MATERNAL AND NEONATAL OUTCOME OF LOW RISK PREGNANCIES IN AMPANG, SELANGOR.

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ABSTRACT

Risk stratifications for pregnant women are made based on patients personal history during booking visit at primary health care setup. Pregnant women that are classed as 'low risk pregnancy' were treated as normal pregnancy and follow a standard antenatal care. The aim of our study is to observe the demographics of low risk pregnant women in Klinik Kesihatan Ampang, Malaysia and their pregnancy outcomes. The study is part of a prospective cohort study conducted among 47 low risk pregnancies, known as 'The effect of BPV in the maternal and neonatal outcome'. All participants were followed up until delivery and postpartum data gained from patients and clinic. The sample comprised of 28 primigravidas (59.5%) and 19 multigravidas (40.5%). At the end of the study, 3 subjects (6.4%) developed hypertension and one of them developed severe preeclampsia, 1 subject (2%) developed placenta previa and gestational diabetes mellitus and 3 subjects (6.38%) PPROM. Majority of them delivered via SVD and 36.2% delivered via EMLSCS. 10.6% delivered LBW baby, 8% are premature baby and 14.9% born with low Apgar score. Pregnant women that were classed as low risk pregnancy still at risk of getting obstetric complications as well as the neonates from normal pregnancies. This study contributed to an overview of pregnancy outcome among the low risk pregnant women in Ampang, Malaysia. The findings revealed that a low risk pregnancy does not ensure or predict a normal pregnancy outcome. Considering the various potential negative maternal and neonatal outcomes, this group of mothers should be given thorough medical and social attention as an effort to improve their pregnancy outcome.

Keyword: neonatal, hypertension in pregnancy, obstetric complications, low risk pregnancy, pregnancy outcome

INTRODUCTION

A poor pregnancy outcome is defined by the presence of any obstetric complications throughout the 40 weeks of pregnancy and also 6 weeks of puerperium. These complications may lead to various maternal and neonatal morbidity or mortality. Three main leading causes of maternal death during pregnancy worldwide are contributed by hemorrhage, hypertensive disease in pregnancy (HDP) and sepsis (Say et al., 2014). In Malaysia, the top 5 causes of maternal death are underlying medical condition, obstetric emboli, postpartum hemorrhage (PPH), HDP and last but not least, sepsis (DOSM, 2017). The maternal mortality ratio (MMR) in developing countries in 2015 is 263 per 100 000 live births (Group, 2015) that makes the death rates 100 to 200 times greater compared to Europe and North America (Duley, 1992). The trend was labile in Malaysia as maternal death recorded as 273 in 2010 (MMR = 26.1), reduced to 238 in 2013 (MMR = 21.4) but then tremendously raised again to 302 death of pregnant women in 2016 (MMR = 29.1) (DOSM, 2017). Postpartum hemorrhage is the number one killer among pregnant women (19.1%) where it is defined as blood loss intrapartum > 500ml in vaginal delivery or > 1000 ml in cesarean delivery (LSCS) (Pritchard et al., 1962). Direct causes of postpartum hemorrhage are multifactorial like poor contractility of uterine muscle (uterine atony), retained placenta, uterine ruptures and uterine inversion as well as cesarean related bleeding with the risk factor of placenta previa, placental abruptio and preoperative anemia (Maswime & Buchmann, 2016). A different trend was observed in HDP where although it only affected about 2.73% cases worldwide (Abalos et al., 2014) it significantly caused 14% of maternal death

especially preeclampsia and eclampsia (Say et al., 2014). In Malaysia, it was reported that from 2011 until 2012, there were about 11,746 or 4.34% of pregnancy with HDP. Gestational hypertension is the commonest type of HDP (52%) followed by preeclampsia-eclampsia at 20% (Rohani A et al., 2012).

Sepsis as one of the leading cause of maternal death was identified as systemic bacterial infection which is mostly caused by Group B streptococcus (GBS) and Escherichia coli (E.coli) infections from the primary source of infection over genital or urinary tract area (Knowles et al., 2015). It contributed to 10.7% of maternal death (Say et al., 2014). However, the overall incidence of obstetric complications is closely related to the accessibility of medical services which was evidenced by stark differences in pregnancy outcome between US and Europe countries with Asian and African continents.

Apart from that, obstetric complications are normally associated with poorer fetal and neonatal outcome. Low birth weight (LBW), prematurity, intrauterine growth restriction (IUGR) and perinatal death are among the poor outcome in fetal and neonatal associated with a pregnancy complicated with HDP (Sibai, 2011). Apgar score is a standard score that assesses newborn in the 1st, 5th and 10th minutes of life based on heart rate, respiratory rate, color and muscle tone and irritability reflex (Moster et al., 2001). The score less than 7 is associated with a poor outcome such as cerebral palsy and subsequent death which need neonatal resuscitation and have to be admitted in ICU for further observation (Lie et al., 2010). All of these conditions not only pose an immediate threat to the neonatal life but also cause poor long term effect on the mother and child.

In view of the various obstetric complications that can occur in a pregnancy with potential deleterious short and long term consequences, the risk factors have been studied to identify mothers and fetus at risk. Previously, most of the studies were focused on searching the relationship between high risk pregnancy and their pregnancy outcome. It was just for the last 5 years, that researchers have started to give more attention to pregnant women who were classed as 'low risk pregnancy'. A recent study in the United States showed that unexpected obstetric complications were observed in 29% of low risk pregnancies (Yeung et al., 2016). An earlier study done in Iran reported that pregnant women of low risk pregnancy but received inadequate prenatal care were predisposed to low birth weight and higher rates of NICU admission(Ashraf et al., 2011). A Malaysian population study had found that low risk pregnancy had more cases of poor fetal and maternal outcome compared to high-risk pregnancy (Yeoh et al., 2016). All of these studies revealed that a poor pregnancy outcome not mainly developed among high risk pregnancy group, but also among low risk pregnant women. Furthermore, Muto et al had suggested that maternal background and physical findings were important to inform the associated risk of HDP among low risk pregnancy (Muto et al., 2016). This further emphasizes the importance of understanding social aspects of each pregnant women along with the clinical information.

According to the Ministry of Health Malaysia, all pregnant women need to register and follow regular check-ups for their pregnancy in the nearest Klinik Kesihatan (KK) (Ghazali I. et al., 2013). Klinik Kesihatan Ibu dan Anak (KKIA) offering a frontline care to all pregnant woman and they are recommended to come for 'booking' at less than 12 weeks periods of amenorrhea (POA) to enrolled herself for periodic antenatal check-ups. The early antenatal visit is important to identify any risks factors. Risk stratification is made based on history taking, physical examination, blood and urine investigations. Color tagging is used to mark the risk of each pregnancy that includes the guideline of standard management by primary care staff and hospital referral. Flowchart 1 illustrated the process done in KK for antenatal booking and follow up.

This study observed the demography of low risk pregnancies of women attending the antenatal care in Klinik Kesihatan Ampang, Malaysia and their pregnancy outcomes in mother and newborn. The research question is whether the pregnancies managed as low risk ensure a good pregnancy outcome and if they are not, how many still end up with complications?

There were several studies in Malaysia that focused on high risk group pregnancies especially in HDP (Rahman et al., 2008), diabetes (Subramaniam et al., 2017), thyroid disorder (Zainuddin, 2005) and anemia (Milman, 2015). However, to the best of our knowledge, there were no studies done to evaluate the pregnancy outcome among low risk pregnancies in Malaysia population. Due to the nearly stagnant trend of the complications seen in mothers and neonates in Malaysia (Seet Wymen et al., 2014), further attention should also be given to those who were treated as normal pregnancy as they also contribute to the poor end outcome.

METHOD

The study is part of a prospective cohort study conducted among low risk pregnancies, to study the effect of BPV in the maternal and neonatal outcome. This study was conducted between May 2017 to May 2018. 250 low risk pregnant women were eligible for recruitment from Mother and Child Health Care (MCHC) at Klinik Kesihatan Ampang (KKA), Selangor, Malaysia. Ampang is an urban area with multiethnic populations.

52 pregnant women who were willing to participate in the study and fulfilled the diagnostic criteria for low risk pregnancy in this study which is defined as healthy pregnant mother within age of 18-40 years old, normal BP reading at booking (BP less than 140 mmHg systolic and less than 90 mmHg diastolic), absence of any condition requiring the use of antihypertensive medication and gestational age of 5 weeks to 19 weeks at the time of recruitment. We excluded any pregnant women who are < 18 years old and > 40years old, or any one of this criteria, multiple pregnancies, have underlying chronic disease or have any antenatal/fetal/neonatal problems in previous pregnancy (Gaillard et al., 2011) (Uzan et al., 2011) (Yeung et al., 2016). Group of low risk pregnant women was justified based on obstetric guideline from Malaysia and ACOG (Ghazali Ismail et al., 2013) (Roberts et al., 2012).

Flowchart 1: Process done in KK for antenatal booking and follow up.
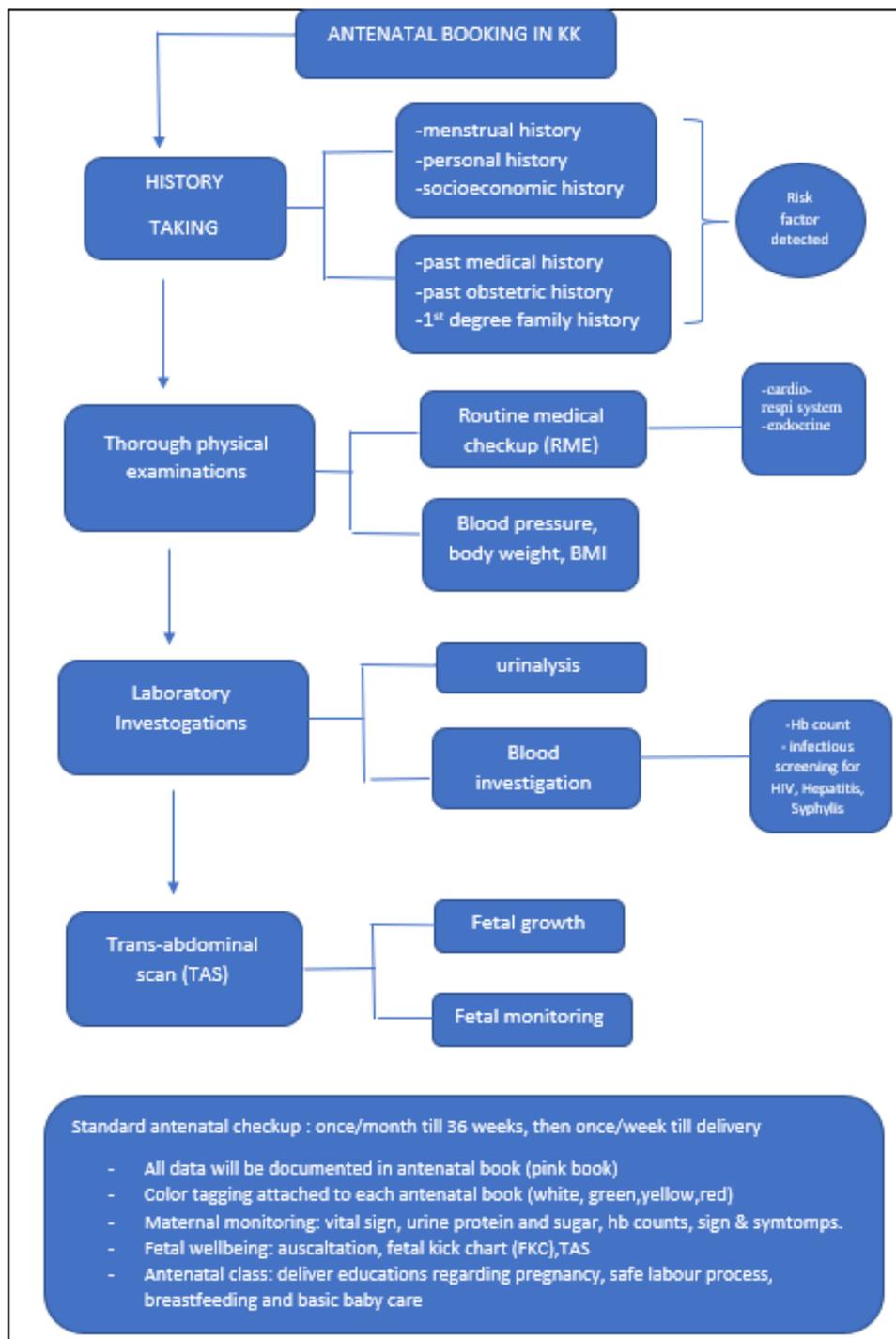
Source: Malaysia Perinatal Care Manual 3 rd Edition, 2013

Adverse medical outcome observed included the following; HDP, gestational Diabetic Mellitus (GDM), placenta previa (PP), meconium staining, preterm premature rupture of membranes (PPROM), GBS positive, maternal pyrexia, fetal distress, birth weight < 2500 g or > 4000 g, premature delivery, postdate delivery, 5 minutes Apgar score < 7 scores, labor difficulty, induction of labor, delivery via cesarean section either Emergency Lower Segment cesarean Section (EMLSCS), Elective Lower Segment cesarean Section (ELLSCS) or instrumental delivery. In this study, the final medical outcomes were defined based on a current guideline from Royal College of Obstetrics & Gynaecology (RCOG) and published Malaysian CPG that used by obstetricians in Malaysia Hospitals.

Sample size were calculated using a single correlation formula (Lachin, 1995) via Microsoft Excel with reference of correlation coefficient value of HDP among low risk pregnancy from the previous study as to fulfill the objectives of the main study.

Ampang, Selangor was selected as the location of the study using convenience sampling. Klinik Kesihatan Ampang is selected because all subjects had to attend the data collection day in our clinical laboratory located at level 12, Faculty of Medical and Health Sciences, Universiti Sains Islam Malaysia (USIM), Pandan Indah, Ampang. The clinic located around 5 km radius from our faculty. Simple random sampling procedures used to choose which day for recruitment was made using an online software called "Random Integer Generator" (RIG). 3 days per week were chosen for recruitment purposes.

All participants were followed up from 1st trimester until delivery. Prior to the study, all participants were explained about the procedure of the study and were informed that their participation is voluntary upon signing the informed consent form. Demographic data were collected at the 1st appointment from history taking and patient's antenatal book. As the main study, 'The effect of BPV in the maternal and neonatal outcome' required patients to come for the second appointment after 28th weeks of gestational age, clinical information throughout 1st and 2nd trimester yielded from patient's antenatal book as well during the appointment. While the 3rd trimester, intrapartum and postpartum data were retrieved from patient's antenatal book and were crosschecked from the respective clinic or hospital postpartum.

All data were kept and analyzed using SPSS version 21.0 for windows 10 (IBM Corp Released 2012.Armonk, NY). Descriptive statistics were used to present study characteristic by mean and frequencies of socio-demographic profiles.

RESULTS

Out of 52 participants, 5 withdrew due to work commitment, early hospitalizations and moved to another place. Demographic data are as summarized in Table 1.

Table 1: Socio-demographic characteristics of the study population (N=52)

Variables	Frequency (N=52)	Percentage (%)
RACES		
Malay	47	90.4
Chinese	1	1.9
Indian	1	1.9
Others	3	5.8
OCCUPATION		
Working	28	42.3
Housewife	22	53.8
Students	2	3.8
PARITY		
Primigravida	32	61.5
Multigravida	20	38.5
BMI		
Underweight (< 18.50)	3	5.8
Normal (18.50-24.99)	24	46.2
Overweight (25 – 29.99)	16	30.8
Obesity (>30)	9	17.3
FAMILY HISTORY OF HYPERTENSION		
Yes	27	51.9
No	25	48.1

Table 2 has summarized the adverse outcome associated with this group of low risk pregnant women at the end of their pregnancy. Among the outcome in mother of this study are HDP, Placenta Previa (PP), Premature Prelabour Rupture of Membrane (PPROM), Gestational Diabetes Mellitus (GDM), maternal pyrexia, infections, difficulty in labor and cesarean section. 2 pregnant women who delivered via ELLSCS were planned for delivery via LSCS because of the incidence of Placenta previa and history of 2 previous scars. While pregnant women who were delivered via EMLSCS were due to other clinical reason including uncontrolled high BP (HDP), fetal distress, poor progress of labor, failed induction of labor (IOL), breech in labor and 2 previous scar in labor.

On the other hand, adverse outcome reported in neonatal in this study were low birth weight (LBW), prematurity, low Apgar score, Intrauterine Growth Restriction (IUGR) and fetal distress. Baby born with Low birth weight (LBW) as least weight recorded as 1900 gram up to 2400 gram. Normal birth weight recorded as BW 2500 -3900 gram and big baby defined as BW > 4000g. Prematurity defined as delivery before 37 weeks of gestations while postdate is delivery after 42 weeks of gestation. In this study, there were 7(14.9%) babies born with APGAR score less than 7. No baby born with Apgar score < 3. Throughout this study, there were no cases of maternal or neonatal death among 47 pregnancies observed. All results were summarized in table 2.

Table 2: Summary Results. The primary outcome of maternal and neonatal.

Variables	Frequency (N=47)	Percentage (%)
Hypertension		
HDP	3	6.4
Normotensive	44	93.6
Other pregnancy complications		
PP	1	2.13
PPROM	3	6.34
GDM	1	2.13
Maternal Pyrexia	1	2.13
GBS positive	1	2.13
Birth Weight		
LBW	6	12.77
Normal	40	87.23
Big Baby	1	2.13
PREMATURITY		
Normal	38	80.85
Premature	8	17.02
Postdate	1	2.13
APGAR SCORE		
7-10	40	85.1
<7	7	14.9
Another Perinatal outcome		
IUGR	1	2.13
Fetal Distress	5	10.64
MOD		
SVD	28	59.6
EMLSCS	17	36.2
ELLSCS	2	4.3
Labour Progress		
Poor Progress	5	10.64
Secondary Arrest	1	2.12

Based on adverse pregnancy outcome, 9 patients (19.1%) had maternal antenatal complications (HDP, PP, PPROM, GDM and maternal pyrexia), 23 (48.9%) had neonatal complications (IUGR, LBW, prematurity, macrosomia, fetal distress and Apgar score <7) and 19 (40.2%) had operative delivery. So surprisingly, the majority, 30 pregnant women (63.8%) in this study

developed either poor maternal or neonatal outcome throughout their pregnancy. Out of that, 17 are primigravida (56.7%) which 13 had EMLSCS, 2 had HDP, 2 had PPROM, 5 LBW, 6 premature, 3 low Apgar scores and all 5 fetal distress. Majority of Malay pregnant women had poor pregnancy outcome, 63%. 6 out of 8 obese pregnant women marked 75% poor pregnancy outcome in this study as well as 65% of the overweight group. While 53.3% of pregnant women who have a family history of hypertension found to have poorer pregnancy outcome compared to 46.7% of those who did not have a family history of hypertension. Statistically, there was no significant association between races, number of parity, BMI and family history with poor pregnancy outcome (Table 3). All patients delivered at the tertiary health center (hospital) and there were no cases of maternal or perinatal death recorded in this study.

Table 3: The relationship between poor pregnancy outcome with maternal race, number of parity, BMI (at booking) and family history.

Variable		Adverse Outcome		df	p value
		Yes	No		
		n (%)	n (%)		
Race*	Malay	27 (90)	16 (3.3)	3	0.108[a]
	Chinese	1 (3.3)	0 (0)		
	Indian	0 (0)	1 (5.9)		
	Others	2 (6.7)	0 (0)		
Number of parity**					
	Primigravida	17 (56.7)	11 (64.7)	1	0.589
	Multigravida	13 (43.3)	6 (35.3)		
BMI*					
	Underweight	1 (3.3)	1 (5.9)	1	0.215[a]
	Normal weight	14 (13.4)	7 (41.2)		
	Overweight	9 (30)	7 (41.2)		
	Obese	6 (20)	2 (2.9)		
Fam History**					
	Yes	16 (53.3)	10 (58.8)	1	0.716
	No	14 (46.7)	7 (41.2)		

* Fischer's Exact Test, ** Pearson Chi Square
a. adjustted with Bonferroni Correction

DISCUSSION.

This study is a population-based study which identifies the risk of the adverse pregnancy outcome in mother and baby of low risk pregnancy. The low risk pregnancies were identified based on respective inclusion and exclusion criteria from a primary care setup, Klinik Kesihatan Ampang. Among 47 low risk pregnancies, we found that 30 pregnant women (63.8%) developed either one of poor maternal or neonatal outcome. This is concordant with the previous study in Selangor that showed that out of 521 samples, poor pregnancy outcome characterized about 14% by low risk pregnancy compared to only 8% in high risk pregnancy (Yeoh et al., 2016). Two main differences between low risk and high risk pregnancies in terms of antenatal care are the frequency of antenatal visits and the amount of attention given from the obstetric team in hospitals. The high risk pregnant mothers which are tagged as yellow or red in their antenatal book were referred to the obstetrics department in the hospital as early as 1st trimester (after booking were made). While the low risk group, were only seen by the obstetrician after the diagnosis of complication were made during the pregnancy, where the approach is more to curative compared to the high risk group, there were seen early by the obstetrician with the aim to prevent further complications throughout the pregnancy. To improve the ability for preventive medicine and early diagnosis at the primary health care setup, regular training of medical staff at KK is required. Ideally, this should be done by regular collaboration with the obstetric team at the tertiary hospitals.

Apart from that, the outcomes observed were not correlated with demographic factors like booking BMI, ethnicity, occupation and family history as illustrated in table 3. This may indicate that the outcome of pregnancy is almost unpredicted based on initial risk given to pregnant women during booking. This is where the importance of social background may play a role. A thorough antenatal care inclusive of social background combined with clinical history may be useful to provide a better-personalized information in order to tackle the unexplained reason of poor pregnancy outcome (Muto et al., 2016). However, this is not studied in our research and may be a need for future study.

The commonest adverse maternal outcome in low risk pregnancy observed was cesarean section whereby the mothers recorded about 40% incidence of EMLSCS and ELLSCS. This is supported by a large study by Yeung et al. which reported that out of 4 million low risk pregnancies from 2011 to 2013 in the US, LSCS is the most common complications (15%) (Yeung et al., 2016). The similar trend was observed since 2003 as reported by Cheng et al earlier for the same populations (Cheng et al., 2008). This epidemiological study had also proved that most common low risk pregnancy is primigravida women which explained why our study participants were mostly primigravida (61.5%). History of LSCS is a risk factor for wound infection, placenta previae and venous thromboembolism as well (Al Jama, 2012) (S, S & Gopalan, 2015) (Jacobsen et al., 2008). Similarly all across the world, the cases for LSCS either emergency and elective as a whole were reported as rising for the last 1 decade in Malaysia (Ravindran, 2008) (Sharma & Dogra, 2017). Hence respective audit authority should re-look again on the decision and indication used for LSCS in Malaysia in order to try and reduce the cesarean section delivery rate.

There was a total of 9 pregnant women presented with antenatal complications throughout their pregnancy in this study. Three cases of HDP, 1 cases of each PP, GDM, maternal pyrexia and GBS positive while there were 3 cases of PPROM. All obstetrical complications listed here were matched with the leading cause of maternal mortality. Placenta previa is one of the risk factors for hemorrhagic due to the antenatal or intrapartum bleeding (Hasegawa et al., 2012). It is followed by HDP and 1 case was treated as severe preeclampsia. While PPROM, GBS positive and maternal pyrexia may increase the risk of getting sepsis in the pregnancy (Yoon et al., 2001)(Kalin et al., 2015). These reflect the risk of maternal mortality and morbidity faced among low risk pregnancies which are unexpected and unpredicted from the risk assessed at the initial phase of pregnancy.

As for the neonatal outcome, the commonest adverse outcome seen are low birth weight (LBW) (12.77%) and prematurity (17.02%). T. Ashraf et al. reported that neonate from low risk pregnant women who have inadequate antenatal care tends to get LBW (p = 0.05) and higher NICU admission (p = 0.02) (Ashraf-Ganjoei et al., 2011). This was also supported by a big data study where it was reported that LBW is the commonest adverse neonatal outcome in low risk pregnancy (Yeung et al., 2016). There was multifactorial maternal cause identified to associated with LBW such as low socioeconomic status, a young maternal age, underweight mother, anemia and primigravida as well (Khan et al., 2016). LBW is the simplest yet powerful markers of fetus growth. Infants born with low birth weights facing a higher risk of neonatal morbidity and mortality and higher potential for development of chronic diseases later in adult life (Mu et al., 2012) (Tessa Wardlaw et al.,2004).

Apart from that, in the comparison between a number of parity, the adverse outcome was seen as more common among primigravida-low risk pregnant women (56.7%). The Yeung et al. study supported our findings as presented with 41% of primigravida in low risk group compared to 19% of multigravida from low risk pregnancy group recorded had poor pregnancy outcome (Yeung et al., 2016). Healthy primigravida was tagged as green color code in Malaysia antenatal healthcare system as there were evidences related to the poorer end outcome. A study done in Pakistan suggested for comprehensive antenatal care for primigravida group as they found that primigravida has a higher risk to deliver via instrumental deliveries, cesarean section, difficulty in labor, fetal distress and perinatal mortality (Danish, Fawad, & Abbasi, 2010). However, this study was compared the risk in booked and unbooked primigravida pregnancies where the result is shown to deviate towards the unbooked primigravida pregnancies. While our study was done among booked pregnant women and that makes a big difference in the statistical point of view.

We are unable to see the confounding factors related to poor pregnancy outcome in this group of pregnant women. Previous studies had suggested some subjective factors that may give major effect to the pregnancy outcome like a place of birth either home or hospital and the frequency of antenatal visits. In Malaysia, all primigravida and multigravida needed to come for antenatal visits for 10 and 8 times respectively throughout their pregnancy. In this study, we did not collect the data for the frequency of antenatal visit attended by the participants. A recent study in the US found that antenatal visit > 10 times in low risk pregnancies are associated with higher risk of hospital interventions such as induction of labor and cesarean section without

additional risk to the neonatal outcome (Odibo et al., 2016). In contra, a study from another side of the world, Iran, found that inadequate antenatal visits (less than 5 visits) are statistically associated with the poor neonatal outcome (Ashraf-Ganjoei et al., 2011). Hence, to blame the frequency of antenatal visits as one of the factors associated with poor maternal or neonatal outcome may be varied among populations and geographical differences. While the discussion on home birth or birth in a hospital setting is another major issue. As for now, Malaysian recommended all deliveries should be done in healthcare center either private or government sector under the supervision of trained obstetric team (Ghazali Ismail et al., 2013).

Clinically, it is very unclear on why the low risk pregnancy may develop the unexpected outcome at the end of their pregnancy. As discussed, many population studies agreed that low risk pregnancy did not ensure a good pregnancy outcome. Looking at the major risk associated with the poor pregnancy outcome towards women and their respective offsprings, review of current healthcare system and policy including the tagging system and procedures of identifying risky pregnancies especially in primary care setting as the frontline healthcare services must be improved. It is beyond this study to identify the social factors influencing the maternal and neonatal outcome. There are various factors other than clinical aspect that may contribute to a poor pregnancy outcome. Stress management at home or workplace, the awareness and education level regarding pregnancy and safe labour, the attitude and expectation of pregnant women towards their pregnancy and the adequacy of medical staff knowledge and training during handling the pregnant women are among the potential issues that need further attention in order to prevent the unexpected poor outcome (Jallo et al., 2008) (Patel et al., 2016) (Gandeh & Milaat, 1999).

As a conclusion, pregnant women who were classed as low risk pregnancy may still have a risk of developing poor maternal and neonatal outcome due to unexpected complications. Hence this makes the decision is further difficult to predict on which pregnant women need additional attention during their pregnancy. In reality, it is hard to predict outcome in any pregnancies especially the low risk one. Due to that reason, a national study of low risk pregnancy and their pregnancy outcome for our population is needed to further dig the actual situations and epidemiological status in order to improve the women health in Malaysia as well as to improve maternal and neonatal mortality ratio. At this point, even though this study participated by small sample size subjects, but the poor end outcome representing bigger problems that warrant for urgent review from the respective authority. Antenatal care facilities in Malaysia has lined the guideline of follow up for all pregnant women according to WHO recommendation. With respect to the present study findings, it is suggested that the low risk pregnant women may need more than the current amount of attention in order to reduce the risk of the unexpected poor outcome. The adequacy of antenatal visits to KK, the understanding of antenatal advice given, thorough physical examination, additional investigation and the level of compliance are among the service that may need comprehensively re-review for further amendment. On the other hand, in line with the results presented in this study, medical staff at KK may add education to low risk pregnant group about the unexpected of pregnancy complications and raise the awareness. Furthermore, regular training of medical staff at KK with collaboration from the hospital providing the obstetric care will also promote better maternal and neonatal outcome.

Limitation of the study.

It is clear that this study only comprises of small sample size and confined to one KK only. The methodology used of the study statistically able to represent a general view of the current condition of antenatal care in Malaysia. It is also adequate to catch the poor outcome among low risk pregnant women and parallel with the other antenatal statistic found in other research.

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