

## ANTENATAL CARE IN THE DETECTION OF PREGNANCY COMPLICATIONS: SYSTEMATIC LITERATURE REVIEW

Supiani<sup>1\*</sup>, Sulistyaningsih<sup>2</sup>, Indriani<sup>3</sup>

<sup>1</sup> Student of Magister Midwifery, 'Aisyiyah University Yogyakarta Jalan Ringroad Barat No.63, Mlangi, Daerah Istimewa Yogyakarta

<sup>2</sup> Lecturer of Health Service Faculty, 'Aisyiyah University Yogyakarta Jalan Ringroad Barat No.63, Mlangi, Daerah Istimewa Yogyakarta

<sup>3</sup> Lecturer of Physical Therapy, 'Aisyiyah University Yogyakarta Jalan Ringroad Barat No.63, Mlangi, Daerah Istimewa Yogyakarta

\*corresponding author: supianisaraf@gmail.com

### Abstrak

It is estimated that around 15-20% of pregnant women will experience high risk or obstetric complications both during pregnancy and childbirth. The direct causes of maternal death are hemorrhage (28%), eclampsia (24%) and infection (11%). The indirect causes of maternal mortality are Chronic Energy Deficiency in pregnancy (37%) and anemia in pregnancy (40%). One preventive effort to reduce the problem of maternal mortality in Indonesia is through antenatal care. Antenatal care in the form of prenatal checks to optimize the mental and physical health of pregnant women. The aim of this study was to determine the effect of antenatal care as the effort of early detection of high-risk pregnancy. This Systematic Literature review employed database from PubMed and ScienceDirect during 2014-2018. There were 439 initial articles identified. This study analyzed 6 articles that met the inclusion criteria. In early pregnancy, complications were difficult to detect, so a good antenatal care could be seen from the presence of pregnant women in antenatal visits; the effectiveness of antenatal care and the coverage of antenatal care could effectively detect pregnancy complications earlier. Pregnancy is a normal life cycle that most women must go through, but the normal conditions can threaten the lives of mothers and their babies if complications arise during pregnancy or during childbirth. Therefore, detection of pregnancy complications is very necessary so some efforts can be done to eliminate or minimize complication.

### 1. INTRODUCTION

WHO estimates that 901,000 deaths are related to pregnancy and childbirth, global maternal mortality is 37% worldwide (Buchmann, Sa, Stones, & Thomas, 2016). Indonesia still has a higher Maternal Mortality Rate (MMR) than the previous year, which is 359 per 100,000 live births [1]. This figure is still quite high when compared to neighboring countries in the ASEAN Region. Maternal mortality occurs of direct causes of medical complications such as bleeding, high blood pressure and sepsis, while indirect causes of non-medical aspects such as social culture, economy, education and geography [2]. It is estimated that around 15-20% of pregnant women will experience a high risk or obstetric complications both during pregnancy and childbirth. The direct causes of maternal death are bleeding (28%), eclampsia (24%) and infection (11%). Indirect causes of maternal mortality include Chronic Energy Deficiency (KEK) in pregnancy (37%) and anemia in pregnancy (40%). The incidence of anemia in pregnant women will increase the risk of maternal mortality compared to mothers who are not anemic [3]. One of prevention effort to reduce the problem of maternal mortality in Indonesia is through antenatal care. Antenatal care, or often abbreviated as ANC, is a global program carried

out by each country, with the aim of reducing maternal mortality through preventive activities in the form of prenatal care to optimize the mental and physical health of pregnant women, so they are able to face childbirth, postpartum, preparation Breast milk until the mother's reproductive health returns [4]. In addition, antenatal visits can also reduce neonatal mortality by implementing interventions that focus on antenatal care, effective referral systems and retraining health workers to manage labor complications [5]. Some of pregnancy complications can be prevented by identifying early mothers at risk of pregnancy complications and childbirth through prenatal screening, teaching pregnant women to recognize signs of pregnancy complications, timely access to emergency care, monitoring labor to reduce multiple categories of death [6].

**2. METHODS**

There are several stages in the search for papers / articles that will be used. First looking for papers in general in several databases and on Google Scholar, the keywords used were "Antenatal Care", "Early Detection" and "High Risk Factors of Pragnant". The article used as a reference is a paper that is a review / systematic review to develop keywords to get a specific paper. Secondly, after getting the keywords then looking for papers in the pubmed and sciencedirect database. Search is limited by the paper published in the last 5 years so that the antenatal services displayed in the article are the latest antenatal services and according to standards, using English, no criteria for the specific country to be addressed, not limited to the type of article.

Data sources were obtained from PubMed and ScienceDirect. Inclusion Criteria: 1) Pregnant women who do ANC and do not do ANC, 2) Full Free text, Articles of the last 5 years, International journals. The appraisal study uses Critical Appraisal Joanna Briggs, and the synthesis method uses PICO modification. After searching several articles, the researcher got the keyword and then searched for papers in the pubmed and sciencedirect database. In searching 2 databases and reference lists found 439 articles, then several double / duplicate articles were deleted so that there were 437 articles. From 437 articles, screening based on title / abstract related to antenatal care and high risk of pregnancy, 58 articles were taken to be taken and reviewed independently based on inclusion and exclusion criteria. Then a further article screening was conducted to find the right and complete reference regarding the high risk of pregnancy related to antenatal care and obtained 10 articles for critical appraisal. Authors filter based on critical appraisal results and get 7 articles for final review.

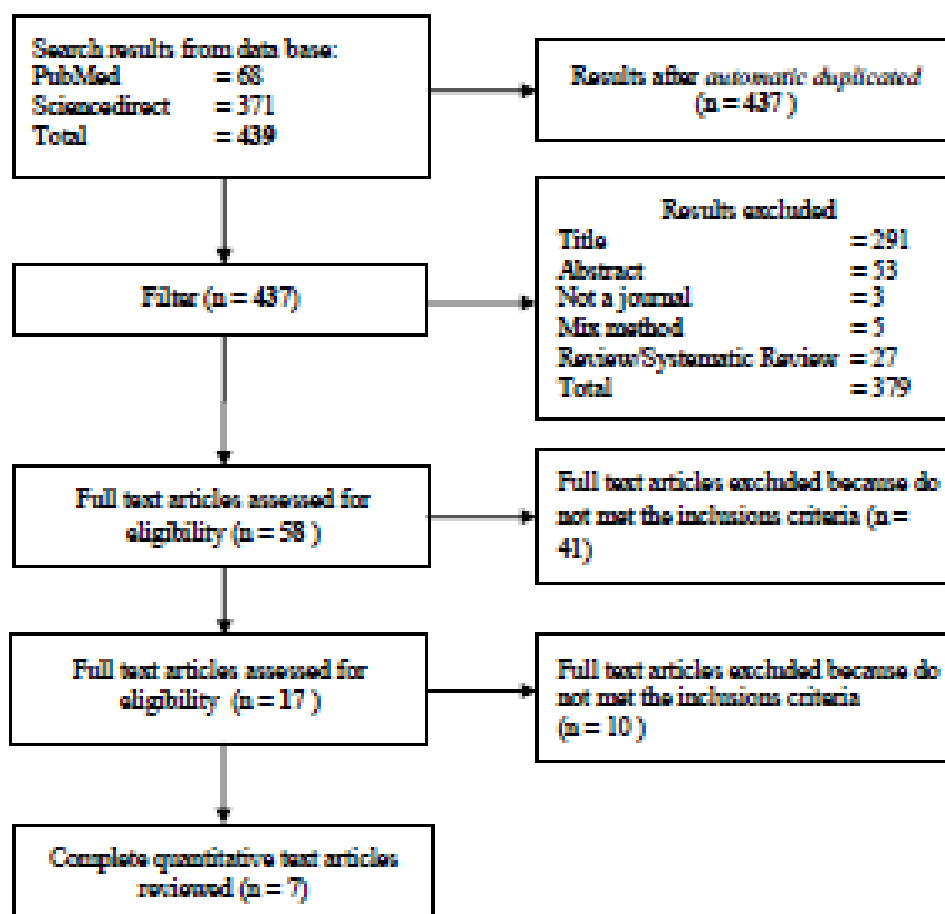
**Table 1. Research Framework**

<b>Element</b>	<b>Inklusi</b>	<b>Eksklusi</b>
Population	All pregnant women who visit ANC	The Pregnant women who not attendance the ANC
Intervention	a. Some were not given intervention b. The participation of pregnant women in antenatal care	

Comparison	Without intervention or other interventions that are different from the intervention group. a. Pregnant women who perform ANC according to standards b. Pregnant women who don't follow the right standard of ANC
Outcomes	Increased antenatal care, high risk of pregnancy

Critical appraisal is used to assess the quality of articles to be used. The tool chosen to assess the quality of the article is checklist Joanna Briggs of The Joanna Briggs Institute. At the critical appraisal stage there are 1 article that is in accordance with the topic of antenatal care in an effort to early detection of high risk of pregnancy. 10 articles used the cross-sectional method and 8 articles used the cohort method. Each research method has different critical appraisal designs. After doing critical appraisal, 7 articles were selected.

**Figure 1. PRISMA Flow chart**



**Table 2 Data Extraction**

No	Title/Author/ Years	Aim	Research Design	Method	Participants	Results
1	Antenatal care attendance, a surrogate for pregnancy outcome? The case of Kumasi, Ghana (Ntui et al., 2016) [7]	This study aims to investigate the association of the presence of ANC with adverse pregnancy outcomes	Cross- Sectional	Quesioner	629 pregnant women aged 19 - 48 years and 16 traditional birth attendants who helped deliver.	Pregnant women attending ANC <4 times detected having a pregnancy at risk compared to pregnant women who have ANC visits $\geq$ 4 times.
2	Effectiveness of antenatal care services in reducing neonatal mortality in Kenya: analysis of national survey data (Arunda et al., 2017) [8]	The aim of this study was to examine the effectiveness of ANC services in reducing neonatal deaths in Kenya	Cross- Sectional	Survey and Quesioner	14.190 case	About 38% of all neonatal deaths in Kenya are due to a lack of examinations for pregnancy complications, inadequate ANC visits, lack of ANC examinations by skilled health personnel and tetanus injection during pregnancy.
4						
3	Timing of first focused antenatal care booking and associated factors among pregnant mothers who attend antenatal care in Central Zone, Tigray, Ethiopia (Gidey et al., 2017) [9]	This study aims to assess the lack of the first antenatal visit and its causal factors	Cross- Sectional	Quesioner	239 pregnant women who visit antenatal care centers.	Only 41% of pregnant women who visit antenatal care sites on time and according to their gestational age, most pass their first visit at 5 months of pregnancy, so there are still many risk factors for pregnancy that cannot be detected until labor complications occur.

4	Antenatal care visit attendance, intermittent preventive treatment during pregnancy (IPTp) and malaria parasitaemia at delivery (Obstet et al., 2014) [4]	This study aims to evaluate the determinants of ANC visits and uptake of IPTp-SP which hypothesize that the time of visit of the ANC can first affect the absorption of IPTp-SP / dose and consequently malaria infection during labor.	Cross-Sectional	Questioner	During the first survey, a total of 287 women who gave birth were aged between 14-40 years.	Previous ANC visits can increase the coverage of two or more SP doses in the study area. About 40% of women give birth to the recommended ANC that is $\geq 4$ times and get two or more doses of SP. So that malaria pregnancy and childbirth can be prevented during antenatal care.
5	Factors associated with antenatal depression and obstetric complications in immigrant women in Geneva (Ratcliff, Sharapova, Suardi, Borel, & Midwife, 2015) [10]	This study aims to identify psychosocial sociodemographic and specific risk factors for antenatal depression and obstetric complications.	Kohort	EPDS and Questioner	228 pregnant women	From 228 participants in this study, twenty women (9%) had obstetric complications, and 11 infants (5%) suffered neonatal problems. The results showed that women who faced life difficulties and were unable to access antenatal services were 17 times more likely to experience depression. Women without marital support have a 7-fold higher risk of experiencing depression or obstetric complications.
6	A prospective observational description of frequency and timing of antenatal care attendance and coverage of selected interventions from sites in Argentina, Guatemala, India, Kenya, Pakistan and Zambia (Bucher et al., 2015) [11]	This study aims to explain the number of antenatal visits for four years and explore the quality of coverage for selected birth prevention, screening and birth readiness.	Kohort	MNHR data from these sites are prospectively collected from 1 January 2010 to 31 December 2013	269,710 data on pregnant women (excluding women who left before labor; miscarriage; or undergo a pregnancy medical termination)	This study shows a relatively high level for birth preparations in pregnant women in Pakistan, but for most other preventive and screening interventions, record lower coverage rates compared to other Global Network sites.

7	Pregnancy wantedness, frequency and timing of antenatal care visit among women of childbearing age in Kenya (Ochako & Gichuhi, 2016) [12]	This study aims to: 1. Describe characteristics pregnant women who report unwanted pregnancies. 2. Determine the relationship between frequencies desired antenatal care visit and pregnancy. 3. Establish the relationship between the initial time first ANC visit and desired pregnancy.	Kohort	This study used data from 2008-2009 DHS Kenya and qusioner	8444 pregnant women aged 15 - 49 years.	Unwanted pregnancies are related to the low frequency of antenatal care visits and the delay in the time of the first visit made by pregnant women so that the risk factors cannot be detected during pregnancy which causes many complications during labor.
---	---	--	--------	--	---	---

---



### 3. RESULT AND DISCUSSION

#### Article Characteristics and Thematic Analysis

The findings with a systematic search obtained 7 suitable and good quality articles published in the last 5 years. then extraction of data to find out in detail and classify a number of points from the article, such as the country of study, the purpose of the study, the type of research used, and the results or findings of the research conducted. From 7 articles selected, 3 articles used the cohort study method and 4 articles used the Cross-Sectional method. Articles obtained from all countries except the conflicting countries, namely: 1 article from Ghana, 2 Kenya, 1 Ethiopia, 1 Cameroon, 1 Geneva, 1 Multy Country.

#### Antenatal Care in Early Detection Efforts for High-Risk Pregnancy

In this review there are several journals that examine the interrelationship of antenatal care to early detection of high risk pregnancies and are summarized in the following Table:

No	Early Detection Efforts at High Risk of Pregnancy	References
<b>Antenatal care in the effort of early detection of high risk of pregnancy</b>		
<b>1</b>	<b>Antenatal Care</b>	
	Total of antenatal care attendance	Ntui et. al., 2016 Obstet et. al., 2014 Bucher, et. al., 2015 Ochako, et. al., 2016
	Effectiveness of antenatal care	Arunda, et. al., 2017 Ratcliff, et. al., 2015
	The first of antenatal care	Gidey, et. al., 2017
	Quality coverage of antenatal care	Bucher, et. al., 2015
<b>2</b>	<b>High Risk of Pregnancy Detected</b>	
	Risky pregnancy:	Ntui, et. al., 2016
	a. low birth weight babies, namely birth weight <2.500 g r	Ochako, et. al., 2016
	b. prematurity (<37 minggu kehamilan)	Gidey, et. al., 2017
	c. stillbirth	
	d. 4 T in pregnancy	
	Neonatal death	Arunda, et. al., 2017
	Malaria in pregnancy and childbirth	Obstet, et. al., 2014
	Depression of pregnancy to labor and childbirth	Ratcliff, et. al., 2015
	Obstetric complications	
	Syphilis, anemia and HIV	Bucher, et. al., 2015

#### Antenatal Care

In a study conducted in Kumasi, Ghana, it was found overall, 22% of study participants had a risky pregnancy. Of this number, 37.7% of women during their ANC visits <4 times. About 16% of women who experienced preterm birth attended ANC visits <4 times compared to 5.7% of women with ANC visits ≥ 4 times. 20% of women who gave birth to low birth weight babies also attended ANC visits <4 times compared to 9.4% for those attending ANC visits AN 4 times [7].

In another study found in 287 pregnant women, 2.2% performed the first trimester, 59.7% in the second trimester, and 38.1% in the third trimester. About 90% of women receive at least one dose of SP but only 53% receive two doses. IPTp coverage of two doses increased to 64%. Early antenatal visits are associated with a history of fever experienced by



pregnant women. Women who received one dose of SP were significantly associated with a lack of antenatal visits (<4 visits) compared to pregnant women who visited ANC  $\geq 4$  times. A higher proportion, women who made the first visit in the third trimester received only one dose, while those who did the first ANC earlier were more likely to receive two or more doses of SP. So malaria often occurs among women enrolled in the third trimester and only receives one dose of SP than those who visit ANC  $\geq 4$  times and get two doses of SP [4].

Around 67% of all pregnant women in the survey made their first ANC visit in the second trimester and more than half of all women visited ANC  $\geq 4$  times during pregnancy. Neonatal morbidity rates were 3.5 times higher among pregnant women who did not visit ANC compared to pregnant women who visited ANC  $\geq 4$  times. Likewise, the odds of neonatal death were significantly higher among women who did not get a TT injection during pregnancy compared to pregnant women who received an TT injection. Lack of examination for complications during pregnancy is associated with neonatal death. The lack of ANC visits, the presence of unskilled ANCs, did not get TT injection and lack of examination for complications related to neonatal death [8]. 771

Overall, 96% of women reported at least one antenatal visit and a small number received an TT injection, as did pregnant women screened for syphilis (49%) and anemia (50%). HIV testing rates are above 95% on Argentine, African and Indian sites. In Pakistan it shows a relatively high rate of birth preparation, but for most other prevention and screening interventions, it is noted as a lower coverage rate compared to other Global Network sites [11]. Regarding the level of pregnancy depression many factors cause it, namely, immigrant legal status, poverty and marital status. In fact, more than a third (37%) of participants had clinical complications. In this study it was also mentioned that women who had a high level of depression could not effectively carry out antenatal care so that there were still pregnant women who were found to experience obstetric complications, and babies who suffered neonatal problems [10].

### **High Risk of Pregnancy Detected**

From the results of studies that have been reviewed, several high risks of pregnancy in antenatal care have been found, namely: a risky pregnancy (20% of women give birth to low birth weight ie birth weight <2,500 gr, 16% of women experience preterm birth (<37 weeks) and a small portion of the rest is found with stillbirths that occur within the previous 12 hours or 12 hours after birth. Parity is also a risk factor for pregnancy for women who have > 5 children, because many of them only attend ANC visits 1-3 times during pregnancy [7].

In a study conducted in Kenya, results showed that 45% of pregnant women aged between 25-34 years old, 35% were aged 15-24 years and the remaining 20% were aged between 35-49 years and the distance from previous births was estimated at only 25 months [12]. About 38% of all neonatal deaths in Kenya are caused by a lack of examination of pregnancy complications and tetanus injection during pregnancy due to a lack of skilled antenatal care [8]. So 60.9% of malaria or microscopic parasitemia at delivery was significantly higher ( $\chi^2 = 9.938$ ;  $P = 0.007$ ) among women who had their first ANC visit in the third trimester and received only one dose of SP or not at all. When compared with women who get two SP positions, namely 21.7% and those who get two or more doses as much as 17.4% [4].

Pregnancy depression was associated with obstetric complications, and of the 228 participants in this study, twenty women (9%) had obstetric complications, and 11 infants (5%) suffered neonatal problems. The results showed that poor women could not access antenatal services more 17 times higher risk of depression. Women without marital support have a 7-fold higher risk of depression or obstetric complications [10]. Overall, 49% of women in the other 6 sites reported receiving syphilis screening. The overall coverage for HIV testing during pregnancy is 91%. Overall, 50% of women who have at least one ANC visit get anemia screening [11].

### **Discussion**

To realize a safe pregnancy without complications, pregnant women need routine antenatal care according to the recommended standards. Antenatal care is associated with early detection of risk factors during pregnancy, childbirth, and the puerperium. Antenatal care has the potential to identify and manage obstetric complications, educate women about risks during pregnancy and promote trained births during labor [12]. The results of a systematic literature review study found that there is an influence of antenatal care in the effort of early detection of high risk of pregnancy. Antenatal care is a routine medical service and has been identified as a determining factor in pregnancy. Regular ANC visits provide opportunities to reach pregnant women by providing services or interventions that are beneficial for the welfare of the mother and newborn. ANC is also an integral part that identifies an increased risk of pregnancy that can cause labor complications [14]. The level of compliance with recommended care guidelines can also be affected by clinical time constraints. This is particularly relevant in health care settings where pregnant women present with many comorbidities, or in the presence of a large number of recommendations [15].

Good antenatal care can be seen from the number of pregnant women attending antenatal visits, the effectiveness of antenatal care and the coverage of antenatal services that can detect early high risk of pregnancy, such as: adverse pregnancy (birth of low birth weight ie birth weight <2,500 gr, premature birth <37 weeks of gestation, stillbirth occurs in the previous 12 hours or 12 hours after delivery, 4 too in pregnancy, neonatal death, malaria pregnancy and childbirth depression pregnancy to childbirth and childbirth, obstetric complications, syphilis, anemia and HIV. high pregnancy, recently, research in China revealed that the pregnancy rate of high-risk women has increased [16].

Medically defined complications of perinatal obstetrics such as gestational diabetes mellitus, hypertension, thyroid disease and a variety of comorbidities related to maternal and infant health disorders are becoming increasingly common and are a very sad event, contributing to the risk of pregnancy and childbirth often causing maternal or fetal disease even death [17]. In several studies it was also stated that high risk of pregnancy sometimes cannot be detected directly at the first antenatal visit. So it is necessary to make an appointment to make the next visit.

In Indonesia, there are still many cases of maternal and infant deaths during labor due to high risk that are not detected earlier. This study found that, most pregnant women conduct examinations to health services in the second trimester. So that the lack of integrated antenatal services can cause a high risk of complications of pregnancy and childbirth. Therefore, it is necessary to promote and educate all women to check themselves early if

they feel a pregnancy.

#### 4. CONCLUSION

Pregnancy is a normal life cycle that most women must go through, but the normal conditions can threaten the lives of mothers and their babies if complications arise during pregnancy or during childbirth. Therefore, detection of pregnancy complications is very necessary so some efforts can be done to eliminate or minimize complication. Antenatal care is important to ensure that the natural process continues to run normally. With the presence of antenatal care, mothers can find out the possible risks of complications of pregnancy and childbirth that will be experienced and what should be done to prevent and deal with complications that arise in order to prevent the occurrence of disability and death.

#### 5. ACKNOWLEDGMENTS

The author thank to Sulistyarningsih, SKM., MH.Kes and Indriani, M.Sc in Universitas Aisyiyah Yogyakarta for advice in writing of this manuscript. 773

#### REFERENCES

- [1] Buchmann, E. J., Sa, F., Stones, W., & Thomas, N. (2016). Preventing Deaths From Complications of Labour and Delivery. *Best Practice & Research Clinical Obstetrics & Gynaecology*. <https://doi.org/10.1016/j.bpobgyn.2016.05.012>
- [2] Mahmood, M. A., Mufidah, I., Scroggs, S., Siddiqui, A. R., Raheel, H., Wibdarminto, K., ... Wahabi, H. A. (2018). Root-Cause Analysis of Persistently High Maternal Mortality in a Rural District of Indonesia: Role of Clinical Care Quality and Health Services Organizational Factors. *BioMed Research International*, 2018, 3673265. <https://doi.org/10.1155/2018/3673265>
- [3] Kementerian Kesehatan. Laporan Tahunan Direktorat Bina Kesehatan Ibu Tahun 2013. Jakarta. 2014.
- [4] Obstet, A. G., Cristina, A., Joa, M., Kara, M., Orbak, Z., Döneray, H., ... E., S.-E. (2014). Antenatal care visit attendance, intermittent preventive treatment during pregnancy (IPTp) and malaria parasitaemia at delivery. *Malaria Journal*, 13(1), no pagination. <https://doi.org/10.1080/15513815.2016.1217960>
- [5] Nisar, Y. Bin, & Dibley, M. J. (2014). Determinants of neonatal mortality in Pakistan : secondary analysis of Pakistan Demographic and Health Survey 2006 – 07, 14(1), 1–12. <https://doi.org/10.1186/1471-2458-14-663>
- [6] Mmbaga, B. T., Lie, R. T., Olomi, R., Mahande, M. J., Olola, O., & Daltveit, A. K. (2012). Causes of perinatal death at a tertiary care hospital in Northern Tanzania 2000 – 2010 : a registry based study.
- [7] Ntui, A. N., Jolly, P. E., Carson, A., Turpin, C. A., Zhang, K., Berhanu, T., & Hospital, A. T. (2016). HHS Public Access. *Matern Child Health Journal*, 18(5), 1085–1094. <https://doi.org/10.1007/s10995-013-13382.Antenatal>
- [8] Arunda, M., Emmelin, A., & Asamoah, B. O. (2017). Effectiveness of antenatal care services in reducing neonatal mortality in Kenya: Analysis of national survey data. *Global Health Action*, 10(1). <https://doi.org/10.1080/16549716.2017.1328796>

- [9] Gidey, G., Hailu, B., Nigus, K., Hailu, T., Woldegebriel, G., & Gerensea, H. (2017). Timing of first focused antenatal care booking and associated factors among pregnant mothers who attend antenatal care in Central Zone , Tigray , Ethiopia. *BMC Research Notes*, 1–6. <https://doi.org/10.1186/s13104-017-2938-5>
- [10] Ratcliff, B. G., Sharapova, A., Suardi, F., Borel, F., & Midwife, B. A. (2015). Factors associated with antenatal depression and obstetric complications in immigrant women in Geneva. *Midwifery*, 31(9), 871–878. <https://doi.org/10.1016/j.midw.2015.04.010>
- [11] Bucher, S., Marete, I., Tenge, C., Liechty, E. A., Esamai, F., Patel, A., ... Koso-Thomas, M. (2015). A prospective observational description of frequency and timing of antenatal care attendance and coverage of selected interventions from sites in Argentina, Guatemala, India, Kenya, Pakistan and Zambia. *Reproductive Health*, 12(2), 1–11. <https://doi.org/10.1186/1742-4755-12-S2-S12>
- [12] Ochako, R., & Gichuhi, W. (2016). Pregnancy wantedness , frequency and timing of antenatal care visit among women of childbearing age in Kenya. *Reproductive Health*, 1–8. <https://doi.org/10.1186/s12978-016-0168-2> 774
- [13] Salem, A., Lacour, O., Scaringella, S., Herinianasolo, J., Benski, A. C., Stancanelli, G., ... Schmidt, N. C. (2018). Cross-sectional survey of knowledge of obstetric danger signs among women in rural Madagascar, 1–9. <https://doi.org/10.1186/s12884-018-1664-x>
- [14] Carson, A., & Turpin, C. A. (2014). Antenatal Care Attendance , a Surrogate for Pregnancy Outcome? The Case of Kumasi , Ghana, 1085–1094. <https://doi.org/10.1007/s10995-013-1338-2>
- [15] Waller, A., Bryant, J., Cameron, E., Galal, M., Symonds, I., & Sanson-fisher, R. (2018). Screening for recommended antenatal risk factors : How long does it take? *Women and Birth*, (2017), 1–7. <https://doi.org/10.1016/j.wombi.2018.01.005>
- [16] Dai, Z. E. (2014). Impact analysis of nursing intervention on bad mood of the high-risk pregnant woman. *Guide of China Medine*, 12,375–376
- [17] Zeng, S. (2010). Risk assessment and holistic nursing on high – risk pregnant women during prenatal period. *Nursing Practice and Study*, 7,52–54.





