

Multilevel Analysis of the Implementation of the Health Belief Model on Antenatal Visit at Integrated Health Posts in Kapuas Hulu, West Kalimantan, Indonesia

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Received: May 10, 2024; Accepted: June 07, 2024; Available online: July 16, 2024

ABSTRACT

Background: Antenatal care (ANC) is carried out to prevent causes of morbidity (illness or complications) and mortality (death) in pregnant women and children. This study aimed to determine the relationship between the application of the health belief model and the behavior of utilizing/visiting antenatal services.

Subjects and Method: The research was conducted with a cross-sectional study design. The approach taken was to use an analytical observational model with a sample size of 213 pregnant women. This research was conducted at the Kapuas Hulu District Health Center. This research was conducted in November-December. A sample of 213 pregnant women was selected using stratified random sampling. The dependent variable in this study is ANC visits. Meanwhile, the independent variables in this study were perceived vulnerability, perceived severity, perceived benefits, self-efficacy, and gestational age. Data collection was carried out using a questionnaire and data was analyzed using a multilevel multiple linear regression analysis model.

Results: ANC visits increased with high perceived susceptibility ($b= 0.13$; 95% CI= 0.06 to 0.20; $p < 0.001$), high perceived severity ($b= 0.17$; 95% CI= 0.12 to 0.21; $p < 0.001$), high perceived benefit ($b=0.13$; 95% CI= 0.09 to 0.18; $p < 0.001$), high self-efficacy ($b= 0.11$; 95% CI= 0.03 to 0.18; $p=0.005$), and high gestational age ($b= 0.15$; 95% CI = 0.10 to 0.20; $p < 0.001$).

Conclusion: Several constructs in the Health Belief Models which include perceived vulnerability, perceived severity, perceived benefits and perceived self-efficacy can be used as predictors of antenatal visits for pregnant women at Integrated service post, Kapuas Hulu Regency, West Kalimantan Province. Resulting in an ICC of 14.9%, which means there is a contextual influence of Integrated service post on antenatal visits of pregnant women.

Keywords: multilevel analysis, health belief model theory, antenatal care, pregnant women.

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Cite this as:

Purwantati TC, Demartoto A, Murti B (2024). Multilevel Analysis of The Implementation of The Health Belief Model on Antenatal Visit at Integrated Health Posts in Kapuas Hulu, West Kalimantan, Indonesia. 09(03): 236-244. <https://doi.org/10.26911/thejhp.2024.09.03.05>.



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BACKGROUND

Antenatal care (ANC) is carried out to prevent causes of morbidity (illness or complications) and mortality (death) in pregnant women and children. The aim of ANC is to prepare as well as possible physically and mentally and save the mother and child during pregnancy, childbirth and the postpartum period, so that during postpartum the mother and child are healthy and normal physically and mentally. Antenatal care (ANC) services have an important role in ensuring the health of pregnant women and fetuses (Nainggolan and Harista, 2021).

ANC is a series of health care provided to pregnant women to monitor the progress of pregnancy, detect potential problems, and provide education about maternal and neonatal care (Ministry of Health of the Republic of Indonesia, 2018). Globally, data from the World Health Organization (WHO) shows significant variations in ANC utilization around the world. According to WHO, around 86% of pregnant women worldwide visit ANC services at least once during pregnancy, but only around 58% attend the recommended minimum of four ANC visits (Adedokun and Yaya, 2020).

Data in Kapuas Hulu Regency itself recorded that in 2021 the number of visits by pregnant women was 84.5% with a target of 100% (Kapuas Hulu Regency Health Profile, 2021). However, ANC utilization tends to be higher in urban areas compared to rural areas. However, it should be noted that ANC utilization alone is not sufficient to assess the quality of care and desired pregnancy outcomes. (Ministry of Health of the Republic of Indonesia, 2022).

The Health Belief Model (HBM) is a theoretical framework that describes how individuals' perceptions of risks and benefits can influence their decisions in adopting health behaviors (Glanz et al., 2015).

Studies regarding ANC utilization need to involve psychological and social factors, such as cultural factors and community traditions, which can influence pregnant women's decisions in utilizing this service (Rachmawati and Puspitasari, 2017).

Several studies have also identified the role of culture and community traditions in influencing ANC utilization. Local traditions, spiritual beliefs, and social norms can play a significant role in a pregnant woman's decision to attend ANC (Simbolon and Nahak, 2021). Based on these problems, this study aimed to determine the relationship between the application of the health belief model and the behavior of utilizing/visiting antenatal services.

SUBJECTS AND METHOD

1. Study Design

This research is an analytical observational study with a cross sectional approach. This research was conducted in November-December 2023. The location of this research was carried out in Kapuas Hulu, West Kalimantan, Indonesia.

2. Population and Sample

The population in this study were pregnant women in the Kapuas Hulu Regency area. The number of samples was taken from 8 integrated service post from 4 community health centers, so that 213 pregnant women were selected.

3. Study Variables

The dependent variable includes ANC visits, while the independent variables are perceived vulnerability, perceived severity, perceived benefits, self-efficacy, and gestational age.

4. Operational Definition of Variables

Perceived Susceptibility is an individual's perception of his/her vulnerability to disease. Data was measured using a questionnaire. The scale used is a Conti-

nuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

Perceived Severity is an individual's view of how serious the impact of the disease or health condition is. Data was measured using a questionnaire. The scale used is a Continuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

Perceived Benefits is an individual's evaluation of the expected benefits of adopting healthy behavior. Data was measured using a questionnaire. The scale used is a Continuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

Perceived barriers are an obstacles or obstacles that individuals feel in adopting healthy behavior. Data was measured using a questionnaire. The scale used is a Continuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

Self-efficacy refers to an individual's belief that they are capable of carrying out certain health actions. Data was measured using a questionnaire. The scale used is a Continuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

Gestational age is a measure of the length of time a fetus in the womb. Data was obtained by interviewing pregnant women. The scale used is a Continuous scale, and for the purposes of further analysis the scale will be changed to a Dichotomous scale.

5. Study Instruments

The research instrument used for data collection was a questionnaire.

6. Data analysis

Univariate analysis to obtain frequency distribution and percentage characteristics of research subjects. Bivariate analysis to

analyze differences in independent and dependent variables using the t-test with a significance level of $p < 0.050$, and multivariate analysis using a multilevel multiple linear regression analysis model.

RESULTS

1. Sample Characteristics

This research was carried out in November-December 2023 in Kapuas Hulu Regency, West Kalimantan, where Kapuas Hulu Regency consists of 23 sub-districts, 278 villages and 4 sub-districts. This research was conducted on 213 pregnant women.

Table 1 showing the age characteristics of research subjects, states that 103 research subjects (48.36%) were under 25 years of age, and 100 research subjects (51.64%) were 25 years or older. Of the 200 respondents studied, the education level of the research subjects in this study was the highest, namely those whose last education was high school were 91 research subjects (42.72%).

Based on table 1 it can be seen that body weight characteristics, 100 subjects (46.95%) had a body weight below 63 kilograms and 113 (53.05%). Based on height characteristics, 86 subjects (40.38%) had a height below 152 centimeters and 127 subjects (59.62%) had a body height above 152 centimeters.

Table 1 also showed the district characteristics, 55 subjects (25.82%) live in Hulu Gurung District, 23 subjects (10.80%) live in Suhaid District, 27 subjects (12.68%) live in Silat Hulu District, 28 subjects (13.15%) residing in Boyan Tanjung District, 17 subjects (7.98%) residing in Silat Hilir District, 23 subjects (10.80%) residing in Pengkadan District, 21 subjects (9.86%) residing in Semitau District, and 19 subjects (8.92%) resides in North Putussibau sub-district.

Table 1. Sample characteristics (Continous data).

Characteristics	Category	Frequency (n)	Percentage (%)
Age	<25 years old	103	48.36
	≥25 years old	110	51.64
Education	Primary school	40	18.78
	Junior high school	53	24.88
	Senior high school	91	42.72
	Higher Education	29	13.62
Weight	<63 kg	100	46.95
	≥63 kg	113	53.05
Height	<152 cm	86	40.38
	≥152 cm	127	59.62
District	Hulu Gurung	55	25.82
	Suhaid	23	10.80
	Silat Hulu	27	12.68
	Boyan Tanjung	28	13.15
	Silat Hilir	17	7.98
	Pengkadan	23	10.80
	Semitau	21	9.86
	Putussibau Utara	19	8.92

2. Univariate analysis

Table 2 shows the results show that the 213 research subjects had an average of 3.65 visits and had a standard deviation of 1.69 with a minimum of 1 visit and a maximum of 9 visits. In the perceived vulnerability variable, 213 research subjects had an average point of 4.34 and a standard deviation of 2.09. In the perceived severity variable, 213 research subjects had an average point of 5.37.

The perceived benefit variable showed results, 213 research subjects had an average point of 6.34 and a standard deviation of 3.67 with the smallest point being 0 and the largest being 12 points. In the perception of obstacles variable, the 213 re-

search subjects had an average point of 2.90 and a standard deviation of 2.87. In the self-efficacy variable, 213 research subjects had an average point of 4.40 and a standard deviation of 1.63 with the smallest point being 0 and the largest being 6 points.

For the signal variable for action, 213 research subjects had an average point of 4.84 and a standard deviation of 1.70 with the smallest point being 0 and the largest being 6 points. In the gestational age variable, the 213 research subjects had an average gestational age of 34.83 weeks and a standard deviation of 2.53 with the smallest age being 32 weeks and the largest being 40 weeks).

Table 2. Results of univariate analysis of the health belief model on antenatal visit at integrated health posts in Kapuas Hulu, West Kalimantan, Indonesia.

Variable	n	Mean	Std. Dev	Min.	Max.
Antenatal Visits	213	3.65	1.69	1	9
Perception of Vulnerability	213	4.34	2.09	0	8
Perception of Severity	213	5.37	3.13	0	10
Perception of Benefits	213	6.34	3.67	0	12
Perception of Barriers	213	2.90	2.87	0	8
Self-Efficacy	213	4.40	1.63	0	6
Cue To Action	213	4.84	1.70	0	6
Gestational Age	213	34.83	2.53	32	40

3. Bivariate Analysis

Bivariate analysis was carried out to determine the effect of one variable. independent and dependent using the dependent T test. Bivariate analysis test results in this study were carried out to determine whether there were differences in scores for antenatal visits with perceived susceptibility, perceived severity, perceived benefits, self-efficacy, cues to action, and gestational age.

Table 3 shows the t-test results of the variables perceived susceptibility, perceived severity, perceived benefits, self-efficacy, cues to action, and gestational age regarding antenatal visits. Based on the results of the t-test, the perception of low vulnerability (Mean=2.30; SD=0.80) with the perception of high vulnerability (Mean=4.27; SD=1.63) shows that someone with a high perception of vulnerability can increase antenatal visits and this is statistically significant (p <0.001). It can be concluded that a high perception of vulnerability can influence antenatal visits.

Table 3 shows the results for low perceived severity (Mean=2.60; SD=0.89) with high perceived severity (Mean=4.66; SD=1.67) indicating that someone with high perceived severity can increase antenatal

visits and is statistically significant (p <0.001). It can be concluded that high perceived severity can influence antenatal visits.

Table 3 shows the results for low perceived benefits (Mean=2.42; SD=0.81) with high perceived benefits (Mean=4.52; SD=1.61) indicating that someone with high perceived benefits can increase antenatal visits and this is statistically significant (p<0.001). Table 3 shows the results on low self-efficacy (Mean=2.16; SD=0.85) with high self-efficacy (Mean=4.10; SD=1.63) indicating that someone with high self-efficacy can increase antenatal visits and is statistically significant (p<0.001).

Table 3 shows the results for low cues to action (Mean=2.41; SD=1.05) with high cues to action (Mean= 4.40; SD=1.57) indicating that someone with high cues to act can increase antenatal visits and is statistically significant (p <0.001).

Table 3 shows the results at low gestational age (Mean=2.55; SD=0.94) with high perceived benefits (Mean=4.23; SD=1.71) indicating that someone with a high gestational age can increase antenatal visits and this is statistically significant (p<0.001).

Table 3. Bivariate test results of differences in scores regarding antenatal visits with perceived vulnerability, perceived severity, perceived benefits, self-efficacy, cues to action, and gestational age (n= 213).

Variable	Category	n	Mean	SD	p
Perception of Vulnerability	Low (score<4)	67	2.30	0.80	<0.001
	High (score ≥4)	146	4.27	1.63	
Perception of Severity	Low (score<5)	104	2.60	0.89	<0.001
	High (score ≥5)	109	4.66	1.67	
Perception of Benefits	Low (score <5)	88	2.42	0.81	<0.001
	High (score ≥5)	125	4.52	1.61	
Self-Efficacy	Low (skor<4)	49	2.16	0.85	<0.001
	High (skor ≥4)	164	4.10	1.63	
Cues to actions	Low (score <6)	80	2.41	1.05	<0.001
	High (score ≥6)	133	4.40	1.57	
Gestational Age	Low (<34 weeks)	73	2.55	0.94	<0.001
	High (≥34 weeks)	140	4.23	1.71	

4. Multivariate analysis

Table 4 shows the results of multivariate analysis on perceived vulnerability, perceived severity, perceived benefits, self-efficacy, and gestational age with antenatal visits, as well as the contextual influence of integrated service post with antenatal visits at level 2.

There was a positive relationship between perceived vulnerability and antenatal examination, and this relationship was statistically significant. Every 1 unit increase in susceptibility score will be followed by an increase in antenatal examination score of 0.13 (b= 0.13; 95% CI= 0.06 to 0.20; p <0.001).

There was a positive relationship between perceived severity and antenatal examination, and this relationship was statistically significant. Every 1 unit increase in the severity score will be followed by an increase in the antenatal examination score of 0.17 (b= 0.17; 95% CI= 0.12 to 0.21; p <0.001).

There is a positive relationship between perceived benefits and antenatal care, and this relationship is statistically significant.

Every 1 unit increase in the benefit score will be followed by an increase in the antenatal examination score of 0.13 (b= 0.13; 95% CI= 0.09 to 0.18; p <0.001).

There is a positive relationship between self-efficacy and antenatal examination, and this relationship is statistically significant. Every 1 unit increase in self-efficacy score will be followed by an increase in the antenatal examination score of 0.11 (b= 0.11; 95% CI= 0.03 to 0.18; p=0.005).

There is a positive relationship between gestational age and antenatal examination, and this relationship is statistically significant. Every 1 week increase in gestational age will be followed by an increase in the antenatal examination score of 0.15 (b= 0.15; 95% CI= 0.10 to 0.20; p <0.001).

Table 4 shows the ICC of 14.9%. This means that 14.9% of the variation in antenatal checks is determined by contextual factors located at the integrated service post level. Because ICC = 14.9% > 8-10%, a multilevel multiple linear regression analysis model is needed in analyzing this data.

Table 4. Multilevel test results of the relationship between antenatal visits and perceived vulnerability, perceived severity, perceived benefits, self-efficacy, and gestational age.

Independent Variable	Coefficient (b)	CI 95%		P
		Lower Limit	Upper Limit	
Fixed Effect				
Perception of Vulnerability	0.13	0.06	0.20	<0.001
Perception of Severity	0.17	0.12	0.21	<0.001
Perception of Benefits	0.13	0.09	0.18	<0.001
Self-efficacy	0.11	0.03	0.18	0.005
Gestational Age	0.15	0.10	0.20	<0.001
Random Effect				
Integrated service post	0.07	0.027	0.19	
N Observasi=213				
N Integrated service post=25				
Log likelihood=-216.76				
LR test vs Linear Regression	p<0.001			
ICC= 14.90%				

DISCUSSION

The characteristics of the research subjects observed included age, education, weight, height, sub-district. The research subjects in this study were 103 research subjects aged <25 years and 110 research subjects totaling 110. The most recent education was SMA (High School), namely 91 research subjects.

The body weight of the research subjects was <63 kilograms for 100 research subjects and ≥63 kilograms for 113 research subjects, the height of the research subjects was <152 centimeters for 86 research subjects while ≥152 centimeters for 127 research subjects. The district with the most research subjects is Hulu Gurung District. Perception of vulnerability is one of the important things in terms of antenatal examination because it refers to a subjective assessment of the development of future pregnancy problems, so that pregnant women think about the health implications they will have when pregnant in the early trimester (Wari and George, 2020).

The results of this study indicate that there is a positive relationship between perceived vulnerability and antenatal examination, and this relationship is statistically significant. Every 1 unit increase in susceptibility score will be followed by an increase in antenatal examination score of 0.13 ($b=0.13$; 95% CI= 0.06 to 0.20; $p < 0.001$). This research is in line with research by Muthingu et al. (2018) stated that the perception of high vulnerability to pregnancy, pregnancy complications, birth and postpartum complications increased the likelihood of ANC by 7.33 times (OR=7.33, 95% CI=3.13 to 17.44, $p < 0.001$) meaning that there was a positive relationship with perception. vulnerability to Antenatal Care with a statistically significant relationship.

The perception of severity in antenatal check-ups can be said to have the

potential to be more severe when the complications experienced by pregnant women are more severe so that pregnant women who are worried about the health of their womb will be more likely to undergo antenatal check-ups, than those who have little fear about the health of their womb (Alanazy and Brown, 2020).

The results of this study indicate that there is a positive relationship between perceived severity and antenatal examination, and this relationship is statistically significant. Every 1 unit increase in the severity score will be followed by an increase in the antenatal examination score of 0.17 ($b=0.17$; 95% CI= 0.12 to 0.21; $p < 0.001$). Research by Izadirad et al. (2018) and this research shows similar research where perceived severity results were obtained ($b=0.28$, $p < 0.001$).

Perception of benefits is what an individual has regarding the benefits they get from making health efforts. The greater the benefits obtained, the greater the efforts made on their body's health, so that they can prevent risks during pregnancy, so it is highly recommended to carry out pregnancy checks starting from the first trimester (Nisa et al., 2023). In table 4, the results show that there is a positive relationship between perceived benefits and antenatal examination, and this relationship is statistically significant. Every 1 unit increase in the benefit score will be followed by an increase in the antenatal examination score of 0.13 ($b=0.13$; 95% CI= 0.09 to 0.18; $p < 0.001$).

This research is in line with research by Nisa et al. (2022), this research obtained results from perceived benefits (OR=0.39, 95% CI=0.168 to 0.887, $p=0.039$). It can be interpreted that in this study, perceived benefits have a positive relationship with antenatal care and have a statistically significant relationship, so that the higher the

perceived benefits of pregnant women, the higher the desire to visit Antenatal Care. This research was conducted on 110 pregnant women during the Covid-19 pandemic.

Self-confidence or self-efficacy is an individual's belief in this case, namely in pregnant women. Self-efficacy also refers to mental readiness in facing future situations related to pregnancy so as to enable pregnant women to master challenges and face stressful events. Antenatal care education can be a strategy for increase self-efficacy to face childbirth (Tsai et al., 2018). There is a positive relationship between self-efficacy and antenatal examination, and this relationship is statistically significant. Every 1 unit increase in self-efficacy score will be followed by an increase in the antenatal examination score of 0.11 ($b= 0.11$; 95% CI= 0.03 to 0.18; $p=0.005$).

This research is in line with research by Mokennen et al. (2021) which was conducted in Northwest Ethiopia and obtained results regarding self-efficacy, namely high self-efficacy ($aOR=2.91$; 95%CI: 1.40 to 6.04; $p=0.20$) so that in this study self-efficacy for Antenatal Care has a positive relationship and has a statistically significant relationship, so that the higher the level of self-confidence in pregnant women, the higher the level of desire to come to health services. Antenatal check-ups are highly recommended for early gestational ages, starting antenatal care at the recommended age can give pregnant women time to prepare a birth plan, consult with family and health service providers and can reduce the number of undesirable events (Mkandawire et al., 2018). There is a positive relationship between gestational age and antenatal examination, every 1 week increase in gestational age will be followed by an increase in the antenatal examination score of 0.15 ($b= 0.15$; 95% CI= 0.10 to 0.20; $p < 0.001$).

According to Aduloju et al. (2016) said that gestational age at antenatal care ranged between 6 and 39 weeks, gestational age and the first antenatal visit had a significant influence while the pregnant woman's occupation also had a significant relationship with early antenatal care ($aOR = 0.388$; 95% CI = 0.212 up to 0.710; $p = 0.002$) so that the direction of the relationship is positive and statistically significant.

AUTHOR CONTRIBUTION

All authors have made significant contributions to data analysis as well as preparing the final manuscript.

FUNDING AND SPONSORSHIP

This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

ACKNOWLEDGMENT

We would like to thank the research subjects who were willing to give their time, and the parties who have helped in preparing this article.

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