ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH LATE BOOKING OF ANTENATAL CARE AMONG PREGNANT WOMEN DURING COVID-19 PANDEMIC

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ABSTRACT

The prevalence of late antenatal care (ANC) booking in Malaysia is higher than the target set by the Ministry of Health (20%). First ANC is suggested to be conducted within 12 gestation weeks. This study aims to investigate the prevalence and factors of late booking of ANC among pregnant women in Sepang, Selangor. A cross-sectional study using a self-administered questionnaire on 492 pregnant women in the first, second, and third trimesters was conducted randomly at government health clinics. The prevalence of late ANC booking was 27.6% (136). Multiple logistic regression showed that poor knowledge (AOR = 1.604, 95% CI:1.022,2.517, P-value = 0.040), higher parity (AOR = 1.225, 95% CI:1.003,1.495, P-value = 0.046), previous experience of spontaneous vaginal delivery (SVD, AOR = 2.855, 95% CI:1.227,6.645, P-value = 0.015) and did not have experience on delivery (AOR = 2.906, 95% CI:1.147,7.364, P-value = 0.025) associated with late ANC booking. The prevalence of late ANC booking in this study was higher than MOH targeted, therefore it is suggested to devise the appropriate program to improve knowledge and awareness of the targeted high-risk population.

***Keywords**: late booking, early booking, antenatal care, Selangor, pregnant women.*

INTRODUCTION

Antenatal care (ANC) is defined as the care of the women and foetus during pregnancy to monitor maternal health and foetal growth (WHO, 2016). The World Health Organisation (WHO) recommends a minimum of four antenatal care visits, with the first ANC should be initiated in the first 12 weeks of gestation (WHO, 2017).

The recent pandemic caused major changes to daily activities, including the healthcare system. The imposition of the Movement Control Order (MCO) with several standard operating procedures (SOP) targeted to prevent the community spread of infection posed a challenge to people seeking medical interventions, including pregnant women, resulting in late ANC booking.

Several factors associated with late booking have been identified, including maternal age, marital status, unplanned pregnancy, level of education, gravidity, parity, monthly income, mode of delivery, the distance between health clinic, transportation cost, worker attitude, the waiting time, knowledge, and attitude of ANC [1-3].

Before the pandemic, the prevalence of late ANC booking in Malaysia were varied, ranging from 28.2% to 56.6% [1, 4, 5],which are higher than the target (20%) set by Ministry of Health (MOH). This might be due to these studies have been conducted in different geographical location but mainly in rural area [1, 4, 5]. As author aware, there is paucity study conducted in urban area during pandemic period. Understanding the late ANC booking during the pandemic might be a future reference to the management of late ANC. Hence, this study aims to investigate the prevalence and factors of late booking of ANC among pregnant women in Sepang, Selangor.

METHODS

Study Design and Setting

A cross-sectional study was conducted among pregnant women during their ANC visit to four government health clinics in Sepang District, Selangor, Malaysia, from August to December 2020. Sepang is a district located in the southern part of the state of Selangor in Malaysia. The Sepang District covers an area of around 600 km^2, with a population of 324,935 in the 2020 census. The district comprises four government health clinics, with all were included in the study. Sample size was calculated using a two-proportion formula6, the proportion of late booking among employed (20.9%) and unemployed status (31.3%),95% confidence level, 80% power and 10% non-response rate [1], with a total of 638 pregnant women was needed in the study. Simple random sampling was used, with random number was first, second or third trimester who are registered at government health clinics in Sepang District,

Selangor whereas exclusion criteria were illiteracy or foreigner. First ANC booking later than 12 gestation weeks was considered late ANC booking.

Data Collection and Outcomes

Self-administered questionnaire in dual languages (English and Bahasa Malaysia) was used. Researcher briefed the respondents about this study and requested they filled in the consent form. It took approximately 15 minutes to fill in the questionnaire, the questionnaire was collected and checked by the researcher to ensure all the questions have been answered.

The questionnaire consists of four sections, Section A: Socio-demographic profile [4], Section B: Knowledge of ANC, adapted from previous study [4, 20] questions and two options (yes or no). Section C: Attitude towards ANC [4, 14] questions with 5-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). The knowledge and attitude score were further categorized to two categories (good and poor knowledge), using the mean score as the cut off value. Section D, questions on clinic factors3, comprises seven questions, including the perception of health care service in clinics, perception of estimated time in the registration section, lab section, nurses' section, doctor's section, distance, and transport [3]. Proforma was used to collect obstetric and medical data from the record book of the antenatal mother, such as the last menstrual period, expected delivery date, parity, gravida, family planning, maternal problem, and family medical history (diabetes, high blood pressure, allergies, asthma, heart disease, anaemia, tuberculosis, thalassemia, and others). The questionnaire was back-to-back translated from English to Malay language, by two translators who were specialized in English education.

Statistical analysis

The collected data were coded and analysed using SPSS version 26.0. Descriptive statistics was conducted, where the mean and standard deviation (SD) were be used for continuous variables, frequency and percentage for categorical variables. Normality test for continuous data was performed by using histogram with normal curve. Chi-square test and fisher exact test were used to investigate the association between both categorical variables. Simple logistic regression was used to explore the effect of each factor associated with late ANC booking. Variables with a P-value < 0.25 in simple logistic regression were tested using multiple logistic regression. Variables with a P-value < 0.05 were considered statistically significant.

Ethical Consideration

The study was approved by the Medical Research and Ethics Committee (MREC), MOH, with the ethical approval number NMRR-19-3619-52055 (IIR).

RESULTS

A total of 492 respondents were recruited for the study, accounting for 98.4% of the response rate. The mean ± SD of the age was 30.07 ± 5.202, Muslim (436, 86.6%), Malay (424, 86.2%), had a tertiary level of education (328, 66.7%), B40 (below RM4850) family income group (350, 71.1%), and working status (305, 62.0%), reported in Table 1.

The mean ± SD of parity and gravida among pregnant women were 1.26 ± 1.27 and 2.45 ± 1.44 respectively (Table 2). About 276 (56.1%) of the respondents experienced a previous SVD, and 450 (91.5%) of the respondents did not have any medical problems. Among 42 pregnant women with medical problem, diabetes was the leading cause of medical problems among the respondents (17, 40.5%).

Most of the respondents were satisfied with the service of the health clinics (486, 98.8%), and only 3 (50.0%) of them dissatisfied with the clinics' late services. The mean ± SD of waiting time at the registration counter was 14.56 ± 12.08. Most respondents drove to the clinic (445, 90.4%), with mean ± SD of distance from home to the clinic was 15.39 ± 9.70 km.

The mean ± SD of knowledge and attitude were 17.95 ± 1.10 and 60.26 ± 7.07 respectively, with most respondents had good knowledge (371, 75.4%) and good attitude (302, 61.4%) towards ANC. A total of 356 (72.4%) of the respondents were booked for ANC less than and equal to 12 gestational weeks (Table 3).

Factors associated with late ANC booking

Four significant variables were found in the simple logistic regression, including parity, gravida, SVD, and knowledge of antenatal care (Table 4a and 4b).

Seven variables with a P-value < 0.25, including ethnicity groups, parity, gravida, mode of previous delivery, transportation used, knowledge, and attitude toward ANC, were further tested in multiple logistic regression.

Table 1: Socio-demographic characteristics among respondents (N=492)

Variables	Frequency (n)	Percentage (%)
	Mean ± standard deviation	
Age	30.07±5.20	
Religion		
Islam	436	86.6
Others	56	13.4
Ethnicity		
Malay	424	86.2
Others	68	13.8
Maternal Education		
Below Tertiary Level	164	33.3
Tertiary Level	328	66.7
Family Income (RM)		
B40 (Below 4850)	350	71.1
M40 (Between 4850 and 10959)	142	28.9
Working Status		
Not Working	187	38.0
Working	305	62.0

Table 2: Obstetric history and medical problem and distribution of clinic factors among respondents (N = 492)

	Frequency (n)	Percentage (%)
	Mean ± standard deviation Median (Interquartile range)	
Obstetric history and medical problems		
Parity	1.25 ± 1.27	
Gravida	2.45 ± 1.44	
Mode of Previous Delivery		
Spontaneous vaginal delivery (SVD)	276	56.1
Lower segment caesarean section (LSCS)	52	10.6
No Experience	156	31.7
Medical Problem		
Yes	42	8.5
No	450	91.5
Disease (n = 42)		
Diabetic	17	40.5
Hypertension	8	19.0
Asthma	11	26.2
GERD	1	2.4
Thalassemia	2	4.8
Anaemia	3	7.1
Clinic Factors		
Health care service		
Yes	486	98.8
No	6	1.2
Service Problem (n = 6)		
Late	3	50.0
Not follow sequence number	2	33.3
Need to improve the system	1	16.7
Waiting time (min)		
Registration counter	14.56 ± 12.08	
Lab counter	5.00 (5.00)	
Nurses counter	15.00 (10.00)	
Doctor counter	21.10 ± 14.94	
Distance from home to clinic (km)	15.39 ± 9.70	
Transport		
Motorcycle	41	8.3
Own car	445	90.4
Grab	6	1.2

Table 3: Knowledge and attitude score towards ANC and prevalence of late ANC booking among respondents (N = 492)

	Frequency (n)	Percentage (%)
	Mean ± standard deviation	
Total knowledge score	17.95 ± 1.10	
Good Knowledge	371	75.4
Poor Knowledge	121	24.6
Total attitude score	60.26 ± 7.07	
Good Attitude	302	61.4
Poor Attitude	190	38.6
Late Booking		
No (Less than and equal to 12 weeks)	356	72.4
Yes (More than 12 weeks)	136	27.6

In the final model, three variables are significantly associated with late ANC booking among the respondents. Respondents with previous experience of SVD and those who do not have any experience in a previous mode of delivery are 2.855 and 2.906 times more likely to have late ANC booking than respondents with previous experience of lower segment caesarean section (LSCS) in the previous delivery mode respectively (AOR = 2.855, 95% CI:1.227,6.645, P-value = 0.015; AOR = 2.906, 95% CI:1.147,7.364, P-value = 0.025). Respondents with poor knowledge of ANC are 1.604 times more likely to have late bookings than those with good knowledge (AOR = 1.604, 95% CI:1.022,2.517, P-value = 0.040). Meanwhile, respondents with higher parity are more likely to have late ANC booking (AOR = 1.225, 95% CI:1.003,1.495, P-value = 0.046).

The backward variable selection method was used, and all indicators showed that the model was good fit (Omnibus test x2 = 17.546, P-value = 0.004; classification percentage = 72%, Hosmer Lemeshow test P-value = 0.543; Area Under the Receive Operating Characteristics Curve= 0.614).

DISCUSSION

Due to COVID-19 pandemic, number of pregnant women were lesser than expected. During data collection, researcher was able to meet 500 respondents. Out of 500 respondents, there were 492 agreed to participate in this study, which accounting 98.4% of response rate. The prevalence of late ANC booking among pregnant women in Sepang, Selangor, was 27.6%, similar to a study among pregnant women in Lundu, Sarawak (28.2%)[1]. However, two studies demonstrated higher prevalence at 56.6.% and 51.9% [4, 5]. This is possibly due to this study being conducted in the urban area, where people are more likely to have better knowledge and understand the importance of ANC [9], leading them to comply with it in the first trimester.

The proportion of good knowledge of ANC among pregnant women was 75.4%, higher than a previous study, with 27.0% [10]. Out of 20 knowledge questions, 99.4% of pregnant women agreed to ANC visit, and 98.6% realised that the first antenatal visit should be done in the first three months. Overall, the prevalence of good knowledge among pregnant women is high, probably due to the location of the study in the urban area. Regression result showed that pregnant women with poor knowledge of ANC had significantly higher probability of getting a late ANC booking, similar to a study [11], with the possibility that pregnant women with poor knowledge are unaware of the importance of early ANC booking.

Parity is a significant factor associated with late ANC booking, where higher parity was associated with a higher probability of late ANC booking, similar to other studies [12-14]. Pregnant women with multipara may think that they had experience on giving birth without any complications in previous pregnancies, hence, they choose to do first ANC later.

Pregnant women who experienced SVD were more likely to have late ANC booking than those with LSCS before, similar to previous studies [2,15]. This is probably because they do not face any complications in their previous pregnancy and delivery; hence, the perception of not having to do early ANC booking. One concern is that pregnant women without any delivery experience tend to have late ANC bookings than those who experienced LSCS before. This is probably because women in their first pregnancy might be unaware of the timing for the first ANC; hence, the late booking.

Interestingly, many factors reported in previous studies, such as socio-demographic factors [11,14,16,] transportation [11,17,18,] the attitude of ANC [19], and others, were not significant in this study, possibly due to this study being conducted during the pandemic.

Table 4a: Factors associated with late ANC booking among respondents using logistic regression.

Variables	Simple Logistic Regression					Multiple Logistic Regression				
	Crude OR	SE	95% CI Lower	95% CI Upper	P-value	Adjusted OR	SE	95% CI Lower	95% CI Upper	P-value
Age	0.998	0.019	0.961	1.037	0.936					
Religion groups										
Islam	Ref.									
Others	1.400	0.302	0.774	2.532	0.265					
Ethnicity groups										
Malay	Ref.									
Others	1.407	0.279	0.814	2.430	0.221					
Maternal Education										
Tertiary Level	Ref.									
Below Tertiary Level	1.031	0.213	0.679	1.566	0.887					
Family Income (RM)										
M40 (Between 4850 and 10959)	Ref.									
B40 (Below 4850	1.178	0.226	0.756	1.835	0.470					
Working Status										
Working	Ref.									
Not Working	1.254	0.206	0.838	1.877	0.271					
Obstetric history and medical problem										
Parity	1.205	0.077	1.037	1.399	0.015*	1.225	0.102	1.003	1.495	0.046*
Gravida	1.166	0.068	1.021	1.331	0.023*					

(*) p-value < 0.05; OR: Odd Ratio; CI: Confidence Interval; R2: Coefficient of determination; Ref: Reference

Table 4b: Factors associated with late ANC booking among respondents using logistic regression.

Variables	Simple Logistic Regression					Multiple Logistic Regression				
	Crude OR	SE	95% CI Lower	95% CI Upper	P-value	Adjusted OR	SE	95% CI Lower	95% CI Upper	P-value
Mode of Previous Delivery										
Lower segment Caesarean section (LSCS)	Ref.					Ref.				
Spontaneous vaginal delivery (SVD)	3.060	0.426	1.327	7.054	0.009*	2.855	0.431	1.227	6.645	0.015*
Both	2.143	0.912	0.359	12.802	0.403	1.562	0.925	0.255	9.565	0.630
Not Applicable	2.070	0.447	0.862	4.972	0.104	2.906	0.474	1.147	7.364	0.025*
Medical problem										
No	Ref.									
Yes	1.052	0.357	0.522	2.119	0.888					
Health care service										
No	Ref.									
Yes	1.923	1.100	0.223	16.612	0.552					
Waiting time (min)										
Registration counter	1.000	0.008	0.983	1.016	0.965					
Lab counter	1.008	0.015	0.978	1.038	0.618					
Nurses counter	0.995	0.006	0.982	1.007	0.399					
Doctor counter	0.997	0.007	0.984	1.011	0.688					
Distance (km) Transport	1.007	0.010	0.988	1.027	0.473					
Motorcycle	Ref.									
Own car	0.559	0.338	0.288	1.084	0.085					
Grab	1.563	0.877	0.280	8.716	0.611					
Knowledge on antenatal care										
Good knowledge	Ref.									
Poor knowledge	1.567	0.225	1.008	2.436	0.046*	1.604	0.230	1.022	2.517	0.040*
Attitude on antenatal care										
Good attitude	Ref.									
Poor attitude	1.431	0.205	0.958	2.138	0.080					
Intercept							-2.304 (0.444)			

(*) p-value < 0.05; OR: Odd Ratio; CI: Confidence Interval; R2: Coefficient of determination; Ref: Reference

Worrying about infection risk might be the main reason pregnant women delay their first ANC booking if they do not have any health problems. Besides, strict SOP regulation enforcement increased the waiting time in the health clinics. However, approximately 98% of pregnant women were satisfied with the health care service of the clinic. This indicates that government health clinics had good management, and healthcare providers made every effort to provide good quality healthcare service to pregnant women even during the pandemic.

This study has some limitations. The results of this study have to be carefully interpreted as this study was conducted during pandemic. Besides, this is a cross-sectional study, which could not detect the causality of the factors with the outcome. Furthermore, this study was conducted in the Sepang District of Selangor and not able to generalize to whole country. This study was conducted in urban area, where future study is suggested to conduct in rural area. Future study is suggested to conduct among rural area to understand the prevalence of late ANC booking and its possible risk factors, as previous studies reported that transportation and distance issue are the risk factors of delaying first ANC booking in rural area [11,17,18].

There are several confounding variables which not investigated in this study, for instance, menstruation cycle and having other children with younger age (less than five years). In early of pregnancy, some women with not irregular period might not aware that they are in pregnant as they thought that it may be a sign or irregular ovulation. An irregular menstrual cycle is one that's shorter than 21 days or longer than 35 days [8]. Therefore, they might have the first ANC booking later than 12 weeks. Furthermore, pregnant women with child under five years old might attend ANC lately as they busy on children matters, leading them no time to attend their first ANC. Generally, first ANC booking will take about four hours to complete all the procedures, hence, pregnant women feel difficult when they have younger child. Future study is suggested to investigate the effect of these factors with first ANC booking.

CONCLUSION

The prevalence of late ANC booking was 27.6%, exceeding the MOH target yet lower than previous studies. First ANC booking within 12 gestational weeks can monitor mother health condition and development of their and baby to reduce the risk of miscarriages and birth defects. Thus, an appropriate health education on importance of early antenatal care at health facility is suggested, especially for those delivered women during postnatal home visit or postnatal routine at health clinic, where to remind them about the importance of first ANC booking for next pregnancy.

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Conflict of interest
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