**RESEARCH ARTICLE**

# The prevalence of stillbirth due to antenatal complications (hypertension, diabetes, and anemia): A single center study in Malaysia

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**Abstract:** Stillbirth is a serious problem globally with approximately 2.65 million third trimester stillborn baby cases recorded around the world each year. In Malaysia, there are very limited studies on the risks of stillbirth. Thus, the objective of the study was to investigate the odds and probability of stillbirth due to antenatal complications (hypertension, diabetes and anemia) among women in Malaysia. A case-control study was undertaken at Hospital Serdang in Selangor. The sample size for the study is 367 patients who gave birth at this hospital of which 155 are stillbirths (cases) and 212 are the alive (controls). The data was collected from 2013 to 2015 based on the patient's data in the manual book and database. A descriptive analysis is conducted to know the percentage of mothers with antenatal problems with the birth of their babies. A chi-square test of independence was conducted to identify the association between antenatal complications and stillbirth. The binary logistic regression (odd ratio) is implemented to identify the risk factors of antenatal complications toward stillbirth. The results showed that most of the stillborn baby's mothers did not have any antenatal complications during pregnancy just 18.1% had hypertension, 18.7% had diabetes and 23.2% had anemia. Mothers with babies born alive showed quite similar results with only 18.9% having diabetes and 25% having anemia but a slight difference in hypertension with only 1.9%. The chi square tests of independence results concluded that only hypertension is associated with the birth of a baby. Based on the odds ratio, a mother who has hypertension during pregnancy has 11.465 times higher odds (95 CI: 3.930 to 33.445) of getting a stillborn baby compared to a mother without hypertension. Thus, pregnant women who have hypertension during pregnancy have a higher risk of having a stillborn baby. So, if hypertension is detected during pregnancy, the doctor and mother should be more careful and always monitor the progress of the baby to avoid a stillbirth.

**Keywords:** Stillbirth, Antenatal Complication, Malaysia

## 1. INTRODUCTION

World Health Organization (WHO) define stillbirth as a child dies after 28 weeks of pregnancy, either before or during birth. Stillbirth can be divided into two types which are macerated stillbirth and fresh stillbirth. Other names used for macerated stillbirth and fresh stillbirth are intrauterine death and intrapartum death. Macerated stillbirth is a death of a foetus with birthweight (≥500g), gestational age (≥22 weeks) and the presence of peeling of skin. Meanwhile, for fresh stillbirth, there is the absence of peeling of skin (Mother Newborn Child Mortality Registry, n.d.). Usually, for macerated stillbirth, the baby may have died during late pregnancy which means in the womb or before giving birth while fresh stillbirth is a baby that may have died during labour or birth (Miles, n.d.). Therefore, the physical of the baby will help in estimating time of death in stillborn foetus either in the womb or during labour.

A pregnant woman should always notice if there are any changes in the movement of the baby in the womb. If the movement and reaction of the baby in the womb keep reducing, it shows a problem with your baby. The main signs of stillbirth are when there is no heartbeat and movement of the baby. Other signs of stillbirth are when the pregnant mother feel cramps, pain, and fluid loss or have bleeding from the vaginal. So, the best way is to meet the doctor, to know the progress or problem of the baby. Frequently, the doctor will check the pregnant mother's health and listen to the baby's heartbeat using heart rate monitor but if there is

 

no sign of a heartbeat, the doctor will do an ultrasound to confirm the death of a baby (March of Dimes, 2020).

After the doctor has already confirmed the death of the baby, the doctor will give some suggestions and options for giving birth. The suitable time and best method for delivery of a stillborn baby depend on the gestational age and medical history. From the discussion with the doctor at the hospital, the stillborn baby can be delivered normally after two weeks of death in the womb. Unfortunately, the doctor will suggest medication to induce labour to avoid a baby to degenerate in the womb and doctor can also easily identify cause of death for stillborn baby. Furthermore, most of stillborn babies are normally delivered normally compared to caesarean delivery and only in some cases which requires a baby to be delivered by caesarean such as multiple pregnancy because the doctor needs to save the other baby (Sulaiman, Othman, Razali, & Hassan, 2013).

Stillbirth is a serious issue that needs to be known especially among pregnant women. Pregnant women should always know whether they are in high or low risk in getting a stillborn baby. During pregnancy, many problems can be encountered with the early preparation and the awareness of the mother. Therefore, it is important to meet with doctors regularly to ensure that the mother and the baby are always in a good condition. When the appointment with the doctor is done regularly, the information of the progress of the baby's growth can be monitored and any problems during pregnancy can be avoided and controlled. So, an alive and healthy baby will be born and the proportion of stillborn baby can be reduced.

Stillbirth is a serious problem globally, with approximately 2.65 million third trimester stillborn baby recorded around the world each year with about 98 percent, occurring in low and medium income countries (Froen et al., 2016). The country with the lowest rate of stillbirth babies, which is about 1.3 stillbirths per 1000 total births, is Iceland while Denmark is next at 1.7 per 1000 births. The country with the worst stillbirth rate is Pakistan with 43.1 stillbirths per 1000 total births. Malaysia which stands at rank 54, with stillbirth rate of around 4 per 1000 followed very closely to Indigenous Australians and Colombia (Flenady Vicki, 2015). Identifying the risks of stillbirth can help reduce the number of stillbirths. There are very limited studies on the risks of stillbirth in Malaysia.

The objective of the study was to examine the association between antenatal complication (hypertension, diabetes, anemia) with the birth of baby (alive, stillbirth). Furthermore, to investigating odds and probability of stillbirth due to antenatal complications (hypertension, diabetes and anemia) among women in Malaysia.

## 2. MATERIALS AND METHODS

This is a single-setting study conducted at Hospital Serdang, Selangor, Malaysia. The duration for data collection is from 27th January 2016 until 22th April 2016. The data is collected from years 2013 to 2015 based on the list of all patient that delivers baby at the Obstetrics and Gynaecology Unit in Hospital Serdang, Selangor. The data are focused on the alive and stillbirth baby including macerated and fresh stillbirth.

The study design use for this study is case control study. This type of design is chosen because comparison can be made between patients who deliver a stillbirth baby (cases) with patients who deliver alive baby (controls) in order to make a retrospective review to compare a risk factor in each group.

The design was used because it requires less time to complete because of the presence of the occurrence, in which at the same time, researcher can look at multiple risk factors with is lower in cost as compared to a prospective study. Furthermore, retrospective cohort study also allows the investigator to describe a population over time or obtain preliminary measures of association to develop future studies and interventions.

The data is private and confidential. Every piece of data or research that is related to public hospitals needs to be registered with the National Medical Research Register (NMRR). To get approval for NMRR, the ethics committee needs to get approval from the Medical Research Ethics Committee (MREC) and institutional approval from the head of department and hospital director in Hospital Serdang. So, the data is collected after all the procedures are completed and the NMRR Research ID-28628 is received. The data collection process began on 27th January 2016, and ended on 22th April 2016. The sample for stillbirth in the study is 155 cases. On the other hand, the sample collected randomly for alive is 212 sample. So, the sample for alive and stillbirth is 367 sample. The secondary data was used in this study and the collected data is basically about antenatal complication such as hypertension, diabetes and anemia and birth of baby. The antenatal complication is an independent variables and birth of baby is a dependent variable. Hypertension, diabetes and anemia is divided by yes and no to illustrate having and not having hypertension, diabetes and anemia but for birth of baby is assigned as alive and stillbirth baby. The conceptual framework shows the relationship between independent and dependent variables.

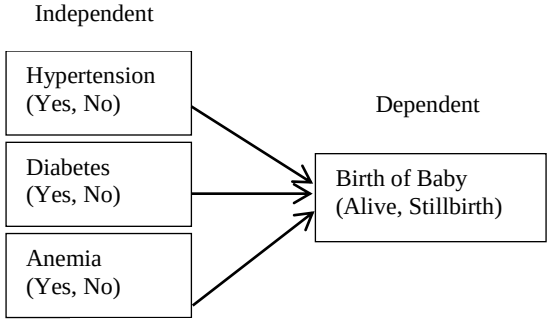


Figure 1: Conceptual Framework

 

It's really importance to understand the data. So, the first step is to conduct the descriptive analysis based on contingency table. Contingency table is a special type of frequency distribution table because it shows a two variable continuously and describes the relationship between several categorical variables (Agresti, 2007). In this study, variable for birth of baby and antenatal complication such as hypertension, diabetes and anemia is a categorical data and its will used contingency table to show the percentage and frequency.

After that, the odds ratio is used to measure of the effected size, describing the strength of association or non-independent between two data values. Basically, the odds ratio was used to measure if there was an association between two variables. Furthermore, the odds ratio for a predictor is defined as the relative amount by which the odd of the outcome increase (OR greater than 1.0) or decrease (OR less than 1.0) when the value of the predictor variable is increased by 1.0 units (Montgomery, Peck, & Vining, 2012) Lastly, the Chi-Square test is conducted to examine the association between antenatal complication such as hypertension, diabetes and anemia towards birth of baby (alive and stillbirth). There is an association if the p-value less than or equal to $\alpha$=0.05 (Triola, 2004).

## 3. RESULTS

The table 1 shows the antenatal complication among alive and stillbirth. The results show that the stillbirth's mother did not have any antenatal complication during pregnancy such as hypertension (81.9%); diabetes (81.3%) and anemia (76.8%). The alive babies show that a mother with hypertension (98.1%), diabetes (81.1%) and anemia (75.0%) respectively.

Table 1: Antenatal Complications

| Variable | Alive n (%) | Stillbirth n (%) |
|---|---|---|
| Hypertension | | |
| No | 208 (98.1) | 127 (81.9) |
| Yes | 4 (1.9) | 28 (18.1) |
| Diabetes | | |
| No | 172 (81.1) | 126 (81.3) |
| Yes | 40 (18.9) | 29 (18.7) |
| Anemia | | |
| No | 159 (75.0) | 119 (76.8) |
| Yes | 53 (25.0) | 36 (23.2) |

The descriptive only show the percentage of mother with antenatal complication, but using chi-square test it to know the association between stillbirth and antenatal complication. From table 2, it shows that the chi-square results for three types of antenatal complications. the result show that only hypertension is associated with stillbirth based on p-value is 0.000. The diabetes and anemia are not associate with stillbirth because the p-value is greater than $\alpha$=0.05.

Table 2: Chi-Square Test for Associations

| Determinants | Chi Square | P-value |
|---|---|---|
| **Hypertension** | **29.442** | **0.000** |
| Diabetes | 0.001 | 0.969 |
| Anemia | 0.153 | 0.695 |

Using chi square test, only hypertension is associated with stillbirth. To know how much hypertension will cause a stillbirth, test for logistic regression need to be conducted to calculate the odd ratio. The odds ratio showed that a mother who has hypertension during pregnancy has 11.465 times higher odds (95 CI: 3.930 to 33.445) of getting a stillbirth baby compared to a mother without hypertension. Unfortunately, a mother who has diabetes during pregnancy has only 0.990 times lower odds (95 CI: 0.582 to 1.682) of getting a stillbirth baby compared to a mother without diabetes. Lastly, a mother who has anemia during pregnancy has only 0.908 times lower odds (95 CI: 0.559 to 1.475) of getting a stillbirth baby compared to a mother without anemia. Thus, pregnant women who have hypertension during pregnancy have a higher risk of getting stillbirth baby. The mother with diabetes and anemia showed the lower risk of getting stillbirth baby.

Table 3: Odd Ratio for Antenatal Complications

| Determinants | Odd Ratio | 95% Confidence Interval |
|---|---|---|
| Hypertension | 11.465 | 3.930-33.445 |
| Diabetes | 0.990 | 0.582-1.682 |
| Anemia | 0.908 | 0.559-1.475 |

## 4. DISCUSSION

The descriptive analysis only can give the number of mothers with antenatal complication. Although, the most of the stillbirth mothers did not have hypertension during pregnancy yet there is still an association between hypertension and birth of baby. The odd ratio and Chi-Square test also shows that hypertension is associated and it is one of the important factor in the risk of getting stillbirth. Patel et al. (2015) supported the result in who stated that hypertension remained risk factors of having stillbirth compared to other maternal problem.

Most of the stillbirth mothers did not have diabetes during pregnancy and there is no association between diabetes and the birth of baby based on the Chi Square test and odd ratio. Hence, diabetes is not a risk factor of stillbirth. Diabetes is not an important risk because if the pregnant women make an intensive antenatal care during pregnancy, it will reduce the risk of stillbirth baby (Pattinson et al., 2011).

Most of the stillbirth mothers did not have anemia during pregnancy and thus there is no association between anemia and the birth of baby. It is contrasted with the literature

 

review because in developing country such Ghana, anemia was related in the increase of the risk of stillbirth (Aminu et al., 2014). The similar result from Chumak & Grjibovski (2010) found that anemia is associated with lower risk of stillbirth or women with anemia in pregnancy were less likely to have stillbirths.

## 4. CONCLUSION

The objective of the study is to investigate the odds and probability of stillbirth due to antenatal complications (hypertension, diabetes, and anemia) among women in Malaysia and to examine the association between antenatal complications (hypertension, diabetes, and anemia) and the birth of the baby (alive or stillbirth).

The odd ratio showed that only pregnant women who have hypertension during pregnancy have a higher risk of having a stillborn baby. The mother with diabetes and anemia showed a lower risk of having a stillborn baby.

Since hypertension is one of the risks of stillbirth, the mother should take care of their health by always monitoring their blood pressure. This is to ensure that their blood pressure reading is normal. Mothers also need to consult a doctor and follow the medication given by doctors.

Besides that, the doctor also plays an important role in raising awareness about the effects of hypertension in pregnancy, which may lead to stillbirth. The doctor needs to check the patient regularly and give suitable medication if needed.

So, hypertension has a high risk of stillbirth, so this is a serious problem that needs to be solved to avoid the increasing number of stillbirths, especially in Malaysia.

## ACKNOWLEDGEMENTS

I would like to express my appreciation to Dr. Wan Hamilton Binti Wan Hassan, the Head of Department of Obstetrics and Gynecology, Hospital Serdang. Furthermore, Dr. Anita Rina Binti Ali and Dr. Nur Aqilah Binti Alias for giving me an opportunity to use medical data in my study and helping in data collection and understanding of the study.

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