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Maternal Compliance in Utilisation of Antenatal Care Services on the Incidence of Preeclampsia: Literature Review

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Abstract

Introduction: Maternal mortality rate (MMR) is an important indicator of the health and well-being of a society, and remains a serious global problem. Preeclampsia is a health problem that can occur in pregnant women who are more than 20 weeks pregnant. Preeclampsia is one of the leading causes of maternal death in Indonesia. The incidence of preeclampsia in pregnant women occurs due to not doing early detection. The importance of Antenatal Care (ANC) check-ups is recognised as a crucial preventive measure to ensure the health of mothers and babies, and to detect early complications during pregnancy. However, ANC service coverage in Indonesia is still below the national target, indicating the need to improve awareness and access to these services. Utilization of Antenatal Care (ANC) services needs to be done by pregnant women in order to detect early and carry out appropriate treatment of pregnant women's health problems, especially preeclampsia.

Objective: To analyze the relationship between the compliance of pregnant women in utilizing antenatal care services and the incidence of preeclampsia.

Method: This research is a literature review with a scoping review method using the PRISMA approach. The data used in this study used online database literature from Google Scholar, Science Direct, and Scopus with the last 5 years.

Result: Based on several previous studies, low compliance of pregnant women in attending ANC visits can be a risk factor for preeclampsia. Pregnant women who are committed to regular check-ups during pregnancy can detect diseases and complications early, including preeclampsia. Quality and regular ANC services can detect pregnancy risks early and help prevent maternal mortality. In this study revealed that the greatest risk of preeclampsia that might occur in pregnant women who are not compliant in conducting ANC is 67 times, this is certainly very risky for the health of pregnant women and babies.

Conclusion: This study concludes that regular Antenatal Care (ANC) visits are crucial to detect and manage complications early. The low rate of ANC visits should encourage healthcare providers to innovate in promoting ANC in an engaging and understandable way.

Keywords: Preeclampsia; Antenatal Care; Compliance

INTRODUCTION

Maternal Mortality Rate (MMR) is one of the indicators of the degree of health and welfare of the people in a country. Maternal Mortality Rate (MMR) is one of the most crucial problems in the world. Every day in all parts of the world in 2020, at least 800 women died during pregnancy and childbirth. Almost 95% of maternal deaths occur in low- and lower-middle-income countries (1). In Indonesia, the MMR is still at around 305 per 100,000 live births, explaining that Indonesia has yet to reach its target of 183 per 100,000 live births by 2024 (2). Until today, MMR is still a major global concern, and reducing MMR is also one of the main goals of the Sustainable Development Goals (SDGs). The Indonesian Health Profile 2022 shows that hypertension is the leading cause of maternal death. One of the factors that can cause pre-eclampsia is a past history of antenatal care (ANC). ANC visits are very important in detecting preeclampsia. Lack of awareness among pregnant women regarding the importance of ANC check-ups during pregnancy can increase the risk of preeclampsia (12).

Preeclampsia is one of the leading causes of maternal death in Indonesia. Preeclampsia is a serious condition that can affect the health of the pregnant woman and the foetus. Preeclampsia is the same condition as hypertension, but this hypertension occurs after the 20th week of pregnancy with blood pressure $> 140/90$ mmHg, increased proteinuria > 300 mg on urine examination and edema that occurs during antenatal, intrapartum and postnatal periods. In pregnancy conditions with preeclampsia, causing trophoblast cell invasion that only occurs in part of the spiral artery in the myometrium area so that there is a disruption of placental function which results in the placenta not being able to meet the blood needs for nutrition and oxygen to the fetus (compliance journal). If preeclampsia in severe presentation occurs, it may progress to eclampsia or HELLP syndrome (3).

ANC is important to ensure that the natural process continues to run normally during pregnancy, as pregnancy can develop problems or complications at any time. However, in Indonesia, ANC visits are still not a top priority for some pregnant women (4). Quality and frequent antenatal check-ups during pregnancy will determine the health status of the pregnant women and the baby to be delivered. The Ministry of Health of the Republic of Indonesia has also stipulated that antenatal care (ANC) is conducted at least 6 times during 9 months, which is a form of commitment to the provision of essential services for pregnant women (2).

ANC is a preventive strategy of the obstetric health care programme to optimize maternal and neonatal outcomes through a series of regular monitoring activities during pregnancy. ANC services have an influence on fetal growth or during pregnancy, one of the strategies in reducing maternal mortality due to complications is by utilising ANC services (5). A regular and routine ANC is the most appropriate and important way to monitor and support the health of normal pregnant women and early detection of women with normal pregnancies. ANC is care provided to pregnant women from conception confirmation to the onset of labour to facilitate healthy and positive outcomes for the mother and baby by fostering a trusting relationship with the mother, detecting life-threatening complications, preparing for birth, and providing education (6). Screening includes blood pressure, urine, weight, height, and other biomarkers related to pregnancy. At least, ANC services must fulfil the minimum in each trimester of pregnancy (7).

The quality of ANC services in Indonesia is still quite low, when it is seen from the ANC coverage which is still below the national target of 100%, where the data on the coverage of visits to pregnant women (K4) in 2019 was 88.54% while in 2020 it was 84.6%, which means that it has not reached the national target that has been determined (8). Therefore, it is important to know the factors that have not achieved the target of ANC visits as a first step in making preventive efforts so that every pregnancy can be monitored (9).

The results of an initial survey conducted by Lilis Sumardiani, on 6 pregnant women who had suffered from preeclampsia, found that all of these pregnant women still considered pregnancy as a normal, natural and natural thing. There were 4 pregnant women who felt that they did not need to check their health and pregnancy regularly because they did not have a history of preeclampsia. There were even 2 pregnant women who only did 1 ANC examination in the first trimester, this certainly had an impact on the health of pregnant women because they did not detect high risk factors of pregnancy as early as possible which caused her to be at risk of preeclampsia (10). As well as research that has been done shows that the regularity of ANC visits can support pregnant women in conducting early detection of complications and complications during pregnancy (11).

Preeclampsia can be identified early by conducting routine ANC examinations so as to find risk factors for preeclampsia complications in pregnant women. The purpose of this literature review is to determine the relationship between compliance of pregnant women in the utilisation of antenatal care services and the incidence of preeclampsia.

METHOD

The method used in this research is a review through the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach, which focuses on a more specific review of various kinds of literature obtained and combined to be drawn conclusions. This research was conducted using a sample journal search engine

in the Science direct, Scopus, and Google Scholar databases with a selection of articles published in the last five years, namely in 2019 to 2024, due to the fast-paced development of science, the focus in the last five years has been to ensure that it covers the most relevant and up-to-date information. The keywords used in the article search were "adherence", "antenatal care", and "preeclampsia". The articles obtained totalled 1,551 articles from Google Scholar, 99 articles from Science direct, and 24 articles from Scopus. The inclusion criteria in this study were articles that matched the keywords used. Articles that are relevant or related to the compliance of pregnant women in the utilisation of antenatal care services to the incidence of preeclampsia. The PRISMA-ScR diagram of this research can be seen in Figure 1.

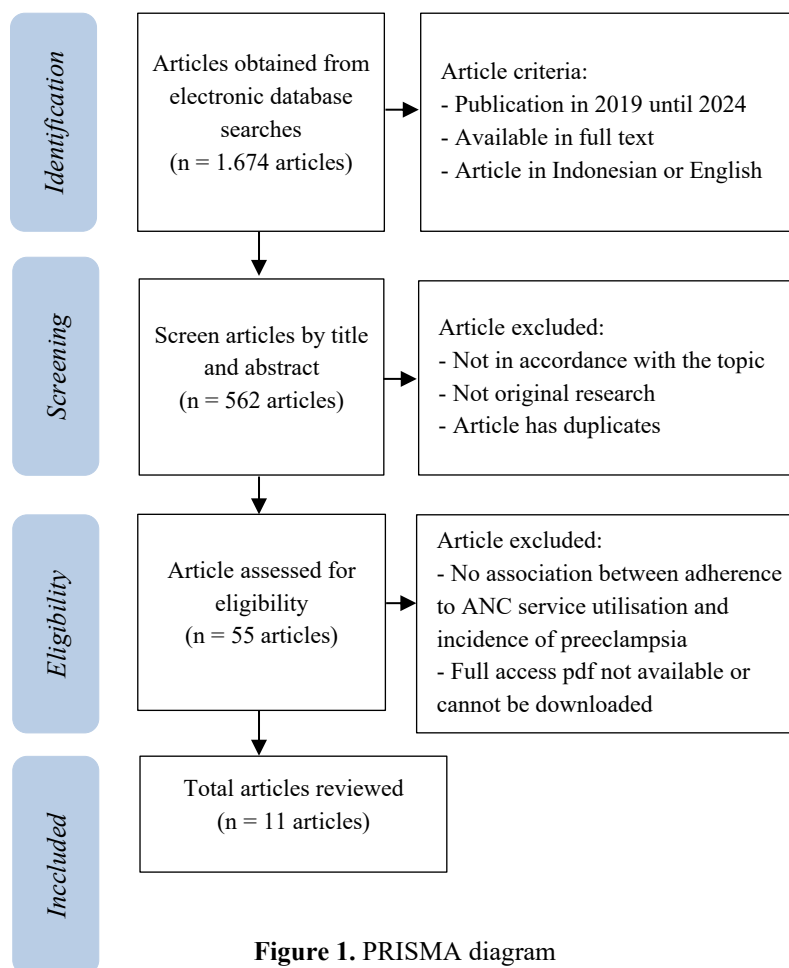


Figure 1. PRISMA diagram

RESULTS

The search results obtained from online databases and reviewing articles that have been obtained are suitable and relevant to the needs of this research. After selection, eleven articles relevant to the research topic were obtained. Furthermore, the details of the articles are reviewed as presented in Table 1.

Table 1. Summary of Articles

No.	Title	Authors	Location	Years	Study Design	Research results
1.	Kepatuhan antenatal care dengan kejadian preeklampsia pada ibu hamil di Puskesmas Kayon Kota Palangkaraya	Fitria Ningsih	Puskesmas Kayon Kota Palangkaraya	2020	Analytical study with retrospective approach	There is an association between antenatal care compliance and the incidence of preeclampsia with a p-value of 0.001 and obtained an OR value = 3.598 which means that pregnant women who are not compliant with ANC visits have a risk of 3.5 times experiencing preeclampsia compared to

						mothers who are compliant with ANC visits.
2.	Hubungan pengetahuan dan kepatuhan ANC terhadap kejadian preeklampsia pada ibu hamil trimester III di UPT Puskesmas Toroh I Kabupaten Grobogan	Irfana Tri Wijayanti, dan Siti Marfuah	UPT Puskesmas Toroh I Kabupaten Grobogan	2019	Correlation analytic study with a cross-sectional approach using the survey method	There is a relationship between ANC compliance and the incidence of preeclampsia in third trimester pregnant women with the results of sig value $(0.07) > 0.05$
3.	Hubungan usia, paritas, riwayat hipertensi dan frekuensi pemeriksaan ANC terhadap kejadian preeklampsia pada ibu hamil	Eka Fauzia Laila	RSUD Palabuhan Ratu Kabupaten Sukabumi	2019	Descriptive correlation study with a cross-sectional approach	There is an association between the frequency of ANC examination and the occurrence of preeclampsia obtained p-value = $0.000 < 0.05$
4.	Hubungan pemeriksaan antenatal care (ANC) dan konsumsi multivitamin dengan kejadian preeklampsia di wilayah kerja Puskesmas Latowu	Andi Handayani, dan Siti Marfu'ah	Wilayah kerja Puskesmas Latowu	2023	Correlation analytic study with a cross-sectional approach	There is an association between ANC visits and the incidence of preeclampsia with a sig value obtained. = $0.000 < 0.05$
5.	Faktor-faktor yang berhubungan dengan kejadian preeklampsia pada ibu hamil trimester III pada praktik mandiri bidan X di Bangkalan	Zakkiyatus Zainiyah, dan Dewi Angraini Harahap	Praktik mandiri bidan X di Bangkalan	2023	Analytical study with a cross-sectional approach	ANC adherence has a significant effect on the incidence of preeclampsia with a p-value = $0.004 < 0.05$ and obtained an OR value = 10.111 which means that pregnant women who are not compliant with ANC have a risk of 10.111 times experiencing preeclampsia.
6.	Hubungan pola makan, kualitas tidur dan kepatuhan ANC dengan preeklampsia di wilayah kerja Puskesmas Toboali Bangka Selatan tahun 2022	Swita Angraini, Milka Anggraeni K., dan Retno Sugesti	Wilayah kerja Puskesmas Toboali Bangka Selatan	2023	Quantitative study with a cross-sectional study design	There is an association between ANC adherence and preeclampsia with p-value = $0.000 < 0.05$ and obtained an OR value = 67.5 (6.4 – 708.5) which means that pregnant women who are not compliant with ANC have a risk of 67.5 times experiencing preeclampsia.
7.	Faktor-faktor yang mempengaruhi kejadian preeklampsia pada ibu hamil di RS Karitas Weetabula	Maria Erni Tandil, Yusnita Julyarni, dan Titin Sutriyani	RS Karitas Weetabula Sumba Barat Daya	2021	Quantitative study	There is a significant influence between adherence to ANC visits and the incidence of preeclampsia in pregnant women with a p-value = 0.001

Sumba Barat Daya						
8.	Antenatal care dengan kejadian pre eklampsia pada ibu hamil di puskesmas pembina	Sutrisari Sabrina Nainggolan dan Nur Wahyuni	Puskesmas Pembina	2023	Analytical survey research with a cross-sectional approach	There is a relationship between antenatal care and the incidence of pre-eclampsia in pregnant women with a p-value = 0.000 and the OR value = 0.614 means that pregnant women who do not do ANC have a 0.614 times greater risk of experiencing preeclampsia.
9	Hubungan kepatuhan ANC dengan kejadian preeklampsia di ruang ponek RSUD Ekajayanthi	Ni Luh Putu Puspa Reni, Ni Made Eggar Adhestiani, Luh Putu Widiastini, Pande Putu Novi Ekajayanthi	Ruang Ponek RSUD Sanjiwani	2024	Quantitative study with retrospective case control study design	There is a relationship between ANC compliance and the incidence of preeclampsia with a p-value = 0.004 (<0.05) with an odds ratio (OR) = 0.231 CI (0.084 – 0.637) indicating that respondents who are not compliant with ANC visits have a 0.231 times greater risk of developing preeclampsia than pregnant women who are compliant with ANC visits.
10	Hubungan kepatuhan melakukan Antenatal Care (ANC) dengan kejadian preeklampsia di wilayah kerja Puskesmas Mayang Kabupaten Jember	Nurul Ajizah, Muthmainnah Zakiyyah, Dwi Anggun Lestari	Puskesmas Mayang, Kabupaten Jember	2024	Quantitative study with cross sectional approach	There is a significant relationship between ANC adherence and the incidence of preeclampsia p-value = 0.003
11	Pengaruh riwayat hipertensi, frekuensi kunjungan ANC, dan obesitas terhadap kejadian preeklampsia pada ibu hamil	Yustina Panca Putri Simatupang, Erma Puspita Sari, Putu Lusita Nati Indriani, Reffi Dhamayanti	RSUD Sungai Lilin Kabupaten Musi Banyuasin	2024	Quantitative study with cross sectional approach	The relationship between the frequency of ANC visits and the incidence of preeclampsia with a p-value = 0.005 and OR value = 8.690 indicates that pregnant women who are incomplete in conducting ANC visits tend to experience preeclampsia by 8.69 times compared to pregnant women who complete ANC visits.

DISCUSSION

Pregnant women are categorised as a vulnerable group because they have a low immune system, making them more susceptible to diseases and infections. Antenatal care (ANC) checks are very important to do during pregnancy. ANC examination is an important effort to avoid and reduce morbidity and mortality in pregnant women and children (13). Among the other risk factors for preeclampsia, a pregnant woman's medical history is very influential during her pregnancy and during labour. Every trimester that pregnant women go through, it is necessary to know the development and growth of the fetus. Regular ANC examinations can certainly have a good impact on pregnant women, fetuses, families and health workers to prepare for everything that might happen during pregnancy. By conducting ANC, clinical signs of preeclampsia in pregnant women can be monitored.

Low adherence of pregnant women to ANC visits can lead to complications during pregnancy. Quality ANC services can certainly detect the occurrence of risks in pregnancy, but also have the opportunity to detect early complications that can arise and can avoid maternal deaths. Early detection of preeclampsia risk is an activity to find risk factors and complications due to preeclampsia during pregnancy. Early detection of preeclampsia is usually done by several tests and measurements that can be done during ANC. A study conducted by Trias Nadhiroh Maulani, et

al stated that there was a relationship between early detection of preeclampsia risk and adherence to ANC visits in the working area of Puskesmas Wuluhan (8).

Based on Table 1. shows that the results of the research conducted by Ningsih (14) There was a significant relationship between ANC compliance and the incidence of preeclampsia with $p\text{-value} = 0.001 < 0.05$ and OR 3.598 CI 95% (1.636 - 7.911). The OR 3.5 means that pregnant women who are not compliant with ANC visits have a 3.5 times risk of developing preeclampsia compared to mothers who are compliant with ANC visits. Therefore, to increase community compliance in carrying out ANC visits, health promotion efforts are needed about the importance of carrying out routine ANC visits, namely at least one visit in the first trimester, one visit in the second trimester and two visits in the third trimester. So that health workers can assess or diagnose as early as possible related to the presence of preeclampsia symptoms in mothers so as to reduce the risk of complications in pregnancy and childbirth in mothers.

The results of the research by Wijayanti, et al., (15) shows that there is a relationship between ANC compliance and the incidence of preeclampsia in third trimester pregnant women at UPT Puseskesmas Toroh I Grobogan Regency with a sig value = $0.07 > 0.05$ where out of 21 mothers who experienced preeclampsia 18 pregnant women were not obedient to do ANC. Whereas from 32 pregnant women who did not experience preeclampsia, 30 of them were obedient to do ANC. So, it can be concluded that pregnant women who get and do ANC regularly and obey the advice obtained from health workers will reduce the risk of not experiencing preeclampsia. Because mothers who are obedient to ANC can detect or prevent the incidence of preeclampsia earlier.

The results of the research by Fauzia (16) the Statistic test results obtained with $p\text{-value} = 0.000 < 0.05$ which means that there is an association between the frequency of ANC examination with the incidence of preeclampsia. In addition, the results of this study also showed that 71.4% of mothers who were irregular in ANC examinations experienced severe preeclampsia, while 83.3% of mothers who were regular in ANC examinations experienced mild preeclampsia, this can be interpreted that the more frequent ANC examinations, the lower the risk of experiencing preeclampsia. The OR value of 14.700 was also obtained, which means that pregnant women who do antenatal care irregularly have a 14.7 times higher risk of preeclampsia compared to pregnant women who do ANC regularly. It is expected that pregnant women who have risk factors in pregnancy to routinely check their pregnancy so that it can be detected early in the incidence of preeclampsia and reduce the incidence of preeclampsia and for those providing care to be more alert in dealing with patients who experience preeclampsia and patients who also have risk factors for preeclampsia.

The results of the research by Handayani, et al., (17) obtained test results with a sig value. = $0.000 < 0.05$ which can be concluded that there is a relationship between ANC visits and the occurrence of preeclampsia at Latowu Health Centre. The lack of ANC visits in pregnant women is due to some pregnant women mentioning that during pregnancy they did not have any complaints, so pregnant women rarely come to health facilities. Whereas ideally, by conducting ANC examinations, every pregnant woman would want to check her pregnancy, with the aim of detecting abnormalities that may occur in the pregnancy will be quickly known and can be immediately overcome before affecting her pregnancy, not waiting for a new health problem to check her pregnancy.

The results of the research by Zainiyah, et al., (18) have results $p\text{-value} = 0.004 < 0.05$, which means that ANC compliance is significant with the incidence of preeclampsia with an OR value of 10.111, which means that the less compliant to do ANC, the greater the risk of preeclampsia. Prevention and diagnosis of preeclampsia in pregnant women is very important to reduce morbidity and mortality. To increase compliance with regular ANC service utilisation, it is necessary for midwives or health workers to create Whatsapp groups for pregnant women to provide information about pregnancy not only directly during ANC visits.

The results of the research by Anggraini, et al., (19) of the study showed that the $p\text{-value} = 0.000$, which means that there is a relationship between ANC compliance and preeclampsia in the Toboali South Bangka Health Centre working area in 2022. The results of the analysis also obtained an OR value of 67.5 (6.4 - 708.5), which means that respondents who are not compliant with ANC have a 67.5 times chance of having preeclampsia. In this study, researchers also assumed that ANC compliance plays an important role in preeclampsia. Respondents who are obedient to conduct ANC can find out various diseases and complications during pregnancy. Thus, the incidence of preeclampsia in pregnant women can be detected early. Therefore, it is necessary to increase community compliance in carrying out antenatal care visits by conducting health promotion about the importance of carrying out routine antenatal visits and health promotion about the risk of preeclampsia. In addition, pregnant women need to be open in receiving information from health workers so that the knowledge of pregnant women increases so that it can motivate them to carry out pregnancy checks (11).

The results of the research by Tandi, et al., (20) the study obtained with an Asymp.sig (2-sided) value of $0.001 < 0.05$, which means that there is a significant effect of ANC visits on the incidence of preeclampsia in pregnant women. Pregnant women need to make ANC visits more than 4 times to reduce the risk of developing preeclampsia.

The results of the research by Nainggolan, et al., (21) showed a p-value = 0.000, which means that there is a relationship between ANC and the incidence of preeclampsia in pregnant women at the Pembina Health Centre in 2023. Then the OR value = 0.614 means that mothers who do not do ANC have a risk opportunity of 0.614 times greater to experience preeclampsia. Maternal compliance to carry out care during pregnancy regularly and obey the advice given by health workers can prevent preeclampsia. Therefore, the role of health workers is very important in providing counselling and motivation for pregnant women to do ANC regularly, so that health personnels can detect as early as possible the symptoms of preeclampsia in pregnant women.

The results of the research by Reni, et al., (22) showed a p-value = 0.004, which means that there is a relationship between ANC compliance and the incidence of preeclampsia in the Ponok Room at Sajiwani Hospital. The results of the analysis also obtained the odds ratio (OR) value = 0.231 CI (0.084 – 0.637) which indicates that respondents who are not compliant with ANC have a risk of 0.231 to experience preeclampsia compared to mothers who are compliant with ANC. ANC is needed because by doing ANC, it can find out and control risk factors in pregnant women that can complicate maternal labor so that anticipation can be done as early as possible.

The results of the research by Ajizah, et al., (23) showed a p-value = 0.003, which means that there is a significant relationship between ANC compliance and the incidence of preeclampsia in the Puskesmas Mayang working area, Jember. There are factors that can influence ANC compliance and the incidence of preeclampsia in pregnant women such as education, age and maternal employment. However, it is necessary to prevent and treat health problems in pregnant women by considering factors that can affect ANC adherence, one of which is demographic factors.

The results of the research by Simatupang, et al., (24) showed a p-value = 0.005, which means that there is a significant relationship between the frequency of ANC visits and the incidence of preeclampsia. The results of the analysis also obtained the odds ratio (OR) = 8.690 which indicates that pregnant women who do not make complete ANC visits are likely to experience preeclampsia 8.690 times compared to pregnant women who make complete ANC. Frequency of antenatal check-ups plays an important role in detecting and managing the risk of preeclampsia. Early detections allow for quick action and further monitoring of pregnant women which can help in detecting, preventing and better managing preeclampsia.

Globally, the coverage of ANC visits within 14 weeks was reported to have increased from 40.9% to 58.6% from 1990 to 2013. However, the uptake rate differs between developed and developing countries. It is known that in 2013 the ANC uptake rate in developed countries was 84.8% while in developing countries it was 48.1%. This can be due to the geographical, economic and educational conditions of a country (25).

This literature review has limitations that need to be considered, including potential publication and selection bias, differences in access to health services between regions, and variations in the quality of ANC in various health facilities. These biases may affect the validity and generalizability of the findings, especially as results that are relevant in one context may not be applicable in another. Therefore, it is hoped that this can be an input for future researchers.

CONCLUSION

This study concludes that antenatal care (ANC) visits are very important to do regularly. Utilising ANC services does not need to wait for pregnant women to feel symptoms of illness, but it is better to do it as early as possible for faster detection and proper treatment. The low ANC visits of pregnant women should trigger health workers to innovate in providing health promotion efforts about ANC in an attractive and closer manner, not only to pregnant women but to all levels of society so that everyone understands that conducting ANC visits has a huge impact on the sustainability of pregnant women and even after childbirth. Some of the innovations include the use of technology and health apps, strengthening free or affordable transportation for pregnant women especially in remote areas so that they can more easily access health facilities and most importantly improving the quality of ANC services to increase the satisfaction of pregnant women and improve their compliance.

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