

Multilevel Analysis on the Determinants of Antenatal Care Visit at Community Health Center in Madiun, East Java

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ABSTRACT

Background: Antenatal care (ANC) is an important determinant of high maternal mortality rate and one of the basic components of maternal care. However, some pregnant women still had low awareness about the importance of ANC. The purpose of this study was to examine determinants of ANC visit in community health center, Madiun, East Java, and to determine the contextual effect of the community health center on the ANC visit.

Subjects and Method: This was a case-control study conducted in Madiun, East Java, from November to December 2018. A sample of 200 pregnant women was selected by simple random sampling. The dependent variable was ANC visit. The independent variables were knowledge, occupation, number of children, attitude, income, and husband support. The data were collected by questionnaires and analyzed by a multilevel linear regression.

Results: The likelihood of ANC visit increased with employment status ($b= 1.97$; 95% CI= 0.81 to 3.13; $p= 0.001$), good knowledge ($b= 1.56$; 95% CI= 0.41 to 2.72; $p= 0.008$), positive attitude ($b= 1.74$; 95% CI= 0.52 to 2.96; $p= 0.005$), higher family income ($b= 1.42$; 95% CI= 0.29 to 2.55; $p= 0.014$), and stronger husband support ($b= 1.29$; 95% CI= 0.16 to 2.43; $p= 0.260$). ANC visit decreased with larger number of children ($b= -1.05$; 95% CI= -2.17 to 0.07; $p= 0.067$). Community health center had strong contextual effect on ANC visit in pregnant women with ICC= 41.85%.

Conclusion: ANC visit increases with employment status, good knowledge, positive attitude, high family income, and strong husband support. ANC visit decreases with large number of children. Community health center has strong contextual effect on ANC visit in pregnant women.

Keywords: antenatal care, determinants, pregnant women

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BACKGROUND

Antenatal Care (ANC) is all health services provided by medical personnel to pregnant women, starting from the moment of conception until entering labor, which aims to ensure the health of both the mother and the fetus (WHO, 2016; Ministry of Health, 2014).

Regular prenatal check-ups are a potentially effective way to monitor the health status of pregnant women and the fetus during pregnancy. ANC routinely can provide rights for pregnant women and their fetuses to obtain proper health services so that the creation of pregnancy, childbirth, and childbirth is healthy for both the mother and fetus. Integrated ANC is one of the efforts recommended by the

World Health Organization (WHO) to reduce Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR). The cause of death of pregnant women is dominated by actual complications that can be detected early during pregnancy through routine ANC (Acharya et al, 2015).

The main foundation of ANC is the immediate detection and treatment of complications. Detection and preventive measures are stated in the ANC component, better known as 10T, which consists of measurements of LiLA, height and weight, Uterus Fundus Height (TFU), blood pressure, Tetanus Toxoid injection (TT), iron tablet administration, laboratory examination (HIV and other infections, blood type, urine protein, blood sugar etc.), management of complications and counseling (Ministry of Health, 2014).

ANC services are the right place and moment to provide counseling and information that can improve healthy behavior and avoid poor maternal and fetal outcomes. Not just counseling on pregnancy, off-topic pregnancy counseling can also be discussed during ANC. Some examples of counseling outside the topic of pregnancy that can be discussed are contraception, parenting, to growth and development (Walleret al, 2016).

The importance of the role of the ANC in the community makes the ANC a priority for health services. This maternal health service has been facilitated in all levels in the health care system. At the basic level, in this case PHC, health services for pregnant women in the form of ANC are given to pregnant women with a low risk of pregnancy. Women with a high risk of pregnancy who cannot be handled by the PHC will be given a reference to higher health services. Various policies are set by the Government to facilitate access to ANC services. The aim is none other than so that

the ANC coverage rate increases (Shabila et al, 2014).

ANC is recommended at least 4 times during pregnancy. One time is in the first Trimester, once is in the second Trimester and twice is in the third Trimester. Each visit includes several aspects that describe the condition of the pregnant woman at that time as a whole, and help pregnant women prepare their labor later. If there are abnormalities in the mother or fetus, ANC visits can be more than 4 times. Referring to WHO recommendations, there are five pillars of ANC, which are more focused on service quality than quantity of visits, independent care, detection of diseases outside of risk factors, Evidence Based Practice (EBM) and birth preparation and complications (Gitonga, 2017; Ejigu et al, 2013).

In Indonesia, there are only around 66% of pregnant women who complete ANC visits up to a minimum of 4 times. This figure is far from the government's targeted target of 90%. Madiun Regency is a regency located in the East Java Province. Based on data from the Health Profile of East Java Province in 2017, Madiun Regency is in the third place with the highest maternal mortality. The K1 ANC in Madiun Regency in 2017 was 97.5%, which is still below the Province's achievement. The East Java Provincial Health Office urges the City/ Regency that has a K1 number below the Province to improve data collection and assistance to pregnant women. The K4 number of Madiun Regency in 2017 is 90.4%. Similar to East Java Province and 38 other Cities/ Regencies throughout East Java, the K4 number of Madiun Regency has not yet reached the target. The K4 number is included in the SPM (Minimum Service Standards) indicator, with a target for 2017 of 100% (East Java Health Office, 2017).

The number of ANC visits that are still below the target is caused by biopsychosococultural factors that are related to each other. It is important to comprehensively understand the factors that influence ANC visits. Factors that influence the scope of ANC visits can be used as material for consideration so that the policies provided can go right on target. Therefore, this study was made so that it can be used as an illustration of community barriers to accessing ANC services.

SUBJECTS AND METHOD

1. Study Design

This was an analytic observational study with a case control design. The study was conducted in 25 community health centers in Madiun, East Java, from November to December 2018.

2. Population and Samples

The population in this study was all pregnant women with gestational age ≥ 36 weeks in the area of Madiun Regency, East Java. At the PHC level, the stratified random sampling technique was chosen according to the strata of each PHC, then samples at the individual level were selected using simple random sampling technique. A total sample of 200 people spread across 25 health centers, each health center was taken 8 pregnant women.

3. Study Variables

The dependent variable was completeness of antenatal visit. The independent variables were employment, knowledge, number of children, attitude, family income, and husband support.

4. Operational Definition of Variables

Maternal knowledge was defined as maternal knowledge about pregnancy and ANC. The data were collected by questionnaire. The measurement scale was continuous and transformed into a dichotomous, coded 0 for low (score < 6) and 1 for high (score ≥ 6).

The number of children was defined as the number of living children. The data were collected using questionnaire. The measurement scale was continuous and transformed into a dichotomous, coded 0 for ≥ 1 and 1 for 1.

Attitude was defined as the response of the mother regarding pregnancy and ANC. The data were collected using questionnaire. The measurement scale was continuous and transformed into a dichotomous, coded 0 for negative attitude (score < 5) and 1 for positive attitude (score ≥ 5).

Maternal occupation was defined as the daily economic activities of pregnant women who generate income in the form of money. The data were collected using questionnaire. The measurement scale was categorical, coded 0 for unemployed and 1 for employed.

Family income was the average amount of income generated by family members from their work in the last 6 months in rupiah. The data were collected using questionnaire. The measurement scale was continuous and transformed into a dichotomous, coded 0 for $< \text{Rp } 1,576,892$ and 1 for $\geq \text{Rp } 1,576,892$.

Husband support was defined as an attitude and action in the form of assistance/ support given by a husband to his wife regarding his pregnancy, in the form of informational, appraisal, instrumental, and emotional support. The data were collected using questionnaire. The measurement scale was continuous and transformed into a dichotomous, coded 0 for weak score < 20 and 1 for strong score ≥ 20 .

Community health center accreditation was the value given by an independent institution that organizes accreditation to community health center after it is assessed that the community health center has met the service standards set by the minister to continuously improve the quality of the

services. The data were collected from Madiun District Health Office Data with a categorical scale of 0 for non-accredited and 1 for accredited.

ANC visit was defined as the number of ANC visits that pregnant women had performed at health services during this pregnancy until the time of the study. The data were collected from the MCH Handbook of each pregnant woman on a categorical scale. A value of 0 is for an ANC visit which is incomplete and 1 is for a complete ANC visit.

5. Research Ethics

The research ethical clearance was obtained from the Research Ethics Committee at Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Central Java, Indonesia. Research ethics included issues such as informed consent, anonymity, confidentiality, and ethical clearance.

RESULTS

1. Univariate Analysis

The subjects of this study were 200 pregnant women. The case group was namely pregnant women with incomplete ANC, namely 43 pregnant women and 157 pregnant women in the control group, namely pregnant women with complete ANC visits.

Table 1 shows that pregnant women who did not work were 98 subjects (49%) and pregnant women who worked were 102 subjects (51%). Pregnant women with low knowledge were 109 subjects (54.5%) and pregnant women with high knowledge were 91 subjects (45.5%). Pregnant women who do not have children are 117 subjects (58.8%) and pregnant women who have children are 83 subjects (41.5%). Pregnant women with negative attitudes towards ANC were 100 subjects (50%) and pregnant women with a positive attitude towards ANC were 100 subjects (50%). Pregnant

women who had low family income (<Rp 1,576,892) as many as 100 subjects (50%) and mothers who have high family income (Rp 1,576,892).

RESULTS

1. Univariate Analysis

Table 1. The results of univariate analysis

Variable	n	%
ANC Visit		
Incomplete	43	21.5
Complete	157	78.5
Occupation		
Not working	98	49.0
Working	102	51.0
Knowledge		
Low	109	54.5
High	91	45.5
Number of Children		
None	117	58.5
≥1	83	41.5
Attitude		
Negative	100	50.0
Positive	100	50.0
Income		
Low	100	50.0
High	100	50.0
Husband support		
Weak	96	48.0
Strong	104	52.0
Community health center's accreditation		
Not accredited	4	15.9
Basic	11	42.3
<i>Madya</i>		

Table 1 showed the results of univariate analysis. Table 1 showed that as many as 157 pregnant women (78.5%) had ANC visit, 102 (51.0%) were employed, and 109 (54.5%) had low knowledge about ANC visit.

2. Bivariate Analysis

Table 2 showed the results of bivariate analysis. Table 2 showed that ANC visit increased with maternal employment (OR= 3.02; 95% CI= 1.47 to 6.23; p= 0.002),

knowledge (OR= 3.02; 95% CI= 0.42 to 6.42; p= 0.003), attitude (OR= 2.87; 95% CI= 1.39 to 5.90; p= 0.003), family income (OR= 3.81; 95%= 1.79 to 8.10; p<0.001),

and husband support (OR= 4.92; 95% CI= 2.27 to 10.70; p<0.001), but decreased with number of children (OR= 0.22; 95% CI= 0.11 to 0.46; p=0.001).

Table 2. The results of bivariate

Independent Variables	Complete		Incomplete		OR	CI 95%		p
	n	%	n	%		Lower Limit	Upper Limit	
Employment								
Unemployed	68	69.4	30	30.6	3.02	1.47	6.23	0.002
Employed	89	87.3	13	12.7				
Knowledge								
Low	77	70.6	32	29.4	3.02	1.42	6.42	0.003
High	80	87.9	11	12.1				
The Number of Children								
Do Not Have Children	104	88.9	13	11.1	0.22	0.11	0.46	<0.001
Have Children	53	63.9	30	36.1				
Attitude								
Negative	70	70.0	30	30.0	2.87	1.39	5.90	0.003
Positive	87	87.0	13	13.0				
Income								
Low	68	68.0	32	32.011	3.81	1.79	8.10	<0.001
High	89	89.0	11	0				
Husband Support								
Weak	63	65.6	33	34.4	4.92	2.27	10.7	<0.001
Low	94	90.4	10	9.6				

Table3. The results of multivariate analysis

Independent Variables	b	CI 95%		p
		Lower Limit	Upper Limit	
Fixed Effect				
Employment	1.97	0.81	3.13	0.001
Knowledge	1.56	0.41	2.72	0.008
The number of children	-1.05	-2.17	0.07	0.067
Attitude	1.74	0.52	2.96	0.005
Income	1.42	0.29	2.55	0.014
Husband Support	1.29	0.16	2.43	0.026
Random Effect				
Community Health Center				
Var (constant)	2.37	0.69	8.09	
Log likelihood = -65.26				
LR test vs. Logistic				
Regression: chibar2 (01)= 11.18				
p= 0.0004				
ICC = 41.85%				

3. Multivariate Analysis

Table 3 showed the results of multivariate analysis. Table 3 showed that ANC visit increased with maternal employment (b= 1.97; 95% CI= 0.81 to 3.13; p= 0.001), knowledge (b= 1.56; 95% CI= 0.41 to 2.72, p=

0.008), attitude (b= 1.74; 95% CI= 0.52 to 2.96; p= 0.005), family income (b= 1.42; 95%= 0.29 to 2.55; p= 0.014), and husband support (b= 1.29, 95% CI= 0.16 to 2.43; p= 0.026). ANC visit decreased with number of children (b= -1.05; 95% CI= -2.17 to

0.07; $p= 0.067$). Community health center had contextual effect on ANC visit with ICC= 41.85%.

DISCUSSION

1. The effect of maternal employment on ANC Visits

The result of this study showed that there was a significant effect of maternal employment on ANC visits. Pregnant women who have a job can increase ANC visit by 1.97 times, on the contrary, pregnant women who did not have a job can decrease ANC visit.

Employment was related to social environment. Pregnant women who work have a wider social environment than housewives. This allowed pregnant women to access more information related to pregnancy, including ANC. The influence of co-workers and other information that pregnant women got during work increased the knowledge of pregnancy which would eventually initiate ANC visits according to recommendations (Rahman et al, 2017).

The work environment also influenced the decision making of pregnant women. Women's behavior in the community of pregnant women has a great strength in shaping maternal autonomy over their health. Both family and coworkers, they have a role in shaping a character. Being in a empowered, independent and autonomous community influenced the mothers to be able to make health decisions for themselves. Important decision makers were related to health services that would be obtained, including ANC services (Osorio et al, 2014).

2. The effect of maternal knowledge on ANC visits

There was a significant effect of maternal knowledge on ANC visits. As shown in the results of the study, pregnant women who have a higher knowledge of ANC could

increase ANC visits by 1.56 times, whereas pregnant women with low knowledge of ANC could reduce the rate of ANC visits in pregnant women.

ANC benefits and the risk of pregnancy were important knowledge for pregnant women. Pregnant women who did not understand this concept tend to have a lower frequency of ANC visits than mothers who already understand. Knowledge was the result of synthesis of education, communication and information, so that to increase knowledge, the target of the intervention was directed at education, information, and communication. Easy access to information, clear information, and good information delivery by health personnels would increase the knowledge of pregnant women. Mothers with high knowledge would be more concerned about their health so they would be encouraged to conduct a complete ANC (Nsibuet *al*, 2016).

In addition, the health care system must innovate in providing alternative of others information delivery. The submission of information through internet-based networks was an effective effort. In the multimedia era, social media was a communication tool that was easier and faster to reach. Not only effective, this method was also quite fun and easy to accept (Gulema *et al*, 2017).

3. The effect of the number of children on ANC visits

The result of this study showed that there was a significant effect of the number of children on ANC visits. Pregnant women who have a lot of children could reduce the number of ANC visit by 1.05 time, on the contrary, pregnant women who did not have children can increase the number of ANC visits in pregnant women. Some studies showed the same results with this study (Ghayffaret *al*, 15).

The number of children was related to the availability of time that the mother has. The large number of children would reduce the mothers' free time. Mother's free time can be used for ANC test. The dependence of the child and family on the mother made a mother finished a lot of homework by herself. Therefore, mothers would not have enough time to conduct ANC test (Tsegay *et al*, 2013).

The number of children was also related to the experience of pregnant women. Pregnant women with a large number of children saw that pregnancy and childbirth were natural and did not require intervention from medical personnel. This was reinforced if pregnant women did not experience complications in the previous pregnancy and childbirth. For mothers who did not have children, pregnancy was a new thing. Because it was the first experience, pregnant women who did not have children would try to monitor their fetal development more intensively by following the recommended ANC schedule in an accurate manner (Muindiet *al*, 2016).

4. The effect of maternal attitude on ANC visits

The result of this study showed that there was a significant effect of maternal attitude on ANC visits. Pregnant women who have a positive attitude toward ANC can increase ANC visits by 1.74 times, whereas pregnant women who have a negative attitude toward ANC reduce the rate of ANC visits in pregnant women.

In the previous study, it was stated that mothers who did not fulfill the minimum number of recommendations for ANC visits were mothers who had negative attitudes towards ANC. This negative attitude was indicated by pregnant women who considered that ANC was not needed, except if the complications occurred in the previous obstetric history or there were

complications in the current pregnancy. Attitude WAS closed behavior, one of them was influenced by knowledge (Hajizadeh *et al*, 2016).

5. The effect of family income on ANC visits

The result of this study showed that there was a significant effect of total family income on ANC visits. It can be seen in table 3 that pregnant women who have high family income can increase ANC visits by 1.42 times, whereas pregnant women who have low family income can reduce the rate of ANC visits in pregnant women.

Pregnant women with high family income have a higher frequency of ANC visits. This was related to costs during the examination. Actually, the Indonesian government has made insurance policies for the poor community. This health insurance allowed insurance holders to get health services for free without paying the premium. But unfortunately, some checks were not covered, such as ultrasound and some other investigations (Fauk *et al*, 2017).

Previous studies stated that low income families have poor understanding and low utilization of preventive, promotive and curative aspects of the health system. Pregnant mothers with higher family incomes have a higher standard of living. Higher living standards gave more attention to budgets for health, both direct and indirect ANC costs (Ghaffaret *al*, 2015).

6. The effect of husband support on ANC visits

The result of this study showed that there was a significant effect of husband support on ANC visits. Pregnant women who received strong husband support can increase ANC visits by 1.29 times, whereas pregnant women who have weak husband support can reduce the rate of ANC visits in pregnant women. This was in line with various previous studies which stated that husband

support has an effect on ANC visits (Gitonga et al, 2017; Sakeah et al, 2017).

Husbands support has an important role in maternal health, not only on maternal health status, but on health services obtained by pregnant women. Husbands support was influenced by several things, such as husband's education, family economic welfare, cultural influences, and several other factors. Strong husband support allowed the mother to have autonomy over herself. Mothers who have autonomy over their own health can make important decisions on their own health independently (Sakeah et al, 2017).

A study in Ethiopia investigated the effect of husband's presence on ANC visits. The researcher conducted an experimental study, with a case-control study design. The control was obtained from local health profile data, while the cases were pregnant women who were treated to conduct ANC visit with their husbands. Husband's participation in ANC visits was one form of instrumental support. The results of the study showed a significant influence on the participation of husbands during the visit on the frequency of ANC visits. Possible causes were that husbands were open to health services and understand the benefits of ANC so they can persuade pregnant women to get complete ANC services (Forbes et al, 2018).

7. The effect of community health center on ANC visits

The results showed that the ICC score= 41.85%, the indicator showed that the variation in ANC visits of pregnant women by 41.85% was determined by variables at the community health center level. The results of multilevel analysis showed that there was a contextual effect of the condition of the Health Center and the effect was important

In the PRECEDE-PROCEED model, behavioral change factors consisted of predisposing factors, enabling factors and reinforcing factors. Public health as a factor outside the individual which caused pregnant women to check their pregnancy was an enabling factor. Similar theories were explained in the triad of reciprocal determinism. The method of reciprocal determinism referred to individual reciprocal interactions, behavior and environment, which can be interpreted that behavior was influenced by the individual and his/her environment (Murthi, 2018).

This study concluded that pregnant women's visit was influenced by maternal employment, maternal knowledge, the number of children, maternal attitude, family income and husbands support. Pregnant women who work, have high knowledge, did not have children, have positive attitudes, high family income, and strong husband support could increase ANC visits in pregnant women.

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