A Case Control Study on Maternal Health-Seeking Behavior at Pre-Pregnancy Stage among Mothers with Low Birth Weight Babies

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Abstract

Background: Early identifying maternal modifiable factors has been recommended in preventing occurrence of low birth weight babies. The aim of this study was to determine the relationship between pre-pregnancy maternal health-seeking behavior and low birth weight.

Methods: An unmatched case control study was conducted at randomly selected Primary Healthcare Centres (PHC) in Malaysia recently. Selection of PHC and the respondents for case and control groups were based on inclusion criteria set. The respondents were interviewed face-to-face or via telephone by an interviewer using a structured validated questionnaire on health seeking behaviour constructed tailored to local culture.

Results: A total of 622 samples were obtained. There were 311 of the postnatal mothers with low birth weight babies (cases) and 311 postnatal mothers with normal weight babies (controls). This study found that the younger women (crude OR = 2.60, 95% CI = 1.12-6.00), Indian women (adjusted OR = 2.09, 95% CI = 1.19-3.65), women with unplanned pregnancy (adjusted OR = 1.48, 95% CI = 1.05-2.68) and among women not using folic acid intake at pre-pregnancy stage (crude OR = 1.85, 95% CI= 0.99-3.42, P=0.05) were likely to have higher risk of low birth weight. The overweight and the obese women (adjusted OR = 0.53 (0.35-0.81) were found as protective factor in this study.

Conclusion: Couples should be advised on pregnancy plan and promoting services provided at pre-pregnancy clinics. Women accessing pre-pregnancy consultation and family planning clinic need to be screened on risk of having poor maternal health seeking behaviour for proper advocacy on low birth weight prevention.

Keywords: Low birth weight, Maternal health seeking behavior, Pre-pregnancy care

Introduction

Low birth weight (LBW) is defined by World Health Organization (WHO) as birth weight of less than 2500 grams [1]. It is the principal risk factor for neonatal and infant mortality in developing countries and prime public health concern worldwide. Studies show that LBW babies are more likely to die than heavier babies and nearly 60-80% of neonatal deaths occur among LBW infants [2,3]. Moreover, LBW is closely related to delay in childhood motor skills, cognitive and social development [4-6]. According to WHO, a child’s risk of dying is highest in the first month of life. Among the most common cause of infant mortality in developing countries is LBW, prematurity and congenital abnormalities. The reduction of LBW is a key indicator for the attainment of lowering child mortality as part of the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs).

The incidence of LBW in developing countries is more than double compared to the level in developed regions (16.5% and 7% respectively) [7]. Among developing countries, higher incidence of LBW has been reported in South Asian countries of India and Bangladesh [8,9]. In contrast, the perinatal mortality rate, prematurity and congenital abnormalities. The reduction of LBW is a key indicator for the attainment of lowering child mortality as part of the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs).

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Materials and Methods

The study was conducted in an urban setting state, located at the centre of west coast of Peninsular Malaysia. Based on 2010 census, the state had a total population of 5.46 million and had the second highest population growth in Malaysia. The average population density in 2010 was 674 people per square kilometre. The study was conducted in 30 selected Primary Healthcare Centres (PHC) out of 75 PHC in five districts with the highest populations.

This quantitative unmatched case-control study was conducted to determine the relationship between pre-pregnancy maternal health seeking behaviour and LBW among the postnatal mothers. In this study, the postnatal mothers with LBW babies (cases) and postnatal mothers with normal weight babies (controls) were randomly selected from the chosen clinics. Study subjects were identified from the name list of postnatal mothers who had antenatal check-up in clinics. Cases were postnatal mothers who had LBW babies which were identified from maternal home-based record registry at the clinics. Controls were selected by simple random sampling using the name list of postnatal mothers who attended the same PHC as case. For both cases and controls, eligibility was restricted to mothers who delivered singleton baby of less than 2 months old and a Malaysian citizen. Mothers who delivered twin babies and who had mental illness were excluded from this study.

The sample size was determined based on previous study [19], which was related to maternal education level among LBW. It was calculated by Power and Sample Size 2 (PS2) based on Fleiss JL (1981) formulæ. The calculation used the value of alpha = 0.05, power of 80%, probability of exposure in the control (P_o = 24.5%), probability of exposure in case (P_i = 35.5) and the ratio of controls to cases as 1:1. Then, 15 percent was added for the expected non-response, making the final sample size 625 respondents. From the seven districts in selected urban setting state, five districts were purposively selected as they have the highest populations. The sample was selected from 30 PHC out of 75 PHC. Systematic random sampling technique was applied to identify a case (low birth weight) from the delivery name list available while the control is selected by simple random sampling from the delivery name list who attended the same PHC.

The study was conducted using a structured questionnaire, which was developed and administered to the participants through interview face to face. The consistency of the content was controlled by using only one interviewer. It was developed by combining questionnaires from various sources to assess maternal health-seeking behaviour because of unavailability of specific questionnaire on maternal health-seeking behaviour. The questionnaire was first developed in English, and then translated into Malay language. The questionnaire was pre-tested on ten postnatal mothers in Universiti Kebangsaan Malaysia Medical Centre (UKMMC) who were not included in the study for assessing the face validity. A pilot study was done among 100 postnatal mothers to examine the reliability and construct validity of the questionnaire.

The questionnaire contained two sections. The first section covers the socio-demographic characteristics, clinical data and delivery process as well as child’s health. Data for the first section was obtained from the maternal home-based record while the second section covers pre-pregnancy and pregnancy behaviour were collected through interview. The reliability (internal consistency) source of information was tested using Cronbach’s alpha. Reliability coefficients Cronbach’s alpha coefficient was more than 0.7, an adequate level of internal consistency of instruments. Data were entered using SPSS version 21.0 for statistical analysis. Data exploration was done to visualize the general feature of the data. After exploration, frequency and percentages were used to assess the socio-demographic characteristics, obstetric profile and pre-pregnancy and pregnancy behaviour.

A logistic regression model was used to determine the association between different factors and low birth weight and two steps were followed. First, each variable was entered into bivariate analysis. Second, variables which were significant at p-value of 0.05 were fitted into multiple logistic regressions to identify independent factors of low birth weight. The strength of association was interpreted using the adjusted odds ratio and 95% confidence interval (CI). Ethical clearance was obtained from Medical Research Etiquette Committee, Faculty of Medicine, UKMMC and National Medical Research Register. Written consent through e-mail from the original authors of the questionnaires used was obtained and modification was done to accommodate with local people needs. Written consent was obtained from the participants before the research. The participants were assured on the voluntarily and confidentiality of the information given.

Results

Table 1 shows the distribution and bivariate analysis of factors studied for low birth weight babies at pre-pregnancy stage. Less than 5% of total samples were among the young mothers. The percentage of younger mothers (<20 years) with low birth weight babies were significantly higher than mothers with normal weight babies. Three-fourths of the participants are Malays, followed by Indian, Chinese and other races. Indian group in low birth weight cases showed a significant higher percentage than controls. Majorly of the participants among cases were married (97.4%), had degree or diploma (45.3%) and were housewives (41.3%). As for control group, majority of them were also married (98.4%), had upper secondary level (SPM/STPM) (46.9%) and were housewives (40.2%). However, the median income for both case and control group were almost similar (RM3,000.00, interquartile RM2,000.00 - RM4,000.00).

There were 74.7% cases with birth interval of less than 2 years. This is almost the same with controls (73.1%). This means majority of cases and controls had gap between pregnancies of less than 2 years. Pre-pregnancy consultation was found to be very low among cases (2.6%) and controls (4.2%). It is believed...
that pre-pregnancy consultation used was not well known among mothers in Malaysia. Percentage of unplanned pregnancy was higher in case group (65.9%) compared to control group (44.5%), while those who planned the pregnancy among cases were about 31% and another about 3% were mistimed pregnancy. Mistimed pregnancy is defines as wanted pregnancy but in not suitable time. Percentages of pre-pregnancy folic acid intake were not much differing between cases and control (5.5% versus 9.6%). Majority of women in both groups have not yet practice taking regular folic acid intake before conceive (pre-pregnancy stage). In our healthcare service practice, folic acid is usually given routinely during antenatal follow up (pregnancy stage). Higher percentages of cases had normal BMI (74.6%) compared to controls (60.9%). The reverse was observed for obese, whereby cases were lower (18.9%) compared to controls (30.3%). However, there was not much difference noted for underweight women (6.5% versus 8.8%).

Bivariate analysis (Table 1) showed that the factors found to be significantly associated with low birth weight were maternal age, ethnicity, planning of pregnancy, folic acid intake and BMI (p<0.05). Marital status, occupation, income and educational level were found not significantly associated with LBW. Multivariate logistic regression (Table 2) was conducted to predict the final determinant of LBW. All variables with p<0.25 in simple logistic regression were analysed. The multiple logistic regression analysis showed that age group, ethnicity, planning of pregnancy and BMI were found to be consistently significantly associated with LBW. The Indian women were about 2.1 times (AOR = 2.09, 95% CI = 1.19-3.65) more likely to have low birth weight babies compared to other races. The odds of having low birth weight babies was 1.5 times (AOR = 1.48, 95% CI = 1.05-2.08) higher for those who did not plan or mistimed the pregnancy. The obese mother was noted protected for having low birth weight babies (AOR = 0.53, 95% CI = 0.35-0.81).

**Discussion**

Pre-pregnancy maternal health-seeking behaviour plays an important role in determining the outcome of the baby. Many studies showed that poor maternal health-seeking behaviour leads to poor outcome such as low birth weight and prematurity. This study is different from other studies as we interviewed the respondents instead of using available data in hospitals. Hence, this study represented an initial effort to assess the association between pre-pregnancy maternal health-seeking behaviour and low birth weight in Malaysia.

Our study demonstrated that Indian ethnicity and unplanned pregnancy were significant independent determinants for low birth weight. Maternal age was not a determinant of low birth weight in multivariate analysis and had 2.60 higher risks in
bivariate analysis. Many studies showed that mothers aged 18 and below and 35 years and above have higher risk of low birth weight [20-22]. However, majority of respondents in this study were mothers aged 20 to 34 years old. There were only 17% respondents aged above 35 years. Women aged 35 years and above are believed to be economically more stable. Therefore, they may opt for private health services for pregnancy care or have reduced fertility as busy in career pathway.

Indian was found to be a determinant for low birth weight. The same finding was found in a study in one of Government Hospital in Malaysia where Indian had highest risk of prematurity and low birth weight compared to Malays and Chinese [21]. Another study in America also found that African America has higher risk as compared to white Americans [23]. Indians is a minority in Malaysia and usually have lower socioeconomic status. Almost 90% of Indian women in this study had household income of below RM3,000.

Pregnancy planning is one of the important determinants for perinatal outcomes including LBW. A study using population data from PRAMS (Pregnancy Risk Assessment Monitoring Surveillance) in US reported unplanned/unintended pregnancies have 1.16 higher risk of LBW [24]. Another study in California among Latin population reported the same finding. Our study confirmed that higher risk of 1.40 among those who did not plan or mistimed. The mechanism by which pregnancy intention status affects birth weight is not yet fully understood. Unwanted pregnancy may contribute to LBW by means of maternal behaviour such as non-use of prenatal care and smoking or alcohol consumption during pregnancy [25-29]. However, findings in the association between pregnancy and birth weight have been inconsistent. Several studies from developed countries found that pregnancy intention is not associated with birth weight [30-32], although some others reported a statistically significant association between unintended pregnancy and low birth weight [24,33].

Folic acid intake before conceive (pre-pregnancy stage) has been encouraged worldwide. However, it is still low been practice. Folic acid was only taken by 5% of cases and 10% of controls group before pregnant. The lower percentage was also found by a study done in France where 20% women took folic acid before pregnant [34]. The percentage was higher in developed countries e.g. Ireland and Netherlands where about 65% took folic acid before pregnant [35]. This might be due to few factors such as geographical differences, maternal educational level, economic status and family planning status [36]. Bivariate analysis shows that this behaviour has significant relationship with LBW. Those who did not take folic acid before pregnancy had 1.85 higher risk of LBW. However, it was not a determinant when entered into multivariate analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Crude odds ratio (95% CI)</th>
<th>p value</th>
<th>Adjusted odds ratio (95% CI)</th>
<th>p value</th>
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<td>Indian</td>
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<td>1.48 (0.91-2.43)</td>
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<td>1.65 (0.68-4.04)</td>
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<tr>
<td>No</td>
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<td>1.71 (0.91-3.20)</td>
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<tr>
<td>&lt; 2 years</td>
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<td>Normal</td>
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<td>Overweight and obese</td>
<td>0.54 (0.37-0.78)</td>
<td>0.001</td>
<td>0.53 (0.35-0.81)</td>
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Table 2: Multivariate analysis on determinant factors for low birth weight at prepregnancy stage.
Most of our cases and control respondents have secondary and tertiary level education. We found that there is no significant relation between educational level and perinatal outcome. This is different from previous studies which showed that mothers with low education level have higher risk of poor perinatal outcome [22,37]. Meta-analysis study on the association of maternal education level and low birth weight showed that high education level is a protective factor against low birth weight [38]. However, this study is only applicable in certain country such as India [11], while a study in developed country like America showed the adverse [39].

Majority of our respondents have birth spacing of less than 2 years between pregnancies. Previous studies showed that birth gap of less than 2 years or more than 5 years are at higher risk of LBW [40-42]. This is because mothers who get pregnant again before 2 years are exposed to develop anaemia during pregnancy and the body does not have enough time to replenish the nutrition. Surprisingly, we found no significant relationship between birth interval and LBW in this study. This is probably due to small number of respondents as compared to previous studies which had samples of more than 10,000 [43].

In this study, respondents were assessed if they had pre-pregnancy consultation with medical practitioners as a preparation before getting pregnant. Majority of them were not aware of such service provided by Ministry of Health Malaysia. The topics that will be discussed during the consultation includes folate acid intake before conceive, immunization, ideal body weight, genetic diseases and high risk behaviour e.g. alcohol consumption and smoking. Pre-pregnancy care was made available in Malaysia since 2011. It aims to give care and early intervention to all women in their reproductive age before getting pregnant. However, the service is not yet popular among healthy women. Only 2-4% of cases and controls were found to have pre-pregnancy consultation. This service is utilized mainly by women of high risk group for example women with medical illness and with history of genetic and congenital abnormalities in the family. Our findings supported earlier research in a rural area of Malaysia who found that knowledge and utilization of pre-pregnancy care was still very low [44]. Therefore, more effort needs to be done to promote pre-pregnancy care among women in Malaysia.

This study showed that planning a pregnancy could give an opportunity to plan for better neonatal birth weight. Knowledge on family planning should be emphasized to all women through health promotion and education in health clinics. Family planning services are conducted by various bodies in Malaysia but contraceptive prevalence rate is still not improving and stagnant at 50% for almost 12 years. This is probably due to poor awareness and accessibility of the service. Therefore, family planning services should be easily reachable and acceptable. Besides that, the variability of contraceptive methods should be made available in all health clinics so that the community will have more choices.

This study has several limitations. It was done in an urban state of Malaysia which was purposively selected. Therefore, it can only be generalized to urban population. It was done through face to face interview of postnatal mothers. Information bias might occur when respondent gives inaccurate answers due to recall bias of the behaviour before pregnant of the last child.

Further study can be done since this is an unmatched case control, retrospective study. In future, another case control study, matched by age and ethnicity should be planned to give better magnitude on each factor. Besides that, a cohort study will give clearer picture on the causal relationship between maternal pre-pregnancy health seeking behaviour and low birth weight.

Conclusion

Identifying women's pregnancy intention during pre-pregnancy consultation will help improve birth weight and prevent other associated neonatal complications by early identifying risk, giving appropriate care and plan for anticipate intervention. Therefore, it is important as a policy maker to emphasis on maternal health-seeking behaviour screening early at pre-pregnancy stage.

Acknowledgement

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References


