Antenatal care quality measurement conducted by midwives in Karawang, Indonesia

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ABSTRACT

Antenatal care standards currently deals with the implementation of 10T (Indonesian Abbreviation), which consist of measurements weight and height, blood pressure checks, examination of uterine fundus, Tetanus Toxoid immunization, administration of Fe tablets, assessment of nutritional status, laboratory tests, assessment of fetal heart rate and presentation, case management and counseling. This study aims to identify the implementation of antenatal care performed by midwives in Karawang District based on the 10 T antenatal care standards. This is a quantitative study, which used the descriptive-analytic design and was conducted for six months. The results showed that measurement of fundus height, nutritional status, TT immunization, determination of fetal heart rate as well as waiting time, reached a standard of above 85%. The measurements weight and height, administration of Fe tablets, tests laboratory, case management, counseling, and service duration are standard care with an achievement rate of less than 85%. The quality of midwifery service and compliance in conducting antenatal care according to the 10T standard need to be improved for early detection of complications to prevent maternal deaths in Karawang Regency.

1. Introduction

Since 2002, WHO has set antenatal visit standards of at least four visits during pregnancy, once in the first and second trimesters, and twice in the third trimester. In Indonesia, the first antenatal visit is called K1, while the 4th in the third trimester is called the K4. Dixit, Khan, Dwivedi, & Gupta, 2017 stated that Indonesia is the country with the highest antenatal coverage in southeast Asia at a rate of 93.3% in 2012, due to the high rate of maternal mortality in 2016, the Ministry of Health of Indonesia put more effort as one of the response to reduce maternal mortality, which were promoting 10 minimum standards that need to be carried out by health workers when performing antenatal services, including measuring the weight and height; blood pressure; determination of nutritional status (Measuring Upper Arm Circumference/MUAC); height of the fundus uterus; Determining fetal presentation and heart rate (FHR), Screening for tetanus immunization status and providing Tetanus Toxoid (TT) immunization, Giving a minimum of 90 Fe tablets, Laboratory tests, hemoglobin (Hb) level test, blood type examination, urine protein examination, case management, and health education then are commonly referred to as the 10T standard antenatal care in Bahasa terminology (Achadi, 2019; Budjianto, Sibuea, Widiantini, Indrayani, & Wardah, 2019; Dixit et al., 2017; Kemenkes RI, 2010; Kementrian Kesehatan Republik Indonesia, 2016; WHO, UNICEF, UNFPA, Group, & UNPD, 2015).

Kementrian Kesehatan Republik Indonesia (2019) reported that the proportion of the 10T care component in West Java province has an average of over 90% except for body height, MUAC, fundus height, and Tetanus Toxoid (TT) immunization, which is in the proportion of 63.2-86. 2%. This shows that in general, the achievement of the antenatal care component based on the 10T standard has been quite successful, although certain aspects need improvement (Kementrian Kesehatan Republik Indonesia, 2019). Karawang regency seems to have successful coverage in K1 and K4 since the data revealed that K1 coverage in 2010 was 99.82% and K4 was 94.82% (Dinkes Jawa Barat, 2018; Nurdiana & Setiawati, 2018). However, Karawang Regency continued to experience frequent maternal mortality due to post partum haemorrhage (PPH), preeclampsia and heart diseases. In 2018, approximately 21.7% of maternal deaths were caused by PPH, another 21.7% of maternal deaths by preeclampsia, and 10.9% by heart disease (Karawang, 2019; Nurdiana & Setiawati, 2018). These incidences of PPH, preeclampsia, and heart diseases actually may be prevented, because it could be detected in early during a pregnancy checkup, therefore, it is important to assess all the potential risk within antenatal care visit (Achadi, 2019; Baharuddin et al., 2019; McClure et al., 2014)

Have the phenomena described within this background, it is essential to conduct a research on the implementation of the 10T antenatal care in Karawang Regency. Furthermore, two standard criteria based on the study Dettrick *et al.* (2016) and Soliman (2015) such as duration and the service was implemented (Dettrick et al., 2016; F. E.-S. Soliman, 2015). The purpose of this study was to measure the quality of antenatal care conducted by midwives in Karawang District based on the 10T and addition of the two quality standard criteria.

2. Method

This was a quantitative study and the population was 864 midwives in 50 regions in Karawang regency. After sample calculation has been done, 70 selected subjects to be included to this study. A total of 70 subjects was obtained through proportional sampling. Inclusive criteria was midwives who work at community health center or private practice, with there is not limitation in age and education. Data collection used blind observation where midwives didn't know that they were selected as a respondent of this study, this observation method is allowed to maintain the objectivity of the observing target (Dahlan, 2016).

The authors observed all the antenatal care standard carried out by midwives and then the assessment results were included in the check list, while the characteristic of respondent obtained from the interview. This is an analytic quantitative research which used cross sectional design, the antenatal care standard assessment result were analyzed univariatel, while the cumulative score analyzed bivariately with age, education and services place as confounding variable, bivariate analysis used fisher exact and chi square test, data analysis used SPSS 25 (Dahlan, 2016). This study is approved by Universitas Singaperbangsa Karawang Research department with approval letter number 1803/SP2H/UN64/PP/2019 and The office of National and Political Unity Karawang District with letter number 070.1/400/KSBAM/2019.

3. Results

Karawang is one of the provinces in West Java. It consists of 30 districts and 297 villages, with a total population of 2,316,489 people, there are 46 cases of maternal mortality in 2018, due to preeclampsia, bleeding, and heart disease (Statistik, 2018).

Maternal mortality rate is the frequency of death during pregnancy, labor and afterbirth, with its rate calculated per 100,000 live births. According to recent data, approximately 22% of deaths occur in countries with low incomes such as Indonesia, which ranks 3rd after Myanmar and Laos, and 62nd in the world. Say, Souza, & Pattinson, (2009) stated the causes of maternal deaths are abortion (8%), embolism (3%), bleeding (27%), hypertension (14%), sepsis (11%), indirect causes (27%), another immediate causes (10%) (Say et al., 2009). The implementation of antenatal care standard evaluation has been published in a journal written by Triyana and Shankar (2017). The article stated that out of the 12 antenatal care standards, the average midwives take only measurements of blood pressure, maternal weight and measurement of the fetal heart rate, while the other 9 care standards are

rarely performed. Achievement rates are less than 50% of the total respondents of 2,369 pregnant women (Triyana & Shankar, 2017).

Table 1. Results of Achieving ANC Quality by Midwives in Karawang District

Antenatal Care Standards	F N=70	%
Height and Weight Measurements		
Inappropriate to the standard	20	28,6
Appropriate to the standard	50	71,4
Blood Pressure Measurement		
Inappropriate to the standard	0	0
Appropriate to the standard	70	100
Measurement of uterine fundus height		
Inappropriate to the standard	0	0
Appropriate to the standard	70	100
Screening TT		
Inappropriate to the standard	2	2,9
Appropriate to the standard	68	97,1
Distribution of Fe Tablet		
Was not conducted	12	17,1
Conduct	58	82,9
Nutritional Status Measurement		
Was not conducted	5	7,1
Conduct	65	92,9
Lab Test		
Was not conducted	13	18,6
Conduct	57	81,4
Fetal Heart Rate Examination and Presentation		
Was not conducted	2	2,9
Conduct	68	97,1
Case Manageement		
Was not conducted	20	28,6
Conduct	50	71,4
Counseling		
Inappropriate to the standard	35	50
Appropriate to the standard	35	50
Waiting Duration		
≥30 Minutes	7	10
<30 Minutes	63	90
Mean	12	
Minimum-maximum	1-40	
Service Duration		
≤10 minutes	38	54,3
>10 minutes	32	45,7
Mean	13	
Minimum-Maximum	3-30	
ANC Score		
Low	26	37,1
High	44	62,9
Mean	12	
Minimum-Maximum	8-14	

The results in table 1 shows that 100% of midwives in Karawang District conducted blood pressure measurements at every pregnancy visit, 100% of midwives measured fundal height, 17% of midwives fail to provide Fe tablets to their patients in accordance with the minimum standard, which is 90 tablets during pregnancy, 92.9% of pregnant women that attended antenatal had their nutritional status measured using both BMI and MUAC, 18.6% did not receive laboratory examination services, 97.1% of midwives examined fetal heart rates and fetal presentations, 28.6% of midwives did not administer case management to patients, this study achieved 50% counseling standards, most pregnant women wait less than 30 minutes to acquire these services.

Combining assessment of the quality of pregnancy care based on the 10T standard is outlined in the ANC score variable, which is divided into 2 classifications, namely low and high. It is low when the achievement is less than the median value of 12 and high when the merging score is more than or equal to 12. Furthermore, the confounding variables were analyzed and the results shown in tables 2, 3 and 4.

Table 2. Relationship of Midwife Education with Antenatal Care Score

Education	ANC Score				P* Value
	Low		High		
	n	*%*	*n*	*%*	
D3	24	38,7	38	61,3	0,367
D4	2	25	6	75	
Total	**26**	**37,1**	**44**	**62,9**	**100**

Fisher's Exact Test

In accordance with the findings in Tables 2, midwives provide services in the field are no lower than those with diploma education. Therefore, there is no significant difference in services offered by graduates of diploma. However, according to the results of the study in table 3, the place of service tends to affect the quality of care provided.

Table 3. Relationship between Place of Service and Antenatal Care Score

Service Place	ANC Score				P* Value
	Low		High		
	n	*%*	*n*	*%*	
Community health centers or integrated service posts	5	19,2	21	80,8	0,03
Midwives Private Practice	21	47,7	23	52,3	
Total	**26**	**37,1**	**44**	**62,9**	**100**

Chi-Square Test

Approximately 80.8% of ANC in community health centers received high score. This number is more than those that provided care in midwifery private practice. The results of the analysis proved a significant relationship between the place of service and the achievement of the ANC score (P-value <0.05).

Table 4. Relationship of Midwife Ages with Antenatal Care Score

Age	ANC Score				P* Value
	Low		High		
	n	*%*	*n*	*%*	
≤30	8	53,3	7	46,7	0,123
>30	18	32,7	37	67,3	
Total	**26**	**37,1**	**44**	**62,9**	**100**

Fisher's Exact Test

Table 4 shows 67.3% of midwives offered antenatal care services for over 30 years received high scores (52.3%). The results of the analysis proved that there was no significant relationship between age and achievement of the ANC score (P value> 0.05).

By 100% compliance of blood pressure measurement standard (table 1) Karawang Midwives have the appropriate action of early detection of preeclampsia which is needed to prevent the maternal mortality in Karawang, pregnancy-induced hypertension (PIH) causes 6-10% of complications in pregnancies. PIH refers to one of four conditions, namely: a) preexisting hypertension, b) pregnancy hypertension and preeclampsia (PE), c) preexisting hypertension plus gestational hypertension accompanied by proteinuria, and d) non-classified hypertension. PIH is the leading cause of maternal, fetal, and newborn morbidity and mortality.

4. Discussion

Women suffering from PIH have a greater risk of placental abruption, cerebrovascular events, organ failure, and disseminated intravascular coagulation. The fetus is at a greater risk of intrauterine growth retardation, prematurity, and intrauterine death (Kintiraki, Papakatsika, Kotronis, Goulis, & Kotsis, 2015).

Appropriate measurement of blood pressure in pregnant women aids in the early detection of hypotension. The incidence causes secondary shock, and this leads to bleeding, while early diagnosis aids in the management of preeclampsia. However, in underdeveloped countries, there are a lot of sub-standard service deliveries, and the use of cheap blood pressure gauges affects the accuracy when conducted by health workers.(Beardmore Gray, Dyer, & Shennan, 2019)

The occurrence of preeclampcia is getting higher in women with obesity, therefore, measurements of weight and height need to be conducted, not only because it is related to the weight and height of babies born but it is also related to the risk of preeclampsia, study found that mothers with low height tend to have children that experience growth disorders. (Addo, 2013) conducted a study to determine the relationship of maternal weight with the incidence of preeclampsia. It was conducted using a cohort method on 503,179 mothers in their first pregnancies. The results found that those with a height below 164 cm had a low risk of preeclampsia, while obsessed mothers stand a risk of preeclampsia (Addo et al., 2013; Sohlberg, Stephansson, Cnattingius, & Wikström, 2012).

Table 2 states that 28.6% of midwives did not measure height and weight. Based on observations, the nonconformity occurred due to the absence of equipment used to measure the height at the health service facility. Contrary to the Minister of Health Regulation No. 28 of 2017, height measuring devices are one of the tools required in establishing midwife practices (Kementerian Kesehatan Republik Indonesia, 2017). As a solution to absence of the equipment the nutritional status can be administered through the measuring upper arm circumference (MUAC) as stated by Fakier, Petro, & Fawcus, (2017) which stated that both BMI and MUAC examination need to be conducted in both pregnant and non-pregnant conditions. In a fairly limited health care facility, MUAC examination is an alternative method and it is easier than the BMI measurement.(Fakier et al., 2017).

Benítez Brito et al. (2016) conducted a research on 1373 patients by measuring weight (BW), height, body mass index (BMI) and upper arm circumference (MUAC), the results stated that measurements of the body mass index and upper arm circumference, had significant results and are appropriate for determining nutritional status. Ultimately BMI and LILA measurements are accurate methods for determining nutritional status.(Benítez Brito et al., 2016)

Other main cause of maternal mortality in Karawang is PPH, based on the pathophysiology of bleeding during childbirth and puerperium, these occurrences are avoided by preventing anemia during pregnancy through the provision of micronutrient supplementation in the form of Fe tablets and folic acid supplementation. This supplementation aids in producing optimal baby conditions, reduces infant mortality, and prevents low birth weight (Smith et al., 2017). Fe tablet supplementation is something that needs to be administered to pregnant women, especially those in developing and underdeveloped countries because Fe deficiency leads to maternal anemia and this results in maternal or infant mortality (Hovdenak & Haram, 2012).

Anemia during pregnancy can be known through the proper laboratory testing but in fact laboratory tests is one of the elements used to assess the quality of antenatal care standards with still not achieved 100% compliance. This is contrary to the Minister of Health regulation No. 59 of 2013 concerning laboratory examinations for, childbirth, and postpartum mothers. Routine laboratory examinations need to be conducted on pregnant women, childbirth, and postpartum mothers in order to detect their hemoglobin and blood types. Women need to be encouraged to perform HIV and malaria examinations. They are also expected to perform other laboratory examinations that might

help detect other diseases that might result in complications. (Menteri Kesehatan Republik Indonesia, 2013).

Antenatal care is crucial competency that needed not only to prevent maternal mortality but also to examine the fetal wellbeing, International Confederation of Midwives (2018) agreed that midwives need to be able to perform specific tasks such as determining the health status of pregnant women, assessment of the fetus, monitoring the progress, conducting promotional efforts and supporting healthy behaviors which enhances maternal health, prepare anticipatory steps, conduct early detection, treatment and referral of patients with complications and help determine the appropriate place of birth (International Confederation of Midwives, 2018).

Measurement of fundal height, leopold palpation, TT immunization and measuring fetal heart rate are the standards that performed to check the fetal well-being. According to the study conducted by Pay et al (2015) a systematic review states that the measurement of fundal height may be used as a clinical indicator for specific pregnancy conditions coupled with the results obtained from other medical examinations such as a previous obstetric history and the current medical condition of pregnant women (Aase Serine D. Pay et al., 2015).

Furthermore, fundal height measurement is essential to predict the baby weight along with the age pregnancy consideration, because the effectiveness and efficiency of fundal height examination without considering gestational age contradicts the results of a study conducted on 42,018 first time pregnant women in Sweden. It was deduced that measurement of fundal height taken at 24 weeks gestation tends to predict a baby's weight by 3%, whereas measurements at 40 weeks tend to predict a baby's weight by as much as 40%. Based on this, it was deduced that the measurement of fundal height at the end of pregnancy has more accurate predictions than in early pregnancy.(A. S.D. Pay, Frøen, Staff, Jacobsson, & Gjessing, 2016).

Administering TT immunization is very important due to its ability to prevent the fetal death, this provides 91.4% protection in the first 2 months of birth, 69% in the first birth year, 87.9% before the baby receives its first DPT immunization, 81.4% between DPT 1 and 2, and 65.9% after the DPT 3 immunization (Baxter, Bartlett, Fireman, Lewis, & Klein, 2017; Khan, Zahidie, & Rabbani, 2013). Based on the research conducted by Lewis & Klein (2017), it was discovered that out of 278 pregnant women that attended antenatal, 98.9% received TT immunization, while only 82% were properly screened and this is in line with the study in table 2.

Fetal wellbeing during pregnancy observed through examination of fetal heart rates and fetal presentations. Based on observations, midwives used fetal Doppler to examine the fetal heart rates while Leopold palpation was used to detect its presence. The results obtained were in line with the study of Stampalija et al. (2012) which stated that the examination of fetal heart rate can be carried out using cardiotocography (CTG) and traditional fetal Doppler telemetry, however, examination using CTG is preferred because it prevents the mobilization of patients and the intervention of midwives. In addition, CTG examination results also aid in preventing wrong obstetrical interpretations.(Ressl & O'Beirne, 2015; Stampalija et al., 2012).

Leopold palpation is used to examine the baby's position to increase the contact and frequency of communication between mother and baby. Additionally, Leopold palpation performed at 32, 34- and 36-weeks' gestation, increases the chances of detecting any abnormal fetal position, however, to avoid the occurrence of abnormal positions that might not be detected during delivery, the Leopold palpation and vaginal examination must be conducted. Health professionals in clinics are advised to use ultrasound.(Nishikawa & Sakakibara, 2013; Ressl & O'Beirne, 2015).

Health workers also need to have an in-depth knowledge of FHR measurements, because it is used to aid in understanding the basic pathophysiology of fetal heart rate. This knowledge is useful because it aids in the safety of the baby at birth. Examination of FHR in infants is precisely useful for early detection of hypoxia in infants. FHR measurement is performed using fetal doppler or

cardiotocography (Clark et al., 2017; Martis, Emilia, Nurdiati, & Brown, 2017; Nageotte, 2015).

After conducting several examinations related to maternal and fetal wellbeing midwives needs to conduct proper assessments of the mother's pregnancy, provide information to the spouse or family. When discomfort is detected, the expectant mother is provided health education when any sign of danger is detected (International Confederation of Midwives, 2018). Missing case management of patient contradicts the essential competencies outlined by ICM. The inability of midwives to conduct case management contributes to maternal mortality events caused by delay in recognizing danger signals in expectant mothers. This is happening in other developing countries such as Rwanda. Factors that contribute to maternal mortality events are the occurrence of 3 delay factors, that is, delay in seeking help, delay of going to health care facilities, and delay in getting appropriate managements due to difficulty in recognizing danger signs in pregnancy. In addition, economic conditions can also be one of the factors that influence delays in reaching health care facilities (Musafili *et al.*, 2017).

Currently, there are some midwives that offer substandard health education services. Contrary to the research of Alimoradi, Taghizadeh, Rezaypour, & Mehran, (2013) which stated that communication skills are fundamental and need to be owned by midwives. It strengthens the relationship between health workers and patients due to the information delivered, which is well assimilated by the patient (Alimoradi *et al.*, 2013).

Health workers need to be able to build a good relationship between themselves and patients, this creates delivery of information and the quality of services provided. According to Borrelli (2014), a good midwife needs to possess several abilities namely theoretical knowledge, professional competence, personal quality, communication skills, and moral/ethical values (Borrelli, 2014; Mosadeghrad, 2014). As a healthcare provider infrastructure fulfillment is other necessity that needed to be concerned as well as personal competencies, Soliman (2015) conducted a study on the satisfaction of pregnant women with the quality of services offered in clinics. The study was conducted in 14 different healthcare centers in the city of Tanta, Egypt. The result shows that the waiting room conditions and duration of service is an element for patient satisfaction due to its cleanliness, proper ventilation and good lighting condition (E. Soliman, 2015).

Pillay et al. (2011) which stated that the waiting time for antenatal services is prolonged. The results of a study conducted in 21 public hospitals in Malaysia had an average waiting time of 2 hours for admitted patients, and 15 minutes to contact health workers. The duration of a patients' waiting time is caused by the attitude of health workers in providing services, work culture, and the ratio of the number of sick patients to health workers (Pillay et al., 2011). While this study found that the waiting time and contact duration at community health center and midwife private practice are shorter than in public hospital.

Mosadeghrad (2014) stated that the factors which tend to affect the quality of services are the existence of a good relationship between patients and health workers, followed by conducive environmental conditions, good health care systems, and health service organizations. Therefore, the health services provided need to be supported by good environmental conditions (Mosadeghrad, 2014). From the consumer perspective, skills, patients, midwifery experience, and managerial work patterns have a more significant impact on the quality of health care compared to financial factors. Consumers tend to appreciate good service even though it is expensive compared to cheap ad poor quality service (Durdyev, Ihtiyar, Ismail, Ahmad, & Bakar, 2014).

5. Conclusion

The quality of midwifery service and compliance in conducting antenatal care according to the 10T standard need to be improved for early detection of complications to prevent maternal deaths in Karawang Regency.

6. Recommendation

Midwives in Karawang Regency need to improve the quality of services and compliance in conducting antenatal care according to the 10T standard, especially in the areas of weight and height measurements, administration of Fe tablets, laboratory tests, case management, counseling, as well as the need to be accurate and not in a hurry when delivering services. This aids in the early detection of complications and the prevention of maternal deaths in Karawang Regency.

Acknowledgment

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