

**ORIGINAL ARTICLE**

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**A REVIEW OF DETERMINANT FACTORS OF STILLBIRTHS IN MALAYSIA**

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**ABSTRACT**

**Introduction** : Stillbirth is one of the important adverse pregnancy outcomes that has been used as a health indicator for the measurement of the health status of a country especially for its obstetric care management. However, the aetiology of the occurrence of the stillbirth was commonly difficult to identify because of limitations in the classification system.

**Methods** : A review of existing, available information published up to January 2007 on stillbirths in Malaysia was used to obtain the basic background on the determinant factors of stillbirths.

**Results** : Malaysia, which is a fast developing country, reported a stillbirth rate in the range of 4 to 5 per 1000 births. Almost 30- 40% were recorded as normally formed macerated stillbirths. This was based on a rapid reporting system of perinatal deaths using the modified version of the Wigglesworth's pathophysiology classification. Those of extreme maternal age (less than 19 years and more than 35 years), those reside in rural areas, of the 'Bumiputera' and Indian ethnic groups were at higher risk of stillbirth. On detailed analysis it was seen that the risks of having a normally formed macerated stillbirth increased among those who had a preterm delivery and hypertension. Stillbirth rates were also higher in those with shorter gestational age and in those with parity between 2 and 5. No other factors related to stillbirth were found in this review.

**Conclusion** : This is a review based on existing published data which has a lot of limitation when it comes to analysing other important factors that might be related with the risk of the stillbirth. However, extreme maternal age and mothers from rural areas are the two factors that were persistently found in almost all literature. When these factors are combined with signs of pre term delivery, they indicate that close monitoring needs to be done.

**Keywords** : determinant, foetal loss, risk factors, stillbirths

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## INTRODUCTION

The Malaysian perinatal mortality rates have been falling since the 1980s, but, throughout this period, stillbirths have been, and remain, the largest contributor accounting for nearly two third of perinatal deaths cases<sup>1,2</sup>. The fall in perinatal death rates is mainly due to the marked fall in early neonatal death rates rather than in stillbirth rates. More effort has been put into the hospital based service and better neonatal care services have resulted from budget allocation and manpower distribution under the Malaysian Plans. This might be one explanation for the reduction in early neonatal deaths rate<sup>3</sup>. During the ante natal period, most antenatal services are given by the primary health care sector<sup>4</sup>. This is because the Government Health sector provides free of charge antenatal care at primary health care centres. Only those with antenatal complications are referred to hospital for further assessment and follow up.

To identify the causes of deaths some stillbirths need post mortem analysis. Post-mortems in Malaysia are not commonly done due to a lack of stillbirth's accessibility facilities. Cultural and religious beliefs might also limit the opportunity for conducting perinatal autopsy. Moreover, some autopsies done in Malaysia are based on block placentae examination<sup>5</sup>.

Malaysia, a rapidly developing country, had experienced which stillbirth rate has been declining for quite sometimes. However, other rates such as the neonatal death rate and the infant death rate had shown much greater declined<sup>1,2,6</sup>. Since it is difficult to ascertain the actual causes of stillbirths, we would like to explore the common factors that are present in these cases and how they differ. This may aid the identification of those at risk and how they can be more appropriately managed.

## OBJECTIVE

The purpose of this paper is to identify determinant factors related to stillbirth in Malaysia.

## METHODOLOGY

Published and known unpublished studies reported up to January 2007 were searched. The electronic database sources used included Medline, CINAHL and SCOPUS. WebPages for the World Health Organization; UNDP; UNICEF; Ministry of Health, Malaysia; Department of Statistics, Malaysia and Ministry of Finance, Malaysia were also searched. Hand searching of relevant reference lists of papers obtained was also adopted. There was no quality assessment of the papers obtained undertaken for this review because papers and reports obtained were based on census, annual data collection for respective services and none from a primary study.

A review of available published papers or reports was conducted using electronic journal

search. This included tracking of proceedings reports and annual reports published by the Government Department and hospitals. Published, compiled data was also obtained from the Department of Statistics, Malaysia. In Malaysia, the health data were collected by both the Ministry of Health under the Health Management Information System (Information and Documentation Unit) and by the Statistics Department (General Registrar's Office). Data collected for stillbirth were used based on the definition of stillbirth: foetuses with a birth weight of at least 1000g or with at least 28 weeks of gestation based on the Death Notification.

Specific data pertaining to stillbirths and neonatal deaths in Malaysia were also requested from the Family Health Development Division, Ministry of Health as this data was not usually available from the public library but was relevant to this study such as the annual reports, guidelines and keynotes address papers. Since the introduction of the Rapid Reporting of Stillbirth and Neonatal Death Format (PNM) in 1998 the data on stillbirth and neonatal deaths has been collected by the Family Health Development Division, Ministry of Health based on foetus deaths that occurred after at least 22 completed weeks of gestation or with a birth weight of at least 500g if the gestational age is unknown at time of death. Data was also collected for live borns up to 28 days of age. The format PNM was only a reporting system and not a confidential inquiry system which could identify risks attributed to suboptimal clinical care. The classification used in this format was based on a modified pathophysiological Wiggles worth classification and on the Aberdeen (Obstetric) classification. Based on this database an annual report has been produced.

## RESULT

Stillbirth data from the Statistics Department and the Ministry of Health presented in this study were based on date of delivery and not by date of death for the stillborn<sup>7</sup>. Stillbirths data obtained from the Department of Statistics, Malaysia, were based on the death certificates reported by the Registration Department<sup>1</sup>. However, the data obtained from the Family Health Development Division, Ministry of Health, were based on the Modified Wigglesworth Pathophysiological Classification for 1998 to 2002, using the Reporting of Stillbirth and Neonatal Deaths System<sup>7,8,9</sup>.

### *The trends of stillbirth rates in Malaysia*

In Malaysia, during the last 50 years, the reduction of stillbirth rates has been just as remarkable as in the developed countries. In the early 1950s, the stillbirth rate was about 28 per 1000 births. During the 1990s, this indicator was about 5 per 1000 births<sup>1,2</sup>. However, this reduction was occurring at

different rates in different geographical areas within the country because of differences in accessibility to healthcare facilities and in the acceptance of healthcare services which was influenced by cultural and religion factors. Stillbirth rate increased in 1997 (6.6 per 1000 births) compared to 1995 (4.5 per 1000 births) and decrease in 2000 (5.6 per 1000 births)<sup>1,2</sup>. In 1996, the Family Health Development Division, under the Ministry of Health, was established. One of its aims was to monitor and evaluate healthcare services and data collection. The stillbirth rate showed an increase of its rate in year 1997 onwards as compared to earlier years. This could be related to the enforcement of the reporting system by the Family Health Division from the year 1997.

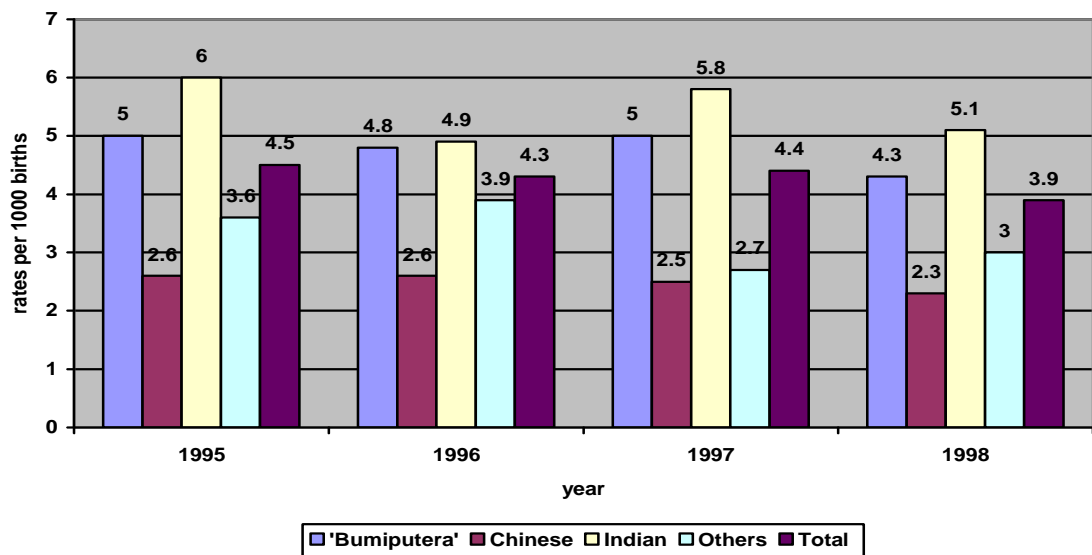
**Stillbirth rate by gender**

Foetus sex has not shown any difference in rates for girl and boy for the year 1995-2000<sup>1,2</sup>.

**Stillbirth rates by ethnic group**

Malaysia is a multiethnic country. The ethnic groups were classified as four categories (The 'Bumiputera', Chinese, Indian and Others). The 'Bumiputera' is a group of Malaysian citizens comprised of Malays and indigenous and this form the majority group in Malaysia. A stillbirth rate was shown higher among the Indian followed by the 'Bumiputera' in all years from 1995 -1998<sup>1</sup>. (Figure 1).

**Figure 1: stillbirth rates by Malaysian ethnic groups,1995-1998**



**Figure 1 Stillbirth Rates By Malaysian Ethnic Groups, 1995-1998**

**Stillbirth rate by maternal age group**

Table 1 shows the stillbirth rates based on maternal age distribution based on data obtained from Department of Statistics Malaysia (6). Stillbirth rate followed a U-shaped pattern with the highest rates from mothers in the extreme age groups of less than 15 years old and above 44 years old. The trend of risk steeply increased after 34 years old. In fact, results based on the Malaysia Family Life Survey 2 conducted in 1988, showed a monotonic

increase with maternal age among the stillbirths group(10).

**Table 1 Stillbirth rate per 1000 births by maternal age group, Peninsular Malaysia, 2000**

Maternal age	Total births (N=431,832)	Total stillbirth (N=2003)	
		n	Rate
<15	88	1	11.36
15-19	10,524	50	4.77
20-24	75,455	306	4.06
25-29	142,702	536	3.76
30-34	118,494	534	4.51
35-39	64,893	404	6.23
40-44	19,300	144	7.46
45 and above	1692	20	11.82

\* Data based on Vital Statistic Department of Malaysia. The data were based on birth weight  $\geq 1000$ g or 28 weeks gestation

### *Stillbirth rate by urban / rural area*

Available data on singleton stillbirths on urban-rural distribution for Peninsular Malaysia for maternal age group distribution, showed that the total percentage of stillbirths was higher in urban areas (1,2). Seventy percents of stillbirths in urban areas were from the age group 20-34, while only 66.5% of stillbirths in rural areas were from this age group (1,2). For the age groups 35 and above the percentages for urban areas were 27.4% and for rural areas were almost 30% (1,2). This showed that elderly maternal age commonly from rural areas and the non high risk maternal age group of 20-34 years old were more likely from urban areas. Those of less than 20 years old, a higher percentage also came from rural areas.

### *The trends of maternal care services in Malaysia*

The percentages of antenatal care from Government health facilities were 68.8% in year 2005 (2). Some of pregnant mothers obtained their antenatal care from private health facilities. Malaysia has adopted a Health Management Organization (HMO)(11) in health care services in which those working with companies who signed up with HMO were more likely to go to private health sectors for antenatal care. Thus antenatal cases that went to the private health sector may not be captured in the returns on coverage of antenatal care. However, there is no figure published on the percentages of antenatal care from the private health facilities. It could be underreported.

The trend on the average number of antenatal visits was recorded more than 4 per pregnancy since 1990 and in year 2005 rose to 8.4

(12,13,14). The World Health Organization recommends that all antenatal care should incorporate at least 4 visits spread across the full antenatal period. However, no data was recorded on the timing of antenatal care bookings.

The percentage of safe deliveries has been increasing each year in Malaysia with a rate of more than 95% during the past decade. Availability and accessibility of antenatal care and obstetric care services are very important in the management of pregnancy outcomes. The increase in the percentage of safe deliveries by trained personnel may have helped in improving obstetric outcomes in Malaysia.

### *Classification of perinatal death*

The classification was based on data collected by the Ministry of Health Malaysia using the PNM format based on the modified Pathophysiological Wigglesworth classification (7,9,15). The annual report of stillbirths and neonatal deaths 2005 (16) reported that for 1998-2002, the largest proportion of all perinatal deaths were classified as normally formed, macerated stillbirths. For the years 1998 (17) and 1999 (18), the second most common perinatal deaths had was Lethal Congenital Malformation but the 'asphyxia' group increased more than the Lethal Congenital Malformation group starting from the year 2000 and continuing up to 2002. The trend for immaturity as a cause of perinatal deaths was increasing but infection was on the other way down. The percentages of the unknown group also declined steeply due to increase awareness of the system of classifying and reporting stillbirths and neonatal deaths.

**Table 2 Percentages of perinatal deaths based on the Wigglesworth classification, Malaysia, 1998-2002**

	1998	1999	2000	2001	2002
Lethal congenital malformation	18.6%	18.0%	16.1%	17.2%	18.3%
Normally formed macerated stillbirth	20.8%	22.8%	29.4%	33.8%	35.9%
Asphyxia	17.8%	14%	19.0%	22.3%	21.1%
Immaturity	12.4%	13.1%	13.6%	15.4%	16.0%
Infection	5.3%	5.2%	3.1%	2.7%	2.7%
Others	9.9%	13.6%	10.3%	4.8%	4.3%
Unknown	15.3%	13.3%	8.5%	3.8%	2.7%

\*Based on stillbirth and neonatal deaths annual report 1998, 1999 and 2000-2002.

However, in 1991, 51% of stillbirth deaths were recorded as unexplained in the Hospital Universiti Sains Malaysia (19). From the annual report 2001, Tengku Ampuan Rahimah Hospital, showed that macerated stillbirth (41.5%) constitute the highest group of perinatal deaths (20) and in Hospital Universiti Kebangsaan Malaysia also showed that in 2004, 48.8% was classified as macerated stillbirths (21). In hospitals, the perinatal audit has been regularly conducted to assess for suboptimal care of each case delivered in the hospitals. This exercise helped in planned management to overcome any anticipate similar problem that would happen in future. It also helps in monitoring of those with identified risk.

#### ***Trend analysis for Normally Formed Macerated Stillbirth.***

The normally formed macerated stillbirth was showed as one of the major group classified under perinatal deaths based on Wigglesworth classification. The trends mentioned below were based on actual data obtained from the Annual Report of Stillbirth and Neonatal Deaths for the years 1998 and 1999 which were published by the Family Health Development Division, Ministry of Health Malaysia. This data contained all cases of perinatal deaths from singleton and multiple pregnancies. A recent Report of Stillbirth and Neonatal Deaths for the year 2000-2002 (16), published in 2006 by the Family Health Development Division, Ministry of Health Malaysia is available but it was not used in this analysis because the report did not present the result based on the classification of normally

formed macerated stillbirth by each risk factor analysed in this study. However, the trend of the perinatal deaths recorded from year 2000-2002 was continuously showed highest percentage for the normally formed macerated stillbirth group each year: 29.2% (2000), 34.1% (2001) and 36.0% (2002) compared to other group.

#### **Normally formed Macerated Stillbirth Birth based on maternal age and ethnic group**

Table 3 showed that in both years 1998 and 1999, the age group 25-29 and 30-34 year old were reported higher percentages compared to the other age group among the normally formed macerated stillbirths. The figure was based on proportion of total normally formed macerated stillbirth only. The pattern would be change if the calculation made by total number of deliveries for maternal age group is available.

There was not much difference in term of percentage by distribution of ethnicity group. The Malays followed by the Indians were the most contributors to the normally formed macerated stillbirths in both years.

#### **Normally formed Macerated Stillbirth Birth based on gravidity**

Based on percentages showed in Table 3, there was not much difference in terms risk by parity for normally formed MSB. Note the improvement in data collection leading to a reduction of unknown percentages.

**Table 3 Percentages of normally formed macerated stillbirth by maternal age group, ethnicity and parity, 1998 and 1999**

Identified risk factor	1998 (N=1381)		1999 (N=1409)		
	f	%	f	%	
Maternal age group	<15	1	0.1%	1	0.1%
	15-19	70	5.1%	66	4.7%
	20-24	261	18.9%	246	17.5%
	25-29	364	26.4%	354	25.1%
	30-34	307	22.2%	348	24.7%
	35-39	231	16.7%	260	18.5%
	40-44	117	8.5%	108	7.7%
	≥45	19	1.4%	15	1.1%
Ethnic group	Unknown	11	0.8%	11	0.8%
	Malay	782	56.6%	782	55.5%
	Chinese	89	6.4%	96	6.8%
	Indian	133	9.6%	123	8.7%
	Kadazan/Dusun	60	4.3%	59	4.2%
	Murut	13	0.9%	12	0.9%
	Bajau	37	2.7%	57	4.0%
	Melanau	4	0.3%	0	0%
	Iban	16	1.2%	15	1.1%
	Bidayuh	2	0.1%	8	0.6%
	Orang Asli	10	0.7%	14	1.0%
	Other Sabahan/ Sarawakian Tribes	83	6.0%	65	4.6%
Parity	Others	152	11.0%	178	12.6%
	1	347	25.1%	355	25.2%
	2-5	709	51.3%	769	54.6%
	>5	257	18.6%	274	19.4%
	Unknown	68	4.9%	11	0.8%

#### **Normally formed Macerated Stillbirth Birth based on gestational age**

Comparing the year 1998 and 1999 (17,18), showed that the percentage for gestational age 40 weeks and above had a decline of 12.7% (Table 4). The gestational age of 28 to 36 weeks were considered premature and less chances of survival compared to 36 to 39 weeks of gestation. There was a markedly differences in proportion of percentages for gestational age group 28 - 39 and above 40 weeks of gestational age group in both years. In the year 1999 showed more deaths came from age group 28-39 compared to year 1998.

#### **Normally formed Macerated Stillbirth Birth based on gender**

The percentages of male foetus compared to female foetus were higher in both years (Table 4). The percentages for male increased in 1999 (55.5%) compared to 1998 (53.0%). However, the percentages of unknown sex declined.

#### **Normally formed Macerated Stillbirth Birth based on antenatal care characteristics**

The percentages of antenatal care received were very high in both years (Table 4). However, there

is no elaboration on the number of visits or the level of care given and whether there was proper screening for health risk factors. Some of the cases might have very late bookings and no regular antenatal care follow up.

#### **Normally formed Macerated Stillbirth Birth based on antenatal complication**

Table 4 shows the total cases of normally formed macerated stillbirth based on the antenatal complication that were reported in the database. It showed that the most common antenatal complication was pre term labour followed by maternal hypertension. However, overall, pre term labour increased markedly in 1999, by almost 50% compared to 1998. The percentages of anaemia, hypertension and ante partum haemorrhage declined in 1999.

#### **Other risk factors for stillbirth**

It is difficult to obtain data for measuring social class because it has not been reported by the Statistics Department except for urban rural areas which was only for the Peninsular Malaysia. Malaysia has a high fertility rate and the family planning services actively collaborate with maternal health care services, especially at Government

premises. There is no data on birth spacing that can be assessed in relation to the incidence of stillbirth. At every antenatal visit, weight measurement of the pregnant mother was carried out but no data was found that mentioned maternal weight and pre-pregnancy BMI in relation to the occurrence of stillbirth. There is no published

study or data to elucidate the relationship of smoking, or any other unhealthy lifestyle habit, with the risk of stillbirth. The stillbirths and neonatal deaths reporting system in Malaysia does not capture any previous obstetric history. No other study found in the review also mentioned this matter.

**Table 4 Percentages of normally formed macerated stillbirth by obstetric history, 1998 and 1999**

Identified risk factor		1998		1999	
		f	%	f	%
Gestational age group	28-31	216	15.8%	300	21.3%
	32-35	298	21.9%	359	25.5%
	36-39	374	27.4%	413	29.3%
	40-	298	21.9%	130	9.2%
	unknown	18	1.3%	29	2.1%
	Total	1363	100%	1409	100%
Sex of foetus	male	732	53.0%	782	55.5%
	female	618	44.8%	610	43.3%
	Indeterminate	12	0.9%	8	0.6%
	Unknown	19	1.4%	9	0.6%
	Total	1381	100%	1409	100%
Antenatal care	Yes	1321	95.7	1314	93.3%
	No	60	4.3	95	6.7%
	Total	1381	100%	1409	100%
Antenatal complication	Hypertension	257	18.6%	218	15.5%
	Diabetes mellitus	72	5.2%	72	5.1%
	Ante partum haemorrhage	77	5.6%	68	4.8%
	Prolonged rupture of membranes	29	2.1%	32	2.3%
	Anaemia	181	13.1%	139	9.9%
	Preterm labour	518	37.5%	886	62.9%

\* Source of data: Family Health Development Division, Ministry Of Health

## DISCUSSION

The trend of stillbirth rate was declining in previous decades and plateaued after the 1990s. The pattern seen was similar to that in developed countries. The stillbirth rate recorded in Malaysia (6 per 1000 birth) was lower compared to other developing countries in Asia such as Indonesia (17 per 1000 birth), Thailand (11 per 1000 birth) and India (39 per 1000 birth) for the year 2000 (22,23). The main reasons for this could be the relatively long political and economic stability in Malaysia. This may allow for better health services provision and accessibility and a higher health budget allocation for infrastructure development and manpower training. It may also be due to an increased awareness of mothers on the importance of proper antenatal care and the delivery process.

This study has shown that male foetus, the Indians and 'Bumiputera' ethnic groups, extreme maternal age (less than 15 years old and above 34 years) have higher percentages of stillbirth, especially among the rural population. According to the Modified Wigglesworth Pathophysiological Classification for perinatal deaths, Normally

Formed Macerated Stillbirths were the most common causes of deaths in Malaysia (16,17,18). In this study, Malays followed by Indians ethnic groups showed higher in proportion of normally formed macerated stillbirths. The gestational age assessment showed that stillbirths commonly occur among the premature and were associated with the presence of antenatal complications, of preterm labour and of prolonged ruptured of the membranes. However, not much interpretation can be done for the maternal age group and the presence of antenatal care since there was not much difference seen between both years.

A Colour Coding System that has been implemented in Malaysia guides the healthcare staff in case management through screening for high risk cases before label for an appropriate levels of care (24,25). This system may help in preventing those who are potential to stillbirth, with close monitoring of those with listed risk factors.

Having good quality antenatal care has been showed able to improve pregnancy outcomes. Lack of antenatal care in a majority of the mothers is certainly a contributing risk factor. An earlier study done in Malaysia (10) showed that women

with a relatively high risk of losing their unborn or born child are more likely to obtain prenatal care and to deliver in a hospital or clinic by trained personnel. That study also showed that prenatal care has strong beneficial effects on foetal survival and that institutional deliveries significantly increase the children's chances of survival. This study showed that most antenatal mothers (more than 95 percents) had antenatal care with an average of more than 4 visits but no information available on gestational week of each visit, not even the booking visit. The booking visit is crucial as it helps in screening potential risk factors such as maternal conditions and measurement of actual gestational age. Since one of the main contributing factors to the occurrence of stillbirth is preterm delivery, the correct estimation of gestational age is important in case management planning. A scan at booking would help in confirming the gestational age. A proper fundal height and maternal weight measurement would give some clues about foetal wellbeing and help in the detection of those who are risk of intrauterine growth retardation.

Previous studies showed that poor attendance at antenatal clinics is a recognised phenomenon among Malaysians especially among the Malays (10). Results obtained in this study, however, showed that the percentages for received antenatal care were high but they did not show what the frequencies or the timings of the bookings were. It is difficult to say whether there was adequate management of chronic conditions such as hypertension and diabetes mellitus which are prevalent among mothers in this country. The data showed the average antenatal care received by the population was high. There might have been some pockets of low utilisation of maternal health services caused by various factors including: lack of accessibility, long waiting times at health centres or poor quality of services given. Such information could not be obtained for this study.

The Malaysian literacy rate has increased and, on average (more than 90%) (14). The Malaysian Family Life Survey 1976-77, a population-based probability sample survey, pinpointed mothers' education as the most consistent factor accounting for the decline in overall mortality between 1941 and 1975 (26).

Most of the data consistently came from same databank which were the Department of Statistics and the Information and Documentation System of the Ministry of Health. The breakdown of perinatal deaths was systematically collected at the national level and the report presented in the same manner each year which enabled the researcher to compare the trends of the deaths. In some other studies, the same definitions of death were systematically used for each report for comparison.

Overall, even though there is a strategy to measure risk through the screening process of antenatal care it is not linked with the data

collection for stillbirth. Information on how many of those cases of stillbirth were categorised as red, yellow, green and no risk white tags could not be obtained from any study.

Extreme maternal age, multiparity, coming from a rural area, of Indian and Bumiputera ethnic group and also prematurity were noted as factors giving higher risk of stillbirth in Malaysia. The level of antenatal care received showed no differences. Smoking and other lifestyle habits could not be assessed in this review because of a limitation in data resources. Previous obstetric history was also not captured in the reporting format of PNM, therefore the researcher has no access to it.

The Malaysian review conducted using the available published literature, was noted to have many limitations in assessing the determinants of perinatal death as information on some of the factors had to be gleaned from old published data. In Malaysia available data stored online such as the stillbirths and neonatal deaths data is not easily available and the researcher received no permission to access it. Overall, the study was limited by publication bias as very few studies have been published and many studies have been done but could not be accessed, especially those based on perinatal auditing. Each hospital with a maternity unit should have its own database on perinatal auditing which may showed the trend of risk factors based on the classification of perinatal deaths it used. If this perinatal auditing can be standardised in term of capturing the available relevant information from all existing hospitals with maternity units, it would be very helpful for the future researcher to broaden further the scope of this study.

The database for stillbirth and neonatal deaths in Malaysia has just been established less than ten years ago and reports produced using this database were published from 1998 to 2002 when this review was written. However, because of the non standardised format of data on normally formed, macerated stillbirths in recent reports for the years 2000 to 2002, it was not used in this review as a data source.

### **Recommendation**

It is hoped that this review will help to recommend where proper and systematic documentation is needed for future surveys. Many data had been collected by specific department but these are not easy to access by external researchers and permission to use available primary data is hard to obtain. These data may give an opportunity for the researchers to analyse and help in providing more evidence for the improvement of health care in Malaysia. Many studies conducted in Malaysia were not published and some are not easily available to the public.

The ability to identify risk is essential in providing high quality obstetric and perinatal care. The presence of one or more risk factors in the mother or in the foetus increase the likelihood residence of an adverse outcome of the pregnancy. Extreme maternal ages, multiparity and place of origin from rural area had shown a higher risk for occurrence of stillbirth in this study. Tackling of these factors during screening in antenatal care visits may be helpful. Proper screening helps in identifying more risk cases, even with lower numbers of antenatal visits spread throughout the antenatal period. When identified the women should be given additional care that prevents, anticipates, treats or minimises the effects of the potential adverse outcome.

Assessment of data completeness and validation of cases was very important but had a lot of limitations. Difficulty in data collection and transmission of cases was noticed in Malaysia. It is hoped that Malaysia will soon have a complete, valid and timely database for all births- live births, stillbirth and neonatal deaths, at par with the developed countries. This has been suggested by the WHO under the OBSQID Project (23,27). More studies which have been conducted or are ongoing should be published as references. There is under five year old children reporting system just at the beginning of implementation and it is hoped that all data can be linked so that future studies can be conducted.

Recent studies which have some bearing on the scope of this study have been published electronically but these studies were mostly from European countries - very few were from the Asian countries and none were seen electronically on stillbirth from Malaysia(28).

Some of the risk factors identified are modifiable and could be used to advise woman either pre pregnancy or in the early stages of pregnancy especially during booking visit. They could be advised to start pregnant before 35 years old and to have close monitoring if they are nullipara with higher maternal age and those multipara pregnancy with previous stillbirth and higher maternal age.

In this study the main aim was to determine whether any antenatal characteristics could be more commonly detected in pregnancies ending in unexplained ante partum stillbirth than in others. Access to health facilities for monitoring would be able to reduce the incidence of unexplained, ante partum stillbirths among those who were identified as belonging to the high risk group. As fertility declined in most countries, proper monitoring of the nulliparas may help in producing good outcomes since the nullipara mother has no commitment to look after other children as the multipara does. However, a close monitoring of cases incurs cost and each country that plans to standardise its guidelines on the introduction of close monitoring to all high risk

cases needs to assess its effectiveness and its acceptability. A need to recognize those potential cases at a higher risk of unexplained ante partum stillbirths will remain a challenge to health care providers if there is no proper reclassification of the perinatal deaths and no availability of monitoring and intervention guidelines to follow. Future study may also have to assess substandard care that may be present in the management. A standard, as a benchmark, will be needed before we can identify areas where improvements might be made. The only risk factors for normally formed macerated stillbirth which were evident from the routinely collected data were: increasing maternal age, increasing gestational age, from rural areas and multiparity. Overall these studies did not assess maternal, medical risk factors, for example hypertension and diabetes which have been shown in many -studies to be responsible for a significant proportion of foetal deaths. It is well known that if these diseases have optimal management, including prepregnancy care and close medical monitoring, it is possible to reduce the risk of foetal deaths. Ability to identify the causes of stillbirth may help in counselling mothers for future pregnancies. Identifying risk may help in identifying and closely monitoring high risk cases

There are limited papers related to Malaysian studies available as online or in the top reviewed journals. The annual report, conference proceedings and also statistical data should available online and up to date for public access. Permission to use some data for research purpose should be encouraged. The existing national perinatal database in Malaysia is recommended to produce a similar prototype annual report or in combined years for easily access and comparison to be made.

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