PREGNANT WOMEN'S PREFERENCE FOR ANTENATAL CARE (ANC) PROVIDER: LESSONS LEARNED TO SUPPORT MATERNAL MORTALITY RATE REDUCTION STRATEGIES

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Abstract. The disproportionate number and distribution of healthcare workers and facilities have become a great challenge in reducing the maternal mortality rate (MMR) in Indonesia. This study aimed to analyze pregnant women's preference for antenatal care (ANC) providers to support MMR reduction strategies. This study used the 2018 Basic Health Research (Riskesdas) subset data. Data were analyzed from 75,155 female household members aged 10-54 years with inclusion criteria from 300,000 households spread across the 34 provinces in Indonesia. The variables studied include demographic characteristics, as well as the types of healthcare workers and their compliance in implementing ANC Minimum Service Standards (ANC-MSS). The data obtained were then processed using bivariate and binary logistic regression. Most pregnant women prefer to use midwives as their ANC providers. The majority of midwives have good compliance in implementing the ANC-MSS. Obstetrician service was relatively accessible in urban areas and very common among mothers with high education who are formal sector workers. Furthermore, obstetricians are the second most preferred antenatal provider by urban pregnant women because they tend to provide case management (TLK) immediately. Residential location, age, education level, and occupation were the significant factors influencing the selection of midwife's service. Midwives have a potential role in reducing MMR because they are the most pregnant women preference, good compliance in implementing ANC-MSS, and the most accessible to the community. Improving their competence and increasing the obstetrician-population ratio in focused areas with high

MMR and infant mortality rate (IMR) can provide valuable benefits in reducing the mortality rate.

Keywords: health seeking behavior, maternal, midwife, minimum service standards, obstetrician

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INTRODUCTION

Maternal mortality rate (MMR) is a health development indicator, and lower values indicate better health development. Furthermore, the MMR in Indonesia tends to fluctuate and is still far from the Millennium Development Goal 5 (MDG 5) global target of 102 per 100,000 live birth (World Bank, 2019; UNICEF, 2019). Its reduction involves the components of adequacy, affordability, and equitable distribution of healthcare workers and facilities, as well as the quality of antenatal care (ANC) and delivery services provided. In the last two decades, several efforts have been made to improve the adequacy and equitable distribution of healthcare workers and facilities to make them more accessible for pregnant and maternity mothers. Until 2019, there were 43,527 Health Posts, 20,407 Maternity Posts, and 54,312 midwives living in villages (MOH RI, 2019). Previous reports showed that 17.7% of villages in Indonesia lack permanent midwives as of 2019 (MOH RI, 2019). One of the efforts to improve antenatal care and delivery services is the ANC Program, which was implemented in 2011 (Communication Bureau, 2011). The program plays an important role in healthy and safe pregnancy, and it must be carried out by all pregnant women in order to monitor fetal development as well as to detect diseases or abnormalities early. ANC for normal pregnancy can be carried out by a midwife, general practitioner, or obstetrician. Meanwhile, if complications occur during pregnancy, pregnant

women are advised to consult obstetrician whose competencies are highest amongst ANC provider.

The disproportionate distribution of medical personnel and facilities, as well as the diverse curriculum modification in health workforce education institutions, contribute to the inequality of ANC services in Indonesia. To overcome these challenges, the government implemented the ANC Minimal Service Standards (ANC-MSS), also known as 10T, as a guideline for healthcare workers in providing antenatal services (MOH RI, 2014). This ANC-MSS consists of weight and height measurement (Timbang berat badan), blood pressure measurement (Tensi), fundal height measurement (Tinggi fundus uteri), tetanus toxoid immunization (status TT), iron supplementation (Tambah darah), Laboratory test (Tes), Counselling (Temu wicara), fetal heart rate monitoring (Tumbuh kembang bayi), assessment of nutritional status and case management (Counseling, Tata laksana kasus-TLK). Starting with 10 Ts, this ANC-MSS called as 10T in Indonesian language.

Several studies revealed that medical personnel's compliance with the ANC-MSS is still low in some populations, hence, there is a need for improvement (Hendarwan, 2018; Guspianto, 2012; Maryono, 2020; Dharmayanti *et al*, 2019). Detailed data about national-scale ANC services by healthcare workers and facilities are also not available.

To achieve the global Sustainability Development Goals (SDGs) target of 70 per 100,000 live births by 2030, a synergistic effort is needed to increase the proportionate distribution of healthcare workers and facilities, as well as to improve the quality of maternal services during pregnancy and after childbirth. Therefore, this study aims to analyze pregnant women's preferences for ANC providers to support MMR reduction strategies, as well as to assess the compliance of healthcare workers to ANC-MSS. The results are expected to serve as a policy recommendation to formulate strategies to reduce MMR, especially in prioritizing interventions based on the community's health-seeking behavior as well as medical personnel's compliance to ANC-MSS.

MATERIALS AND METHODS

Concept of this study is shown in Fig 1; the quality of a health facility is influenced by several factors, such as policies, budgets, equipment, infrastructure, human resources, and applicable standard operating procedures. These factors also have a major effect on the quality of antenatal care services for pregnant women. Furthermore, there are ten minimum service standards that must be met by healthcare workers who provide antenatal services to optimize the achievement of healthy pregnancies, safe deliveries, normal newborn babies, and safe mothers after labor. The ultimate goal of setting the minimum service standards is to control MMR and IMR.

Research design

The design research of this analysis is a cross-sectional, following the Riskesdas *2018* research design (Health Research and Development Agency, 2019). Riskesdas is community-based research, which is used for assessing health developments. It is held every five years using indicators that can describe the achievements at the national level up to the district/city level. The population of Riskesdas 2018 was all households in Indonesia, with a target sample of 300,000 households, spread across 34 provinces in the country. Sampling technique using the probability proportional to size – linear systematic sampling method with two-stage sampling to maintain the representativeness of the diversity value of household characteristics. This study used the 2018 Riskesdas subset data with following criteria, female member of household aged 10-54 years with the status of married/divorced/widow, had been pregnant, and has gone for a pregnancy check-up with a health worker about 75,155 respondents. Furthermore, data were collected with interviews using a structured questionnaire that can be accessed from URL: https://labmandat.litbang.kemkes.go.id/images/download/kuesioner/RKD/2018/236-kues_ind_rkd18.pdf. Riskesdas' 2018 data were used as the source, and they were obtained from the National Institute of Health Research and Development (NIHRD) through www.litbang.kemkes.go.id with certain requirements and procedures.

Variables

The variables studied include 1) demographic characteristics, such as family status, marital status, age, educational status, and employment status, 2) types of healthcare workers, and 3) health workers' compliance in implementing the ANC-MSS (10T), as shown in Fig 1. Maternal age factors were grouped into safe age (20-34 years) and high-risk age (10-19 years or ≥35 years) based on possible risks during pregnancy in teenage and old

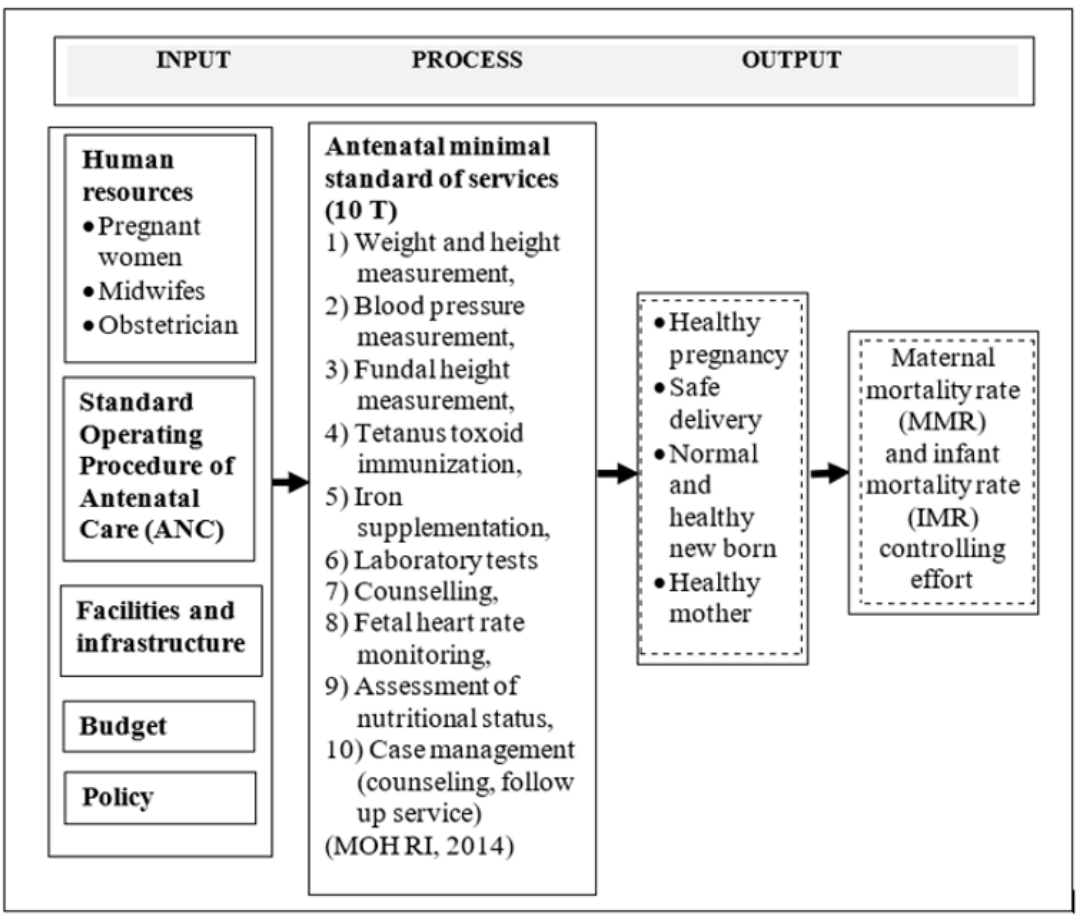

Fig 1 - Concept of the study

age (Socolov *et al*, 2017; Heazell *et al*, 2018; Sesunan *et al*, 2021). Education status was grouped into 2 categories, namely low (not school- senior high school) and high (Diploma/college). This classification of education based on President decree and Draft of Education System Law year 2022, that urges every citizen to get a minimum of 12 years of education (Sesunan *et al*, 2021; Ministry of Education, Culture, Research, and Technology, 2022; Ministry of Communications and Informatics, 2015). Employment status was also divided into 2 categories, namely formal sector worker and non-formal sector worker. Formal sector worker, known as white-collar worker, are people who work in offices, doing work that needs mental rather than physical effort. Included in formal workers are workers whose employment relationship is, in law or in practice, subject to national labor laws, income tax, social protection or property rights certain employment benefits (advance notice of dismissal, severance pay, paid annual or sick leave). While non-formal workers, known as blue-collar workers, comprises employers employed in their own informal sector enterprises, paid domestic workers employed by households and other employment that is not complied to labour regulations for any reason.

Statistical analysis

The data were processed using bivariate and binary logistic regression to describe pregnant women's preferences for healthcare workers, as well as the ANC-MSS compliance by the workers and facilities selected. Hosmer and Lemeshow test are used for explain the "goodness of fit" of the regression model. Furthermore, the data were analyzed descriptively and analytically presented in the form of cross-tabulation and odds ratio Statistical Package for the Social Sciences (SPSS) version 26 for windows (IBM, Armonk, NY) was used for all statistical analysis.

Ethical approval

Riskesdas 2018 received ethical approval from the Health Research Ethics Commission, National Institute of Health Research and Development

Number LB.02.01/2/KE.024/2018. All human consent requirements as subjects were met and were approved prior to data collection. This study has also obtained approval for using the 2018 Riskesdas subdata from the Health Research and Development Agency, Ministry of Health with letter number IR.03.01/4/3464/2021.

RESULTS

Antenatal care service provider

From the 2018 Riskesdas subset data, 75,155 respondents who met the analysis criteria were obtained. Based on sociodemographic variables, the distribution of responses to the types of health workers who offer ANC is shown in Table 1.

Table 1 shows that most of the community have their pregnancy checked by midwives. Respondents who lived in rural areas, had low education, and non-formal employment status were also often check their pregnancy at midwife practices. Meanwhile, obstetrician services were mostly accessed by people who lived in urban areas, with high education and formal employment status. Table 1 also shows that residence, marital status, age, education, and occupation status respondents impact the respondents' decision to choose the types of healthcare worker providing them the ANC (p<0.05). The binary logistic regression analysis shows that residence, marital status, age, education and occupation status respondents are significant (p<0.05) on the decision of midwife as the most preference pregnant women, as shown in Table 2. Furthermore, pregnant women in rural areas had a 3.46 times chance of checking their pregnancies with midwives compared to others living in urban areas. Pregnant mothers who are divorced or widow had a 1.33 times chance of going for an antenatal check-up with their services compared to others who are married. The result also showed respondents with safe aged (20-34 years) category have a 1.12 times chance of having their pregnancy checked by a midwife compared to high-risk aged category (10-19 years or ≥35 years). Women with low educational status have 5.35 times chance of going for check-up with midwife service compared to others with high education.

Table 1

Bivariate analysis of the demography social respondent toward the types of healthcare worker providing antenatal care

Demographic characteristic	Type of healthcare worker providing antenatal care (N = 75,155)					
	Obstetrician	General practitioner	Midwife	Nurse	Total	*p*-value
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	
Residence						<0.001
Urban	7,263 (22.8)	366 (1.1)	24,196 (75.9)	73 (0.2)	31,898 (100.0)	
Rural	2,923 (6.8)	370 (0.9)	39,791 (92.0)	173 (0.4)	43,257 (100.0)	
Status in Family						0.376
Head of the family	215 (13.0)	21 (1.3)	1,411 (85.3)	8 (0.5)	1,655 (100.0)	
Non-head of the family	9,971 (13.6)	715 (1.0)	62,576 (85.1)	238 (0.3)	73,500 (100.0)	
Marital Status						0.008
Married	9,980 (13.6)	712 (1.0)	62,374 (85.1)	238 (0.3)	73,304 (100.0)	
Divorced and widow	206 (11.1)	24 (1.3)	1,613 (87.1)	8 (0.4)	1,851 (100.0)	
Age						<0.001
High risk (10-19 years or ≥35 years)	3,703 (14.4)	255 (1.0)	21,723 (84.3)	84 (0.3)	25,765 (100.0)	
Safe (20-34 years)	6,483 (13.1)	481 (1.0)	42,264 (85.6)	162 (0.3)	49,390(100.0)	

Table 1 (cont)

Demographic characteristic	Type of healthcare worker providing antenatal care (N = 75,155)					
	Obstetrician	General practitioner	Midwife	Nurse	Total	*p*-value
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	
Education						<0.001
High (University)	4,525 (42.6)	131 (1.2)	5,930 (55.9)	24 (0.2)	10,610 (100.0)	
Low (≤Senior high school)	5,661 (8.8)	605 (0.9)	58,057 (89.9)	222 (0.3)	64,545 (100.0)	
Occupation						<0.001
Formal	3,048 (37.7)	112 (1.4)	4,900 (60.7)	18 (0.2)	8,078 (100.0)	
Non formal	7,138 (10.6)	624 (0.9)	59,087 (88.1)	228 (0.3)	67,077 (100.0)	

Source: Health Research and Development Agency (2019)

Table 2
Multivariate binary logistic regression of the social demographic factors toward the most pregnant women preference (midwife and obstetrician)

Sociodemographic characteristic of respondent	Midwife and obstetrician as the most preference pregnant women (n = 74,173)		
	SE	aOR (95% CI)	p-value
Residence			
Rural	0.025	3.46 (3.30-3.63)	<0.001
Status in family			
Non-head of the family	0.087	1.16 (0.98-1.68)	0.081
Marital status			
Divorced and widow	0.087	1.33 (1.12-1.57)	<0.05
Age			
Safe (20-34 years)	0.025	1.12 (1.06-1.17)	<0.001
Education Status			
Low (≤Senior high school)	0.029	5.35 (5.06-5.66)	<0.001
Occupation			
Non-formal	0.032	1.79 (1.68-1.91)	<0.001
Constant (-1.957)		0.092	<0.001

Source: Health Research and Development Agency (2019)
aOR: adjusted odds ratio; SE: standard error

Mothers in the non-formal employment sector had a 1.79 times chance of having antenatal care provided by midwife compared to others who work in the formal sector. The decision to choose a midwife or others as the ANC service provider has nothing to do with being the head of the family or not (p>0.05).

Hosmer and Lemeshow test (p<0.05) showed that the regression model results did not explain the data adequately. Simultaneous modeling of the

six demographic status variables on the selection of midwives only accounted for 23% of the decisions (Nagelkerke R square), while the remaining 77% was caused by other factors/variables. As whole, the percentage of prediction accuracy for pregnant women preference to midwife is 87% (Classification table = 87%).

Compliance of healthcare workers toward the minimal service standard of ANC (ANC-MSS) - 10T

Table 3 shows that blood pressure measurement was implemented by >90% of health workers. Meanwhile, fetal heart rate monitoring and iron supplementation were carried out by 80-90%. Based on the type of healthcare workers, midwives have a higher percentage in most aspects of ANC-MSS (10T) implementation compared to others, but obstetricians are more skilled in examining the fetal heart rate. Table 3 also shows that obstetricians tend to provide case management (TLK) immediately after counselling.

DISCUSSION

The data processing results showed that most of the respondents have their pregnancies checked by midwives over obstetricians who had higher competency in managing complications during gestation. Influential factors for the selection of ANC service providers include residential location, marital status, age group, education level, and the employment sector. These findings are consistent with several studies, such as Andersen's theory that the factors influencing the use of health services include age, education, and employment (Andersen, 1995; Rurangirwa *et al*, 2017; Furuta and Salway, 2006).

Our results study (Table 2) finds that there is greater chance of the safe-maternity age group (20-34 years) choose midwife to have ANC services, compared to the high-risk maternity group (10-19 years or ≥35 years). This result is consistent with the competency level of the providers, which indicates that obstetricians are more qualified than midwives to manage cases of high-risk pregnancies. According to a cohort research conducted in Romania,

women who got pregnant before the age of 20 had a higher probability of experiencing postpartum hemorrhage, cephalopelvic disproportion, episiotomy, uterine revision, APGAR 7 at 1 minute, and premature birth at 37 weeks (Socolov *et al*, 2017). Compared to the 20–34-year age group, this group also had comorbid risk factors for anemia, low urinary tract infection, pediculosis, anogenital condyloma, and trichomoniasis (Socolov *et al*, 2017). Another study found that women who became pregnant before the age of 35 were more likely to have a stillbirth, a baby that was small for gestational age, preterm birth, preeclampsia, and maternal death. These risks increase with age. This could be due to the maternal cardiovascular and endocrine systems aging, which affects placental function (Heazell *et al*, 2018). The dominance of midwives' activities in rural areas shows that they are more accessible compared to other health care providers. In Andersen's theory, services existence is an enabling factor in the utilization of healthcare services (Andersen, 1995). One of the factors influencing the high preference of rural communities for midwives is their affordability and availability. The distribution of nurses, midwives, doctors and specialists in Indonesia is still disproportionate. The ratio of midwives and nurses to the population is greater than the ratio of general practitioners (MOH RI, 2019).

It is a good phenomenon for people to have their pregnancies checked by midwives due to the autonomy recognition and competence of midwives in carrying out antenatal care and physiological deliveries (International Confederation of Midwives, 2014). The partnership between them and traditional birth attendants also contributes to this high preference. This is because rural communities with socio-cultural beliefs still prefer traditional birth attendants (Widayanti *et al*, 2020; Hayati *et al*, 2018). The National Health Insurance financing scheme, which is widely used by the public and obliged for every pregnant woman, often provides antenatal care through midwife service, as the first level of the referral system (Social Security Agency for Health, 2014). In the situations with several limitations, alternative policies can be implemented, such as increasing the competence of healthcare workers as well as deploying more health resources and facilities in priority areas with high maternal mortality cases (Pozo-martin *et al*, 2017; Anselmi *et al*, 2015).

Based on Tables 1 and 3, the majority of pregnant women received proper treatment from midwives with sufficient competence and compliance to the predetermined service standards. Improvements are needed in laboratory tests, especially hemoglobin and proteinuria levels, as well as counseling due to their large contribution to ANC outcomes, namely safe delivery and healthy babies (Goldenberg *et al*, 2018). Blood samples test is a problem faced by most low to middle-income countries (Arsenault *et al*, 2018), such as Indonesia's geographical obstacles. The counseling materials in the mother and child's health (MCH) handbook as well as the pocketbook of the alert village cadres are relatively comprehensive (Health Promotion Center, 2014; Firmansyah, 2020). Concerns on the way the materials are delivered also need to be addressed because previous studies showed that midwives believe the counseling sessions are unimportant (Heru *et al*, 2012). Meanwhile, another study revealed that there was knowledge improvement in pregnant women after they were counseled during antenatal care visits, especially when the midwife used proper teaching aids (Firrahmawati and Kustiyati, 2017; Mahdalena and Barus, 2019)

The strength of this study is that a large amount of data was used for national representation. Subset data from surveys that have been carried out previously were also analyzed, hence, the variables processed are limited from the accepted types. Several variables found in previous studies that are related to the compliance of healthcare workers toward ANC-MSS cannot be analyzed.

In summary, most women in every social-demographic class prefer midwives as their ANC provider, while women in urban area and who are working in formal sector prefer obstetrician. Midwives are more preferred due to their accessibility in term of distance and cost. Study finding also reveals that midwives have highest compliance compared to other health workers in term of carrying out MSS-ANC. Therefore, increasing the competence of midwives and the ratio of obstetricians in areas with high maternal and infant mortality rates is a strategic option. Several methods, such as raising pregnant women's awareness of the importance of a complete test, must also be developed to ensure increased compliance of all healthcare workers in

Table 3
Research characteristics

Types of Healthcare workers	The ANC Minimal Service Standards/ANC-MSS (N = 75,155), *n* (%)										
	Weight and height	Blood pressure	Fundal height measure-ment	Tetanus toxoid immuniza-tion	Iron supple-mentation	Laboratory test	Fetal heart rate monitoring	Assess-ment of nutritional status	Counseling	Follow up service	Counseling and Follow up service
Obstetrician	6,641 (65.2)	9,985 (98.0)	8,482 (83.3)	6,358 (62.4)	8,562 (84.1)	3,856 (37.9)	9,711 (95.3)	7,369 (72.3)	6,756 (66.3)	414 (4.1)	2,681 (26.3)
General practitioner	491 (66.7)	712 (96.7)	607 (82.5)	519 (70.5)	646 (87.8)	222 (30.2)	688 (93.5)	584 (79.3)	513 (69.7)	34 (4.6)	142 19.3)
Midwives	45,660 (71.4)	62,824 (98.2)	57,879 (90.5)	48,606 (76.0)	58,505 (91.4)	18,522 (28.9)	60,580 (94.7)	54,444 (85.1)	46,060 (72.0)	2,325 (3.6)	13,025 (20.4)
Nurse	156 (63.4)	231 (93.9)	188 (76.4)	194 (78.9)	208 (84.6)	47 (19.1)	202 (82.1)	196 (79.7)	162 (65.9)	18 (7.3%)	48 (19.5)

Source: Health Research and Development Agency (2019)

carrying out the 10T during antenatal care. The quality of ANC counseling sessions can also be improved by using the appropriate teaching aids.

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CONFLICT OF INTEREST DISCLOSURE

The authors declare no conflicts of interest.

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