

ORIGINAL ARTICLE

USAGE OF HOME-BASED MATERNAL HEALTH RECORD IN ANTENATAL MONITORING AMONG MALAYSIAN WOMEN ATTENDED UNIVERSITY KEBANGSAAN MALAYSIA MEDICAL CENTRE

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ABSTRACT

Maternal Home-based Record (MHR) is a concise medical record that can be kept by the pregnant women for regular documentation throughout pregnancy stages. This study was done to assess the usage of the MHR among the pregnant women and its associated factors. A good MHR usage was assigned using mean value as cut-off point that has been agreed by an expert group from scoring system which incorporates usage elements in term of follow-up, information documentation, knowledge seeking, continuity of care and self-monitoring of pregnancy. A cross-sectional survey was conducted in University Kebangsaan Malaysia Medical Centre (UKMMC) and a total of 79 pregnant women who attended the antenatal clinic were recruited. A validated self-administered questionnaire was used. The questionnaire was newly developed in Bahasa Malaysia. Content validity and reliability test for internal consistency for the knowledge, satisfaction and usage scale was performed. The Cronbach's Alpha value for each domain was 0.764, 0.716 and 0.877 respectively. The results showed that the prevalence of good MHR usage was 51.3%. There were significant association found between level of education (Adj OR=0.32, 95% CI 0.12, 0.85, p=0.023) and doctor as birth attendant in previous pregnancies (Adj OR= 2.54, 95% CI 1.97, 6.59, p=0.045) with good usage of MHR. There was a positive significant relationship between satisfaction level among the respondent and the level of the usage (p=0.01, r=0.377), whereby with every increase in 1 score in satisfaction level will increase the usage score by 0.4 (95% CI 0.2 to 0.7) units, p<0.01. Therefore, MHR is still relevant as antenatal care monitoring instruments and it is important to make an effort to improve patient satisfaction in using MHR. Health care providers can use this validated self-administered questionnaire to assess function of MHR to remain relevant to the pregnant women population in their locality.

Key words: Antenatal care, home-based maternal record, usage, satisfaction.

INTRODUCTION

Home-Based Maternal Health Record (MHR) for pregnant woman was first introduced to Malaysia by World Health Organization (WHO) in 1996. This was because in 1989, WHO had implemented the Safe Motherhood initiatives that consisted of four pillars which were antenatal care, family planning, clean or safe delivery and essential obstetric care. Among the mentioned pillars, antenatal care was recognized as the key strategy to reduce maternal mortality. The strategies in the antenatal pillar itself included home-based maternal health card, risk approach strategy, quality assurance program, referral or feedback system and Clinical Practice Guideline (CPG) were introduced.

The original term of home-based MHR is the home-based maternal record which takes the form of a card that is kept at home by mothers themselves and on which information about their pregnancies, the birth of their children and health problems between pregnancies can be recorded¹. In Malaysia the aim of MHR or also called Maternal Health Record was to provide a

concise record that could be kept by the pregnant women themselves. The MHR would contain all information about pregnancies, birth history and other health information. But it was not until 1st July 1997 that the MHR was finally implemented nationwide².

Over the years, the MHR was deemed to serve for many purposes of the pregnant women and health care providers. At the individual level, MHR encouraged self-care among the pregnant women. Nonetheless, at the health provider level it was considered as an important instrument to access relevant information during antenatal visits, to identify high risk cases as well as to transmit information to delivery staff at later stage. More importantly, MHR also generated service statistic and serve as an important means to assess the epidemiological characteristics of a pregnant population. These characteristics would in turn provide a deciding factor in determining priorities in a public health perspective.

However, in current practice, although the maternal indicators in Malaysia supported the positive result from this strategy, some studies

still questioned the effectiveness of the colour coding system which was one of the key components of the MHR. Ravindran, 2005 in his study highlighted that the colour coding system should be reviewed. There were some findings to support that the colour coding assignment in low and high mortality areas in Malaysia did not differ significantly³. Another study by Geefhuysen (1998) showed that colour coding system was ineffective and he recommended that more personalized counselling for pregnant women would be a better strategy instead. Therefore, there is indeed a need to look for evidence that the present MHR and the colour coding system may not give substantial contribution in improving the antenatal health care in Malaysia.

Furthermore, the important aspect of MHR that was often overlooked in previous studies of antenatal care field was the usage or utilization of the MHR by the pregnant women themselves. Though, there were many studies that investigated into the health seeking behaviour of women, it was quite difficult to find the studies that focus on the utilization or usage behaviour of pregnant women toward the MHR per se.

This study on the usage of Malaysia MHR as one of the instrument in antenatal monitoring will be able to provide an important insight into health behaviour of pregnant women towards MHR. In addition, home-based maternal record does contribute to cost burden in the health care centre as it is provided gratis to the population. Therefore, if there is proof that the record is redundant, neither utilized nor appreciated by the pregnant women population or the data collected fail to meet the standard, remedial actions such as to withdraw or replace the record with a method or measure that is more efficient and cost effective to the health system could be taken.

The main objective of this study is to measure the prevalence of good MHR usage and its association with socioeconomic demography, family structures, autonomy, previous pregnancy experiences, knowledge and satisfaction level.

METHODS

This is a cross sectional survey conducted between May and July 2012 to measure the prevalence of MHR usage and its associated factors among the Malaysian women in all trimesters of the pregnancy that had already been issued with MHR prior to the period of this study and

attending antenatal check-up in Universiti Kebangsaan Malaysia Medical Centre (UKMMC).

UKMMC which is formerly known as Hospital Universiti Kebangsaan Malaysia (HUKM) is one of the four university hospitals in Malaysia. It is located in Bandar Tun Razak, Kuala Lumpur and is managed by Universiti Kebangsaan Malaysia (UKM). This is a tertiary medical centre where the academic and research components are involved aside from the offered clinical service. There are 16 clinical departments available in UKMMC. Department of Obstetrics and Gynaecology is the only department involved for this study.

The sample size calculated using the formula by Lwanga and Lemeshow (1991) giving a minimum sample size of 79 at 5% level of significance and power of 80%⁴. All pregnant women who attended the UKMMC antenatal clinic were invited to participate in the study. The women who consented were given a set of self-administered questionnaire to answer while waiting for their treatment. The questionnaire was newly developed in Bahasa Malaysia. To ensure internal consistency, reliability test for the knowledge, satisfaction and usage scale was performed.

The content validity of the questionnaire was ensured by having a panel of experts to do the review prior to the pilot. The experts involved were from relevant disciplines related with antenatal care and service such as Family medicine specialist, Obstetrician and Family health specialist.

Data on socio-demography (age, race, education and occupation), previous pregnancy experiences, knowledge, satisfaction and usage were collected from the respondents through self-administration.

The questions on the knowledge were divided into danger signs in pregnancy, supplements important in pregnancy, awareness of colour coding, breastfeeding information and postpartum information. All of this information was incorporated inside the MHR. The respondents would later be categorized as having good knowledge if they managed to give the correct answer covering all of the respective areas. Meanwhile for satisfaction, it consisted of perspectives on aesthetic, usefulness, relevancy, convenience and informative aspect of MHR. The respondents who gave high ranking to all this area will be categorized as satisfied with the current MHR. Lastly, the questions for usage part focused on the areas of information documentation, knowledge, and continuity of care as well as the management of pregnancy. The respondents with

good usage would reflect their practices by giving higher ranking on the level of agreement of MHR usage pertaining to these areas in the questionnaires.

Data exploration, cleaning and analysis was performed using SPSS version 20.0. Descriptive analysis was performed using frequencies, percentages, means, median, standard deviation and normality checking for skewness and kurtosis. The scoring analysis to differentiate the categories for knowledge, satisfaction and usage would use mean score for normal distribution data and median score for data which is not normally distributed as cut-off point. The cut-off point using mean and median score allows for the comparison to be made between two groups using binary logistic regression followed by multivariable bivariate regression. However, the group of expert who involved in the questionnaire validation were also deciding the cut off point. Meanwhile, for continuous data association, linear regression analysis was used instead.

Ethical approval to conduct the study was obtained from the Medical Research Ethics Committee of the Faculty of Medicine, Universiti Kebangsaan Malaysia.

RESULTS

A validated self-administered newly developed questionnaire in Bahasa Malaysia was used. Reliability tests to check for internal consistency was performed for the knowledge, satisfaction and usage scale showed the Cronbach's Alpha value of 0.764, 0.716 and 0.877 respectively.

General characteristics of the subjects

A total of 79 women agreed to participate in this study. However, only 78 out of 79 respondents gave completed data for analysis. From Table 1, the largest group of respondents was from the age group of 30 to 34 years old (41.0%). A total of 73.1% were Malays followed by Chinese (2.3%) and least were Indians (1.3%). For the religion, Muslims (73.1%) is the majority. The proportion of respondents that had received tertiary education was highest with 59% while none of them belonged to the group who did not receive any education or having only primary education. Majority of women were not working (80.8%) while almost all the spouses were working (98.7%).

Table 1. General characteristics of the respondents

Characteristics	Frequency	Percentage (%)
Age group		
20-29 years old	19	24.4
30-34 years old	32	41.0
35-39 years old	21	26.9
Above 40 years old	6	7.7
Race		
Malay	57	73.1
Chinese	18	23.1
Indian	1	1.3
Others	2	2.6
Religion		
Muslim	57	73.1
Christian	4	5.1
Buddha	15	19.2
Hindu	1	1.3
Others	1	1.3
Education level		
Secondary level	32	41.0
Tertiary level	46	59.0

Family structure and autonomy

Majority of the women came from nucleus family about 71.8% where they lived only with their husband and children while the minority about 7.7% were single parents. With regards to autonomy, only 19.2% had high autonomy while the rest had low autonomy in making pregnancy decision.

Pregnancy history

Regarding the previous pregnancy experiences, from Table 2, the number of respondent's children range between none to four children, hence none of them was grand multipara. Majority had only one child (52.6%). Majority of them delivered at government facility (60.3%) and attended by doctors (52.6%). In the aspect of previous pregnancy complications, 11.5% had history of miscarriage, 3.8% suffered from stillbirth and 2.6% had bleeding episodes during pregnancies. However, majority of them (43.6%) claimed not experiencing any complication at all.

Table 2. Family structure and Pregnancy history

Pregnancy history	Frequency	Percentage (%)
Number of children		
0	21	26.9
1	41	52.6
2	8	10.3
3	4	5.1
4	4	5.1
Place of delivery		
Government		
Hospital/Clinic	47	60.3
Others	8	10.3
No previous delivery	21	26.9
Delivery attendant		
Doctors	41	52.6
Nurses	14	17.9
Others	6	7.7
No previous delivery	21	26.9
Complication		
Miscarriage	9	11.5
Stillbirth	3	3.8
Per vagina bleeding	2	2.6
Emergency C-section	13	16.7
No complication	34	43.6
Pregnancy-induce illness		
Diabetes Mellitus	7	9.0
Hypertension	2	2.9
Others (not specify)	7	9.0
None	49	62.8

Knowledge on antenatal care from using MHR

There were 20 questions on knowledge, whereby for each correct answer it was given one mark and no mark was given for wrong and unsure answer. In this survey the knowledge score of the respondents ranged between 6 and 17 with the mean of 12.6 (S.D±2.8). The knowledge level was further divided into 2 categories: good knowledge (score ≥12) and poor knowledge (score<12) using the accepted cut off point decided by the expert group of family health specialist, obstetrician and neonatologist in UKMMC. The cut off point 12 was set based on minimum score that mothers need to obtain about knowledge on maternity care using the MHR. Table 3 showed the proportion of respondent with good knowledge was 65.4% and further analysis of the questions on knowledge

revealed that majority (96.2%) of pregnant women knew that if they had per vagina bleeding they should go to the hospital immediately. However, half of the women were not aware that the best duration to get pregnant again was after more than 1 year from the last delivery. A quarter of them knew gaining one kilogram per month for the first five months meant that they were gaining extra weight than the recommendation. Only 47.4% knew tetanus immunization was important to prevent their baby from getting tetanus infection. As for the colour coding, merely 14.1% knew that the green sticker meant that they did not have to be seen by a specialist during their pregnancy and not even half realized the red sticker code mean high risk pregnancy.

Table 3. Proportion of respondents' good and poor knowledge level, satisfaction level and usage level score

Characteristics	N (%)		N (%)	
	Good score		Poor score	
Knowledge level score	51	(65.4)	27	(34.6)
Satisfaction level score	45	(57.7)	33	(42.3)
Usage level score	40	(51.3)	38	(48.7)

Satisfaction on using MHR

The initial statements in this part of questionnaire consisted of a mixture of positive and negative statements. The negative statements had been recoded to positive statements to facilitate the data analysis. There were 20 statements with 5-point Likert's scale agreement options to measure the satisfaction level which were given 1 to 5 marks. The minimum possible score is 20 and the maximum possible score is 100. Results showed that the satisfaction level of the pregnant women range from 50 to 89 with the mean score of 71.3 (SD±7.6). The satisfaction score was further divided to two levels which were satisfy (score ≥ 70) and not satisfy (score <70) using the mean score as the cut-off point as been agreed by group of expert mentioned earlier. From Table 3, the proportion of respondents who were satisfied with MHR (57.7%) was more than those who were not satisfied with minor different in percentage. For the individual questions, 62.9% of respondents were satisfied in term of the MHR gave the latest update on their pregnancy condition. Unfortunately, 41% or almost half of the group felt not satisfied that the MHR serve as a great or reliable reminder for their next follow-up and more than a quarter felt that the documentation inside the MHR was not always neat or easy to read.

Usage of MHR

As for the statements in questionnaire about the usage of MHR, they were similar in design to those in satisfaction part where a mixture of positive and negative statements had been recoded. The 20 statements with 5-point Likert's scale agreement option to measure the usage level which was given 1 to 5 marks. The minimum possible score was 20 and the maximum possible score was 100.

Results show that usage score of MHR by pregnant women ranged from 60 to 95, with the mean score of 76.7 (SD ± 8.7). The score was normally distributed. The usage score was further divided into two categories which were good usage (score ≥ 75) and poor usage (<75) using the mean score as the cut-off point and from expert opinion as mentioned earlier. Table 3 showed the proportion of respondent with good usage was 51.3% also not much different with poor usage with 48.7%. For individual questions, major proportion of pregnant women (88.5%) always brought their MHR for follow-up and stored their record in an easily accessible place. However, in terms of information more than a quarter (38.5%) found that MHR was not useful as a reference for pregnancy danger sign and 35.9% did not agree that they need to check whether the health provider provide documentation inside the MHR during their follow-up.

Relationship between usage, knowledge, satisfaction and other associated factors

As for the socio-demography, family structure, autonomy and previous pregnancy factors, simple logistic regression using $p < 0.05$ as the level of significance was utilized to test the association of these factors with the usage of MHR. Table 4 found that, there were significant association between level of education ($p = 0.011$), whereby the respondents with tertiary education is 0.29 (95% CI: 0.11- 0.76) times likely to have be in good usage category. Furthermore, doctor as birth attendant in previous pregnancies also showed significant association with level of MHR usage ($p = 0.026$), whereby respondents who had experienced delivery conducted by doctor have 2.85 (95% CI: 1.14 to 7.14) times to be a good user of MHR compared to the others. Cases were collected at UKMMC with many of them were from UKM staffs received maternity care services.

Table 4. Associated between independent factors and level of MHR usage among respondents using simple logistic regression

Variable	Crude OR	(95% CI)	X ² stat. (df) ^a	P-value ^a
Age (years)	0.94	(0.86; 1.03)	1.76 (1)	0.190
Race				
Malay	1.00	-	6.59 (3)	0.502
Non Malay	0.42	(0.14, 1.27)	2.36 (1) ^b	0.125
Religion				
Muslim	1.00	-	5.91(4)	0.577
Christian	2.52	(0.25, 25.67)	0.61(1) ^b	0.436
Buddhist	0.42	(0.13, 1.38)	2.04(1) ^b	0.153
Education				
Secondary	1.00			
Tertiary	0.29	(0.11; 0.76)	6.75(1)	0.011*
Occupation				
Working	1.26	(0.41; 3.89)	0.26 (1)	0.691
Not working	1.00			
Autonomy	1.05	(0.49; 4.87)	0.57 (1)	0.454
Family structure				
Single parent	1.00	-	0.95(2)	0.622
Nucleus family	2.15	(0.36; 12.69)	0.71(1) ^b	0.399
Extended family	2.57	(0.36; 18.33)	0.64(1) ^b	0.346
Birth attendant in previous pregnancies				
Others	0.95	(0.18; 5.00)	0.00 (1)	0.948
Nurses	1.33	(0.42; 4.28)	0.23 (1)	0.629
Doctor	2.85	(1.14;7.14)	5.15 (1)	0.026*

^aLikelihood Ratio (LR) test, ^bWald test, *p<0.05 taken as level of significance.

Further analysis using multivariable logistic regression was conducted. Backward methods were used for Multiple Logistic Regression Model. Multi-collinearity and interaction was checked and not found. Hosmer-Lemeshow test, (p=0.962), classification table (overall correctly classified percentage (65.4%) and area under the ROC curve (69.9%) were applied to check for model fitness. The model showed that the respondents with

tertiary education and above were poor MHR user compared to those with only secondary education level to be a good user (95% CI: 0.12, 0.85, p=0.023). Simultaneously, respondents who had experience being delivered by doctor in the past had 2.5 times more potential to be a good user (95% CI 0.97, 6.59, p=0.045) after adjusted with the level of education.

Table 5. Associated factors of level of usage (total score) among respondents using simple logistic regression and multiple logistic regression model

Variable	Simple logistic regression			Multiple logistic regression ^a			
	b	Crude (95%CI)	OR p	b	Adjusted (95%CI)	OR p	
Education	-1.23	0.29 (0.11, 0.76)	0.011	-1.13	0.32 (0.12, 0.85)		0.023
Tertiary							
Birth attendant in previous pregnancies	1.05	2.85 (1.14, 7.14)	0.026	0.93	2.54 (1.97, 6.59)		0.045
Doctor							

Additionally, simple linear regression was performed to look at the relationship between age in years, total knowledge score and total satisfaction score with the total usage score. Table 6 showed that age have inverse relationship with the total usage score, meanwhile the total knowledge score and total satisfaction score showed a more proportionate relationship instead. Out of these three independent

variables, only total satisfaction score indicated a significant relationship with total usage score with the p value=0.001. Moreover, it was found that with every increase of one total satisfaction score, the total usage score increase by 0.43 (95%CI 0.19, 0.68) giving the final equation for Total usage score = 45.85 + 0.43*Total Satisfaction Score.

Table 6. Factor associated with level of usage (total score) among respondents using simple linear regression

Independent Variable	SLR ^a		
	<i>b</i>	(95% CI)	P value
Age (years)	-0.39	(-0.43, 0.36)	0.843
Total knowledge score	0.28	(-0.43, 0.99)	0.442
Total satisfaction score	0.43	(0.19, 0.68)	0.001*

^aSimple linear regression (Outcome as Total Usage Score), *b*= crude regression coefficients.

DISCUSSION

Maternal Mortality Rate (MMR) in Malaysia rapidly decline from 141 to 28 per 100,000 live births between 1970 and 2010. This is due to adequate allocation of resources by Ministry of Health; improve access to professional care during pregnancies and childbirth and to quality family planning services and information. However, progressive declines in the MMR is slower as the indirect causes of maternal mortality are more complex to manage and will need support from other disciplines for specialized skills, multidisciplinary case management, and prevention of known high-risk. Hence, emphasize on any aspect of maternal care including antenatal care is needed continuously in order to prevent a further rise in MMR due to nation's complacency in the existing care system⁵.

This study was done based on the theory that, MHR was one of the important antenatal instruments been used as one of the effort to reduce maternal mortality. Therefore, its usage would be able to provide an insight into antenatal health seeking behaviour of the expectant women. Since there was no specific study pertaining to the usage of MHR in pregnant women recently, no clear comparison can be made with other studies in the aspect of prevalence of usage of MHR in Malaysian women. There were, however, two studies done by Ravindran³ and Geefhuysen⁶ which focused on colour coding aspect or risk approach component in MHR among the Malaysian women in 1997. The

findings at that time was only 56% pregnant women were given the correct colour codes in accordance to the risk factors associated and only 32% of high risk pregnancy were correctly coded⁶.

For the purpose of this study, the factors associated with MHR usage, as stated in previous literatures including socio-demography, family structures, autonomy of the expectant women, previous pregnancy experiences as well as environmental influences played a role in health seeking behaviour of the women. This health seeking behaviour can be translated as the usage behaviour of the MHR during the antenatal period of the pregnant women population.

Education level was found to be significantly associated with usage of MHR. It was also found in other study that the proportion of women who default their antenatal care declined steadily as their educational level increases⁷. The findings might also implied that women with higher education would be more less likely to read through the MHR therefore would not proceed to make full use of it in the course of their pregnancies.

Race and religion of the respondents did not reveal any significant relationship with the level of MHR usage. These findings are expected due to the fact that majority of the studied subjects were Malays with very few representative of Chinese, Indians or other ethnic groups. Nevertheless, the findings were different when compared with other studies. Study of population in Ethiopia for example; found that women of

Orthodox religion were more likely to see health professionals for antenatal care than any other religion⁷. As for the race, it was a known fact that different race or ethnicity existed with different set of culture. Chew (2011) observed that Chinese community believed in a specific care during the postpartum period of pregnant women and had special name for that period⁸. In addition to this, the financial state of the respondents by looking at their occupational status could also influence the antenatal seeking behaviour of the women. Household's poverty status was a major determinant in health-seeking behaviour⁹. The finding was not significant for race in this study could be due to the fact that MHR was design with the features that ensures easy usage regardless of variety of ethnic or language.

Another aspect that was predicted to be associated with usage of MHR was the type of family structure and the autonomy of the women themselves. Spouses and other family members such as in-laws could affect the decision making of the pregnant women¹⁰. However, in this study no significant relationship was found between the family structure and autonomy with the usage of MHR. The findings might be due to the reason that MHR usage might not be regard as one of the important decision making component in pregnancy by the women and their family members in comparison with other component such as place or method of delivery.

For previous pregnancy experiences, the number of birth would play an important role in influencing the usage of MHR. Furthermore, the role was stronger in a woman who had experienced some form of complication or bad outcome in their previous pregnancy as well as a first time mother who did not know what to expect in their pregnancy and concerned about the outcome of pregnancy. It was found that the proportion of women seeking antenatal care for the first birth is relatively higher than subsequent birth orders⁹. Furthermore, any negative past experiences during receiving care such as lack of attendance, excessive waiting times, lack of concern regarding one's health, and embarrassing physical examinations had in fact, discouraged women from seeking care at health facilities¹¹. In this study, it was found that there was a significant relationship between pregnancy experience in the aspect of the birth attendant of doctors ($p=0.02$) while there was not significance in other areas such as place of previous delivery, complication in previous delivery or history of contracting a pregnancy induced illness. The reason for the significant association could be

due to the possibility that when a women was attended by doctor during the previous delivery, the aspect of education to use MHR for the next pregnancy would be more especially for the women who delivered in private health care facility where the ratio of doctor to patient is more compared with those delivered in government facilities.

Though the study only found significant relationship existed between the satisfaction level and usage, but the important part was antenatal care education for the patient because some relevant knowledge on pregnancy care were still lacking as seen in the result section. Therefore, health education aspects such as a brief session by health care staff on the important aspect of antenatal knowledge such as danger signs in pregnancy and nutrition would be very beneficial for them during the antenatal care follow-up. At the same time, the usage of MHR could be advocate at the end of this session.

Nevertheless, there were other important factors that were not covered in this study which were environmental factors such as mass media influences and logistic difference of the respondent. Both factors could influence usage of MHR. For mass media influences, a study found out that there was a trend of accessing health information from reliable sources available such as printed in magazines or in electronic form like the Internet by the women¹². Other than that, with regards to logistic, a study showed that rural women were less likely than their urban counterparts to get antenatal care from health professionals and more likely to get no care at all⁷. There was also evidence that women in slums area were less likely to seek antenatal check-up compared to pregnant women in urban areas¹³.

The findings of significant association between satisfaction level and usage of MHR ($p= 0.01$, $r=0.377$) implied that the behaviour toward MHR usage was dependent on the way the MHR was presented to the pregnant women population, in other words what the health provider delivered via the MHR. The Malaysian MHR has not been updated since its implementation. The progress in term of technology and information resources such as the internet may render the MHR obsolete, hence losing its original purpose. Ki-Moon 2010 highlighted that a comprehensive integrated package of essential interventions and services could accelerate the progress to achieve the MDG5 goal. Undeniably, excellent antenatal care packages which include MHR for pregnant women need to be attended and researched throughout time if the nation wants to achieve

the goal^{14,15}. This can be translated as the MHR must be made to appear and serve as attractive package to the pregnant women. In realizing that, the MHR might need to be updated to current time practice and technology without losing its purpose as outlined by World Health Organization¹.

The future endeavour to update or upgrade the MHR should follow the guidelines by WHO to ensure its integrity and functionality remain intact as done previously by other countries such as Nicaragua and Pakistan. The adaptation of WHO pattern in their MHR manages to create a different version of MHR and it still serves the main purpose in maternity care^{16,17}.

This study had several limitations including the period of study was brief and cross sectional design would not truly give a causal relationship of the study factors. Instead a cohort study in the future will be more appropriate. Other than that, the convenience sampling method used provided bias in terms of generalization, and it was suggested that random sampling method should be adopted instead. For the factor studied, the limitation was the environmental factors especially on geographical factors. This was due to the place of study location which was more towards urban population area and this might introduce bias to the result favouring the urban as significant factors in the outcome. Other factor that can be explored as might contribute to positive association with knowledge, satisfaction and usage of the pregnant women might include total number of visits which according to current guideline by WHO which recommended at least four visits spread across the period of pregnancy to be seen by any care provider¹⁸ which was also not able to be covered in this study.

CONCLUSION

In conclusion, the prevalence of good usage of MHR was more than poor usage proportion, meaning that the MHR was still relevant and important in antenatal care. However with the evidence that the level of satisfaction significantly affected the usage of MHR among the pregnant women in this population, any the area of weakness inside the record such as documentation aspect should be enhanced by the health provider side. Apart from that, the health providers should provide better health education on antenatal care of the pregnant women. Furthermore, knowledge and satisfaction level need to be improved by giving awareness on the

importance of the MHR and empowering them continuously at every visit. Mothers with records tend to have better outcomes in healthcare and preventative measures.

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