because individuals with higher education tend to have critical thinking skills and can analyze information more effectively. They not only receive information but also understand and apply it. This finding aligns with previous research suggesting that one of the factors influencing a person's ability to process information is their education level, as broader perspectives and thought processes are influenced by one's level of education (31). These results are also supported by research conducted by Wulandari, 2020, which found that education affects knowledge about pregnancy danger signs. Women with higher education levels have more opportunities to identify pregnancy danger signs. This study also highlighted similar findings from studies in Papua New Guinea, Ethiopia, and Tanzania, which found that women with secondary education had better chances of knowing pregnancy danger signs compared to women without education or with only primary education (31).

### 3.4. The relationship between maternal occupation and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

**Table 4** Chi-square test of the relationship between maternal occupation and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

| **Occupation** | **Knowledge Categorues** | | | | | | | | **P Value** |
|---|---|---|---|---|---|---|---|---|---|
| | **Low** | | **Moderate** | | **High** | | **Total** | | |
| | **F** | **%** | **F** | **%** | **F** | **%** | **N** | **%** | |
| Unemployed | 19 | 25.3 | 15 | 20.0 | 41 | 54.7 | 75 | 100.0 | 0.344 |
| Employed | 5 | 14.3 | 10 | 28.6 | 29 | 57.1 | 35 | 100.0 | |
| Total | 24 | 21.8 | 25 | 22.7 | 61 | 55.5 | 110 | 100.0 | |

This study involved 110 samples, of which 75 (68.2%) were unemployed mothers and 35 (31.8%) were employed mothers. Based on the statistical test results, the employment variable showed a p-value of 0.344, indicating no significant relationship between maternal employment and knowledge level about pregnancy danger signs.

This outcome may be attributed to the fact that both employed and unemployed mothers might have equal access to information, such as from healthcare providers, resulting in no discernible difference between the two groups. Employed mothers often manage their time effectively, enabling them to seek information sources despite their busy schedules. Meanwhile, unemployed mothers may have more time to search for and comprehend the information they receive.

These findings align with the theory proposed by Brekman and Kawaci, 2000, which states that socioeconomic conditions, including employment, can influence health outcomes. However, their impact on health knowledge is often more significantly determined by education and access to information rather than employment status alone (33).

### 3.5. The relationship between obstetric history and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

**Table 5** Chi-square test of the relationship between obstetric history and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

| Obstetric history | Knowledge Categories | | | | | | | | *P Value* |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | Moderate | | High | | Total | | |
| | F | % | F | % | F | % | N | % | |
| Good | 19 | 20.0 | 23 | 24.2 | 53 | 55.8 | 95 | 100.0 | 0.449 |
| Poor | 5 | 33.3 | 2 | 13.3 | 8 | 53.3 | 15 | 100.0 | |
| Total | 24 | 21.8 | 25 | 22.7 | 61 | 55.5 | 110 | 100.0 | |

This study involved 110 participants, of whom 95 (86.4%) were pregnant women with a good obstetric history, and 15 (13.6%) had a poor obstetric history. Statistical analysis of the relationship between obstetric history and knowledge of pregnancy danger signs revealed no significant association, with a p-value of 0.449.

This finding suggests that a mother's previous experiences do not always equate to a deeper understanding of pregnancy danger signs. Differences in the sources of information accessed by mothers may also make prior obstetric experiences less relevant. Consequently, having a specific obstetric history does not guarantee a better or worse level of knowledge about pregnancy danger signs. The lack of a significant relationship between obstetric history and knowledge may also be attributed to the influence of health education access and antenatal care (ANC) services rather than previous pregnancy experiences. For instance, mothers who frequently receive counseling or information from healthcare providers during ANC visits tend to have better knowledge, regardless of whether they have a poor obstetric history. A poor obstetric history does not necessarily provide mothers with sufficient information to recognize danger signs. Personal experiences alone may be inadequate for enhancing knowledge about unencountered risks, particularly if healthcare facilities fail to provide comprehensive explanations about danger signs to be aware of in subsequent pregnancies.

This study aligns with findings from research conducted in antenatal clinics and a national referral hospital in Thimpu, Bhutan, which demonstrated that obstetric history does not always have a direct correlation with knowledge levels. For example, some women with poor obstetric histories, such as stillbirths, did not necessarily have higher levels of knowledge about pregnancy danger signs (28).

### 3.6. The relationship between antenatal care visits and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

**Table 6** Chi-square test of the relationship between antenatal care visits and the level of knowledge about pregnancy danger signs at the Trawas Health Center, Mojokerto

| Antenatal care visit | Knowledge categories | | | | | | | | *P Value* |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | Moderate | | High | | Total | | |
| | F | % | F | % | F | % | N | ~~%~~ | |
| Compliant | 21 | 21.2 | 22 | 22.2 | 5 | 56.6 | 99 | 100.0 | 0.049 |
| Non- compliant | 6 | 54.5 | 2 | 18.2 | 3 | 27.3 | 11 | 100.0 | |
| Total | 27 | 24.5 | 24 | 21.8 | 59 | 53.6 | 110 | 100.0 | |

This study involved 110 participants, of whom 99 (90.0%) were pregnant women with a number of ANC visits appropriate for their gestational age, and 11 (10.0%) had fewer visits than recommended for their gestational age. Statistical analysis regarding the relationship between the frequency of ANC visits and knowledge of pregnancy danger signs revealed a significant relationship, with a p-value of 0.049, although the strength of the relationship was weak. Nevertheless, the findings indicate that pregnant women who regularly attend ANC visits according to their gestational age tend to have better knowledge of pregnancy danger signs. Adhering to the standard frequency of ANC visits allows

mothers to receive comprehensive information about their pregnancies. Regular ANC visits also facilitate better pregnancy monitoring.

These results align with a study conducted by Assaf (2018), which highlighted the importance of counseling during ANC visits to raise awareness of pregnancy danger signs. However, the improvement in knowledge among mothers attending ANC visits is not solely dependent on the frequency of counseling but also on its effectiveness and the extent to which the information communicated by healthcare providers is easily understood and remembered by pregnant women (3).

### 3.7. The relationship between sources of information and the level of knowledge about danger signs in pregnancy at Trawas Community Health Center, Mojokerto

**Table 7** Spearman's Rho Test: The Relationship Between Maternal Sources of Information and Knowledge Level of Danger Signs in Pregnancy at Trawas Community Health Center, Mojokerto

| Sumber Informasi | Knowledge Categories | | | | | | | | *P Value* |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | Moderate | | High | | Total | | |
| | F | % | F | % | F | % | N | % | |
| Healthcare providers | 27 | 30.0 | 19 | 21.1 | 44 | 48.9 | 90 | 100.0 | 0.642 |
| Social Media | 4 | 21.1 | 5 | 26.3 | 10 | 52.6 | 19 | 100.0 | |
| Family | 1 | 100.0 | 0 | 0.0 | 0 | 0.0 | 1 | 100.0 | |
| Total | 32 | 29.1 | 24 | 21.8 | 54 | 49.1 | 110 | 100.0 | |

This study involved 110 samples, of which 90 (81.8%) received information about pregnancy danger signs from healthcare providers, 10 (17.3%) obtained information from social media, and 1 (0.9%) sourced information from family members. Based on the analysis results, the variable "source of information" showed no significant relationship with the knowledge level of pregnancy danger signs (p-value = 0.642).

This is because merely accessing similar sources of information does not necessarily guarantee proper understanding, making it challenging to comprehend and retain the information. Social media as a source also requires verification since its information may not always be accurate.

These findings align with research conducted by Elena 2022, which highlights that even when individuals seek health information from various sources, including social media, it does not always lead to increased knowledge or improved health behaviors. The study underscores the inconsistency in individuals' ability to filter the quality of the information received. This indicates that the source of information alone does not ensure an improvement in health knowledge (10)

## 4. Conclusion

Based on the results and discussion of the study on factors influencing pregnant women's knowledge of pregnancy danger signs at Trawas Community Health Center, Mojokerto, during the period of July–August 2024, it can be concluded that there is a relationship between age, education level, and antenatal care visits with the knowledge level of pregnancy danger signs. Conversely, there is no significant relationship between occupation, obstetric history, and sources of information with pregnant women's knowledge of pregnancy danger signs

## 5. Compliance with ethical standards

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*Disclosure of Conflict of interest*

There is no conflict of interest in this study.

*Statement of ethical approval*

This study implemented the principle of Helsinki Declaration and has received an ethical certificate from Health Research Ethics Committee of Airlangga University. The Mojokerto District Health Office has issued an approval letter for the implementation of the study, and the letter has been submitted to the Trawas Community Health Center

*Statement of informed consent*

Informed consent as obtained from all individual participants included in the study.

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