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## Determinants of Maternal Mortality Prevention by Midwives in Sleman Regency in 2023

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### Abstract

The Maternal Mortality Rate serves as a gauge of maternal health quality and can also assess the level of public health, due to its sensitivity to improvements in healthcare services, both in terms of accessibility and quality. Research to find out the determinants, efforts and obstacles to preventing maternal death by midwives in Sleman Regency in 2023. This research method uses mixed methods with a sequential explanatory approach. Quantitative analysis used Chi Square bivariate analysis. The results of the study found that the factors related to the prevention of maternal death by midwives in Sleman Regency were length of work and competence. An overview of efforts to prevent maternal death by midwives in Sleman Regency, namely by carrying out ANC, keeping records, making referrals when needed, providing KIE and participating in training to upgrade knowledge, competencies and skills supported by regulations related to pregnant women's health and an innovation program called "Totality of Besti". This research can be utilized to enhance maternal health services in Sleman Regency by improving and updating the experiences and competencies of midwives through regular training. It requires collaboration among the health department, midwives, and pregnant women to prevent maternal mortality

**Keywords:** Determinants, Prevention of Maternal Mortality, Midwives, Sleman Regency.

### Introduction

The Maternal Mortality Rate (MMR) is a measure of public health status, because of its sensitivity to improving health services, both in terms of accessibility and quality (Ministry of Health RI, 2021). Based on World Bank data (2021), the Maternal Mortality Rate (MMR) worldwide in 2017 is estimated at 217/100,000 live births and the Infant Mortality Rate (IMR) is 28.2/1,000 live births. In the ASEAN region, Indonesia is in the 2nd position with the highest MMR after Laos, namely 357/100,000 live births (ASEAN Secretariat, 2020). Furthermore, based on data from the ASEAN SDGs, (2022), the ratio of maternal deaths in ASEAN has only decreased slightly, from 202.8 per 100,000 live births in 2016 to 199.8 in 2020. Singapore and Thailand, on the other hand, an increase in MMR occurred in Brunei Darussalam and Myanmar in 2020 compared to 2016, Indonesia, the Philippines and Vietnam cannot be ascertained due to data constraints (ASEAN Secretariat, 2022).

Maternal mortality has diverse impacts on families, affecting not only the husband as the head of

the household but also the surviving children. Support for mental health and financial stability for families following maternal death is crucial (Lawrence, et al., 2022). Additionally, women play vital social, economic, and productive roles in various economies. Maternal mortality is known to have negative impacts on inclusive growth and economic development (Matthew et al., 2019). The maternal mortality rate significantly weakens the socio-economic development of a country as it reflects a poor healthcare system, stemming from weak social structures (Olonade et al., 2019).

Among the causes of maternal mortality are internal and external factors such as maternal characteristics, maternal health factors, reproductive status, access to services. The factor of health workers is one of the factors that indirectly causes maternal death if they are unable to provide proper delivery services and management. The ability to communicate is the key to success in building public trust in midwives (Ministry of Health, 2009).

Several complaints were obtained during the maternity services. Mirzania stated that some respondents experienced abuse in childbirth such as



yelling, applying pressure to the fundus, and slapping their thighs during childbirth (Mirzania et al., 2022). Negative attitudes and behavior of health workers usually involve harassment, rudeness such as ignoring or mocking patients, or neglect (Mannava et al., 2015). The behavior of birth attendants in providing services can be caused by several factors such as demographic factors and psychological factors.

Factors of age and work experience are related to participants' knowledge, attitudes, and practices regarding maltreatment in childbirth (Mirzania et al., 2022). Coal's research in 2021 found that there was a relationship between the level of length of work ( $p = 0.039$ ) and motivation ( $p = 0.000$ ) and prevention of infection during childbirth (Batubara, 2021). Desiana & Saputra's 2020 research shows that the factors that influence the performance of medical personnel are competence (Desiana & Saputra, 2020). The findings of Putri & Emi's 2020 research show that work competence influences the performance of health workers, but the motivational variable partially does not have a significant effect on performance (Putri & Emi, 2020).

Many ways have been carried out by the government in reducing MMR and IMR, the efforts that have been made include integrated antenatal care services, maternal health services during the postpartum period, health services for mothers in childbirth, conducting classes for pregnant women, the P4K program or the birth planning program, and Complication Prevention, and Maternal and Child Health (MCH) books. The MCH handbook is a guide to information and health records during pregnancy, childbirth and up to 6 years of age. The contents of the book are very important for monitoring health and recording abnormalities in mothers and children. Each pregnant woman will receive one book for a single pregnancy, if a mother is pregnant with twins, she will receive one additional book. Prospective mothers can get this book from the health center, midwife, or hospital where they consult during pregnancy (Effendi et al., 2020). In accordance with the Decree of the Minister of Health Number 284/Menkes/SK 2004, it states that the MCH handbook is the only instrument for recording and providing services for maternal and child health that is used to monitor and identify risk factors for emergencies and failures in the growth and development of infants (Ministry of Health RI, 2020a).

Based on data recorded in the profile of the DIY Provincial Health Office in 2022, it is known that the total maternal mortality rate in 2020 was reported at 337.07 per 100,000 live births, while in 2021 the maternal mortality rate in DIY increased by 339.19 per

100,000 live births. The number of maternal deaths in Sleman Regency was 45 cases with an MMR of 363.40 per 100,000 live births, this shows that maternal mortality has increased compared to 2020, namely 8 cases of death with an MMR of 62.17 per 100,000 live births (Sleman Health Office, 2022).

Data for August 2022 at the DIY Health Office, it is known that the number of pregnant women in the Province of the Special Region of Yogyakarta in 2021 is 44,425 pregnant women, with the following details, Kulon Progo has 5,102 pregnant women, Bantul has 13,661 pregnant women, Gunung Kidul has 7,790 pregnant women, Sleman as many as 14,719 pregnant women and Yogya City as many as 3,153 pregnant women. From these data it is known that the highest number of pregnant women is in Sleman Regency, with a total of 14,719 pregnant women (Sleman Health Office, 2022). In accordance with the Sleman Regency Health Profile data for 2021, it is known that there were 12,381 deliveries with details of 5,410 deliveries assisted by obstetricians, 1,162 deliveries assisted by general practitioners, and 5,814 deliveries assisted by midwives. It is known from the data that most deliveries are assisted by midwives.

The high target of pregnant women requires special attention to avoid maternal mortality. A study by Nisa et al (2019) found that midwives had a poor performance of 46.4%. At the time of the antenatal examination, there were some midwives who had not carried out a complete physical examination from head to toe. Midwives only do things that are very important according to the 10T standard (Nisa et al., 2019). Another study by Hikma et al. It is also known that the self-preparation of midwives who do not use aprons to prevent infection is 28.6%, midwives who do not remove jewelry before washing their hands are 23.0%, midwives who do not dispose of trash in its place are 54.7%. Midwives who do not help pregnant women to adjust to a comfortable position, the opening is complete and the condition of the fetus is good as much as 47.7%, midwives who do not recommend a comfortable position for pregnant women, if the pregnant woman does not want to push in 60 minutes as much as 30% (Hikma et al., 2014). Based on the previous research studies above, it is known that there are still midwives who do not provide services to mothers giving birth. While the results of previous research also found that there was a variable gap that affected delivery attendants in providing services. Based on this background, the researchers were interested in conducting research on "Determinants of maternal death prevention by midwives in Sleman Regency in 2023".



**Methods**

The method in this study is mixed methods, which combines quantitative and qualitative research but is more dominantly quantitative. The research design is sequential explanatory. This research was conducted in the Sleman Regency area starting in October 2022 using questionnaires, interviews, observations and documentation.

The population in this study were all midwives in Sleman Regency as many as 250 people spread across 4 Branches of the IBI Branch of Sleman Regency. The samples involved represented the 4 Branches of the Sleman IBI Branch, where each branch consisted of 5 to 6 Kapanewon, so 17 Kapanewon Regions in Sleman Regency was fully represented, with a total of 250 midwife. The minimum number of quantitative samples in this study was 72 midwives. The sampling technique in this study used cluster random sampling and obtained a sample of 77 midwives. The research informants used to carry out qualitative analysis included the Head of the Health Service, the Head of the Sleman Branch of IBI and 2 Sleman Branch IBI administrators with the criteria of having worked for more than 10 years, D-IV education. Additional informants in this study were 3 mothers giving birth. The sampling technique in qualitative research uses a purposive sampling technique, which is based on the considerations that the researcher made.

**Results**

**Table 1.** Characteristics of midwives

Characteristics	Frequency (n)	Percentage (%)
<b>Age</b>		
<30 Years	1	1,3
31-40 Years	19	24,7
41-50 Years	34	44,2
51-60 Years	21	27,3
> 60 Years	2	2,6
<b>Length of Work</b>		
<10 years	3	3,9
>10 years	74	96,1
<b>Competence</b>		

**Table 3.** Research informants

No	Informant Code	Age	Last education	Information
1.	KD	56	Doctor-S2	Head of Sleman Health Service
2.	B1	39	D-IV Midwife Educator	Midwife (Chair of IBI)
3.	B2	43	D-IV (SI)	Midwife (Management of IBI Branch Sleman)
4.	B3	38	D-IV (SI)	Midwife Management IBI

Characteristics	Frequency (n)	Percentage (%)
Not good	26	33,8
Good	51	66,2
<b>Integrity</b>		
Not good	35	45,5
Good	42	54,5
<b>Prevention of Death by Midwives</b>		
Not good	23	29,9
Good	54	70,1

Analysis of factors related to the prevention of maternal death by midwives in Sleman Regency in this study used Chi-Square analysis using the Statistical Product and Service Solutions (SPSS) data analysis tool. The factors studied are factors of length of work, competence and integrity. The results of the analysis are described in table 6 and table 7.

**Table 2.** Logistic Regression Analysis of Factors Associated with Prevention of Maternal Mortality by Midwives in Sleman Regency

Variable	Wald	P-value	R -Square
Length of work	0,000	0,999	0,163
Competence	6,002	0,000	

Based on Table 9, competency is the factor most related to the prevention of maternal death in Sleman Regency (P=0.000).

**Qualitative Research**

Overview of Research Informants

The research informants consisted of the Head of the Sleman Health Office, the Chairperson of the Sleman Branch of IBI, 2 administrators of the Sleman Branch of IBI, and 3 mothers giving birth. The following is an overview of research informants which can be seen in Table .





No	Informant Code	Age	Last education	Information
5.	I1	28	high school	Branch Sleman)
6.	I2	32	high school	Maternity mother
7.	I3	27	high school	Maternity mother

An overview of efforts to prevent maternal deaths by midwives

conducted interviews with the head of the service and 3 midwives, in this case the Head of the IBI Sleman Branch, as well as two IBI administrators, which are summarized in the following table.

The results of the interviews in this study focused on efforts to prevent maternal death by midwives who

**Table 4.** Interview Results on Maternal Death Prevention Efforts by Midwives

Informant	Interview result	Conclusion
KD	The participation of government officials is quite committed, as evidenced by the existence of regulations related to the Health of Pregnant Women, including: <ol style="list-style-type: none"> <li>1. The government has issued a Regent's Regulation on the Use of Maternal and Child Health Information Systems and the Use of the MCH Handbook where all health facilities are required to record and report.</li> <li>2. Issuing SE concerning the Implementation of Maternal and Neonatal Referral Guidelines</li> <li>3. Issuing SK regarding PONEK Hospital and PONEK Health Center</li> <li>4. Decree on the MCH Clinical Team in Sleman Regency</li> </ol>	It is in accordance with issuing government regulations, decrees and circulars by the Sleman health office
B1	<ol style="list-style-type: none"> <li>1. Midwives who provide delivery assistance are required to have a certificate of attending the Midwifery Update (MU) Training and Normal Childbirth Care (APN) which is valid every 5 years</li> <li>2. Delivery assistance by a midwife must be carried out with at least 4 hands (2 midwives) in accordance with PMK No 36 of 2019.</li> <li>3. Midwives who open licenses for independent practice or who provide delivery services are required to take the midwifery professional education level (D-IV), while midwives with D-III education may only become assistant midwives</li> </ol>	It is in accordance with the improvement of competence and skills of midwives both through formal and non-formal education
B2	Conduct early pregnancy screening, conduct prenatal check-ups according to SOP, provide as complete examination facilities as possible for PMB level, carry out CIE during pregnancy and prepare for delivery with the help of the MCH book	It is in accordance with the implementation of Integrated ANC services
B3	<ol style="list-style-type: none"> <li>1. Provide counseling</li> <li>2. Perform ANC according to standards, namely integrated ANC</li> <li>3. Conducting classes for pregnant women</li> </ol>	
KD	There is an innovation with the name "Totality Besti" namely Please Handle and facilitate Pregnant Women and Toddlers from High Risk. This innovation is an integrated and sustainable program that optimizes the role of stakeholders in accompanying pregnant women so that they do not die There are regulations governing Maternal and Neonatal	There is an innovation "ToTality Besti" to optimize the role of stakeholders in accompanying pregnant women



Informant	Interview result	Conclusion
KD	<p>Referrals which are used as a guide by both health facilities and BPJS</p> <ol style="list-style-type: none"> <li>1. The government provides ultrasound in all health centers,</li> <li>2. Provide a Maternal Neonatal Referral Manual</li> <li>3. Providing MCH Handbooks for all Pregnant Women who live in Sleman</li> <li>4. Providing SES Cars (Sleman Emergency Service)</li> <li>5. Complete the facilities and infrastructure of the PONED Health Center and the PONEK Hospital according to PMK</li> </ol>	Complete and available infrastructure facilities in preventing maternal death

Efforts to prevent maternal death need to be carried out primarily by midwives as birth attendants. One of the things that needs to be done by midwives is to carry out an ANC examination. The results of the interviews revealed that the implementation of ANC examinations was carried out by midwives by conducting ANC 10 T on pregnant women in accordance with the results of the interviews contained in Table 11. What is no less important for a midwife is to record on the mother's card, mother's cohort and MCH book. The results of the research interviews also revealed that the quantity of midwives was sufficient and the infrastructure needed to be provided for both patients and government officials.

*"It's quite a lot because Sleman has quite a lot of human resources, but the quality of human resources is still questionable, because it's possible that many health workers don't update their skills." (KD)*

*"Ambulance to be referred to the hospital." (I1)*

*"A well-equipped delivery room and helpful midwife." (I3)*

*"To prevent maternal death, the government provides ultrasound in all health centers, provides Maternal and Neonatal Referral Handbooks, provides MCH Handbooks for all Pregnant Women who live in Sleman, provides SES (Sleman Emergency Service) cars, completes the facilities and infrastructure of the PONED Health Centers and the PONEK Hospital in accordance with PMK" (KD)*

Obstacles put forward by midwife informants in this study were related to the BPJS system. BPJS claims are not in accordance with the actions that have been taken, BPJS payments are often delayed, and also often have difficulty referring to hospitals due to financing constraints. Another obstacle is related to the attitude of the family who are sometimes unwilling to be referred when complications occur. Obstacles for birth attendants in preventing maternal deaths, according to birth mothers, are the lack of delivery

facilities. The following are the results of the interview.

*"Lack of facilities if there is an emergency to be referred." (I1)*

From the interview above, it can be concluded that the inhibiting factors for preventing maternal death are the BPJS system that is not optimal, family negative attitudes, education is not optimal, system integration is not optimal, mobilization is high, there is no hospital follow-up in identifying risk factors, and awareness regarding causes of death still not enough.

## Discussion

### Factors Associated with the Prevention of Maternal Mortality by Midwives in Sleman District.

The results of the data analysis revealed that there was a relationship between working duration and the prevention of maternal death by midwives. The longer the midwife works, the better the prevention of maternal death by the midwife. This is in line with research on variables related to the performance of midwives, one of which is length of service ( $p = 0.045$ ,  $OR = 5.833$ ) (Yamita, 2020). In another study, it was found that there was a relationship between the length of work of midwives and the completeness of mother's card documentation ( $p=0.03$ ) (Fitriyani et al., 2019). The average length of service for midwives who have been working for more than 10 years has the best performance. The existence of this working period indicates that midwives are more skilled and competent in providing antenatal care services. In addition, because the longer the work period of a midwife, the more experience she gains in completing her work so that it can improve the performance of midwives in antenatal care services (Violinansa et al., 2021).

This study also shows that if the working period is less than 10 years, the prevention of maternal death by midwives is in the unfavorable category (17.4%). In line with Rahmadhani's research regarding the analysis of midwife tenure and performance, it shows that



72.7% of midwives with a working period of 1-9 years have low performance (Rahmadhani, 2021). Likewise, previous studies found that the working period of midwives is vulnerable to 1-9 years, there are as many as 14.0% of midwives with poor performance. There are several factors that influence this, namely midwives who have just worked have not been able to adapt to the work environment, pressure at work is also a factor that can trigger the low performance of midwives who have just worked. Therefore, new midwives are expected to be able to socialize and continue to learn from coordinating midwives (Simanjuntak et al., 2022).

Experience that is more than sufficient during the period of work in administering the MCH program, can be seen from sufficient understanding of the community's situation, gaining the trust of the community and being able to solve the problems encountered. In accordance with one of the functions of village midwives is to improve MCH services, they are required to be able to mobilize the community to participate in health by socializing with the community where they work (Munthe et al., 2021).

#### **The relationship between competency factors and the prevention of maternal death by midwives in Sleman Regency**

The results of the data analysis show that there is a relationship between competence and the prevention of maternal death by midwives. The better the competence of midwives, the better the prevention of maternal death. The results of previous research found that there was a significant relationship between the competence of midwives and the safety of mothers giving birth ( $p=0.004$ ) (Fianasih & Triyono, 2023). Likewise, other studies have shown that the competence of midwives has a significant effect on performance, meaning that the higher the competence of midwives, the higher their performance (Suswati, 2020).

The competence of midwives has a positive effect on the performance of midwives, this is because competence is the main criterion for determining employee work and for achieving success at work. Midwives who have good competence, then midwives have good knowledge, skills and attitudes. This affects performance in providing services. If one of the competency components is not well mastered, then the work or performance of the midwife is unsatisfactory, which will have an impact on hampering the achievement of maternal and child health programs (Ningsih & Wintarsih, 2022). A study in South Africa

found there was a link between an inadequate number of competent midwives and a high ratio of maternal and neonatal deaths highlighting the importance of new, ready-to-work and qualified midwives who can demonstrate clinical competence (Ngcobo et al., 2021).

The results of the analysis show that the majority of midwives have good competency with good midwives (79.5%) preventing maternal death. This means that qualified midwives can save pregnant women during pregnancy and in the delivery process by maximizing their performance. According to Nove et al., midwives can help substantially reduce maternal and infant mortality and stillbirths in LMICs.

However, to realize this potential, midwives need to have skills and competencies that are in line with the recommendations of the International Midwives Confederation (Nove et al., 2021).

Midwives need to have skills and competencies that are in line with the recommendations of the International Confederation of Midwives, be part of a team of sufficient numbers and skills, and work in a supportive environment. Research studies highlight the potential of midwives but there are many challenges to achieving this potential. If increased coverage of interventions provided by midwives can be achieved, the health system will be better able to provide effective coverage of essential sexual, reproductive, maternal, newborn and adolescent health interventions (Nove et al., 2021).

The relationship between the integrity factor and the prevention of maternal death by midwives in Sleman Regency

The results of the data analysis revealed that there was no correlation between integrity and the prevention of maternal death by midwives. This is in line with previous research that partially the integrity sub-variable, namely honesty, has no significant effect on employee performance (Ferial & Syamsir, 2021). According to Dewi's research, high performance is a measure of success that midwives can achieve (Dewi, 2020).

The highest questionnaire answers revealed that midwives complied with regulations, both supervised and unsupervised. According to Prosen M, personal investment in professional practice is an act of personal and professional integrity that enables midwives to be true to themselves (Prosen, 2021). In carrying out the profession of midwives professionally, they must have norms in the form of sincerity and thoroughness, diligence, tenacity and persistence to get the best results and high integrity in carrying out their





work (Safrudin, et al., 2019).

Integrity also influences employee performance significantly. When someone is able to account for or realize what has been said, what someone has promised becomes a reality or reality and the performance carried out becomes meaningful for oneself, other people and the company, at the same time harmonious relationships can be created with customers, co-workers and companies (Mariana et al., 2018).

### **Description of Efforts and Barriers to Preventing Maternal Death by Midwives in Sleman District**

One of the things that needs to be done by midwives is to carry out an ANC examination. The results of the interviews revealed that the implementation of ANC examinations was carried out by midwives by conducting ANC 10 T on pregnant women. Equally important for a midwife is recording on the mother's card, the mother's cohort and the MCH book. In addition to recording, midwives must also make referrals when mothers experience complications in the delivery process.

To realize this potential, midwives need to have skills and competencies that are in line with the recommendations of the International Confederation of Midwives, be part of a team with adequate numbers and skills, and work in a supportive environment (Nove et al., 2021). The competence of midwives greatly influences the safety of mothers giving birth, because basically midwives' competency standards serve as a reference for carrying out all actions and care provided in all aspects of the midwifery profession's service to individuals, families and communities in a safe and responsible manner in various health care settings. Fianasih & Triyono, (2023).

Midwives are required to have the knowledge and competence of midwives. Supporting capacity of midwifery education, both formal and informal, is needed to support the competence and skills of midwives. A midwife is required to have a Midwifery Update (MU) training certificate and Normal Childbirth Care (APN). In addition, midwives also attended training on neonatal maternal emergencies, handling asphyxia babies and early detection of pregnancy risk factors.

Midwives use a variety of strategies, such as antenatal education, diagnosis and treatment of anemia to prevent complications from possible postpartum hemorrhage. Understanding postpartum hemorrhage as

a life-threatening condition allows midwives to provide holistic and effective management that sometimes involves a multidisciplinary team approach. Midwives also identified the need for continuing education and training to improve their standards of care (Kalu & Chukwura, 2022).

The role of delivery attendants in efforts to prevent maternal death both during pregnancy and childbirth by conducting ANC, supported by complete facilities, providing KIE to both pregnant and giving birth mothers. Mothers who are giving birth also think that midwives are experienced and professional so they can help deliver safely and smoothly. This was also conveyed in previous research that the role of midwives as facilitators was adequate, midwives were able to carry out their role in facilitating pregnant women to obtain health services such as facilitating pregnant women to obtain antenatal care, explaining good food during pregnancy, preparation for childbirth and healthy growth and development. children (Yusriani et al., 2019).

Counseling education needs to be given to pregnant women so that it can support the knowledge, attitude and behavior of pregnant women in maintaining their pregnancy until later delivery. In addition, the education provided must be easy to understand with the support of professional and experienced staff. According to (Saputri et al., 2020) efforts to prevent maternal death are by maximizing the role of midwives by monitoring and evaluating the performance of midwives in carrying out maternal health services, especially in the implementation of counseling on adding information on health insurance and increasing public education about risk factors, symptoms and signs of complications as well efforts to prevent maternal mortality and promote the implementation of maternal mortality reduction programs planned by the Ministry of Health resulted in cross-sectoral cooperation in reducing maternal mortality.

According to Herlina et al., reducing maternal mortality needs to be reviewed from various aspects because it sees that existing programs are not yet optimally implemented, and there has not been any real follow-up of obstacles related to existing programs, so that the expectations and goals of the program also has not contributed optimally (Herlina et al., 2021). Obstacles put forward by midwife informants in this study were related to the BPJS system. BPJS claims are not in accordance with the actions that have been taken, BPJS payments are often delayed, and also often have difficulty referring to hospitals due to financing constraints. Another





obstacle is related to the attitude of the family who are sometimes unwilling to be referred when complications occur. Obstacles for birth attendants in preventing maternal deaths, according to birth mothers, are the lack of delivery facilities.

Various health system factors, including poor quality of care, were identified by key informants as the cause of the stagnant maternal mortality ratio in Nepal, as well as several aspects of the demand side. According to key informants, to further reduce maternal mortality, Nepal needs to ensure that family planning, birth preparation, financial incentives, free delivery services, abortion care and postpartum care programs reach marginalized and vulnerable communities. Facilities offering comprehensive emergency obstetric care should be accessible, and in hilly and mountainous areas, access can be supported by building maternity waiting homes. Social accountability can be strengthened through social audits, role models, and empowerment of health and management committees (Sarkee et al., 2021). The identified challenges are: knowledge and skill gaps; leadership gaps and lack of accountability; the lack of institutional political will and inconsistency in conducting FBMDR, hampered the effective contribution of midwives in conducting maternal mortality reviews (Chirwa et al., 2022).

## Conclusion

Factors related to the prevention of maternal death by midwives in Sleman Regency, namely length of service and competence. The longer the working time and good competence, the better the prevention of maternal death by midwives. Meanwhile, the integrity variable is not related to the prevention of maternal death by midwives in Sleman Regency.

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## Author Contribution and Competing Interest

All Authors contributed to this work in the following ways: All authors have read and approved the final manuscript.

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