Regional Differences in Self-reported Maternal Complications in Indonesia: Revisiting the Pattern

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Abstract. Maternal complications can lead to serious effects to mothers and newborns. This study aims to evaluate the current prevalence of self-reported maternal complications in Indonesia and its regional differences as a basis for targeted strategy for improving maternal health. This study analyzes the latest round of the Indonesian Demographic and Health Survey (IDHS) which was conducted in 2017. IDHS 2017 was a cross-sectional study conducted in 34 provinces in Indonesia. The outcome variables are self-reported maternal complications during pregnancy and/or labor. STATA was used to obtained weighted prevalence and spatial description of self-reported complications across provinces in Indonesia. In this study, we found almost 18% of pregnant women have at least one complication during their pregnancy, with 4.9% reported to have two or more complications during pregnancy. A higher prevalence was reported during labor, with 52% of women reported to have at least one labor complications, and more than 22% reported to have two or more complications. The prevalence for pregnancy complications were higher in urban areas (19.7%) compared to rural areas (16.2%). There were also significant differences by provinces. Self-reported pregnancy complications prevalence ranging from 6.2% in West Papua to 22.4% in DKI Jakarta. Meanwhile, the prevalence of self-reported labor complications ranging from 28% in South Sulawesi to 66.5% in Banten. This study showed persistently high prevalence and regional disparities of self-reported maternal complications, particularly during labor. The regional disparities might reflect differences in awareness, access to healthcare, and underlying maternal problems between the provinces in Indonesia.

Keywords: Maternal Morbidity; Labor; Pregnancy; Childbirth.

1 Introduction

Maternal mortality is still being a global public health problem that need to be considered. In 2020, around 287,000 women died during and after pregnancy and -

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childbirth, and almost 95% these occurred in low and lower-middle income countries and were preventable [1]. The improvement of maternal and newborn health and survival as well as the reduction of stillbirths emphasize global advancements in reducing stillbirths, neonatal deaths, and maternal deaths as well as national attempts to reach the global targets for all three of these pressing issues. The number of stillbirths, maternal and infant fatalities, and pregnancy-related deaths that could have been prevented continues to be a major burden in countries that are classed as fragile states. In reality, Indonesia ranks eighth out of ten nations, accounting for 51% of live births, 60% of maternal fatalities, stillbirths, and infant deaths worldwide [2] and it has the second-highest rate of maternal mortality in Southeast Asia (after Laos) regarding maternal mortality. The low use of contraceptives in the community, the high access to traditional birth attendants, poverty, low population or number of hospitals, difficulty accessing health services, and the number of doctors working in the closest health service center are some of the factors that increase the risk of maternal mortality [3]. Maternal issues were significantly affected by social characteristics including wealth index, area of living, accessibility to medical services, and distance from medical facilities [4]. In addition to the need to lower the number of maternal deaths, Indonesia faces a challenge in addressing the relatively high prevalence of maternal morbidity (which includes the time during pregnancy, delivery, and the first six weeks following childbirth). Previous research have shown that Indonesia's self-reported maternal morbidity is rising, and that progress toward the Millennium Development Goals for maternal health is progressing more slowly [5].

Indonesia is the largest archipelagic country in the world, consisting of 34 separate provinces [6] on 5 main islands and there are more than 17.000 other islands [7]. There is a socioeconomic gap between urban and rural areas in Indonesia [8]. The difficulty of guaranteeing equal access to healthcare is made more difficult by the stark contrasts between rural and urban areas that go beyond socioeconomic status [4]. To create effective and targeted community and hospital-based treatments, it is crucial to comprehend the regional or geographic differences in self-reported maternal problems in Indonesia. Currently, in Indonesia, there is still limited data regarding various types of patterns of maternal complications among provinces [5].

Indonesia is fourth of the six countries to have more than 5,000 maternal deaths (but less than 10,000) in 2020 [9]. Maternal deaths in Indonesia are caused by eclampsia, bleeding, infection, locus 78%, health facilities. The Strategic Plan of the Indonesian Ministry of Health 2020-2024 has an implementation strategy, one of which is to improve sustainable maternal and neonatal services in public and private facilities by encouraging all deliveries in health facilities, increasing the coverage and quality of ANC and neonatal services, increasing the competence of health workers, providing facilities and infrastructure, guaranteed availability of blood and registration of maternal deaths in health care facilities [10].

This study aims to evaluate the current prevalence of self-reported maternal complications in Indonesia and its regional differences as a basis for a targeted strategy for improving maternal health.

2 Method

This study uses the latest round of the Indonesian Demographic and Health Survey (IDHS) which was conducted in 2017 [11]. IDHS 2017 was a cross-sectional study with a multistage sampling design conducted in 34 provinces in Indonesia to obtain a nationally representative sample of Indonesia. Data on maternal health were obtained from women of reproductive age (15-49 years old) who had at least a live birth in the last five years before the IDHS survey year.

The population of women of aged 15-49 years based on IDHS 2017 data was 59,100 women. With the inclusion criteria of being aged 15-49 years and having at least one live birth by 2012, the sample included in this study was 14,398 mothers.

The outcome variables in this study are self-reported maternal complications during pregnancy and/or labor in rural-urban area. Self-reported maternal complications during pregnancy consisting prematurity, vaginal bleeding, high fever, convulsions and fainting, gag continuously, vomiting, water broke early, low or high blood pressure, and others. Meanwhile, self-reported maternal complications during labor or delivery consisting prolonged labor, excessive vaginal bleeding, infection, convulsions, premature rupture of membrane, weakness to press, anxiety, and others.

We also considered multiple self-reported socio-demographic variables that could affect the maternal complications, *ie*, the mother's age (<20, 20-35 and >35 years), the mother's age at delivery (<20, 20-35 and >35 years), level of education (completed primary school or less, incompleted secondary school, completed secondary school, and higher), marital status (married or not married), employment status (working or not working), parity (1, 2, 3, and 4 or more), and family wealth which is divided into 5 quintiles namely quintile 1 (the poorest), quintile 2 (poorer), quintile 3 (middle), quintile 4 (richer), and quintile 5 (the richest). The family wealth variable incorporated indicators of assets, *ie*, house and/or land ownership, water supply, latrine type, vehicle, and electronics ownership. Other socio-demographic variables were media exposure consisting of newspaper, radio, and television (rarely means less than once a week, and often means at least once a week), and then woman's autonomy in the decision-making of her healthcare which is divided into 2 levels, namely moderate if the decision maker is mainly made by other people or a joint decision, and high if the decision maker is mainly by herself. Then, birth prepared that indicates the level of readiness in facing the delivery process which consists of 6 categories, namely the place of delivery, transportation, assistance, payment, blood donation, and family planning (low if preparing 2 or less categories, moderate if preparing 3 to 4 categories, and high if preparing 5 or all categories), knowledge on key pregnancy danger signs such as vaginal bleeding, fever, convulsions, baby in wrong position, swollen limbs, faint, breathlessness and others (yes or no), last child's pregnancy was wanted (yes or no), health insurance coverage (yes or no), distance to healthcare which is divided into two categories according to the categorization of the IDHS data, namely big problem if experienced problems related to distance in accessing healthcare facilities, and not a big problem if did not experience these problems [11]. We also included region variables from the Indonesian Central Bureau of Statistics data [12]. The region was divided into three regions based on population density: 1) population density above 500/km^2; 2) population density above the national average

of 112/km^2, but lower than 500/km^2; and 3) population density below the national average of 112/km^2.

Socio-demographic and other characteristics that could affect the maternal complications were analyzed descriptively based on the area of residence (rural or urban), comprising frequencies and cross-tabulations. To account for the unequal stratification of the number of various locations, a weighted analysis was performed. The prevalences of maternal complications were also analyzed descriptively and presented in tables and narrative. While the differences of maternal complications across provinces in Indonesia were analyzed descriptively and presented in a map. All the analyses were conducted utilizing STATA version 16.0 (StataCorp, College Station, TX).

3 Result and Discussion

Table 1 shows the characteristics of 14,398 mothers included in this study. Among all respondents, 50.7% of them live in rural area and 49.3% live in urban area. As many as 67.7% of respondents aged 20-35 years and 77.1% of them aged 20-35 years at delivery. The majority of respondents are married (96.5%), working (54.4%), and at least once or twice gave birth. There are 30.3% respondents that completed secondary level of education, 21% come from both middle and richer families, 87.5% of them at least exposed to media once a week, and 59.2% have health insurance. Meanwhile, 65.9% of respondents have a big role to decide health treatment for herself, 70.1% of them already know the danger in pregnancy, and 83.8% of their last child are wanted. Besides that, most of respondents (89.3%) do not have a big problem in distance to access healthcare, and the majority of them come from the region with high population density (57.8%).

Table 1. Sociodemographic Characteristics of Women Based on the Area of Residence in Indonesia (N=14,398)

Characteristic	Area of Residence		Total
	Rural % (95%CI)	Urban % (95%CI)	% (95%CI)
Proportion of Women	50.7	49.3	100.0
Age (Years)			
<20	2.8 (2.3-3.4)	1.8 (1.5-2.2)	2.3 (2.1-2.7)
20 - 35	69.5 (68.2-70.8)	65.59 (64.2-66.9)	67.6 (66.6-68.5)
>35	27.6 (26.3-28.9)	32.5 (31.1-33.9)	30.1 (29.1-31)
Age at Delivery (Years)			
<20	8.1 (7.2-9.1)	4.6 (4.1-5.2)	6.4 (5.8-7.1)
20-35	76.2 (75.1-77.4)	78.1 (76.7-79.1)	77.1 (76.3-77.9)
>35	15.5 (14.5-16.6)	17.3 (16.3-18.4)	16.4 (15.7-17.1)
Parity			

1	35.8 (34.4-37.2)	35.2 (33.8-36.5)	35.5 (34.5-36.4)
2	35.5 (34.1-37.1)	36.2 (34.9-37.6)	35.9 (34.9-36.9)
3	17.8 (16.7-19.1)	19.0 (17.9-20.1)	18.4 (17.6-19.2)
4 or more	10.1 (9.9-11.6)	9.5 (8.7-10.3)	10.1 (9.5-10.7)
Married			
No	3.8 (3.3-4.3)	3.1 (2.6-3.6)	3.4 (3.1-3.8)
Yes	96.1 (95.6-96.6)	96.8 (96.4-97.3)	96.5 (96.1-96.8)
Working			
No	56.1 (54.2-57.8)	52.7 (51.2-54.3)	54.4 (53.2-55.6)
Yes	43.9 (42.1-45.7)	47.2 (45.6-48.7)	45.5 (44.3-46.7)
Education			
Completed primary or less	33.3 (31.4-35.4)	17.7 (16.2-19.3)	25.6 (24.4-26.9)
Incompleted secondary	32.4 (30.7-34.1)	25.2 (23.7-26.7)	28.8 (27.7-29.9)
Completed secondary	23.4 (21.9-25)	37.4 (35.8-39.1)	30.3 (29.2-31.4)
Higher	10.7 (9.7-11.8)	19.8 (18.1-21.1)	15.1 (14.1-16.1)
Wealth			
Poorest	29.8 (27.8-31.8)	6.5 (5.6-7.5)	18.3 (17.2-19.5)
Poorer	26.6 (25.1-28.2)	13.3 (12.2-14.5)	20.1 (19.1-21.1)
Middle	20.8 (19.4-22.3)	21.1 (19.8-22.5)	21.0 (20.1-22)
Richer	14.8 (13.4-16.2)	27.3 (25.9-28.8)	21.0 (20.1-22.1)
Richest	7.8 (6.6-9.2)	31.5 (29.4-33.7)	19.5 (18.3-20.8)
Media Exposure			
Rarely	14.7 (13.5-16)	10.1 (9.1-11.1)	12.4 (11.6-13.2)
Often	85.2 (84-86.4)	89.9 (88.9-90.8)	87.5 (86.7-88.3)
Decision Making			
Moderate	34.5 (32.8-36.2)	33.5 (31.9-35.1)	34.1 (32.8-35.1)
High	65.4 (63.7-67.1)	66.4 (64.9-68.1)	65.9 (64.8-67.1)
Birth Prepared			
Low	20.4 (18.8-22.1)	13.6 (12.5-14.8)	17.1 (16.1-18.1)
Moderate	35.9 (34.3-37.6)	34.6 (33.2-36.1)	35.3 (34.2-36.4)
High	43.6 (41.7-45.5)	51.6 (50.1-53.3	47.5 (46.3-48.8)
Know Danger in Pregnancy			
No	34.2 (32.5-35.8)	25.4 (23.9-27.1)	29.9 (28.7-31.1)
Yes	65.8 (64.1-67.4)	74.5 (72.9-76.1)	70.1 (68.9-71.2)
Last Child Wanted			
No	14.0 (13.0-15.1)	18.2 (17.2-19.3)	16.1 (15.3-16.8)

Yes	86.0 (84.0-93.8)	81.7 (80.6-82.7)	83.8 (83.1-84.6)
Health Insurance			
No	45.3 (43.6-47.1)	35.9 (34.2-37.5)	40.7 (39.5-41.9)
Yes	54.6 (52.8-56.3)	64.1 (62.4-65.7)	59.2 (58.1-60.4)
Distance to Healthcare			
Not a big problem	87.2 (85.8-88.5)	91.5 (90.4-92.6)	89.3 (88.4-90.2)
Big problem	12.7 (11.4-14.1)	8.4 (7.3-9.6)	10.6 (9.7-11.5)
Region			
Population density >500/km^2	46.1 (44.3-47.7)	70 (68.6-71.3)	57.8 (56.7-58.9)
Population density 112/km^2 - 500/km^2	34.2 (32.8-35.7)	19.5 (18.4-20.7)	27.1 (26.1-27.9)
Population density <112/km^2	19.6 (18.5-20.8)	10.4 (9.7-11.2)	15.1 (14.4-15.8)

Table 2 shows the difference in the proportion of maternal morbidity in women living in rural and urban areas. Of the 14,398 women that included in this study, 17.9% of them experienced pregnancy morbidity. For women who live in rural areas, as many as 16.2% of them experienced pregnancy morbidity, while the number of women that experienced the same in urban areas is higher (19.7%). There are also 4.9% women who have two or more pregnancy morbidities at once. Meanwhile the number of proportions are much higher in labor morbidity. There are 52.2% women experienced labor morbidity and 22.1% of them even have two or more labor morbidities at once. There are also a higher proportion of labor morbidity for women who live in urban areas (53.4%) compared to rural areas (51.1%).

Table 2. Self-Reported Morbidity Types for Rural and Urban Women in Indonesia (N=14,398)

Type of Morbidity	Area of Residence		Total
	Rural % (95%CI)	Urban % (95%CI)	% (95%CI)
Proportion of Women	50.7	49.3	100.0
Pregnancy Morbidity			
Total	16.2 (15.1-17.4)	19.7 (18.6-20.9)	17.9 (17.1-18.7)
Prematurity	1.8 (1.5-2.3)	2.4 (2.1-2.9)	2.1 (1.9-2.4)
Vaginal bleeding	4.4 (3.7-5.1)	6.5 (5.8-7.2)	5.4 (5.1-5.9)
High fever	0.9 (0.7-1.3)	1.1 (0.7-1.3)	1.1 (0.8-1.2)
Convulsions and fainting	0.5 (0.3-0.8)	0.6 (0.4-1.1)	0.6 (0.4-0.8)
Gag continuously	3.6 (3.1-4.2)	3.3 (2.8-3.8)	3.4 (3.1-3.9)
Vomiting	2.5 (2.1-3.1)	3.6 (3.1-4.2)	3.1 (2.7-3.4)

Water broke early	1.7 (1.3-2.1)	2.9 (2.5-3.4)	2.3 (2.1-2.6)
Low or high blood pressure	1.1 (0.7-1.3)	1.4 (1.1-1.8)	1.2 (1.1-1.4)
Other	4.4 (3.8-5.1)	4.9 (4.3-5.5)	4.7 (4.2-5.1)
Multiple Pregnancy Morbidity			
No	83.8 (82.6-85.0)	80.3 (79.1-81.4)	82.1 (81.3-82.9)
1	12.3 (11.3-13.4)	13.7 (12.8-14.7)	13.0 (12.3-13.7)
2 or more	3.9 (3.3-4.5)	6.0 (5.4-6.7)	4.9 (4.5-5.4)
Labor Morbidity			
Total	51.1 (49.2-53.0)	53.4 (51.6-55.1)	52.2 (50.9-53.5)
Prolonged labor	40.1 (38.2-42.1)	41.5 (39.7-43.3)	40.8 (39.5-42.1)
Excessive vaginal bleeding	7.1 (6.3-7.9)	7.1 (6.3-7.9)	7.1 (6.5-7.6)
Infection	8.5 (7.6-9.5)	6.8 (6.1-7.7)	7.7 (7.1-8.3)
Convulsions	1.5 (1.2-1.9)	1.3 (1.1-1.6)	1.4 (1.2-1.7)
Premature rupture of membrane	15.6 (14.5-16.9)	17.1 (16.1-18.2)	16.3 (15.5-17.2)
Weakness to press	10 (9.1-11.1)	10.7 (9.8-11.6)	10.3 (9.7-11.1)
Anxiety	55.8 (53.8-57.9)	51.6 (49.6-53.6)	53.7 (52.3-55.2)
Other	4.6 (4.1-5.3)	5.7 (5.1-6.5)	5.2 (4.7-5.7)
Multiple Labor Morbidity			
No	48.9 (47.0-50.8)	46.6 (44.9-48.4)	47.8 (46.5-49.1)
1	29.0 (27.5-30.6)	31.3 (30.0-32.8)	30.2 (29.1-31.2)
2 or more	22.1 (20.7-23.6)	22.0 (20.6-23.5)	22.1 (21.1-23.1)

The following graphs show the difference of pregnancy morbidity (Figure 1) and labor morbidity (Figure 2) by provinces in Indonesia. Self-reported pregnancy complications prevalence ranging from 6.2% in West Papua to 22.4% in Jakarta. Meanwhile, the prevalence of self-reported labor complications ranging from 28% in South Sulawesi to 66.5% in Banten. The differences of prevalences by provinces are significant for both pregnancy morbidity (p value = 0.0071) and labor morbidity (p value < 0.001).

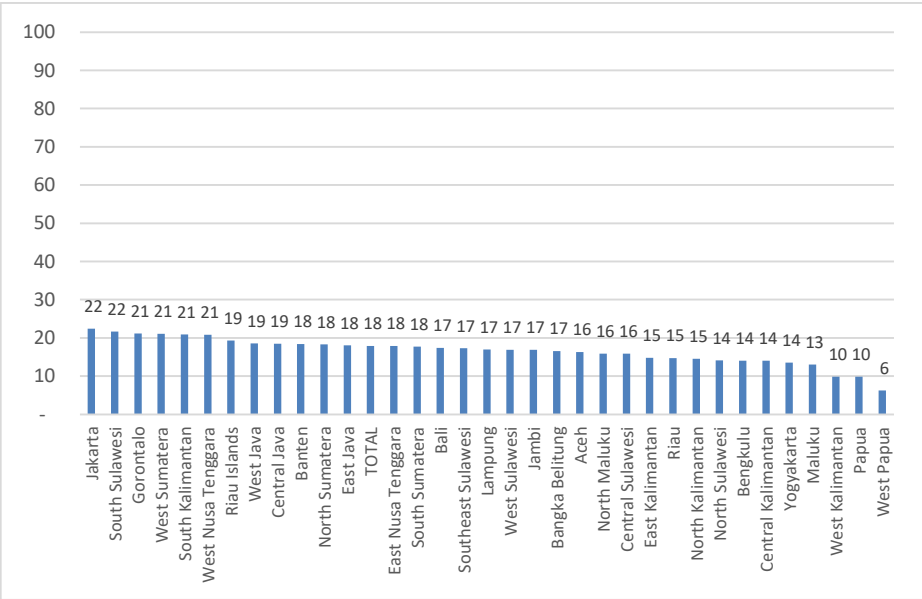

Figure 1. The Differences of Pregnancy Comorbidity by Provinces in Indonesia

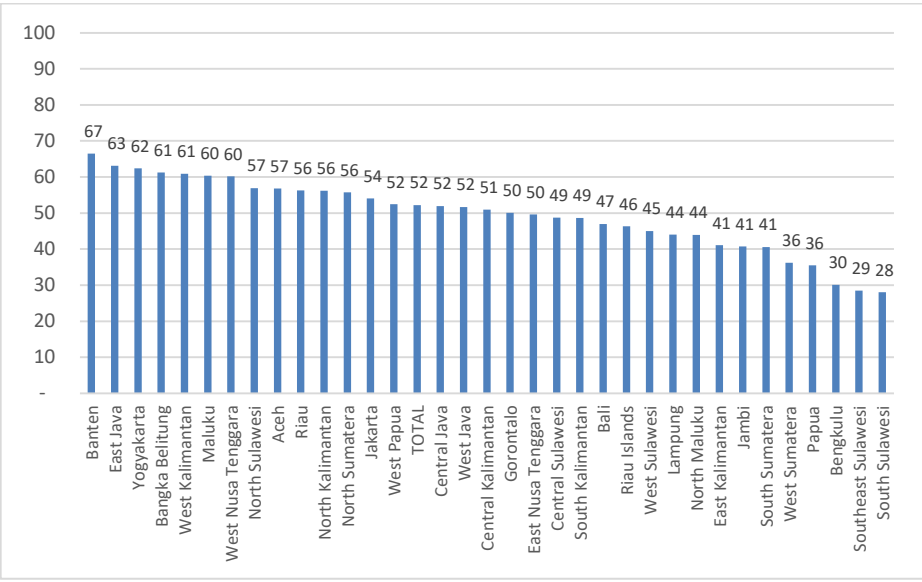

Figure 2. The Differences of Labor Comorbidity by Provinces in Indonesia

Maternal mortality is one of the significant public health problems, especially in developing countries such as Indonesia [13], [14]. According to WHO data, almost 95% maternal mortality occurred during and following pregnancy and childbirth that caused by the complications women experienced during and following pregnancy and childbirth that actually could have been prevented [1]. Most of these

complications develop during pregnancy, or may exist before pregnancy but get worse during pregnancy, especially if it is not managed as part of the maternal healthcare [1]. In U.S, there is an increasing number of women experiencing pregnancy and childbirth complications every year [15].

The results of this study show that almost 17.9% of pregnant women have at least one complication during their pregnancy, and 4.9% of pregnant women even reported to have two or more complications during pregnancy. The complications that they reported such as prematurity, vaginal bleeding, high fever, convulsions and fainting, gag continuously, vomiting, water broke early, low or high blood pressure, and others. Meanwhile during labor or childbirth, there were also higher prevalence reported, with 52.2% of women reported to have at least one labor complication, and 22.1% reported to have two or more labor complications. Labor complications that women experienced in this study such as prolonged labor, excessive vaginal bleeding, infection, convulsions, premature rupture of membrane, weakness to press, anxiety, and others.

Based on the results of this study, there were also disparities of maternal complication prevalence in rural and urban areas. The prevalences were higher in urban areas for both pregnancy complications and labor complications. Previous study also reported the differences in the proportion of maternal morbidities between rural and urban areas related to pregnancy and labor complications [5]. There is also an increase in both pregnancy and labor complications on maternal health in Indonesia based on area of residence in previous study using the 2012 IDHS compared to this study [5]. In previous study, pregnancy complication in urban areas is 13.9% compared to 19.7% in this study, and in rural areas is 12% compared to 16.2% in this study [5]. For labor complications prevalence, it was 50.5% in urban area and 47.7% in rural area based on the result of previous study [5]. Meanwhile in this study, the prevalences for labor complications are 53.4% in urban areas and 51.1% in rural areas. It means there is still an increase in maternal comorbidity in Indonesia which can also cause the increase of maternal mortality.

There were also significant differences in maternal complications by provinces in Indonesia. Previous studies have reported that social-demographic factors can cause the disparities of maternal complications, especially social disadvantage such as poverty and low education can increase the risk for severe maternal morbidity [16], [17]. In addition, geographic barriers to healthcare such as the distance to access healthcare are also associated with adverse maternal health outcomes and can increase maternal morbidity [18].

This study has several limitations. First, there are some major maternal morbidity types that can be analyses in this study due to the limitation of the data source. Second, the self-reported of morbidity status in this study was susceptible to information bias.

4 Conclusion

In summary, this study showed persistently high prevalence and regional disparities of self-reported maternal complications, particularly during labor. The regional disparities might reflect differences in awareness, access to healthcare, and

underlying maternal problems between the provinces in Indonesia. There are also disparities of maternal complications in urban and rural area that can be caused by the socio-demographic factors, such as poverty and education level. Therefore, intervention to improve knowledge and awareness of maternal morbidity is needed, especially in areas where the prevalence of maternal morbidity is still high. Based on this study, it can also be known the women that could be the target of high-risk prevention strategies to reduce maternal morbidity in Indonesia.

References

[1] World Health Organization, "Maternal Mortality," *World Health Organization*, 2023. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/maternal-mortality. [Accessed: 22-May-2023].

[2] World Health Organization, *Improving maternal and newborn health and survival and reducing stillbirth*. 2023.

[3] Demography Institute FEB UI, "Monthly discussion LD FEB UI: Indonesia's Maternal Mortality Rate is the Second Highest in Southeast Asia," *Demography Institute FEB UI*, 2022. [Online]. Available: https://feb.ui.ac.id/en/2022/07/01/monthly-discussion-ld-feb-ui-angka-kematian-ibu-di-indonesia-menempati-posisi-tertinggi-kedua-di-asia-tenggara/#:~:text=Some of the factors that,difficult access to health services%2C. [Accessed: 22-May-2023].

[4] P. Kumar, S. Srivastava, C. Maurya, and P. Dhillon, "An assessment of the role of socio-economic, maternal and service utilization factors in increasing self-reported maternal complications in India," *BMC Pregnancy Childbirth*, vol. 21, no. 1, pp. 1–13, 2021.

[5] V. Widyaningsih and K. Khotijah, "The patterns of self-reported maternal complications in Indonesia: Are there rural-urban differences?," *Rural Remote Health*, vol. 18, no. 4, 2018.

[6] Indonesian Ministry of Foreign Affairs, *2022 Annual Performance Report of the Directorate of Public Diplomacy*. Jakarta: Indonesian Ministry of Foreign Affairs, 2023.

[7] Indonesian Ministry of Foreign Affairs, "A glimpse of Indonesia," *Indonesian Ministry of Foreign Affairs*, 2018. [Online]. Available: https://kemlu.go.id/frankfurt/id/pages/sekilas_tentang_indonesia/4695/etc-menu. [Accessed: 22-May-2023].

[8] The Australia-Indonesia Centre, "The urban-rural divide: Developing Indonesia from the periphery," *AustraliaIndonesia.com*, 2019. [Online]. Available: https://australiaindonesia.com/skills-futures/the-urban-rural-divide-developing-indonesia-from-the-periphery/. [Accessed: 23-May-2023].

[9] W. B. G. and U. D. WHO, UNICEF, UNFPA, *Trends in maternal mortality 2000 to 2020*. WHO Document Publication, 2023.

[10] Indonesian Ministry of Health, *Main Points of The Ministry of Health Strategic Plan 2020-2024*. Jakarta: Indonesian Ministry of Health, 2020.

[11] Statistics Indonesia, National Population and Family Planning Board,

Ministry of Health, and ICF International, "Indonesian Demographic and Health Survey 2017," *Indones. Demogr. Heal. Surv. Final Rep.*, p. 588, 2018.

[12] Central Bureau of Statistics, *Statistical Yearbook of Indonesia 2020*. Jakarta: Central Bureau of Statistics, 2020.

[13] L. Say *et al.*, "Global causes of maternal death: A WHO systematic analysis," *Lancet Glob. Heal.*, vol. 2, no. 6, pp. 323–333, 2014.

[14] K. S. Khan, D. Wojdyla, L. Say, A. M. Gülmezoglu, and P. F. Van Look, "WHO analysis of causes of maternal death: a systematic review," *Lancet*, vol. 367, no. 9516, pp. 1066–1074, 2006.

[15] Blue Cross Blue Shield, "Trends in Pregnancy and Childbirth Complications in the U.S.," pp. 1–8, 2020.

[16] A. Lindquist, N. Noor, E. Sullivan, and M. Knight, "The impact of socioeconomic position on severe maternal morbidity outcomes among women in Australia: A national case-control study," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 122, no. 12, pp. 1601–1609, 2015.

[17] N. M. Noor, N. H. Nik Hussain, Z. Sulaiman, and A. Abdul Razak, "Contributory factors for severe maternal morbidity: A 10-year review of the literature," *Asia-Pacific J. Public Heal.*, vol. 27, pp. 9S-18S, 2015.

[18] W. Dotse-Gborgbortsi *et al.*, "Distance is 'a big problem': a geographic analysis of reported and modelled proximity to maternal health services in Ghana," *BMC Pregnancy Childbirth*, vol. 22, no. 1, pp. 1–12, 2022.