

7. Judul Artikel: The Utilization Of Maternal Healthcare Services During The Covid-19 Pandemic In South Sulawesi,

Jurnal bereputasi (Scopus Q3)

Peran: Co author

Komentar dari Reviewer :

Topik artikel kurang sesuai dengan bidang keilmuan yang diusulkan. Artikel dipublikasi di jurnal internasional bereputasi Q3 SJR =0.197. Hasil cek similarity sebesar 17%. Bukti korespondensi yang memuat komentar dari reviewer dan respon penulis perlu disertakan sebagai bukti kinerja. Mohon diperbaiki.

The screenshot shows the article detail page for the Central European Journal of Nursing and Midwifery. The article title is "657. 2021/IV :: The utilization of maternal healthcare services during the COVID-19 pandemic in South Sulawesi, Indonesia". The author is Dr. Kusriani Semarwati Kadar PhD. The article is associated with Assoc. Prof. Radka Bužgová Ph.D. The abstract describes an analytical cross-sectional study of 226 pregnant women in South Sulawesi, Indonesia, during the COVID-19 pandemic. The study found that 54% of women had poor knowledge related to COVID-19 and negative attitudes regarding health protocols. The most significant predictor of utilization of antenatal care services was antenatal care visiting behavior (p = 0.002; OR = 5.904). The article was published on 2.10.2021. The page also shows the author's comments, corrector notes, and source files list.

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Status	Text
	Dr Kusriani Semarwati Kadar PhD (Erlina Erlina, Kusriani Semarwati Kadar, Suni Hariati, Nurmaulid Nurmaulid) Assoc. Prof. Radka Bužgová Ph.D.
	657. 2021/IV :: The utilization of maternal healthcare services during the COVID-19 pandemic in South Sulawesi, Indonesia
ver. no. 5	<p>Aim: The aim of this study was to evaluate the utilization of healthcare services for pregnant women during the COVID-19 pandemic in South Sulawesi, Indonesia. Design: An analytical cross-sectional study. Methods: A group of 226 pregnant women completed the study questionnaire. The questionnaire was developed based on the basic health research questionnaire from the Ministry of Health, Indonesia, and the Navigating Pregnancy during the COVID-19 Pandemic article from UNICEF. Results: Of the 226 pregnant women, 122 (54%) had poor knowledge related to COVID-19 and negative attitudes regarding health protocols for COVID-19 (79.6%). Most (n = 189; 83.6%) experienced anxiety; however, this did not affect their intention to use healthcare services. Utilization of antenatal care services during the pandemic was associated with antenatal care visiting behavior (p = 0.000) and access to healthcare services (p = 0.000). The most significant predictor of utilization of antenatal care services during the pandemic was antenatal care visiting behavior (p = 0.002; OR = 5.904). Conclusion: These findings provide important information on maternal healthcare provision during the pandemic in Indonesia.</p> <p>Keywords: antenatal care, COVID-19, maternal healthcare, utilization</p>
Proofreading	<p>Author's comments: ...not specified</p>
	<p>Corrector notes:</p> <ul style="list-style-type: none">ab_c Sent: 31.8.2021ab_c Sent: 19.7.2021
	<p>Source files list:</p>

Corrector notes:

Sent: 31.8.2021

Sent: 19.7.2021

Source files list:

File	Size/Changed	Status	No review available.
Manuscript_v4.docx (Cjn_000657_corrected.docx)	356457 B 19.7.2021 05:28	removed	Last version has been sent. 4.8.2021
Manuscript_v5.docx (Dr Kusrini Semarwati Kadar PhD_Cjn_fin.docx) Final version	328905 B 4.8.2021 08:17	new	
TitlePg.docx (Dr Kusrini Semarwati Kadar PhD_Cjn_tit.docx) Final version	15717 B 4.8.2021 08:15	new	
STROBE-checklist-cross-s.docx (STROBE_checklist_cross-sectional CEJNM.docx)	31237 B 4.2.2021 07:48	valid	
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Dear author,
english corrector revised your manuscript. Please accept any changes and upload the final version of the paper, including the title page.
Thank you very much,
Radka Bužgová

Article ver. 4

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File	Size/Changed	Status
Manuscript_v4.docx (Dr Kusrini Semarwati Kadar PhD_cjn_rea.docx) Revision version ready for publication	319541 B 8.6.2021 05:30	new
Manuscript_v4.docx (Cjn_000657_corrected.docx)	356457 B 19.7.2021 05:28	new
TitlePg.docx (Title page CEJNM.docx)	15717 B 4.2.2021 07:48	valid
STROBE-checklist-cross-s.docx (STROBE_checklist_cross-sectional CEJNM.docx)	31237 B 4.9.2021 07:48	valid

Source files list:

File	Size/Changed	Status
STROBE-checklist-cross-s.docx (STROBE_checklist_cross-sectional CEJNM.docx)	31237 B 4.2.2021 07:48	valid
Comments_v3.docx (Responses to the reviewers' comment.docx) Responses to reviewers' feedback	11773 B 20.5.2021 16:00	removed

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Dear authors,
Reviewers have recommended your article for publication. Please upload the final version of the article (without color-coded changes) and the title page to the system. Subsequently, the article will be sent for English proofreading.
Thank you very much,
Radka Bužgová

Article ver. 3 Review ver. 3

Source files list:

File	Size/Changed	Status
Manuscript_v3.docx (Dr Kusrini Semarwati Kadar PhD_cjn_rev.docx) Revision version 2	321700 B 20.5.2021 15:53	new
TitlePg.docx (Title page CEJNM.docx)	15717 B 4.2.2021 07:48	valid
STROBE-checklist-cross-s.docx (STROBE_checklist_cross-sectional CEJNM.docx)	31237 B 4.2.2021 07:48	valid
Comments_v3.docx (Responses to the reviewers' comment.docx) Responses to reviewers' feedback	11773 B 20.5.2021 16:00	new

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Dear authors,
please revise your manuscript according reviewers' comments. Mark all changes made in the manuscript.
Best regards,
Radka Bužgová

Article ver. 2 Review ver. 2

Source files list:

File	Size/Changed	Status
Manuscript_v2.docx (Dr Kusrini Semarwati Kadar PhD_cjn_rev.docx)	320508 B	

Response to Decision Letter

Dear Editor and Reviewers

Thank you for your comments on our paper. We have attempted to address each one and believe the paper is stronger as a result.

Reviewer 1

Comment	Response
The abstract was clearly written, but could be strengthened by including statistics about the association of utilization of antenatal care services and antenatal care visiting behavior and access to healthcare services.	Thank you for your insight, we have added <i>p</i> value for the association of utilization of antenatal care services and antenatal care visiting behavior and access to healthcare services
The Introduction addresses the significance of the problem and the gap in knowledge about utilization of healthcare services for pregnant women in Indonesia during the pandemic.	Thank you for your impression and valuable input.
The aim could be more clearly stated as follows: to examine the associations between demographic characteristics, COVID-19 knowledge and attitude, psychological status, antenatal care visiting behavior, and access to healthcare services on utilization of antenatal care services.	The aim has been revised “to examine the associations between demographic characteristics, COVID-19 knowledge and attitude, psychological status, antenatal care visiting behavior, and access to healthcare services on utilization of antenatal care services.”

<p>A cross-sectional design was used, which is appropriate. It is a strength that a power analysis was done to determine sample size, which was met with 226 women enrolled</p>	<p>Thank you for your impression</p>
<p>The dependent variable was identified (utilization of antenatal care services) and 12 independent variables were specified</p>	<p>Yes it was</p>
<p>The measures for antenatal visiting behavior is unclear-is it both type of service and frequency of service? Please add a new section to Methods after Data collection called Procedures to explain how and where the data were collected, how long the questionnaire administration took, if there was any incentive provided to participants, etc</p>	<ul style="list-style-type: none"> • We have revised the measurement of antenatal care visiting behavior. The antenatal care visiting behavior was evaluated using questionnaire with asking how many times they had antenatal visits appropriate to gestation • We have added the explanation of procedures to collecting data
<p>In the Results section, the sub-headings are not consistent with the content. The first sub-heading should be "Relationship between participant demographics and utilization of antenatal care services" and the second subheading should be "Relationship between COVID-19 knowledge and attitude, psychological status, and antenatal care practice and utilization of antenatal care services".</p>	<p>Thank you for your input, we have revised based the reviewer comment</p>
<p>On page 5, please note the significant association between parity and utilization of antenatal care services ($p=.007$).</p>	<p>We have revised based the reviewer comment</p>
<p>Describe the differences in utilization of antenatal care services by family income using percentages and frequencies instead of the general statement given.</p>	<p>Thank you for your valuable input, we have revised the description in the results section</p>
<p>There were a few discrepancies between the text and Table 1 (see Editorial Corrections below).</p>	<p>We have revised based on editorial correction</p>
<p>On page 6, please note the significant associations between antenatal care visiting behavior and access to healthcare services and utilization of antenatal care services ($p<.0001$).</p>	<p>We have added note for the statistic value</p>
<p>On page 6, it is reported that 221 utilized antenatal care services, but Table 1 reports that 211 did so; please correct the discrepancy. Please report the percentages for the three highest antenatal care providers in order.</p>	<p>We have revised the discrepancy between the result section and the table, 211 utilized antenatal care services</p>

The authors used the wrong symbol for less than in the text and Table 1 as it should be < rather than >. The authors used $p < .25$ for entry of predictors in the logistic regression model, but this cutoff is not standard practice	We have revised the symbol
Based on p values in Table 1, only three predictors were $< .05$ and should be entered into the model. This reviewer recommends that COVID-19 attitude be removed from the model and the analysis re-run and reported in the text and Table 3.	
In the Discussion on page 7, delete attitude to COVID-19 as a significant predictor.	We have deleted attitude to COVID-19 as a significant predictor.
On page 8, the statement about access predicting utilization of antenatal care services should be rephrased to read "pregnant women with easy access to healthcare facilities used 3.675 times more prenatal care services".	We have revised the sentences
On page 9, the statement about higher education and utilization is not accurate because all women with primary education utilized antenatal healthcare services.	We have deleted the statement and added supporting sentences to explain the results
On page 10, delete attitude to COVID-19 as a predictor.	We have deleted attitude to COVID-19 as a predictor.
In the Limitation of study section, discuss that small number of women (n=15) who did not utilize antenatal healthcare services and that the cross-sectional design does not allow causal inferences to be made.	We have added the limitation according to reviewer comment

Thank you very much.

Reviewer 2

Comment	Response
The author focused on a comprehensive set of relevant factors affecting the use of healthcare by pregnant women (age, education, occupation, parity, trimester of pregnancy, family income and state), antenatal visiting behavior, access to healthcare services and psychological status during the pandemic, knowledge about COVID-19 and attitudes regarding COVID-19).	Thank you for your impression and valuable input.
This focus is sufficiently substantiated by references to previous studies	Thank you

We have a comment on the part of the methods, where it would be appropriate to explain in more detail how the following phenomena were measured: knowledge of COVID19 and attitudes towards COVID 19	we have added description of the questions for measure knowledge and attitude towards COVID-19
The abstract is insufficient, it is generally formulated in the part methods, results, conclusions	We have developed abstract based on author guideline

Editorial Corrections:

Comment	Response
Abstract: Change pregnancy to pregnant in "Among the 226 pregnancy women...".	We have revised
Throughout the paper, correct the citation and its reference, "KC et al., 2020"; the first author is Ashish, KC.	We have revised
Page 1: Add "severe" to the title of the acronym SARS-CoV-2 so it reads "severe acute respiratory syndrome".	We have revised
Page 2: Change from "have impacted on services" to "have impacted services".	We have revised
Page 4: Close the space in "open -ended questions".	We have revised
Page 4: Is "six questionnaire" supposed to be "six questions"?	We have revised
Page 5: Change from "were utilized antenatal care services during the pandemic" to "utilized antenatal care services during the pandemic".	We have revised
Page 5: Change from "but there were no women in the age group under 20 years old who utilized antenatal care services" to "but all women in the age group under 20 years old (n=14, 100%) utilized antenatal care services"	We have revised
Page 5: Change "Most participants (n=104, 94.9%) with higher education (university)" to "Most participants with university education (149, 94.9%)".	We have revised
Page 5: Change from "All women with primary school education did not utilize antenatal care services" to "All women with primary school education (n=3, 100%) utilize antenatal care services".	We have revised
Page 6, Change from "Seven types of antenatal care provider" to "Seven types of antenatal care providers".	We have revised
Page 8: This sentence is not clear: "This could be as result, limited services due to COVID-19 pandemic were not barrier for pregnant women to visiting health facilities.	We have revised
Page 8: Explain the acronym ANC the first time it is used.	We have revised
Page 8: Change from "that majority mothers aged 20-35 years" to "that the majority of mothers aged 20-35 years".	We have revised
Acknowledgements: Change from "pregnant women at the participating in this study" to "pregnant women who participated in this study".	We have revised

Thank you very much

The utilization of healthcare services for pregnant women during the COVID-19 pandemic in South Sulawesi, Indonesia

Abstract

Aim: The aim of this study was to evaluate the utilization of healthcare services for pregnant women during the COVID-19 pandemic in South Sulawesi, Indonesia. **Design:** An analytical cross-sectional study was conducted in the study. **Methods:** A group of 226 pregnant women completed the study questionnaire. The questionnaire was developed based on the basic health research questionnaire from the Ministry of Health, Indonesia and pregnancy during COVID-19 pandemic from UNICEF. **Results:** Among the 226 pregnant women, 122 (54%) had poor knowledge related to COVID-19 and poor attitudes regarding health protocol for COVID-19 (79.6%). Most (83.6%, n=189) experiencing anxiety, however it did not affect the intention to use the healthcare services. Utilization of antenatal care services during the pandemic was associated with antenatal care visiting behavior ($p=.000$) and access to healthcare services ($p=.000$). **The most significant predictor of utilization of antenatal care services** during the pandemic was antenatal care visiting behavior ($p=.002$; OR= 5.904). **Conclusion:** These findings have provided important information to maternal healthcare provision during the pandemic in Indonesia.

Keywords: antenatal care, COVID-19, maternal healthcare, utilization

Introduction

Pregnancy is an important period for a woman in her life but also a life-threatening event because complications of pregnancy can occur during pregnancy. They can involve the mother's health, the baby's health, or both (Addi et al., 2020). In addition, pregnant women

and their fetuses are at risk of contracting infectious diseases during pandemics (Addi et al., 2020). Physiological and psychological changes during pregnancy increase susceptibility to infection, especially when the infection affects the cardiorespiratory system. As a result, the risk of respiratory failure during pregnancy is possible (Addi et al., 2020; Culp, 2020). In Indonesia, maternal and neonatal mortality remain problematic, and this is increasingly so in times of national disaster situations (Kementrian Kesehatan Republik Indonesia, 2020). In these circumstances, maternal and neonatal health services are among affected services, both in terms of access and quality (Ashish et al., 2020). There is, therefore, concern that this could impact morbidity and mortality, including for mothers and their newborns (Kementrian Kesehatan Republik Indonesia, 2020; Robertson et al., 2020).

Coronavirus disease 2019 (COVID-19), caused by coronavirus-2 severe acute respiratory syndrome (SARS-CoV-2), has spread widely since it was discovered in China in December 2019 and became a pandemic (Ramussen & Jamieson, 2020). In Indonesia, the pandemic has led to increasing numbers of victims and property losses, as well as broad socio-economic implications. Consequently, the government has designated this pandemic as a national disaster (Kementrian Kesehatan Republik Indonesia, 2020). Although the effect of COVID-19 on pregnant women and fetal development is still not certain (Ramussen & Jamieson, 2020), in China, it has been reported that COVID-19 infection on pregnant women largely occurred in the third trimester or end of the second trimester (World Health Organization, 2020b). However, the effects of this SARS-CoV-2 infection in the first trimester and whether it may cause fetal defects or fetal death are still unknown. Several incidents have been reported of pregnant women with COVID-19 giving birth to preterm or low birth weight babies, however the link between these impacts and COVID-19 cannot be clearly explained (World Health Organization Europe, 2020).

Although as yet there are no studies that describe the risk of complications on pregnant women, especially during the pandemic, it is important for all pregnant women to still be able to access quality maternal and infant health services (Addi et al., 2020; Culp, 2020; Mahajan & Sharma, 2014). There is greater risk for pregnant women and their newborns if they do not access maternal healthcare services during pregnancy (Murray & McKinney, 2017). However, during this COVID-19 pandemic, there are many limitations across all community services, including those services focused on maternal and neonatal care. Decreased quality of maternal healthcare services has similarly been reported in other countries such as Nepal (Ashish et al., 2020) and it is predicted that this could increase the mortality rates of mothers and babies (Robertson et al., 2020).

During the COVID-19 pandemic, several countries have applied lockdown policies and these further effect health-service delivery, including maternal and child health services, particularly in low-middle income countries (Mendendez et al., 2020) such as India, Indonesia, Nigeria, and Pakistan over the past 12 months (Stein et al., 2020). In Indonesia, several issues related to maternal health services, including reluctance of pregnant women to use health services due to fear of infection, recommendations to postpone pregnancy check-ups and antenatal classes, as well as unprepared services in terms of health personnel and infrastructure (Kementrian Kesehatan Republik Indonesia, 2020), have impacted services. The World Health Organization (WHO) has urged countries to ensure the continuity of health services and programs (Mendendez et al., 2020) and to develop guidelines regarding health services for pregnant women during the pandemic which aim to ensure that women still receive essential services, risk factors can be identified independently and they have access to emergency assistance, along with health workers receiving protection from contracting COVID-19 (Kementrian Kesehatan Republik Indonesia, 2020).

From a search of available literature, very few studies have examined the utilization of health services by pregnant women during the pandemic, with only one located from Nepal (Ashish et al., 2020). Several studies on pregnancy during pandemics have focused on expert reviews and comment (Addi et al., 2020; Busch-Hallen et al., 2020; Culp, 2020; Mendendez et al., 2020; Ramussen & Jamieson, 2020). Studies on how pregnant women use healthcare services during the current pandemic are still important and will provide important information for evaluating healthcare services for pregnant women during the pandemic.

Aim

The aim of our study was to examine the associations between demographic characteristics, COVID-19 knowledge and attitude, psychological status, antenatal care visiting behavior, and access to healthcare services on utilization of antenatal care services during the pandemic COVID-19 in South Sulawesi, Indonesia.

Methods

Design

An analytical cross-sectional study was conducted to evaluating the utilization of healthcare services for pregnant women during the pandemic from July to October 2020 in the South Sulawesi Province of Indonesia. South Sulawesi Province is located in the east of Indonesia and is one of the regions in Indonesia with the highest number of confirmed COVID-19 cases (Gugus Tugas Percepatan Penanganan COVID-19, 2021).

Sample

The study population was pregnant women from 0 to 9 months gestation. The required sample size was calculated using *binominal proportions* (Lemeshow et al., 1997).

$$n = \frac{Z^2 P[1-p]}{d^2}$$

Where, n = the sample size

Z = the number relating to degree of confidence anticipated in the result; in this study 95% confidence interval ($\alpha = 5 \% = 0,05$, $Z = 1,96$)

P = an estimate of the proportion of people falling into the group in which we are interested clients of health care based on previous study with $P = 0,15$

d = proportion of error we are prepared to accept (sampling error; 5% anticipated error).

$$n = = \frac{1,96^2 \cdot 0,15[0,85]}{0,05^2} = 195$$

Due to incomplete data and drop out, an extra 10% (20 pregnant women) was added, leading to a total of 215 participants required. **Ultimately, 226 participant responses of utilization of antenatal care services.** We provided the team researcher contact person with informed consent and questionnaires. All participants involved in the study signed an informed consent form after receiving an explanation of the study's objective. Respondents had the right to withdraw at any time during the data collection process.

Data Collection

The outcome variable was utilization of antenatal care during the COVID-19 pandemic, defined as visits of pregnant women for antenatal care. The explanatory variables were socio-economic characteristics (age, education, occupation, parity, trimester of pregnancy, family income and state), antenatal visiting behavior, access to healthcare services and psychological status during the pandemic, knowledge about COVID-19 and attitudes regarding COVID-19. We evaluated the outcome variable of utilization of antenatal care during COVID-19 pandemic with questionnaire by asking if pregnant women had antenatal check-ups during the pandemic (Yes, No and give the reasons). Socio-economic characteristics were assessed by questions consisting of open-ended questions related to maternal age, maternal education, employment status, gestational age, number of children and family income. Instruments for measuring health services for antenatal care consisted of **six questions** around the types of antenatal health services that pregnant women received. **Antenatal care visiting behavior was evaluated using a questionnaire that asked how many times they had antenatal visits appropriate to gestation.** Access to healthcare services was assessed by how easily pregnant women accessed healthcare services for antenatal care during the pandemic (easy and difficult). The psychological condition of pregnant women during the pandemic was measured using a questionnaire

consisting of three questions, knowledge about COVID-19 was measured using five questions, and attitudes related to COVID-19 were assessed using a three question items with a Likert scale. **Questions of attitude towards COVID-19 related to attitude towards prevention of transmission during utilized antenatal care.** The questionnaire was developed based on the basic health research questionnaire from Ministry of Health, Indonesia and pregnancy during COVID-19 pandemic from UNICEF (Kementerian Kesehatan RI, 2018a; UNICEF, 2020; World Health Organization, 2020a).

Procedures

Participants were recruited in the public health center (Puskesmas). The pregnant women volunteered to participate in this study. The information sheet and the informed consent were explained to participants. **The questionnaires were sent to the participants** online via google forms. The participants in this study were given voucher incentive.

Data analysis

In order to identify factors associated with the utilization of antenatal care during the COVID-19 pandemic, bivariate and multivariate analyses was performed. Frequency distributions and descriptive statistics were conducted to describe participant characteristics. Chi squared (χ^2) statistics were used to test associations between outcome variable and categorical explanatory variables. Multivariate analysis used logistic regression models to examine factors best predicting antenatal care utilization during the pandemic.

Results

Relationship between participant demographics and utilization of antenatal care services

A total of 226 pregnant women participated in the study. Table 1 shows the relationship between participants' information (demographic characteristic, COVID-19 knowledge, COVID-19 attitude, psychological condition, and antenatal care practice) and utilization of antenatal care services during the pandemic. The majority (n=195, 86.3%) were in the age range of 20 -35 years old. Most (n=182, 93.3%) in this range used antenatal care services during the pandemic, but all women in the age group under 20 years old (n=14, 100%) utilized antenatal care services. Most participants with university education (n=104, 94.9%) and secondary school (n= 59, 89.4%) utilized antenatal care services during the pandemic. **All women with primary school education (n = 3,100%) utilized antenatal care services.** Among all participants, (n=120, 53.1%) were housewives and most utilized antenatal care services.

One hundred and twenty (53.1%) were multipara, but 104 out of 106 (98.1%) primipara women were more active in using antenatal care services during the pandemic. **There was a significant association between parity and utilization of antenatal care services ($p = .007$).** Most were predominately in trimester three (45.1%, $n=102$) and most (91.2%, $n=93$) utilized antenatal care services during the pandemic. **For family income, the majority of the participant ($n=145$, 92.9%) who reported being under the minimum regional wage utilized antenatal care services during the pandemic.**

Relationship between COVID-19 knowledge and attitude, psychological status, and antenatal care practice and utilization of antenatal care services

The relationship of COVID knowledge and utilization of antenatal care services during pandemic is shown in Table 1. **Among the 226 pregnant women**, 122 (54%) had poor knowledge and there was no difference in antenatal care service utilization during the pandemic between women with good or poor knowledge (>93%). Most respondents (79.6%, $n=180$) had poor attitudes regarding health protocols for COVID-19, and 170 of 180 (94.4%) more actively used antenatal care services during the pandemic than those women with good attitudes (41 of 46 or 89.1%). Psychological condition during the pandemic showed the same distribution, with most (83.6%, $n=189$) experiencing anxiety, and among them (94.4%, $n=178$) more actively used antenatal care services than the women with no anxiety (33 of 37 or 89.2%). One hundred ninety-one participants (84.5%) had antenatal care visiting behavior in line with government recommendations and most (96.3%, $n=184$) more actively used antenatal care services during the pandemic than women whose antenatal care visiting behavior did not align with government recommendations (27 of 35 or 77.1%). From 180 participants (79.6%) who had easy access to healthcare services during the pandemic, 96.1% ($n=173$) used antenatal care services more actively. **There were significant associations between antenatal care visiting behavior and access to healthcare services and utilization of antenatal care services ($p = .000$).**

Types of antenatal care provider

Figure 1 show antenatal care providers accessed by pregnant women during the pandemic. Among 211 pregnant women who utilized antenatal care services, most (47.9%, $n=101$) used one type of antenatal care provider. Seven types of antenatal care providers during the pandemic are shown in this figure. Most women used non-online antenatal care providers (hospital, private physician maternal healthcare, primary healthcare, private midwife maternal healthcare, maternal and children hospital, and health integrated posts at village level (Posyandu). Furthermore, online antenatal care providers were utilized by only a few women ($n=4$).

The predictive factors of utilization of antenatal care services during COVID-19 pandemic

Table 2 shows the predictive factors that qualified for logistic regression analysis. There are three predictors (antenatal care visiting behavior, access to healthcare services during the pandemic and parity). These predictor factors were analyzed using logistic regression as shown in Table 2. **Utilization of antenatal care services during the pandemic was associated with antenatal care visiting behavior ($p=.002$) and access to healthcare services ($p=.024$).** Parity become confounding factor ($p=.066$) for utilization of antenatal care services during the pandemic. Women with antenatal care visiting appropriate with government recommendations utilized antenatal care services 5.904 times more than women whose behavior was not appropriate to government recommendation. Women with easy access to healthcare services during the pandemic utilized antenatal care services 3.675 times more than women who had difficult access during the pandemic.

Discussion

The current coronavirus disease (COVID-19) pandemic has profoundly affected people across the world (Wu et al., 2020). Pregnant women are more vulnerable to SARS-CoV-2 infection than the general population due to immunologic and physiological adaptations during pregnancy (Lou & Yin, 2020). Government directives and hospital policy implementation of social distancing during antenatal care and limiting numbers of family members accompanying expecting women to hospitals have aimed to prevent contagion (Kimani et al., 2020). To the best of our knowledge, the present study was one of the first to investigate factors associated with antenatal care during the COVID-19 pandemic. The results indicate that parity, antenatal care visiting behaviors and access to healthcare services during COVID-19 pandemic were significant predictors of utilization of antenatal care. Women's parity showed a negative association with utilization of antenatal care services during the pandemic. Multiparous women were less likely to utilize antenatal care services and similar findings have been reported by studies elsewhere (Moore et al., 2017; Nuamah et al., 2019; You et al., 2019). Due to multiple risk associated with first pregnancies, higher use of antenatal care facilities can be associated with factors such as fear or anxiety-related or unknown complications (Islam & Masud, 2018). Interestingly, this study revealed that the majority of pregnant women had poor attitudes towards COVID-19. This is in contrast to a study conducted in Nigeria that showed a majority of pregnant women in their third trimester demonstrated good attitudes and preventative practice during COVID-19 (Lee et al., 2020). The attitudes and preventative skills of a person towards the disease are dependent on their knowledge of the disease (Anikwe et al., 2020).

However, half of the pregnant women in the present study had inadequate knowledge concerning COVID-19. Even though pregnant women had poor attitudes and inadequate knowledge, they were more likely to use antenatal care services during COVID-19. In Indonesia, there are several issues related to maternal health services, such as reluctance of pregnant women to use health services due to fear of infection, recommendations to postpone pregnancy check-ups and classes of pregnant women, as well as unprepared services in terms of health service personnel and infrastructure (Kementrian Kesehatan Republik Indonesia, 2020). Nevertheless, the majority of pregnant women disagreed with postponing their pregnancy check-ups due to concern about fetal growth and healthcare centers not providing virtual care during COVID-19 pandemic as per government recommendation. Thus, future activity needs to focus on increasing the knowledge and attitudes of pregnant women, as well as providing virtual care to reduce risk of infection transmission.

Our regression analysis indicates that antenatal care visiting behavior and access to healthcare during pandemic were significant predictors of utilization of antenatal care. Antenatal care visiting behavior was assessed by the number of visits in accordance with gestation. The Indonesian government has suggested pregnant women to have a minimum of four antenatal visits during pregnancy, if they do not have complications and currently recommend postponing visits during second trimester due to the COVID-19 pandemic (Kementrian Kesehatan Republik Indonesia, 2020). The present study reported that participants visited numerous types of care providers, with the majority visiting primary health care (Puskesmas) for antenatal care. This result could be due to cost of healthcare services as primary care provides free services. Free maternal healthcare increases access and utilization, especially among the group with limited financial resources (Zhao et al., 2009). Furthermore, private physician maternal healthcare and hospitals were types of care providers that pregnant women sought as alternatives for antenatal care during the pandemic. **This result could be due to pregnant women visiting health facilities despite government regulation for limited services due to COVID-19 pandemic.**

With regard to accessing healthcare facilities, regression logistics showed that during the pandemic, pregnant women with easy access to healthcare facilities used 3,675 times more prenatal care services than women who had difficult access. This study was conducted in Sulawesi island, one of the thousand islands in Indonesia with urban and rural areas. Many previous studies reported lower utilization of ANC (Antenatal care) services among rural women and due to financial difficulties (Islam & Masud, 2018; Mahajan & Sharma, 2014; Nuamah et al., 2019). Lower rates of use of ANC services among women with difficult access

to healthcare facilities might be linked to lower socio-economic conditions, rural area, and limited healthcare due to government regulation during the pandemic.

In contrast to previous studies, the current study reported that age, employment status, family income, knowledge related to COVID-19 and psychological status were not significantly associated with utilization of antenatal care. Previous studies reported that maternal age was a predictor of ANC service utilization with young mothers less likely to visit healthcare facilities (Addi et al., 2020; Islam & Masud, 2018). This present study reported **that the majority of mothers aged 20-35 years** were more likely to utilize ANC services during the COVID-19 pandemic.

Our study revealed that respondents were mostly unemployed and housewives. Thus, pregnant women categorized with low income were dominant. However, they still had good access to utilize ANC services. This result contrasts with another study that found higher odds of maternal healthcare utilization among women in the highest household wealth index quartiles, compared to those in the lowest (Nuamah et al., 2019). This result could be related to the fact that most pregnant women utilized primary healthcare facilities that provided free services.

Although a previous study showed that education is a key factor in enhancing the quality of maternal health care and utilization of ANC services (Mahajan & Sharma, 2014), in this current study, results indicated no statistical significance between education levels and utilization of antenatal care during the COVID-19 pandemic. In Indonesia, the utilization of the ANC services by pregnant women has been good (level ANC visit is 96%) before the COVID-19 pandemic (Kementerian Kesehatan RI, 2018b). **This happen because the government has set goals** to improve quality and accessibility of health care services for people in Indonesia including for antenatal care including free access to that services. The ANC services is available everywhere from district level to village level. **Thus, the utilization of the ANC services is good regardless of the educational level of pregnant women.**

Knowledge about health protocols for COVID-19 was not significantly associated with utilization of ANC services. Adequate knowledge of the symptomatology will inform practice and lead to reduced spread of the virus (Anikwe et al., 2020). Even though, the participants had inadequate knowledge towards COVID-19, they still utilized ANC services. This result might be linked with the pregnant women feeling more vulnerable because of the outbreak. Despite variations in race or culture, vulnerability of pregnant women prompts them to seek the best result for themselves and minimize risk of vertical transmission to their babies (Lee et al., 2020).

Evidence of psychological conditions during the pandemic was demonstrated among the pregnant women studied, as a significant number reported feeling anxiety with the pandemic and fear for their baby and its wellbeing. It has been reported that anxiety among pregnant women has risen due to the COVID-19 pandemic (Anikwe et al., 2020; Corbett et al., 2020), and they experience additional pressure due to the outbreak potentially having indirect effects on their physical and psychological health (Corbett et al., 2020).

Implications for Healthcare Professionals

This study describes utilization of antenatal care during the COVID-19 pandemic in Sulawesi, Indonesia. Our study reveals very low level of knowledge and poor attitudes among pregnant women towards COVID-19. Furthermore, pregnant women also experienced anxiety due to the outbreak that may prevent them to get healthcare services. Having this information will help the government to plan and develop health intervention strategies that can improve knowledge, attitude, and psychological well-being of pregnant women during pandemic.

Additionally, the antenatal care should be modified to all the barriers to maximize the utilization of services during pandemic. It is recommended that further research be undertaken, using a variety of settings, geographical area and the development of virtual care for pregnant women during COVID-19 pandemic.

Limitation of study

The current study was conducted only in one region in Indonesia, consequently, generalizations beyond this study should be made with caution due to possible sampling bias. Nevertheless, these findings have important value and relevance to maternal healthcare provision during pandemic time in Indonesia, hence results may reflect the utilization of maternal healthcare during pandemic time in similar conditions. It is necessary to compare the results with other studies investigating maternal healthcare utilization during pandemic time from other areas.

Other limitations include the small number of pregnant women who did not utilize antenatal healthcare services and the cross-sectional design does not allowing causal inferences to be made. Thus, the further study is needed, such as a qualitative study to explore reasons for utilizing antenatal healthcare services.

Conclusion

This study describes utilization of antenatal care during the COVID-19 pandemic in Sulawesi, Indonesia, highlighting parity, antenatal care visiting behaviors and access to healthcare services during the pandemic as predictive factors. Our study documents very low knowledge of pregnant women towards COVID-19 and poor attitudes related to it. Furthermore, pregnant women experienced anxiety due to the outbreak. However, the majority of pregnant women still utilized antenatal care. Examining the gaps in this study will be required to inform

increasing the knowledge and attitudes of pregnant women, as well as providing virtual care to reduce risk of infection during the COVID-19 pandemic.

Ethics approval

This study was conducted with the approval of the University Ethics Committee (September 3, 2020, 102/KEPPKSTIKSC/IX/2020). Issues of anonymity and confidentiality were addressed. There were no conflicts of interest in the current study.

Acknowledgments

We would like to express our gratitude to the enumerators and all the pregnant women who participated in this study.

Funding

This research received funding from Faculty of Nursing, Universitas Hasanuddin.

Authors' contribution

Conception and design (EE, KSK), data analysis and interpretation (EE, SH), manuscript draft (EE, KSK, SH, NN), critical revision of the manuscript (NN), final approval of the manuscript (EE, KSK).

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Table 1. Relationship between participant demographics and utilization of antenatal care services during pandemic.

Demographic Characteristic	Total n=226 n (%)	Utilization of antenatal care services during pandemic		P value
		Yes (n=211) n (%)	No (n=15) n (%)	
Age (years)				0,424 ^a
<20	14 (6.2)	14 (100.0)	0 (0.00)	
20-35	195 (86.3)	182 (93.3)	13 (6.7)	
>35	17 (7.5)	15 (88.2)	2 (11.8)	
Occupation				0,579 ^a
Employee	106 (46.9)	100 (94.3)	6 (5.7)	
Housewife	120 (53.1)	111 (92.5)	9 (7.5)	
Education				0,287 ^a
University	157 (69.5)	149 (94.9)	8 (5.1)	

Secondary	66 (29.2)	59 (89.4)	7 (10.6)	
Primary	3 (1.3)	3 (100)	0 (0.0)	
Parity				0,007^a
Primiparous	106 (46.9)	104 (98.1)	2 (1.9)	
Multiparous	120 (53.1)	107(89.2)	13 (10.8)	
Trimester of pregnancy				0,245 ^a
First Trimester	54 (23.9)	53 (98.1)	1 (1.9)	
Second Trimester	70 (31.0)	65 (92.9)	5 (7.1)	
Third Trimester	102 (45.1)	93 (91.2)	9 (8.8)	
Family income				1.000 ^a
More than minimum regional wage	70 (31.0)	66 (94.3)	4 (5.7)	
Under minimum regional wage	156 (69.0)	145 (92.9)	11 (7.1)	
State				
South Sulawesi	184 (81.4)	172 (93.5)	12 (6.5)	1.000 ^a
Others South Sulawesi	42 (18.6)	39 (92.9)	3 (7.1)	
COVID knowledge, attitude & psychological	N (%)	n (%)	n (%)	
Knowledge about health protocol of COVID-19				0.958 ^a
Good knowledge				
Poor knowledge	104 (46.0)	97 (93.3)	7 (6.7)	
	122 (54.0)	114 (93.4)	8 (6.6)	
Attitude towards COVID-19				0.195 ^a
Good	46 (20.4)	41 (89.1)	5 (10.9)	
Poor	180 (79.6)	170 (94.4)	10 (5.6)	
Psychological condition during pandemic				0,278 ^a
No anxiety	37 (16.4)	33 (89.2)	4 (10.8)	
Anxiety	189 (83.6)	178 (94.2)	11 (5.8)	
Antenatal care practice	N (%)	n (%)	n (%)	
Antenatal care visiting behavior				0.000^a
Appropriate with government recommendation	191 (84.5)	184 (96.3)	7 (3.7)	
Not Appropriate	35 (15.5)	27 (77.1)	8 (22.9)	
Access to healthcare services during pandemic				0.000^a
Easy	180 (79.6)	173 (96.1)	7 (3.9)	
Difficult	46 (20.4)	38 (82.6)	8 (17.4)	

n = number, ^aChi-square test

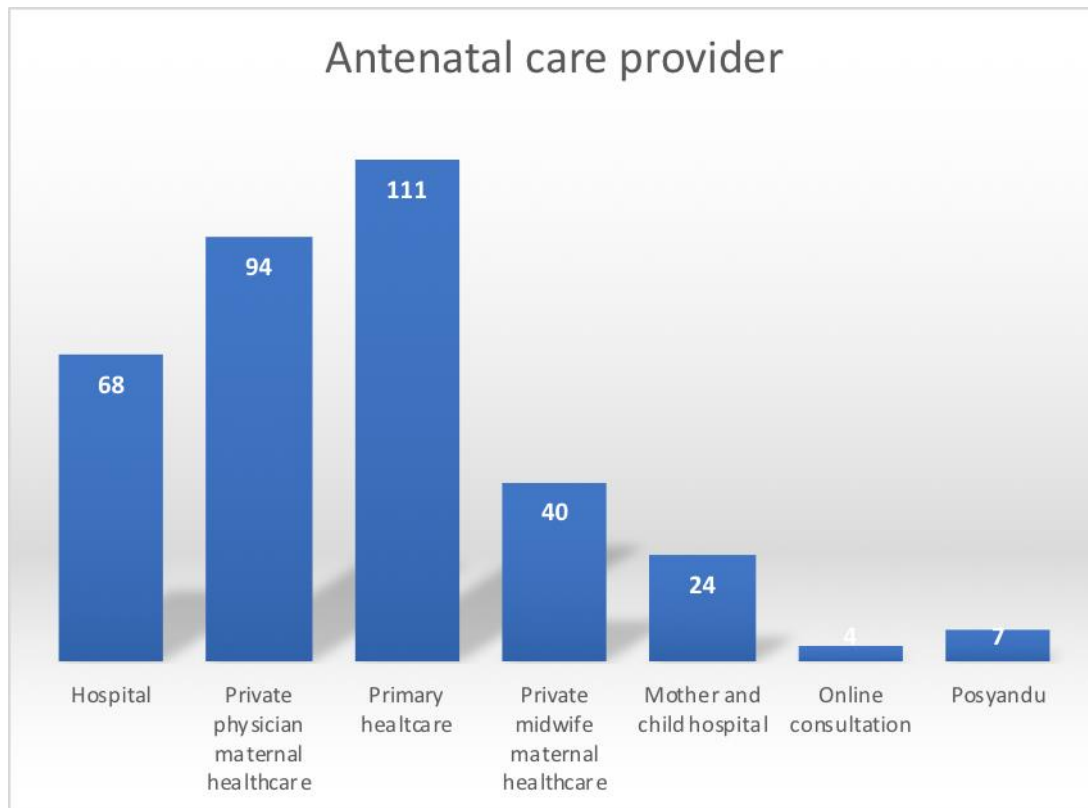


Fig. 1 Types of antenatal care provider used by pregnant women during pandemic

Table 2. Logistic regression result of predictors of utilization of antenatal care services during pandemic

	Utilization of antenatal care services during pandemic							
	Model 1				Model 2			
	P value	OR	95% Confident interval		P value	OR	95% Confident interval	
			Lower	Upper			Lower	Upper
Antenatal care visiting behavior	.008	4.677	1.489	14.690	.002 ^a	5.904	1.897	18.379
Access to healthcare services during pandemic	.025	3.668	1.178	11.421	.024 ^a	3.675	1.182	11.423
Parity of mothers	.066	.231	.048	1.103				

OR: Odds ratio, ^alogistic regression