Since 2002

Determinant Factors for High-Risk Pregnancy among Minangkabau Ethnicity in Indonesia

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Abstract

BACKGROUND: High-risk pregnancy cause multifactorial. The lack of investment in better and more accessible hospital care for women and newborns in Indonesia may be partly to blame for the country's disproportionately high rates of high-risk pregnancy, maternal, and perinatal death.

AIM: The aim of this study was to determine determinant factors for high-risk pregnancy among Minangkabau ethnicity in Indonesia.

METHODS: The authors conducted a case control study. Data were gathered in Healthcare Facilities Padang, Indonesia from December 2019–December 2020. The number of subjects in this research was 64 cases group (women with high-risk pregnancy) and 128 control group (normal pregnancy) matching by sex and region. The sampling technique in this research was proportional random sampling. Data were gathered from medical records and primary data collection with survey data. Bivariate and multivariate analysis was investigated using Chi-square and Logistic binary regression test. The data were analyzed using STATA version 14.2.

RESULTS: There were associations between mother's educational level, women's empowerment, head of the family educational level, chronic diseases, history of childbirth, maternal age, and parity with high-risk pregnancy. Multivariate analysis found that the highest odds ratio (OR) for the occurrence of high-risk pregnancy was history of childbirth (OR = 8.26, 95% CI 3.32–20.52), and mother's level of education (OR = 5.67, 95% CI 2.64–12.15).

CONCLUSION: This analysis confirmed history of childbirth and mother's level of education for high-risk pregnancy among Minangkabau ethnicity in Indonesia. The findings of risk factors for high-risk pregnancy can be determined through early detection and useful predictors so that women can detect high-risk pregnancy themselves.

Introduction

During pregnancy and delivery, at least one woman dies per minute throughout the world [1]. Pregnancy problems and vaginal birth deaths can be readily avoided [2], [3]. Increased understanding of pregnancy danger symptoms, which has a high association with early diagnosis of pregnancy hazards, can help prevent conception. Women who understand the pregnancy hazard symptoms are 6.657 times more likely to discover pregnancy concerns early than those who do not [4]. Antenatal care is strongly linked to knowledge of pregnancy hazard symptoms [3]. Women who are able to recognize pregnancy warning symptoms are 3.470 times more likely to seek antenatal care [5]. It is proof that pregnant women are aware of warning indications, as well as the Maternal Mortality Rate (MMR).

In 2019, the Indonesian government set numerous goals for the improvement of health and nutrition. The MMR was 306 per 100,000 live births in the first place. While Indonesia is expected to accomplish even more than the SDG objective, this is not the case. There are three key targets: Lowering the MMR to below 70 deaths per 100,000 live births, lowering the number of newborn mortalities to 12 per 1000 live births, and lowering the mortality rate among children under the age of 5–25 per 1000 live births [6].

High-risk pregnancy causes multifactorial. The lack of investment in better and more accessible hospital care for women and newborns in Indonesia may be partly to blame for the country's disproportionately high rates of high-risk pregnancy, maternal, and perinatal death [7]. Indonesia scored a "poor score" in a ranking system for access to maternity and neonatal healthcare in a research analyzing maternal and neonatal healthcare in 49 countries [8]. A previous study discovered that sociodemographic characteristics, labor problems, obstacles to care, and degree of care had an impact on mother and high-risk pregnancy [9].

Indonesia must make further efforts to decrease the MMR. To comprehend the pregnancy danger indicators, there must be widespread community

participation, particularly among women. It can help women become more aware of potential threats. Women who believe they are in danger should seek medical help right once.

Therefore, it is necessary to find the appropriate risk factors for Indonesians to help increase public awareness in recognizing the risk of high-risk pregnancy in Indonesia. The findings of high-risk pregnancy can be determined through early detection and useful predictors so that women can detect high-risk pregnancy themselves. The aim of this study was to determine determinant factors for high-risk pregnancy among Minangkabau ethnicity in Indonesia.

Materials and Methods

Study design and research sample

This research was conducted using a case–control study design. Location of research in health-care facilities, Padang, Indonesia, from December 2019 to December 2020. The number of samples in this study was 64 cases group (women with high-risk pregnancy (bleeding, preeclampsia/eclampsia, obstructed labor, uterine rupture, and infection)) and 128 control group (normal pregnancy), with the inclusion criteria of the cases group in this study, were women with high-risk pregnancy and have a husband. The exclusion criteria for cases groups were not able to communicate. The control group was matched for ± 5 years of age and age based on region control. The sampling technique in this study is proportional random sampling.

Data collection technique

This study passed the ethical review by the ethics committee of the Faculty of Medicine, Universitas Andalas, Padang, Indonesia. Data were collected through medical records review and primary data collection using a research questionnaire to the respondents by the written informed consent.

Data collection of risk factors through interviews with respondents includes mother status in the family risk factors consisting of: Educational level (low level, less than senior high school; high level, more than or equal to senior high school) [1], working status (working; not working) [2], monthly salary (<IDR 2,289,228,-; ≥IDR 2,289,228) [4], and women empowerment (good; not good) [4].

Family status in society risk factors consist of: Monthly salary of head of family (<IDR 2,289,228,-; ≥IDR 2,289,228) [4], educational level (low level, less than senior high school; high level, more than or equal

to senior high school) [1], working status (working; not working) [2], home ownership (yes; no) [7], and health-care facilities (available; not available) [7].

Health status risk factors consist of: Nutritional status (malnutrition, body mass index (BMI) <18.5; normal weight, and BMI 18.5–22.9) [7], chronic disease (yes; no) [7], history of childbirth (yes; no) [7], and history of complications (yes; no) [7]. Reproductive status risk factors consist of: Age (risk, ≤16 years or ≥35 years; unrisk, 17–34 years) [1], parity (primiparous; multiparous; and grande multiparous) [1], distance between pregnancies (risk, <2 years or ≥10 years; and unrisk, 2–9 years) [2], and marital status (marriage; single) [2]. Health behavior risk factors consist of: contraceptive method (active; not yet) [7], antenatal care (complete, 4 times; incomplete, < 4 times) [7], and childbirth (health workers; non health workers) [1].

Data analysis

Data were analyzed bivariate using the Chi-square test to select candidate variables. $p < 0.05$ was stated as statistically significant and the variable that passed as a candidate variable with $p < 0.25$. The data were analyzed using STATA version 14.2.

Results

Determinant factors for high-risk pregnancy are shown in Table 1.

Table 1 found that there were associations between mother's educational level, women's empowerment, head of the family educational level, chronic diseases, history of childbirth, maternal age, and parity with high-risk pregnancy ($p < 0.05$).

However, based on the bivariate analysis, it is known that the variables that enter the selection of multivariate analysis for predicting of high-risk pregnancy were variables with $p < 0.25$. These variables were mother's educational level, mother's working status, women's empowerment, mother's age, education of the head of the family, chronic disease, history of childbirth, age, parity, and antenatal care.

Unadjusted odds ratio for high-risk pregnancy is shown in Table 2.

Table 2 showed that the highest odds ratio (OR) for the occurrence of high-risk pregnancy was history of childbirth (OR = 8.26, 95% CI 3.32–20.52), and mother's level of education (OR = 5.67, 95% CI 2.64–12.15).

Multivariate analysis of candidate variable selection scoring model development of early detection of high-risk pregnancy is shown in Table 3.

Table 1: Determinant factors for high-risk pregnancy

Variables	Group		p
	Cases (f/%) (n = 64)	Control (f/%) (n = 128)	
A. Mother status in the family			
Educational level			< 0.001*†
Low	25 (39.1)	13 (10.2)	
High	39 (60.9)	115 (89.8)	
Working status			0.238†
Work	7 (10.9)	24 (18.8)	
Not work	57 (89.1)	104 (81.3)	
Monthly salary			0.549
< IDR 2,289,228,-	61 (95.3)	118 (92.2)	
≥IDR 2,289,228,-	3 (4.7)	10 (7.8)	
Women empowerment			0.013*†
Not good	13 (20.3)	9 (7.0)	
Good	51 (79.7)	119 (93.0)	
B. Family status in society			
Monthly salary			1.000
< IDR 2,289,228,-	28 (43.8)	56 (43.8)	
≥IDR 2,289,228,-	36 (56.3)	72 (56.3)	
Head of family's educational level			0.015*†
Low	15 (23.4)	12 (9.4)	
High	49 (76.6)	116 (90.6)	
Working status			n/a
Work	64 (100.0)	128 (100.0)	
Not work	0	0	
Home ownership			0.559
No	59 (92.2)	113 (88.3)	
Yes	5 (7.8)	15 (11.7)	
C. Health-care facilities			
Health-care facilities			n/a
Not available	0	0	
Available	64 (100.0)	128 (100.0)	
D. Health status			
Nutritional status			1.000
Underweight	6 (9.4)	12 (9.4)	
Normal	58 (90.6)	116 (90.6)	
Chronic disease			< 0.001*†
Yes	38 (59.4)	32 (25.0)	
No	26 (40.6)	96 (75.0)	
History of childbirth			< 0.001*†
Yes	58 (90.6)	69 (53.9)	
No	6 (9.4)	59 (46.1)	
History of complications			0.574
Yes	36 (56.3)	65 (50.8)	
No	28 (43.8)	63 (49.2)	
E. Reproductive status			
Age			0.002*†
Risk	25 (39.1)	22 (17.2)	
Unrisk	39 (60.9)	106 (82.8)	
Parity			< 0.001*†
Risk	41 (64.1)	44 (34.4)	
Unrisk	23 (35.9)	84 (65.6)	
Distance between pregnancies			0.721
Risk	33 (51.6)	61 (47.7)	
Unrisk	31 (48.4)	67 (52.3)	
F. Health behavior			
Contraceptive method			0,251
Not active	1 (1.6)	65 (50.8)	
Active	63 (98.4)	63 (49.2)	
Antenatal care			0.008*†
Incomplete	47 (73.4)	67 (52.3)	
Complete	17 (26.6)	61 (47.7)	
Childbirth			n/a
Non health workers	0	0	
Health workers	64 (100.0)	128 (100.0)	

*p < 0.05, considered statistically significant; †p < 0.25, considered for multivariate analysis; n/a, not account.

Table 3 multivariate analysis found that mother with a history of childbirth with complications was significant dominant factors for high-risk pregnancy.

Discussion

This study found there were associations between mother's educational level, women's empowerment, head of the family educational level, chronic diseases, history of childbirth, maternal age,

Table 2: Unadjusted odds ratio for high-risk pregnancy

Variables	OR (95% CI)	p-value
Educational level		< 0.001*†
Low	5.67 (2.64–12.15)	
High	Ref	
Mother's working status		0.238†
Work	0.53 (0.22–1.31)	
Not work	Ref	
Women empowerment		0.013*†
Not good	3.37 (1.35–8.38)	
Good	Ref	
Head of family's educational level		0.015*†
Low	2.95 (1.29–6.78)	
High	Ref	
Chronic disease		< 0.001*†
Yes	4.38 (2.31–8.31)	
No	Ref	
History of childbirth		< 0.001*†
Yes	8.26 (3.32–20.52)	
No	Ref	
Age		0.002*†
Risk	3.08 (1.56–6.09)	
Unrisk	Ref	
Parity		< 0.001*†
Risk	3.40 (1.81–6.37)	
Unrisk	Ref	
Antenatal care		0.008*†
Incomplete	2.51 (1.39–4.84)	
Complete	Ref	

*p < 0.05, considered statistically significant; †p < 0.25, considered for multivariate analysis.

and parity with high-risk pregnancy. Multivariate analysis found that the highest odds ratio (OR) for the occurrence of high-risk pregnancy was history of childbirth (OR = 8.26, 95% CI 3.32–20.52), and mother's level of education (OR = 5.67, 95% CI 2.64–12.15).

A previous studies found a slew of maternal characteristics linked to poor delivery outcomes, including maternal age, rural residence, distance from hospital, poverty, lack of education, and unemployment. Others have observed similar findings [10], [11], [12], [13]. Access to care is hampered in rural areas or when residents live a long distance from a hospital, whether owing to time, transportation, or other geographical factors.

Mother living in rural areas, being younger, being poor, being less educated, and being unemployed have all been proven to increase a woman's risk of poor birth outcomes in both developed and developing nations. In modified models that took into account particular obstetrical difficulties and the degree of maternal sickness; however, most of these risk variables lost their importance [14], [15], [16], [17].

The discovery of novel early detection of high-risk pregnancy can be one solution in answering several weaknesses of government programs, including the safe motherhood program where there are still several areas in Indonesia with difficult access to healthy childbirth, the causes can be in the form of geographic reasons and equal distribution of health workers [18], [19]. Apart from that, good and regular antenatal care services do not yet cover all areas of Indonesia in the overall geographic topography, even though one of the specific health problems of pregnant women is antenatal care through antenatal services. Facilities for antenatal services that are still found to be inadequate and not functioning properly, and having to

Table 3: Multivariate analysis of prediction for high-risk pregnancy

Variables	Initial OR (Step 1)	Final OR (Step 4)	p-value (Step 1)	p-value of Elimination Step		
				Step 2	Step 3	Step 4
Mother's education	4.30	5.26	0.03	< 0.001	0.002	< 0.001
Mother's working status	0.57	-	0.320	0.328	-	-
Women empowerment	5.64	5.82	0.004	0.004	0.003	0.003
Head of family's education	2.04	-	0.229	0.229	0.266	-
Chronic disease	2.41	2.20	0.026	0.025	0.035	0.040
History of child birth	9.84	9.75	< 0.001	< 0.001	< 0.001	< 0.001
Maternal age	2.11	2.29	0.090	0.075	0.069	0.050
Parity	1.07	-	0.860	-	-	-
Antenatal care	2.27	2.51	0.050	0.045	0.031	0.025

OR, odds ratio

wait a long time or unsatisfactory treatment of officers is the cause of antenatal care is not optimal.

Another factor that becomes a weakness is that some mothers do not know they have to have their pregnancy checked, so the mother does not do it, difficult transportation, both for mothers to check their pregnancies and for midwives to come to them and the lack of traditional and family support that does not allow a woman to leave the house for have her pregnancy checked [20]. The use of novel early detection can be an effort to detect high-risk pregnancies early and respond to limited access to health facilities in health checks and the risk of high-risk pregnancies, so that pregnant women can facilitate their health checks and their risks.

Second, is the Maternity Planning and Complication Prevention Program which is a breakthrough effort in the context of accelerating the reduction of the maternal and newborn mortality rate through activities to increase access and quality of services, as well as an activity to build community potential, especially community awareness for preparation and action in save mothers and newborns [21].

The phenomenon currently faced is high-risk pregnancy diagnostic delays suffered by the community, this can be caused by ignorance of patients (patient delay), ignorance of doctors or medical personnel (doctor delay), or hospital delay. This is due to the low perception of risk of pregnancy, the majority of people tend to underestimate their personal risks which may have an important influence on early detection practices and attention to medical symptoms so that they can influence the delayed discovery of high-risk pregnancy.

Conclusion

This study confirmed history of childbirth and mother's level of education for high-risk pregnancy among Minangkabau ethnicity in Indonesia. The findings of risk factors for high-risk pregnancy can be determined through early detection and useful predictors so that women can detect high-risk pregnancy themselves.

Acknowledgments

References

1. Mulugeta AK, Giru BW, Berhanu B, Demelew TM. Knowledge about birth preparedness and complication readiness and associated factors among primigravida women in Addis Ababa governmental health facilities, Addis Ababa, Ethiopia, 2015. Reprod Health. 2020;17(1):15. https://doi.org/10.1186/s12978-020-0861-z
   PMid:31996221

2. World Health Organization. Maternal Mortality. Geneva: World Health Organization; 2019. Available from: https://www.who.int/news-room/fact-sheets/detail/maternal-mortality [Last accessed on 2022 Feb 01].

3. Wassihun B, Negese B, Bedada H, Bekele S, Bante A, Yeheyis T, et al. Knowledge of obstetric danger signs and associated factors: A study among mothers in Shashamane town, Oromia region, Ethiopia. Reprod Health. 2020;17(1):4. https://doi.org/10.1186/s12978-020-0853-z
   PMid:31948443

4. Mardiyanti I, Nursalam N, Devy SR, Ernawati E. The independence of pregnant women in early detection of high risk of pregnancy in terms of parity, knowledge and information exposure. J Public Health Afr. 2019;10:1180. https://doi.org/10.4081/jphia.2019.1180

5. Belay HG, Limenih MA. Intents of women on obstetric danger signs and its associated factors in Farta Woreda, Ethiopia, 2017. J Health Care Poor Underserved. 2020;31(1):140-52. https://doi.org/10.1353/hpu.2020.0014
   PMid:32037323

6. Communication and Community Service Bureau Ministry of Health. 4 Health Targets Must Be Achieved by 2019 (4 Target Kesehatan ini Harus Tercapai di 2019). Press Release; 2019. p. 1-4. Available from: https://www.depkes.go.id/article/view/18030700008/4-target-kesehatan-ini-harus-tercapai-di-2019.html [Last accessed on 2022 Jan 10].

7. Adisasmita A, Smith CV, El-Mohandes AA, Deviany PE, Ryon JJ, Kiely M, et al. Maternal characteristics and clinical diagnoses influence obstetrical outcomes in Indonesia. Matern Child Health J. 2015;19(7):1624-33. https://doi.org/10.1007/s10995-015-1673-6
   PMid:25656716

8. Bulatao RA, Ross JA. Which health services reduce maternal mortality? Evidence from ratings of maternal health services. Trop Med Int Health. 2003;8(8):710-21. https://doi.

org/10.1046/j.1365-3156.2003.01083.x

PMid:12869092

9. Anggondowati T, El-Mohandes AA, Qomariyah SN, Kiely M, Ryon JJ, Gipson RF, *et al*. Maternal characteristics and obstetrical complications impact neonatal outcomes in Indonesia: A prospective study. BMC Pregnancy Childbirth. 2017;17(1):100. https://doi.org/10.1186/s12884-017-1280-1

    PMid:28351384

10. De Brouwere V, Richard F, Witter S. Access to maternal and perinatal health services: Lessons from successful and less successful examples of improving access to safe delivery and care of the newborn. Trop Med Int Health. 2010;15(8):901-9. https://doi.org/10.1111/j.1365-3156.2010.02558.x

    PMid:20545915

11. Ngoc NT, Merialdi M, Abdel-Aleem H, Carroli G, Purwar M, Zavaleta N, *et al*. Causes of stillbirths and early neonatal deaths: Data from 7993 pregnancies in six developing countries. Bull World Health Organ. 2006;84(9):699-705. https://doi.org/10.2471/blt.05.027300

    PMid:17128339

12. Bayou G, Berhan Y. Perinatal mortality and associated risk factors: A case control study. Ethiop J Health Sci. 2012;22(3):153-62.

    PMid:23209349

13. Sparks PJ, McLaughlin DK, Stokes CS. Differential neonatal and postneonatal infant mortality rates across US counties: The role of socioeconomic conditions and rurality. J Rural Health. 2009;25(4):332-41. https://doi.org/10.1111/j.1748-0361.2009.00241.x

    PMid:19780912

14. Yao N, Matthews SA, Hillemeier MM. White infant mortality in Appalachian states, 1976-1980 and 1996-2000: Changing patterns and persistent disparities. J Rural Health. 2012;28(2):174-82. https://doi.org/10.1111/j.1748-0361.2011.00385.x

    PMid:22458318

15. Van de Poel E, O'Donnell O, Van Doorslaer E. What explains the rural-urban gap in infant mortality: Household or community characteristics? Demography. 2009;46(4):827-50. https://doi.org/10.1353/dem.0.0074

    PMid:20084831

16. Partridge S, Balayla J, Holcroft CA, Abenhaim HA. Inadequate prenatal care utilization and risks of infant mortality and poor birth outcome: A retrospective analysis of 28,729,765 U.S. deliveries over 8 years. Am J Perinatol. 2012;29(10):787-93. https://doi.org/10.1055/s-0032-1316439

    PMid:22836820

17. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: A large population based retrospective cohort study. Int J Epidemiol. 2007;36(2):368-73. https://doi.org/10.1093/ije/dyl284

    PMid:17213208

18. Tjandraprawira KD, Ghozali I. Knowledge of pregnancy and its danger signs not improved by maternal and child health handbook. J Obstet Gynecol India. 2019;69(3):218-24. https://doi.org/10.1007/s13224-018-1162-0

    PMid:31178636

19. Wulandari RD, Laksono AD. Urban-rural disparity: The utilization of primary health care center among elderly in East Java, Indonesia. J Adm Kesehat Indones. 2019;7(2):147-54. https://doi.org/10.20473/jaki.v7i2.2019.147-154

20. Laksono AD, Wulandari RD, Soedirham O. Urban and rural disparities in hospital utilization among Indonesian adults. Iran J Public Health. 2019;48(2):247-55. https://doi.org/10.18502/ijph.v48i2.819

    PMid:31205878

21. Vallely LM, Emori R, Gouda H, Phuanukoonnon S, Homer CS, Vallely A. Women's knowledge of maternal danger signs during pregnancy: Findings from a cross-sectional survey in Papua New Guinea. Midwifery. 2019;72:7-13. https://doi.org/10.1016/j.midw.2019.02.001

    PMid:30739884