

# Knowledge of obesity related pregnancy risks among expectant mothers and its associated factors

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## ABSTRACT

**Background:** Obesity in pregnancy causes both maternal and foetal complications hence adequate knowledge of obesity related pregnancy risks would ensure better outcomes. This study aims to determine the knowledge of obesity related pregnancy risks among pregnant women.

**Methods:** A cross-sectional study was conducted among pregnant women from four antenatal clinics in Seremban, between February and May 2015. Knowledge on pregnancy risks was assessed using questionnaire. Women were defined as having broad knowledge on obesity related pregnancy risks if they correctly identified that women who are very obese, are at higher risk of obesity related pregnancy complications and weight loss prior to pregnancy is associated with lower risk of obesity related pregnancy complications. Descriptive statistics and regression tests were used in the analysis.

**Results:** A total of 315 women participated in this study. Their mean age is 29.3 (SD±4.8) years and majority were Malay (72.4%). More than half of them were overweight and obese (60.6%). About 63.2% participants had broad knowledge on obesity related pregnancy risk. Education is a significant predictor of broad knowledge as women with tertiary education had higher odds of having broad knowledge compared to those with only school education (OR 2.1; 95%CI: 1.28 to 3.59).

**Conclusions:** This study found that more than half of the participants had knowledge of obesity related pregnancy risks and that education is a significant predictor for knowledge. Pre-pregnancy care education programmes can help identify barriers, introduce simple weight management strategies to overcome obesity, to ensure better maternal and foetal outcome.

## KEY WORDS:

*Knowledge, obesity, pregnancy complications, risk, women*

## INTRODUCTION

Obesity in pregnancy is associated with increase adverse outcomes both, for the expectant mother and the foetus. There is 2.5-fold greater risk of developing gestational hypertension and gestational diabetes mellitus (GDM) and 1.6 fold increase of developing preeclampsia compared to non-obese women.<sup>1</sup> Obesity is also independently associated with an increased risk of other obstetric complications

including failed induction, increased caesarean section rates, post-caesarean section infections, anaesthetic complications, postpartum haemorrhage and venous thromboembolism.<sup>1-3</sup> In fact, weight loss significantly reduced the risk of developing GDM compared to those who gained weight in between pregnancies.<sup>4</sup>

Foetal complications also increase with increasing maternal weight.<sup>4</sup> Birth defects such as cleft lip, diaphragmatic hernia, cardiac and gastrointestinal anomalies have all been reported earlier.<sup>4,5</sup> Risk for late-gestation foetal death is also greater among obese women compared with their normal weight counterparts. Obesity is independently associated with increased risk of a macrosomic infant which is defined as a birth weight of more than 4kgs.<sup>6</sup> Macrosomic infants at birth are at increased risk of subsequent obesity.

In general, there is a lack of knowledge regarding obesity related pregnancy complications among expectant mothers.<sup>7,8</sup> Literature shows that expectant mothers in the West have a moderately good knowledge maternal obesity risks.<sup>9</sup> In Asia however, awareness regarding obesity related pregnancy risks has been described as average and only a small percentage identified to have good level of awareness.<sup>10</sup> Although there is a growing prevalence of obesity locally, data on knowledge regarding obesity related pregnancy risks in Malaysia is still lacking therefore it is important to establish this knowledge among pregnant women in Malaysia.

This aim of this study is to assess the knowledge of obesity related risks in pregnancy, among expectant mothers. This information would be useful for future interventions in pre-pregnancy care programs to promote better health for the expectant mothers and better foetal outcome.

## MATERIALS AND METHODS

This is a cross-sectional study conducted at four antenatal clinics in Seremban between February to May 2015. Data was collected on antenatal clinic days using convenient sampling. All expectant mothers in the first trimester between the ages 18 to 45 years were approached at the registration counter and waiting areas of the clinic. Those who were able to read, understand written English or Bahasa Malaysia (national language) and consented to the study were enrolled to participate. Sample size calculation for obesity related risk knowledge is calculated using the prevalence formula based on the percentage of knowledge

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from an earlier study and adjusted for the local small population.<sup>11</sup>

$$N_0 = \frac{Z^2 P (1-P)}{e^2}$$

$$= \frac{1.96^2(0.56)(0.44)}{0.052} = 378$$

Adjustment for small population

$$n = \frac{n_0}{1 + (n_0/N)}$$

$$378 / 1 + (378/960) = 271 \text{ respondents}$$

An additional 15% was added to cover incomplete responses and the final required sample size was 311. Data collection forms were considered incomplete if more than 20% of the questions were unanswered.

Participant's body mass index (BMI) was calculated and categorized based on the Malaysian CPG which defines obesity as BMI of 27.5 kgm<sup>2</sup> or more.<sup>12</sup> Knowledge on obesity related risk in pregnancy was assessed using the questionnaire by Calaway.<sup>11</sup> (validated; Pearson correlation coefficient 0.7-1.0). This questionnaire assesses pregnancy related complications for three different weight categories which are; normal weight, very obese and weight loss prior to pregnancy. Each weight category contains seven items of complications (one overall risk of complications, three maternal related complications and three foetal related complications). Participants are asked to select their risk assessment for each condition form a 5-point Likert scale of "very low risk, low risk, average risk, high risk, very high risk and don't know." Broad knowledge was assessed using the first item pertaining to their perception on the overall risk of complications for each weight category. Women were defined as having broad knowledge if they correctly identified that the overall risk of complication for very obese women is high or very high and that weight loss prior to pregnancy is associated with low or very low overall risk of pregnancy complications. This questionnaire was translated to the local language, Bahasa Malaysia after obtaining permission of the author using forward and backward translation by certified linguists. A pilot test for face validation was done for both the English and the Bahasa Malaysia versions and minor adjustments were made to suit the local context

Statistical analysis was done using SPSS version 22.0. Descriptive statistics was used for socio-demographic and clinical characteristics while regression tests were used to test the association between demographic variables and broad knowledge of obesity related risk for pregnancy complications and outcomes. This study was approved by the Ethics and Industry Research Committee of University Kebangsaan Malaysia (FF-2014-292) and the National Medical Research Registry. (NMR-14-373-20847)

## RESULTS

A total of 315 women participated and completed the questionnaire satisfactorily. Mean age of participants is 29.3 (SD±4.8) years. The majority of respondents were Malay (72.4%, n=228), followed by Indians (12.4%, n=39), Chinese (10.5%, n=33) and others (4.8%, n=15). More than half of the participants were overweight and obese (60.6%, n=191). Overall, 63.2% (n=199) of participants had broad knowledge of obesity related pregnancy risks as they correctly identified

that being very obese increased the overall risk of pregnancy related complications and losing weight prior to pregnancy would reduce the overall risk of pregnancy related complications.

Most participants perceive that obese women have an overall higher pregnancy risk (82.2%). Participants seem to be more aware of maternal complications (range 77.7 to 90.4%) compared to foetal complications related to obesity (range 63.4 to 73.0%). A large majority of them are aware that obese women are at higher risk for gestational diabetes and hypertension. More than half of the participants are aware that normal weight women and very obese woman who lose weight prior to pregnancy are at lower risk of developing pregnancy related complications (53.6 to 68.5% and 60.6 to 69.5% respectively), Table I.

Participants with higher levels of education and higher household income have broad knowledge that very obese women are at high risk of pregnancy complications and that weight loss prior to pregnancy is associated with lower risk of pregnancy complications (p=0.008 and p=0.003 respectively), Table II.

Regression analysis shows that education is a significant predictor for broad knowledge (p=0.004) where participants with tertiary education have higher odds of having broad knowledge compared to those with school education, OR 2.1 (95%CI: 1.28 to 3.59), Table III.

## DISCUSSION

A large majority (82.2%) of the expectant mothers in this study correctly identified that very obese women have overall greater risk of pregnancy related complications. This is higher than the study in Australia which found that 75% of the study group knew about obesity related pregnancy complications.<sup>11</sup> This may be explained by the extensive publicity and awareness campaigns in Malaysia in the last 10 years highlighting obesity related health risks such as diabetes and hypertension in general although not specific to pregnancy. Knowledge of obesity related medical complications such as heart disease and diabetes may have indirectly increased knowledge of its detrimental effects in pregnancy.<sup>13</sup>

Overall, participants appeared to be more aware of maternal obesity related complications (76.6-90.6%) rather than foetal complications related to obesity (62.8-75.8%). These findings are consistent with another study which assessed patients' knowledge on obesity related pregnancy complications and found that more than 60% of participants were aware of maternal risks but less than 50% of participants were aware of foetal complications.<sup>14</sup> Hence educating women regarding the detrimental effects of maternal obesity with emphasis on the risks of foetal complications will create better awareness and stimulate their motherly protective instincts to maintain a healthy weight for the sake of their child's wellbeing.

Although the knowledge of obesity related pregnancy risk among participants is at an acceptable level, more than half, were themselves overweight and obese. One would assume that the presence of good knowledge would encourage

**Table I: Weight related pregnancy complications as perceived by participants**

Pregnancy complications	Very obese woman			Normal weight women			Very obese women loses weight prior to pregnancy		
	DK* (%)	Low-average risk (%)	High-very high risk (%)	DK* (%)	Average-very high risk (%)	Low-very low risk (%)	DK* (%)	High-same risk (%)	Lower-much lower risk (%)
Overall risk of complications	8.2	9.5	82.2	11.1	21.5	68.5	14.2	16.2	68.6
Gestational diabetes	4.1	5.4	90.4	5.0	38.7	56.1	9.8	20.6	69.5
Hypertension in pregnancy	4.1	8.6	87.3	4.1	42.2	53.6	11.7	20.0	68.2
Caesarean section	10.4	11.7	77.7	12.0	30.8	57.1	15.5	19.6	64.7
Prematurity	9.2	17.8	73.0	6.0	33.0	60.9	16.5	19.3	64.1
Special care nursery admission	9.5	19	71.1	7.9	29.2	62.8	16.8	18.4	64.7
Congenital abnormality	16.5	20.0	63.4	11.4	26.3	62.2	21.2	18.0	60.6

\*DK- Don't know

**Table II: Association between demographic variables and broad knowledge**

Variable	n n(%)	No broad knowledge n(%)	Broad Knowledge (df)	$\chi^2$ statistic <sup>a</sup>	P value <sup>a</sup>
<b>Age groups(years)</b>				0.31(1)	0.576
<30	164	58(35.4)	106(64.6)		
≥30	151	58(38.4)	93(61.6)		
<b>BMI category</b>				1.24(1)	0.265
<23	124	41(33.1)	83(66.9)		
≥23	191	75(39.3)	116(60.7)		
<b>Ethnic group</b>				1.07(1)	0.301
Malay	228	80(35.1)	148(64.9)		
Non-Malay	87	36(41.4)	51(58.6)		
<b>Education</b>				7.14(1)	0.008
School education	170	74(43.5)	96(56.5)		
Tertiary Education	145	42(29.0)	103(71.0)		
<b>Job</b>				0.07(1)	0.798
Employed	209	78(37.3)	131(62.7)		
Unemployed	106	38(35.8)	68(64.2)		
<b>Household Income</b>				8.81(1)	0.003
<3000	215	91(42.3)	124(57.7)		
>3000	100	25(25.0)	75(75.0)		
<b>Number of children</b>				0.39(1)	0.533
Nulli/ Primiparous	143	50(35.0)	93(65.0)		
Multiparous	172	66(38.4)	106(61.6)		

Table III: Factors associated with broad knowledge on obesity related pregnancy complications

N=315	Crude OR (95%CI)	Adjusted OR (95% CI)	Wald statistics (df)	P value
<b>Age Groups(years)</b>				
<30	1			
≥30	0.87(0.56,1.39)	0.94(0.56,1.58)	0.06(1)	0.810
<b>BMI category</b>				
<23	1			
≥23	0.76(0.48,1.23)	0.83(0.47,1.45)	0.44(1)	0.507
<b>Ethnicity</b>				
Malay	1			
Non-Malay	0.77(0.46,1.27)	0.77(0.46,1.31)	0.93(1)	0.336
<b>Education</b>				
School education	1			
Tertiary Education	1.89(1.18,3.02)	2.14(1.28,3.59)	8.34(1)	0.004
<b>Job</b>				
Unemployed	1			
Employed	1.07(0.66,1.73)	1.47(0.85,2.55)	1.93(1)	0.164
<b>Number of Children</b>				
Nulliparous	1			
Multiparous	0.86(0.55,1.37)	0.90(0.53,1.53)	0.15(1)	0.702

\*\*R<sup>2</sup>=0.075

mothers to maintain an ideal body weight. This discrepancy suggests a possible underestimation of one's own body weight or a gap between knowledge of obesity related risks and healthy lifestyle practices. In some cultures, obesity may be regarded to represent happiness, good health, normal or even as attractive.<sup>15</sup> Therefore it is important to explore body weight perception and possible cultural misconceptions of ideal weight as these are potential modifiable barriers for future weight management interventions in the community.

In this study, women with tertiary education had two times higher odds of having broad knowledge of obesity related pregnancy risks compared to those with school education (both primary and secondary). This is similar to the findings from the study by Nitert et al.<sup>11</sup> Women with lower education levels may have lower health literacy and perception of obesity related risks. Those from the lower education levels, should receive information on nutrition, weight reduction and possible risks tailored to their level of understanding and if necessary in their own language.<sup>16</sup>

Early intervention on obesity related health and pregnancy complications should reach potential mothers from all walks of life and prepare them for healthy adulthood and family life. This could be in-cooperated during pre-marital counselling or pre-pregnancy care programs.<sup>17</sup> Counselling for weight reduction and advice to delay pregnancy using appropriate contraceptive methods until a desirable weight is achieved are some possible strategies. Physicians and health care providers play a key role in identifying barriers for maintaining healthy weight and advising the importance of healthy weight during pregnancy and the post-partum period.<sup>18</sup>

Limitations of this study include those associated with convenient sampling, hence the results of this study may not be generalisable. Data from participants who could not read and understand English or Bahasa Malaysia were not captured as only the participants who could decipher the language were recruited.

## CONCLUSION

This study shows that most expectant mothers are aware that obesity is associated with higher pregnancy risks. Education is a significant predictor of broad knowledge on obesity related pregnancy risks. Regular counselling through health programs and campaigns should be made available to all women in the society. Pre-pregnancy care programmes should identify barriers and incorporate simple weight management strategies to combat obesity among women in the reproductive age group which will ensure better maternal and foetal outcome.

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