

NATIONAL OBSTETRICS REGISTRY

PRELIMINARY REPORT OF NATIONAL OBSTETRICS REGISTRY

JULY-DECEMBER 2009

Editors:

**Ravichandran Jeganathan
Shamala Devi Karalasingam**

With Contributions from :

**Aw Lin Da, Zarina Man, G. Bavanandan Naidu, Maimunah Bt Fadzi
Nuryuziliana D, Chong Guan Kim, Wan J.N, Soon Ruey, Anita Malek, S.Thillainathan
Rohana Mat Noor, Ruhaizan binti Haron**

**A publication of the National Obstetrics Registry and the Clinical Research Centre,
Ministry of Health Malaysia**



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- Ministry of Health Malaysia for the research grants to fund the registry.
- Our sauce data providers for their timely data collection and hard work.
- Steering committee members and governance board for their tireless effort and expertise dedicated to this registry
- Clinical Research Centre National for its leadership, supervision and technical support.
- The registry coordinating team and technical support team for their commitment and contribution in preparing this report.

About National Obstetric Registry

The National Obstetrics Registry (NOR) is a project initiated by the O&G fraternity with the support of the family health division of MOH. The CRC was instrumental in the development, implementation and administration of this registry. The NOR is the youngest of all the registries under the umbrella of Association of Clinical Registries Malaysia (ACRM).

NOR evolved, as a result of the dearth of statistics and information available, on the obstetric performance of hospitals within the Ministry of Health, Malaysia. Presently information is available upon request to each hospital, which is collected manually. Collective data and data mining were almost impossible. With the advent of NOR, it is now possible to get real time updates as to the performance and work output of each of the hospitals. NOR will also facilitate audits and research which is necessary to improve healthcare delivery systems which will translate into quality patient care. It must also be reflective of staffing norms, equipment needs and allow focused attention on areas of concern.

NOR is a clinical “disease” database which compiles the obstetric data, to enable healthcare planning, implementation and evaluation in a defined population. It is web-based which means it is readily accessible from any computer with internet access. NOR will assist us in evaluating some key areas in obstetric practice, including distribution of birthing centres in Malaysia with regards to population, outcome of breech deliveries, burden of disease in pregnancy, indications and rising rates of Caesarean Section, and outcome of LBW babies. Analysis of these parameters will enhance our efforts to achieve the Millennium Development Goal (MDG)

NOR was conceived years ago in the corridors of O&G congress in 2007, the initial meeting involving senior O&G consultants and CRC was held in Sept. 2007. The stakeholders were JKPPPOG, Family Health Division, MOH and the CRC.

The soft launch was in May 2009 and went fully online on 1st July 2009. It involves 14 state hospitals across Peninsular Malaysia and East Malaysia, which represents the bulk of obstetric practice. Data entry is done by the nursing staff and doctors, using a specific username and password with confidential authentication codes, with the use of SMS. Each hospital has a dedicated site coordinator represented by one specialist and sister, who oversee the running of NOR on a daily basis. There is a very close liaison between CRC and the participating hospitals.

To date, all 14 hospitals have been actively participating in data collection, which has resulted in the entry of 73, 095 up till 31st Dec 2009. All this data has been put to good use, hence this report. NOR will eventually expand to all hospitals with obstetric service within the Ministry of Health on a phased plan. It is our silent prayer that in time NOR will permeate to all delivery centres in Malaysia, both in the public and private sectors.

With the advent of NOR, we have faced a few obstacles which is expected when a new system is introduced. The initial hurdles NOR faced included resistance to change in terms of time, effort, manpower and funding. In time, we managed to overcome these hurdles. Other areas of concern include data entry which may take longer than the stipulated time, internet speed, missing data which requires frequent updates and hanging computer systems.

The funding of NOR is by CR for the next 2 years. Following this we hope that the funding will be contributed by the Ministry of Health as part of the 10th Malaysian plan

The expected outcomes are from 2 aspects, nursing and doctors. From the nursing perspective, NOR will allow us to re-look at the distribution of staff across the board, capturing the workload in various hospitals, assess the effectiveness of midwifery and community nurse training, enable nursing research and audit and to facilitate effective documentation. As for the doctors, NOR will provide an avenue for ample research and audit in terms of risk management and clinical governance, which is pivotal in quality patient care. NOR has also helped nurses and doctors to advance in the field of IT.

About National Obstetric Registry (*cont*)

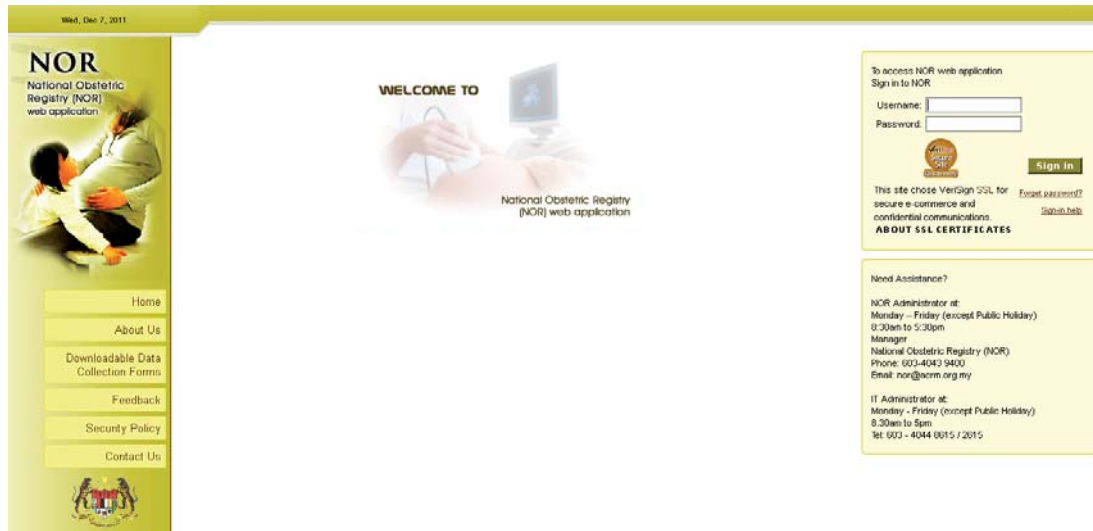
Objectives of this registry are:

1. To develop a complete picture of patient care through a comprehensive database wherein it would help to track patients' management and outcome.
2. To enable in depth study of factors influencing patients outcome and its effective forms of treatment.
3. To evaluate management of patients' obstetric outcome and subsequently to develop guidelines for improved care.
4. To facilitate research on .improving maternal and foetal morbidity and mortality
5. To facilitate research on specific maternal complications (ante partum, intra partum and post partum)

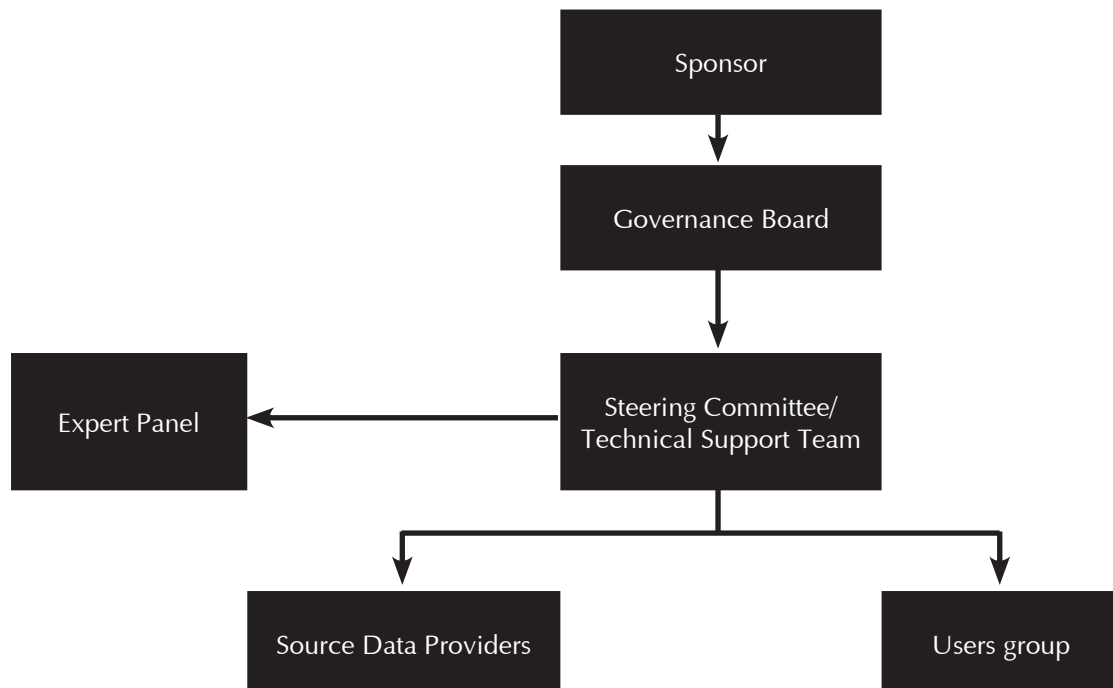
NOR Web Application

- Go to www.acrm.gov.my and click on NOR
- Login to NOR
- Select Patient and fill up NOR notification and relevant details.
- Print out reports.

Organization of NOR



The organizational structure for the registry is depicted below.



NOR Steering Committee

Advisors	Dr Mukudan Krishnan Department of Obstetrics & Gynaecology, Ipoh Hospital
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Chairman	Dr J Ravichandran Jegnathan Department of Obstetrics & Gynaecology, Sultanah Aminah Hospital, Johor Baharu
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	Dr Shamala Devi Karalasingam Kuala Lumpur Hospital
Members	Dr G. Bavanandan Naidu Hospital Sultanah Bahiyah Alor Setar
	Dr Maimunah Bt Fadzi Hospital Melaka
	Dr Soon Ruey Hospital Likas, Sabah
	Sister Anita Malek Hospital Likas, Sabah
	Staff Nurse Ruhaizan binti Haron Hospital Sultanah Aminah
	Dr Sukri Ahmad Hospital Raja Perempuan Zainab II Kota Bh
	Dr Wan Abu Bakar Yusoff Hospital Sultanah Nur Zahirah Kuala Terengganu
	Dr Liza Ling Ping Hospital Raja Permaisuri Bainun Ipoh
	Dr Nazura Bt. Karim Hospital Tuanku Ja'afar Seremban
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NOR Source Data Providers 2009

The current source data providers for NORM are:

No.	Hospital	Site investigators	Second person-in-charge
1	Hospital Kuala Lumpur	Dr S. Thallainathan	Sister Rohana Bt Mat Noor
2	Hospital Raja Perempuan Zainab II Kota Bharu	Dr Sukri Ahmad	KJ Sariah Bt Tais
3	Hospital Sultanah Nur Zahirah Kuala Terengganu	Dr Wan Abu Bakar Yusoff	KJ Salmah Sulaiman
4	Hospital Tengku Ampuan Rahimah Klang	Dr Malar Kawdasamy	Sister Pareswari Sinnathamby
5	Hospital Sultanah Bahiyah Alor Setar	Dr Aw Lin Da	Sister Zarina Man
6	Hospital Sultanah Aminah Johor Bahru	Dr Nisha Angela Dominic	Sister Rohayah Mahmood S/N Ruhaizan Haron
7	Hospital Melaka	Dr Maimunah Bt Fadzil	Sister Chong Guan Khim
8	Hospital Tuanku Fauziah Kangar	Dr Maizuriati Bt. Abd. Rahman	Sister Maslia bt Dali
9	Hospital Raja Permaisuri Bainun Ipoh	Dr Liza Ling Ping	Sister Padilah Aziz
10	Hospital Tengku Ampuan Afzan Kuantan	Dr Sudesan Raman	Sister Noor Lida Bt Jusoh
11	Hospital Tuanku Ja'afar Seremban	Dr Nazura Bt. Karim	Sister Salbiah Janggi
12	Hospital Pulau Pinang	Dr Azmy Bin Mohamad Yusoff	Sister Salbiah Din
13	Hospital Queen Elizabeth Kota Kinabalu	Dr Carol Lim	KJ Anita Malek
14	Hospital Umum Sarawak	Dr Azah Yusof	Sister Melanti Liong

NOR Technical Support Team

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Web Application Developer	Mr Eng Kok King
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Clinical Epidemiology Unit	Dr Jamaiah Haniff Dr Sharmini Selvarajah

Letter From The Principal Investigator

The National Obstetrics Registry has been collecting data since mid July 2009 and it is with great pleasure and pride that we see this report materialized.

It is imperative and timely that this study is done in Malaysia so that further research on obstetrics can emerge from this national registry. The information captured in the registry is important in assisting the MOH, Non Governmental Organization (NGO), healthcare providers and industry in terms of planning and evaluating obstetrics management in the hospitals.

I would like to thank all those who have collected, verified and analyzed the data. The co-operation and energy demonstrated in units throughout the country indicates the importance they place on improving patient management. The success of this report is due to continuous support and cooperation from various people and agencies. The effort of the entire group must be congratulated and it has been my sincere hope that this registry is able to sustain in coming years.

I also take this opportunity to thank the Clinical Research centre Ministry of Health Malaysia, to have trust in us and to provide us with the funding for us embark in this project. This annual report is a testament of all our combined effort.

Thank you,

Dr Ravichandran Jeganathan

Principal Investigator National Obstetrics Registry
Ministry of Health Malaysia

Abbreviations

ACRM	Association of Clinical Registries Malaysia
APH	Antepartum haemorrhage
CRC	Clinical Research Centre
CRF	Case Report Form
DIVC	Disseminated Intravascular Coagulation
DM	Diabetes Mellitus
Dr	Doctor
ECV	External cephalic version
FSB	Fresh Stillbirth
GDM	Gestational diabetes mellitus
IUGR	Intrauterine growth restriction
LSCS	Lower segment Cesarean section
MGTT	Meal Glucose Tolerance Test
MOH	Ministry of Health
MSB	Macerated stillbirth
NICU	Neonatal intensive-care unit
NHMS	National Health Morbidity Survey
NOR	National Obstetrics Registry
SDP	Source Data Provider
SMS	Short Message Service

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CHAPTER 1

TYPE OF DELIVERY

CHAPTER 1: TYPE OF DELIVERY

1.1 Summary

There were 73 095 deliveries recorded in National Obstetrics Registry between July 2009 and December 2009 out of which 53 954 were vaginal deliveries. Malays contributed to 68.5% of the total number of deliveries.

1.2 Introduction

A total of 14 participating hospitals were the source data providers.

Table 1.1: Total Deliveries by Centre, July-December 2009

Participating Institutions	n	%
Hospital Sultanah Aminah	6,608	9.0
Hospital Sultanah Bahiyah	5,257	7.2
Hospital Raja Perempuan Zainab II	6,574	9.0
Hospital Melaka	5,463	7.4
Hospital Tuanku Jaafar	3,703	5.1
Hospital Tengku Ampuan Afzan (HTAA)	4,755	6.5
Hospital Raja Permaisuri Bainun	4,576	6.2
Hospital Tuanku Fauziah	2,259	3.1
Hospital Pulau Pinang	2,608	3.6
Hospital Likas	7,355	10.1
Hospital Umum Sarawak	5,990	8.2
Hospital Tengku Ampuan Rahimah	6,034	8.3
Hospital Sultanah Nur Zahirah	5,915	8.1
Hospital Kuala Lumpur	5,998	8.2
Total	73,095	100.0

Table 1.1 shows that between July 2009 and Dec 2009 the total number of deliveries were 73,095 as recorded at these participating hospitals. Hospital Likas recorded the highest no. of deliveries at 10.1% followed by Hospital Sultanah Aminah (n=6608) and Hospital Raja Perempuan Zainab II (n=6574) at approximately 9.0%.

Table 1.2: Distribution of total deliveries by Type of Delivery, July-December 2009

Type of Delivery	n	%
Vaginal	53,954	73.8
Instrument	2,746	3.8
Caesarean	16,389	22.4
Missing	6	0.0
Total	73,095	100.0

The Caesarean Section rate shown in table 1.2 is at 22.4% whilst the overall rate of Caesarean Section in the country was 10.5% in 2000 and 15.7% in 2006.(1) This clearly shows that Caesarean Section rates have progressively gone up over the last 10 years and currently the Caesarean section rate is similar to that of the UK in 2004 at 22.4%.

1.3 Patient Demographic

Table 1.3: Distribution of total deliveries by Age Group, July-December 2009

Age group (Years)	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
10-<20	3,180	5.9	168	6.1	476	2.9	0	3,824	5.2
20-<30	30,081	55.8	1,820	66.3	7,916	48.3	5	39,822	54.5
30-<40	18,514	34.3	675	24.6	7,025	42.9	1	26,215	35.9
40-<50	1,890	3.5	64	2.3	887	5.4	0	2,841	3.9
50-<55	10	0.0	0	0.0	4	0.0	0	14	0.0
Missing	279	0.5	19	0.7	81	0.5	0	379	0.5
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100.0

Table 1.3 indicates that 5.2% of the total deliveries were teenage pregnancies. This however doesn't reflect the true numbers as there are many that either terminate the pregnancies or may have delivered in a private facility.

Table 1.4: Distribution of total deliveries by Ethnicity, July-December 2009

Ethnicity	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
Malay	37,156	68.9	1,811	66.0	11,117	66.0	4	50,088	68.5
Chinese	3,821	7.1	283	10.3	1,430	10.3	1	5,535	7.6
Indian	2,578	4.8	187	6.8	1,303	6.8	0	4,068	5.6
Kadazan/ Dusun	1,775	3.3	71	2.6	429	2.6	0	2,275	3.1
Murut	132	0.2	4	0.1	24	0.1	0	160	0.2
Bajau	1,753	3.2	52	1.9	275	1.9	0	2,080	2.8
Melanau	49	0.1	1	0.0	5	0.0	0	55	0.1
Iban	1,050	1.9	31	1.1	222	1.1	0	1,303	1.8
Bidayuh	715	1.3	19	0.7	201	0.7	0	935	1.3
Orang Asli (Peninsular Malaysia)	345	0.6	19	0.7	135	0.7	0	499	0.7
Other indigenous group in Sabah & Sarawak	368	0.7	12	0.4	142	0.4	0	522	0.7
Others	4,126	7.6	249	9.1	1,059	9.1	1	5,435	7.4
Unknown	85	0.2	7	0.3	47	0.3	0	139	0.2
Not Available	1	0.0	0	0.0	0	0.0	0	1	0.0
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100.0

Table 1.4 shows that the Malays contributed to 68.5% of the total number of deliveries as compared to the Chinese and Indian communities which were 7.6% and 5.6% respectively. Since 2000 there has been a decline in the Chinese population and this is consistent with our data. Caesarean Section was the mode of delivery in 32.0% of Indians followed by Chinese at 25.8% and Malays at 22.1%.

Table 1.5: Distribution of total deliveries by Gravida, July-December 2009

Gravida	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
1	16,088	29.8	1,712	62.3	5,583	34.1	3	23,386	32.0
2-5	32,858	60.9	955	34.8	9,472	57.8	3	43,288	59.2
6-9	4,574	8.5	69	2.5	1,201	7.3	0	5,844	8.0
≥10	387	0.7	8	0.3	120	0.7	0	515	0.7
0/missing	47	0.1	2	0.1	13	0.1	0	62	0.1
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100.0

Table 1.5 shows that the rate of Caesarean Section is almost consistent with all parity ranging from 23.0% in Primigravida, 21.8% in Gravida 2-5, 20.5% in Gravida 6-9 and 23.0 % in Gravida 10 and above.

1.4 Complications and Outcome

Studies have shown that Apgar score does not usually reflect the degree of acidosis at delivery and hence it needs to be correlated to umbilical artery pH.

Table 1.6: Distribution of total deliveries by Apgar score, July-December 2009

Apgar at 1 min	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Total (n)	%
<7	834	1.6	246	8.9	1068	6.4	2148	2.9
≥7	52326	97.4	2490	90.5	15627	93.6	70443	96.3
Missing	559	1.0	15	0.5	5	0.0	579	0.8
TOTAL(Alive Births)	53719	73.4	2751	3.8	16700	22.8	73170	100.0
Apgar at 5 min	Vaginal	%	Instrument	%	Caesarean	%	Total	%
<7	202	0.4	38	1.4	239	1.4	479	0.6
≥7	52923	98.5	2694	97.9	16442	98.5	72059	98.5
Missing	594	1.1	19	0.7	19	0.1	632	0.9
Total (Alive Births)	53719	73.4	2751	3.8	16700	22.8	73170	100.0

From table 1.6, low Apgar score incidence seems to be highest at 1 and 5 mins with Caesarean Section deliveries at 49.0% and this is consistent with most studies.

Table 1.7: Distribution of total deliveries by Medical History - Hypertension, July-December 2009

Type of Hypertension	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Total (n)	%
Pre Existing	388	13.4	28	14.1	213	11.3	629	12.7
Gestational	1,672	58.0	117	59.1	1,280	67.9	3,069	61.8
Chronic hypertension with superimposed Pre-Eclampsia	134	4.6	10	5.1	162	8.6	306	6.2
Unclassified	35	1.2	5	2.5	13	0.7	53	1.1
NA/Missing	656	22.7	38	19.2	216	11.5	910	18.3
Total	2,885	58.1	198	4.0	1884	37.9	4,967	100

The prevalence of Gestational Hypertension is 4.1 % in the Malaysian population whilst 54.4% of these patients delivered vaginally and 41.0 % had undergone Caesarean Section.

Table 1.8: Distribution of total deliveries by Medical History - HIV, July-December 2009

HIV	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
Reactive	110	0.2	7	0.3	102	0.6	0	219	0.3
Non Reactive	52,584	97.5	2,662	96.9	15,573	95.0	5	70824	96.9
Indeterminate	6	0.0	0	0.0	1	0.0	0	7	0.0
NA	1254	2.3	77	2.8	713	4.4	1	2,045	2.8
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100

The proportion of new cases of HIV in females was 1.4% in 2000 and 15.0% in 2006.(2) In our pregnant mothers this incidence is 0.3%. This low figure could be due to not reporting as this was not a mandatory field when the CRF was initially developed. The current MOH guideline for mode of delivery of retroviral positive cases to reduce vertical transmission is by Caesarean Section. This includes those not on treatment as well as those with monotherapy of zidovudine and for those with viral load of more than 1, /ml. 46.5% of patients underwent Caesarean Section whereas 50.2% of patients delivered vaginally. Grade B recommendation for vaginal delivery is if a patient has been treated with HAART with viral load of less than 1,000 copies/ml and has opted for vaginal delivery. Further analysis is required to conclude the reason for a high percentage of patients being delivered vaginally.

Table 1.9: Distribution of total deliveries by Medical History - Syphilis July-December 2009

Syphilis	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
Yes	106	0.2	4	0.1	53	0.3	0	163	0.2
No	51,616	95.7	2,627	95.7	15,256	93.1	5	69,504	95.1
NA	2,232	4.1	115	4.2	1,080	6.6	1	3428	4.7
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100.0

The incidence of Syphilis in our pregnant mothers is 0.2%. This low figure could again be due to not reporting as this was not a mandatory field when the CRF (Case Report Form) was initially developed.

Table 1.10: Distribution of total deliveries by Mother's Discharge Summary July-December 2009

Mother Discharge Summary	Vaginal (n)	%	Instrument (n)	%	Caesarean (n)	%	Missing (n)	Total (n)	%
Alive	53,944	100	2,745	100	16,385	99.9	6	73,080	100
Dead	10	<0.0	1	<0.0	4	0.02	0	15	<0.0
Total	53,954	73.8	2,746	3.8	16,389	22.4	6	73,095	100

A rough estimate of maternal mortality rate is 20.5 per 100,000 live births from the above data. This however doesn't reflect the actual maternal mortality rate as the data is only captured from the 14 participating hospitals and only captured at the time of discharge only.

1.5 Conclusion

Currently the registry gets data from 14 participating hospital. In 2009 the recorded deliveries for the nation was 481,669. From July to Dec 2009 the deliveries recorded was 242,396 and NOR captured 73,095 which accounted for 30.15 of deliveries. The data obtained could be useful in future to improve obstetric services in the country.

Our future plans are to include all hospitals with birthing facilities in stages to contribute data to the obstetric registry for a comprehensive analysis

1.6 Recommendation

1. To develop a CRF that is more comprehensive to analyze the data.
2. Train people to key in complete accurate data so that time invested in cleaning data is negligible.
3. Convert important data fields to mandatory fields.
4. Include trend analysis reports into the system.

1.7 References

1. Rising Caesarean section rates in Public Hospitals in Malaysia 2006. J Ravindran FRCOG.
2. Clinical Practice Guidelines. Management of HIV infection in pregnant mother. MOH/P/PAK/156.08(GU)

CHAPTER 2

ANAEMIA

CHAPTER 2 : ANAEMIA

2.1 Summary

The incidence of anaemia at booking was 22.1% and there is a noticeable improvement to 7.3% at delivery. More than 30.0% Indians, Orang Asli Peninsular, Bajau, Murut and the Kadazan/Dusun ethnicities in the 14 state Hospitals had anaemia at booking. Grandmultiparity and teenage pregnancy are seen as significant risk factors for anemia.

2.2 Introduction

Anemia is the most prevalent nutritional deficiency during pregnancy. It is a pathological condition in which the oxygen-carrying capacity of red blood cells is insufficient to meet the body's needs. Often the diagnosis is based on blood values, in particular haemoglobin concentration. The WHO recommends that the haemoglobin concentration should not fall below 11g/dl at any time during pregnancy, but many clinicians use the figure of 10.5g/dl as recommended by the Centers for Disease Control of North America. In this report the reference level of < 11g/dl was taken as anemia.

Table 2.1: Anaemia at booking and delivery, July-December 2009

Category	(n)	Total (n)	%
Anaemia At Booking	16129	73095	22.1
Anaemia at Delivery	5369	73095	7.3

The data for analysis was obtained from 73095 patients in the 14 state hospitals. The number of women with anemia at booking was 16129 from a total of 73095, which accounts for 22.1% as compared to the overall prevalence of anemia in pregnancy. A cross sectional survey done in 2007 reported the prevalence of anaemia was 35%(1) The incidence of anemia at delivery was only 7.3%. This improvement is most probably due to an early identification of anemia during the antenatal period and active measures had been taken by all attending medical personals to correct the condition prior to delivery.

2.3 Patient Demographic

Table 2.2: Total deliveries with Anaemia by Age, July-December 2009

Age group	n	Anaemia at booking	%	Anaemia at delivery	%
10-<20 years	3180	1266	39.8	272	8.6
20-<30 years	39822	8434	21.2	2835	7.1
30-<40 years	26215	5626	21.5	2014	7.9
40-<50 years	2841	698	24.6	219	7.7
50-<55 years	14	3	21.4	0	0
Unknown	379	102	26.9	29	7.7
Total	73095	16129	22.1	5369	7.4

Table 2.2 showed that the highest rate of anemia in pregnancy at booking involved the age groups of 10-<20 years old which accounted for 39.8% and this was also noted in the cross sectional survey done in 2007. The incidence of anemia in this age group improved to 8.5% at delivery. For the other age groups the incidence of anemia at booking was at 21.2% and has improved to about 7.0% at delivery. It is a known fact that anemia in pregnancy is a common problem in teenage pregnancy and the most likely reason for this is their poor dietary habits, poor nutritional knowledge, ignorant about pre-pregnancy care and unstable socio economic status.

Table 2.3: Total deliveries with Anaemia by parity, July-December 2009

Parity group	n	Anaemia at booking	%	Anaemia at delivery	%
Para 1	18639	3804	20.4	1376	25.6
Para 2-5	26543	6230	23.5	2133	39.7
Para 6-9	2126	686	32.3	192	3.6
Para ≥ 10	206	76	36.9	13	6.3
Total	73038	16129	22.1	5369	7.4

The table above illustrates the total deliveries with anaemia by parity.

The majority was from parity ≥ 10 group, which comprised of 36.9% in the anaemia at booking and followed by 32.3 % in the para 6-9 group. It is obvious that the incidence of anemia increases with parity. This finding is consistent with previous reports and studies that the risk of anemia is highest among grandmultipara. Grandmultiparity is strongly associated with uterine atony and PPH, which can be worsened in the presence of anemia. It is a known fact that adequate family planning can significantly reduce anemia by reducing the frequency of pregnancy and delivery. Importance of family planning counseling must be emphasized in the training sessions of all health care providers.

Table 2.4: Total deliveries with Anaemia by ethnicity, July-December 2009

Race	n	Anaemia at booking	%	Anaemia at delivery	%
Malay	50088	9945	19.9	3997	8.0
Chinese	5535	1126	20.3	299	5.4
Indian	4068	1405	34.5	600	14.7
Kadazan/ Dusun	2275	706	31.0	23	1.0
Murut	160	51	31.9	1	0.6
Bajau	2080	681	32.7	22	1.1
Melanau	55	16	29.1	2	3.6
Iban	1303	247	19.0	23	1.8
Bidayuh	935	165	17.6	16	1.7
Orang Asli (Peninsular Malaysia)	499	163	32.7	79	15.8
Other indigenous group in Sabah & Sarawak	522	143	27.4	8	1.5
Other	5435	1462	26.9	298	5.5
Unknown	40	19	13.6	1	0.7
Total	73095	16129	22.1	5369	7.3

From Table 2.4, the Indian ethnicity had the highest incidence of anaemia at 34.1%. A small study done in the 80's at Maternity Hospital Kuala Lumpur showed the prevalence of anemia to be the highest among the Indian mothers (2). From our data we also noted the incidence of anaemia among the indigenous people in Malaysia to be high. The incidence of anaemia in the Orang Asli Peninsular, Bajau, Murut and the Kadazan/Dusun ethnicities were at 32.7%, 32.7%, 31.9% and 31.0% respectively. This is probably attributed by the lower socio-economic background leading to poor dietary intake and resulting in poor body iron stores. Fortunately, the incidence of anaemia has reduced with prompt detection and correction during antenatal period.

2.4 Complications and Outcome

Table 2.5: Total deliveries with anaemia by type of delivery, July-December 2009

Type of delivery	n	Anaemia at booking	%	Anaemia at delivery	%
Vaginal	53954	12521	23.2	3590	6.7
Instrumental	2746	507	18.5	147	5.4
Caesarean	16389	3101	18.9	1632	10.0
Total	73089	16129	22.1	5369	7.3

About 10.0% of patients who had anaemia at delivery needed caesarean section. Women undergoing caesarean section are exposed to the risk of haemorrhage. With a decreased haemoglobin concentration they are at risk of compromise and therefore it is vital to identify these patients for early correction of anaemia during the antenatal period

Table 2.6: Apgar score at 1 min and 5 min in relation to maternal anaemia, July-December 2009

Apgar 1 min	Anaemia at Delivery	%
1min <7	209	3.9
1min >=7	5132	95.1
Missing	55	1.0
Total (Alive Births)	5396	100.0
Apgar 5 min	Anaemia at Delivery	%
5min <7	46	0.9
5min >=7	5286	98.0
Missing	64	1.2
Total (Alive Births)	5396	100.0

Anaemia in pregnancy has been associated with prematurity, low birth weight and low apgar score at 1 min. In our patients there was no significant correlation between maternal anaemia and apgar score.

2.5 Conclusion

Approximately one fifth of mothers who delivered in a tertiary government hospital had anemia at booking. However, the incidence of anemia at the time of delivery improved to 7.3%. This is mainly due to prompt detection and correction of anemia during the antenatal period. There is a higher incidence of woman with anemia in the 10-<20 years age group. This is consistent with the findings of other studies. Indians are at risk of developing anemia during pregnancy. Grandmultiparas are at a higher risk of anemia as compared to lower parity. About 10% of women undergoing caesarean section had anemia.

2.6 Recommendation

1. Anemia in pregnancy should be diagnosed early and corrected appropriately.
2. Family planning should be emphasized to have adequate spacing and this allows the woman to build up her iron stores before embarking on the next pregnancy.
3. Patients with poor compliance to oral haematinics will require parenteral iron to ensure optimal iron stores.
4. Family planning counseling should be given to both husband and wife, to ascertain adequate birth spacing.
5. Early diagnosis and intervention of anemia is important to reduce incidence of anemia at delivery and its associated complications especially in the ethnic groups with high prevalence of anemia.

2.7 Reference

1. Anemia in pregnancy in Malaysia: a cross-sectional survey. Jamaiyah Haniff et al on behalf of Malaysian Anemia study group. 2007
2. Nutritional Anemia in Pregnancy: A study at the Maternity Hospital, Kuala Lumpur. Tee et al.1984

CHAPTER 3

BREECH DELIVERIES

CHAPTER 3 : BREECH DELIVERIES

3.1 Summary

The incidence of breech deliveries is 3.5% and the majority of cases was delivered by Caesarean section which accounted to 85.0% whilst External cephalic version (ECV) is a was rarely practiced at the participating hospitals and this accounted for 5.7% of the cases.

Most of the breech deliveries were among nulliparous women. There was no significant difference in the baby's outcome when compared vaginal breech delivery to abdominal delivery. Preterm labour contributed to the highest complication associated with breech deliveries.

3.2 Introduction

Breech presentation is the most commonly encountered malpresentation. The incidence of breech presentation decreases from 20.0% at 28 weeks of gestation to 3.0-4.0% at term. The management of breech deliveries has been the subject of intense discussion in obstetrics.

ECV has been shown to reduce the risk of caesarean section without apparent risk to fetus. Current practice suggested that ECV should be performed later than 37 completed weeks with success rate varying from center to center.

Women should be counseled for elective caesarean section as this two-third reduction in perinatal mortality or morbidity. There is also a place for vaginal breech delivery in centers with adequate trained personnel and no contraindication to vaginal breech delivery. Woman must be fully informed of the risks and benefits of ECV.

3.3 Mode of breech deliveries

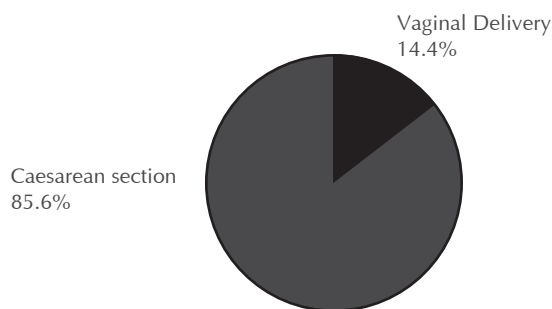


Figure 3.1: Breech deliveries versus type of deliveries

From the data collected, of the 73095 total deliveries, breech deliveries accounted for 3.5% of which 85.6% of cases were delivered by caesarean section and the rest of the cases had assisted vaginal breech deliveries.

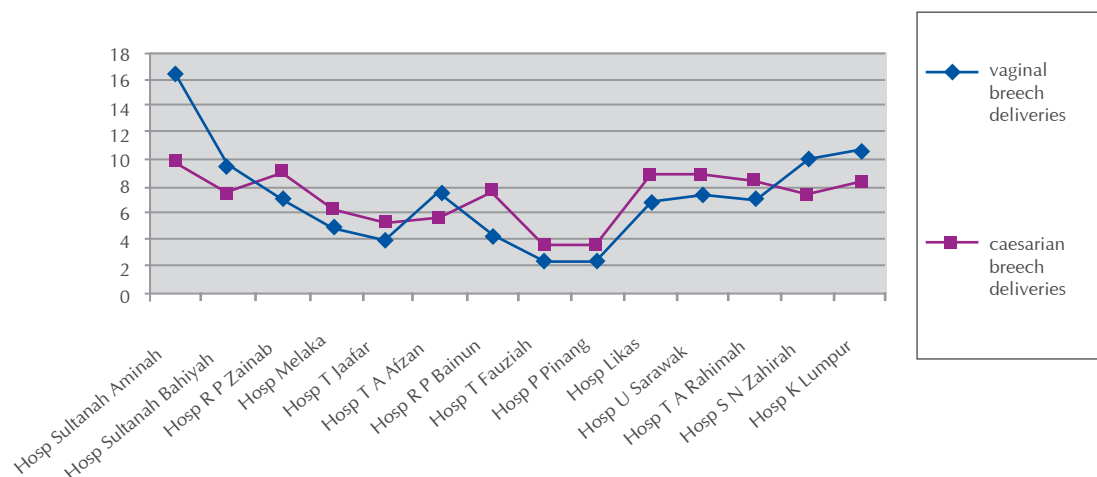


Figure 3.2: Distribution of total breech delivery by Centre, July-December 2009

The above figure shows that Hospital Sultanah Aminah had the highest number of assisted vaginal breech deliveries.

3.4 Patient Demographic

Table 3.1: Distribution of total breech delivery by age group and ethnicity, July-December 2009

Age group (years)	Vaginal Breech	%	Caesarean Breech	%	Total	%
10-<20	22	16.2	114	83.8	136	5.4
20-<30	169	13.4	1095	86.6	1264	50.4
30-<40	144	14.8	827	85.2	971	38.8
40-<50	24	19.7	98	80.3	122	4.9
50-<55	0	0	0	0	0	0
Missing	2	16.7	10	83.3	12	0.5
Ethnicity	Vaginal Breech	%	Caesarean Breech	%	Total	%
Malay	259	15.1	1457	84.9	1716	68.6
Chinese	25	11.7	189	88.3	214	8.5
Indian	19	15.2	106	84.8	125	5.0
Kadazan/ Dusun	10	12.5	70	87.5	80	3.2
Murut	1	16.7	5	83.3	6	0.2
Bajau	10	18.2	45	81.8	55	2.2
Melanau	0	0	0	0	0	0
Iban	5	9.3	49	90.7	54	2.2
Bidayuh	6	16.7	30	83.3	36	1.4
Orang Asli (Peninsular Malaysia)	3	13.6	19	86.4	22	0.9
Other indigenous group in Sabah & Sarawak	3	13.6	19	86.4	22	0.9
Other	19	11.2	150	88.8	169	6.7
Unknown	1	16.7	5	83.3	6	0.2
Total	361	14.4	2144	85.6	2505	100.0

As shown in the above table 50.4% of patients in the 20-30yrs age group had breech deliveries. There was no correlation between ethnicity and breech deliveries where else. From chapter 1 we know that caesarean section rates were higher among the Indians however caesarean section as mode of delivery for breech presentation didn't vary between the Malay, Indians and Chinese communities.

Table 3.2: Distribution of total breech delivery with complications to baby, July-December 2009

Complications to Baby	Vaginal Breech	%	Caesarean Breech	%	Total	%
None	158	43.2	1303	60.4	1461	57.9
Asphyxia (As <5 at 1 min, <7 at 5 min)	39	10.7	49	2.3	88	3.5
Meconium aspiration syndrome	3	0.8	6	0.3	9	0.4
Births injuries, specify	0	0	0	0	0	0
Anomaly	3	0.8	7	0.3	10	0.4
IUGR	1	0.3	7	0.32	8	0.3
Prematurity	19	5.2	29	1.34	48	1.9
IUD	20	5.5	0	0	20	0.8
Other, specify	0	0	5	0.23	5	0.2

Vaginal breech delivery requires an experienced obstetrician and careful counseling of the parents. Breech babies born vaginally in most studies have poor Apgar score when compared to breech babies delivered by elective caesarean section. From our data breech babies delivered by caesarean section both elective and emergency had good Apgar score as compared to vaginal delivery.

Table 3.3: Total breech delivery by birth weight and Apgar score, July-December 2009

Births weight (grams)	Vaginal Breech	%	Caesarean Breech	%	Total	%
<1000	79	74.5	27	25.5	106	4.2
1000-<1500	37	42.5	50	57.5	87	3.4
1500-<2000	41	28.9	101	71.1	142	5.6
2000-<2500	78	18.1	352	81.9	430	17.0
2500-<3000	84	9.7	783	90.3	867	34.4
3000-<3500	41	6.1	632	93.9	673	26.7
3500-<=4000	3	1.7	178	98.4	181	7.2
>4000	3	8.6	32	91.4	35	1.4
Missing	0	0	3	100	3	0.1
Total	366	14.5	2158	85.5	2524	100.0
Apgar 1 min	Vaginal Breech	%	Caesarean Breech	%	Total	%
1min <7	66	37.5	110	62.5	176	7.3
1min >=7	214	9.5	2029	90.5	2243	92.6
Missing	4	100	0	0	4	0.2
Total (Alive Births)	284	11.7	2139	88.3	2423	100.0

Apgar 5min	Vaginal Breech	%	Caesarean Breech	%	Total	%
5min <7	28	57.1	21	42.9	49	2.0
5min ≥7	247	10.4	2116	89.5	2363	97.5
Missing	9	81.8	2	18.2	11	0.5
Total (Alive Births)	284	11.7	2139	88.3	2423	100.0

From the Table 3.3, it was seen that 85.5% of patients with breech presentation had caesarean section as the mode of delivery. Apgar score of >7 at 1 min and > 7 at 5 min was 90.5% and 89.5% respectively. In most studies it has been reported that the caesarean breech babies have poor Apgar score but this is not so from the NOR data.

Table 3.4: Risk and complications associated with breech delivery, July-December 2009

Complications of pregnancy/delivery	Vaginal Breech	%	Caesarean Breech	%	Total	%
Cord prolapse	2	0.6	4	0.2	6	0.2
Foetal distress	4	1.1	16	0.7	20	0.8
Eclampsia	2	0.6	4	0.2	6	0.2
Pyrexia	0	0.0	1	<0.0	1	0.0
Anaesthetic complication	0	0.0	0	0.0	0	0.0
Retained placenta	3	0.8	1	<0.0	4	0.2
Prolonged labour	1	0.3	1	<0.0	2	0.1
RupturedbMembranes	9	2.5	18	0.8	27	1.1
Placenta praevia	0	0.0	10	0.5	10	0.4
Abruptio placenta	7	1.9	4	0.2	11	0.4
Preterm labour	88	24.4	119	5.6	207	8.3
Uterine atony	0	0.0	1	<0.0	1	<0.0
Primary postpartum haemorrhage	2	0.6	15	0.7	17	0.7
Secondary postpartum hemorrhage	0	0.0	1	<0.0	1	<0.0
Genital Tract trauma	5	1.4	0	0.0	5	0.2
Uterine scar dehiscence	0	0.0	0	0.0	0	0.0
Uterine rupture	0	0.0	1	<0.0	1	<0.0
Deep vein thrombosis	0	0.0	1	<0.0	1	<0.0
Amniotic fluid embolism	0	0.0	0	0.0	0	0.0
Pulmonary embolism	0	0.0	1	<0.0	1	<0.0
Indeterminate APH	0	0.0	3	0.1	3	0.1
Uterine fibroid in pregnancy	0	0.0	1	<0.0	1	<0.0
Cervical incompetence	0	0.0	1	<0.0	1	<0.0
Cord presentation	0	0.0	2	0.1	2	0.1
Oligohydramnios	1	0.3	16	0.7	17	0.7
Intrauterine death IUD	19	5.3	0	0.0	19	0.8
IUD-FSB	0	0.0	0	0.0	0	0.0
IUD-MSB	4	1.1	0	0.0	4	0.2
Others, specify	3	0.8	9	0.4	12	0.5
Total	361	14.41	2144	85.59	2505	100.0

Although studies on the delivery of the preterm breech are limited, the recent multicenter term breech trial found an increased rate of perinatal mortality and serious immediate perinatal morbidity. Our data showed that 8.3% of breech delivery was associated with prematurity and 24.4% of these cases had vaginal breech delivery. Fetal head entrapment may result from an incompletely dilated cervix and this percentage is higher with preterm fetuses (< 32 wk), when the head is larger than the body and a head that lacks time to mold to the maternal pelvis. This occurs in 0- 8.5% of vaginal breech deliveries. Hence careful assessment is mandatory when premature breech babies are allowed vaginal delivery.

3.5 Conclusion

The incidence of breech delivery was 3.5% from the total number of deliveries captured from the 14 hospitals contributing data to the registry of which 85.0% were delivered via caesarean section. Breech babies delivered by caesarean section had good outcome as compared to babies delivered vaginally and this is consistent with most studies. Breech deliveries were also associated with prematurity from our data.

3.6 Recommendation

1. External cephalic version (ECV) is a safe alternative to vaginal breech delivery or caesarean delivery hence it should be an option offered for suitable cases as several studies evaluating the success of ECV have good outcome which varies between 50%-80%.
2. Modules on methods and protocols for ECV should be available at all centers with specialist and should be included in the formal training for the trainees.
3. With the dwindling numbers of experienced obstetricians who still perform vaginal breech deliveries and who can teach future generations of obstetricians, this technique may soon be lost. Continuous training for all birth attendances using models and videos in performing vaginal breech delivery, supervised by experienced obstetricians/consultants should be implemented in all centers.

3.7 Reference

1. Royal College of Obstetricians and Gynaecologist : Guideline No 20b December 2006. The management of breech presentation.
2. Royal College of Obstetricians and Gynaecologist, Guideline No 20a External cephalic version (ECV) and reducing the incidence of Breech presentation.

CHAPTER 4

CAESAREAN SECTION

CHAPTER 4 : CAESAREAN SECTION

4.1 Summary

Caesarean sections account for 22.4% of all deliveries in major Government Hospitals in Malaysia. There is a higher risk of Caesarean sections among older mothers and among Indian mothers. The main indication for Caesarean section is fetal distress and this is followed by malpresentations/lie and abnormal progress of labour. There is significant morbidity from Caesarean sections especially from primary Postpartum Haemorrhage.

4.2 Introduction

Table 4.1: Distribution for total deliveries by type of delivery, July-December 2009

Type of Delivery	No.	%
Vaginal	53954	73.8
Instrument	2746	3.8
Caesarean	16389	22.4
Missing	6	0.0
Total	73095	100.0

There were a total of 16,389 Caesarean sections which accounted for approximately 22.4% of all deliveries. This figure is unusually high but as NOR data is currently from tertiary Government Hospitals, this high Caesarean Section rate is not unexpected as these Hospitals cater for referrals and high risk deliveries. However, there is a significant increase compared to the early nineties.

Table 4.2: Distribution of LSCS by elective and emergency, July-December 2009

Type of LSCS	No.	%
Elective	3718	22.7
Emergency	12671	77.3
Total	16389	100.0

Majority of these Caesarean sections were done as emergencies (77.3%) and less than a quarter were done as an elective procedure. This may also suggest that many of these Caesarean Sections were done after office hours and probably by more junior doctors who are on call.

Table 4.3: Caesarean Section Rates by Participating Institutions, July-December 2009

Participating Institutions	LSCS Rates (%)	Elective	Emergency	Total Deliveries
Hospital Sultanah Aminah	25.9	339	1373	6608
Hospital Sultanah Bahiyah	23.2	407	812	5257
Hospital Raja Perempuan Zainab II	20.7	149	1210	6574
Hospital Melaka	19.9	320	766	5463
Hospital Tuanku Jaafar	25.2	231	704	3703
Hospital Tengku Ampuan Afzan (HTAA)	24.9	260	924	4755
Hospital Raja Permaisuri Bainun	31.1	329	1096	4576
Hospital Tuanku Fauziah	21.7	115	376	2259
Hospital Pulau Pinang	23.4	186	425	2608
Hospital Likas	16.8	254	985	7355
Hospital Umum Sarawak	18.3	208	887	5990
Hospital Tengku Ampuan Rahimah	24.4	337	1134	6034
Hospital Sultanah Nur Zahirah	17.8	240	816	5915
Hospital Kuala Lumpur	25.1	343	1163	5998

There is mark variation between the States and this variation will need to be addressed. The lowest Caesarean Section Rate was at Hospital Likas with a Caesarean Section rate of 16.8% and the Highest was at Hospital Raja Permaisuri Bainun with a rate of 31.1%. Possible causes will include variation in protocols and the presence of Caesarean Audits within the Hospitals.

4.3 Patient Demographic

Table 4.4: Distribution of Caesarean Section by age, ethnicity and parity, July-December 2009

Type of delivery	Vaginal		Instrument		Caesarean		Missing		Total	
	No.	%	No.	%	No.	%	No.	%	No.	% of all del.
Age Group (Years)										
10-<20	3180	83.2	168	4.4	476	12.4	0	0.0	3824	5.2
20-<30	30081	75.5	1820	4.6	7916	19.9	5	<0.0	39822	54.5
30-<40	18514	70.6	675	2.6	7025	26.8	1	<0.0	26215	35.9
40-<50	1890	66.5	64	2.3	887	31.2	0	0.0	2841	3.9
50-<55	10	71.4	0	0.0	4	28.6	0	0.0	14	<0.0
Unknown	279	73.6	19	5.0	81	21.4	0	0.0	379	0.5
Race										
Malay	37156	74.2	1811	3.6	11117	22.2	4	<0.0	50088	68.5
Chinese	3821	69.0	283	5.1	1430	25.8	1	<0.0	5535	7.6
Indian	2578	63.4	187	4.6	1303	32.0	0	0.0	4068	5.6
Kadazan/ Dusun	1775	78.0	71	3.1	429	18.9	0	0.0	2275	3.1
Murut	132	82.5	4	2.5	24	15.0	0	0.0	160	0.2
Bajau	1753	84.7	52	2.5	275	13.2	0	0.0	2080	2.8
Melanau	49	89.1	1	1.8	5	9.0	0	0.0	55	0.1
Iban	1050	80.6	31	2.4	222	17.0	0	0.0	1303	1.8
Bidayuh	715	76.5	19	2.0	201	21.5	0	0.0	935	1.3
Orang Asli	345	69.1	19	3.8	135	27.1	0	0.0	499	0.7
Other indigenous group in Sabah & Sarawak	368	70.5	12	23.0	142	27.2	0	0.0	522	0.7
Other	4126	75.9	249	4.6	1059	19.5	1	<0.0	5435	7.4

Unknown	85	61.2	7	5.0	47	33.8	0	0	139	0.2
Not Available	1	0.0	0	0.0	0	0.0	0	0.0	1	0
Para	No.	%	No.	%	No.	%	No.	%	No.	%
0	17293	67.8	1878	7.4	6350	24.9	3	<0.0	25524	34.9
1	14140	75.9	497	2.7	4000	21.5	2	<0.0	18639	25.5
2-5	20624	77.7	348	1.3	5570	21.0	1	<0.0	26543	36.3
6-9	1692	79.6	21	1.0	413	19.4	0	0	2126	2.9
≥10	161	78.2	1	0.5	44	21.4	0	0	206	0.3
Total	53910	73.7	2745	3.8	16389	22.4	6	<0.0	73095	100.0

There was a low Caesarean Section rate among very young mothers with a rate of only 12.4% and more Caesarean sections as the mother gets older (Caesarean section rate of 31.2% among mothers aged 40 to 50 years). This is expected as the older mother usually carries more risks during her pregnancy and in labour and may have other medical problems, previous scars and for subfertility as well as for fetal issues (IUGR, fetal abnormalities, multiple pregnancies).

Among the Indian mothers, there appears to be a much higher incidence of Caesarean Section of 32.0% when compared to the Malays (22.2%) or Chinese (25.8%). The Caesarean section rates were lowest among the Bajaus (13.2%) and the Melanaus (9.0%). However as the numbers for the smaller ethnic groups are small, these differences are not significant. With regards to parity, Caesarean section rates was highest among the primigravidas (24.9%) and lowest among the para 6-9 (19.4%)

4.4 Complications and Outcomes

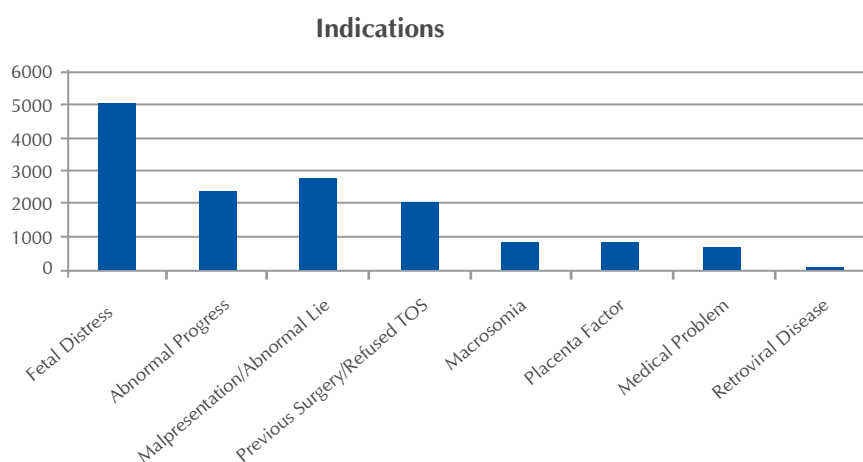


Figure 4.1: Distribution by indications (LSCS Details), July-December 2009

Approximately 30.0% of all Caesarean sections are for 'Fetal Distress'. This is followed by abnormal labour progress and malpresentation, both which roughly accounts for 14.0% of all sections.

Table 4.5: Distribution by Apgar score for alive status birth outcome of LSCS, July-December 2009

Apgar 1 min	Elective	%	Emergency	%	Total	%
Apgar 1 min <7	88	8.5	947	91.5	1035	6.3
Apgar 1 min ≥7	3616	23.9	11654	76.3	15270	93.6
Missing	0	0.0	5	100.0	5	<0.0
Total (Alive Births)	3704	22.7	12606	77.3	16310	100.0
Apgar 5min	Elective	%	Emergency	%	Total	%
Apgar 5min <7	13	5.7	215	94.3	228	1.4
Apgar 5min ≥7	3689	23.0	12375	77.0	16064	98.5
Missing	2	11.1	16	88.9	18	0.1
Total (Alive Births)	3704	22.7	12606	77.3	16310	100.0

There were 79 babies who were born dead to mothers who had undergone Caesarean Section. Majority of these Caesarean sections were for malpresentation of the dead fetus. Of the remaining 16310 babies who were born alive, 93.6% had an Apgar score of 7 or higher at delivery and by 5 minutes, about 98.5% of babies had Apgar scores of 7 or higher. This suggests that for the majority of Caesarean section, the section were timely. About 6.7% of babies were delivered with very low Apgar scores (less than 6) at 1 minute.

Table 4.6: Primary Post Partum Haemorrhage associated with type of delivery, July-December 2009

Type of delivery	Vaginal		Instrument		Caesarean	
	No.	per 10,000 del	No.	per 10,000 del	No.	per 10,000 del
Primary postpartum hemorrhage						
<1500 mls	199	36.88	26	94.68	154	93.97
≥1500 mls	18	3.34	2	7.28	77	46.98
Not Available/Missing	11		3		9	
Total	228	42.25	31	112.89	241	147.05

According to the table above, the risk of bleeding following a Caesarean section (primary PPH) is much higher (147.05/10,000 CS) than when compared to a vaginal delivery (42.35/10,000 vaginal deliveries). The risk of bleeding of less than 1500mls is no different from risks of bleeding following an instrumental delivery. However risks of excessive bleeding of more than 1500mls is 20 times higher than that following a vaginal or instrumental delivery. This excess risk is worrying and needs to be address further.

Table 4.7: Primary Post Partum Haemorrhage associated with Caesarean Sections, July-December 2009

PPH volume	Elective	%	Emergency	%	Total	%
<1500 ml	49	72.06	101	60.12	150	63.56
≥1500 ml	18	26.47	59	35.12	77	32.63
NA/Missing	1	1.47	8	4.76	9	3.81
Total	68	28.81	168	71.19	236	100

4.5 Conclusion

Approximately one fifth of mothers who deliver in a tertiary Government Hospital were though Caesarean section. This high incidence of Caesarean Section (22.4%) is significantly higher than rates quoted from the same hospitals in the late eighties and early nineties. For example, in HKL, the Caesarean section rates was 12.0 % in 1990 and 25.1% in 2009. There is a higher chance of an older mother delivering by Caesarean Section than a younger mother but this is not unexpected. What is interesting however the higher rate of Caesarean sections among Indian mothers is (32.0%) when compared to other races.

These Caesarean section carries with it significant morbidity. In the immediate post operative period, risks of PPH are extremely high with risks of severe PPH (>1500mls) to be about 20 X higher that those mothers delivered vaginally.

These operative deliveries are also though to be associated with higher risks of thromboembolic events and ICU admissions but unfortunately for the moment these events are not captured by the NOR. Based on the previous CEMD reports, many mothers die as well following the Caesarean sections. There is a need to ensure that Caesarean section are indicated, timely, adequately performed by adequately trained staff and with adequate resources (blood, blood products, medication, intensive care facilities) to handle complications when complications occur. This is best addressed with a Caesarean Section Audit that is held weekly or two weekly. Departments with high section rates must also ensure that Maternity Operating Theatres exists and are able to function throughout the day, including after office hours. There should be the ability to open a second or even a third OT should the need arises. Staffing for these operating theatres must be available to agreed norms. As majority of Caesarean Sections occur after office hours, the specialist on call should be available on site to handle difficult Caesarean sections or complications when they occur.

4.6 Recommendations

1. Standardized protocols / guidelines for labour management
2. To encourage all Hospitals to have a Caesarean Audit on a regular basis.
3. As majority of the Caesarean section were done as an emergency procedure, the Hospital should ensure that there is a dedicated operating theatre to cater for these emergency sections.
4. There should be adequate guidelines on safe surgery, access of blood, category of staff managing the case both from the O & G department as well as the anaesthetic department. These guidelines must be applicable for both during office hours and after hours.
5. Because of the very high risk of excessive bleeding following a Caesarean section, there must be adequate protocols to address the availability of blood. The role of 'Group and Save' versus 'Group and Cross Match' and the role and use of Emergency Blood.
6. Drugs to control PPH following Caesarean Sections such as Carboprost, Misoprostol, i/v Tranxenic Acid and Novo 7 should be readily available especially after office hours.
7. In busy Obstetric specialist should be on site during on calls.

4.7 References

1. Rising Caesarean section rates in Public Hospitals in Malaysia 2006. J Ravindran FRCOG.

CHAPTER 5

DIABETES MELLITUS IN PREGNANCY

CHAPTER 5 : DIABETES MELLITUS IN PREGNANCY

5.1 Summary

The incidence of Diabetes in Pregnancy is about 11.1% of all deliveries in Government Hospitals. Higher incidence of Diabetes in Pregnancy was seen in age group 40-50 years. Multigravidas and Indians had a higher incidence of Diabetes complicating pregnancy.

5.2 Introduction

There was a total of 73855 deliveries recorded in the NOR data of which 8241 patients had diabetes in pregnancy and this included both pre-existing and gestational diabetes making the incidence about 11.1% of all pregnancies. This data correlates well with the national statistics of about 10.0%

Table 5.1: Incidence of Diabetes in the Participating Hospitals, July-Dec 2009

Participating institution	Total Deliveries (n)	Total DM (n)	DM Rates (%)
Hospital Sultanah Aminah	6699	864	12.9
Hospital Sultanah Bahiyah	5328	265	4.9
Hospital Raja Perempuan Zainab II	6646	774	11.6
Hospital Melaka	5507	736	13.3
Hospital Tuanku Jaafar	3726	437	11.7
Hospital Tengku Ampuan Afzan (HTAA)	4804	833	17.3
Hospital Raja Permaisuri Bainun	4627	452	9.7
Hospital Tuanku Fauziah	2269	430	18.9
Hospital Pulau Pinang	2630	264	10.0
Hospital Likas	7444	24	0.3
Hospital Umum Sarawak	6048	700	11.6
Hospital Tengku Ampuan Rahimah	6092	906	14.9
Hospital Sultanah Nur Zahirah	5971	743	12.4
Hospital Kuala Lumpur	6064	813	13.4
Total	73855	8241	11.1

From our data the highest incident of Diabetes in pregnancy was seen from Perlis, the smallest state in Malaysia at 18.9%.and this finding needs further analysis. Whilst Hospital Likas had the lowest number of cases at 0.3%.

Table 5.2: Distribution by type of Diabetes. July-December 2009

Type of diabetes	n	%
Pre Existing	486	6.0
GDM	6829	83.9
Missing	827	10.1
Total	8142	100.0

Table 5.2 showed that 83.9% of patients had glucose intolerance which was first recognized during pregnancy and this is consistent with most studies. About 10.1% of the data was not entered and this was because when the CRF was first developed it was not a mandatory field to be captured.

5.3 Patient Demographic

The age incidence of diabetes in pregnancy is higher in the 40-50 years age group at 27.3% as compared to the age group 30-40 years which is at 15.5%. In the former, the distribution in the pre-existing and gestational group is at 2.3% and 24.1% respectively while in the latter group, the distribution in the pre-existing and gestational group is at 1.0% and 13.5% respectively.

Table 5.3: Distribution of Preexisting Diabetes Mellitus and GDM by age, July-December 2009

Age group (years)	Pre Existing	%	GDM	%	Not Available	%	Total DM	Grand Total	%
10-<20	7	0.2	90	2.4	56	1.5	153	3824	4.0
20-<30	154	0.4	2478	6.2	466	1.2	3098	39822	7.8
30-<40	265	1.0	3550	13.5	260	0.9	4075	26215	15.5
40-<50	59	2.3	687	24.1	32	1.1	778	2841	27.3
50-<55	0	0.0	2	14.2	0	0	2	14	14.3
<10 / ≥55 / Missing	1	0.3	22	5.80	13	3.4	36	379	9.5
Total	486		6829		827		8142	73095	11.1

This table above shows an increasing incidence of diabetes in pregnancy with advanced maternal age. Women marry late these days in the 3rd and 4th decade and hence postpone pregnancy until they have finished their tertiary education and embarking on a career. These women probably already have preexisting diabetes however glucose intolerance is only noticed for the first time during pregnancy.

Table 5.4: Distribution for total deliveries with Diabetes Mellitus by ethnicity, July-December 2009

Ethnicity	Pre Existing	%	GDM	%	Missing	%	Total DM	Grand Total	%
Malay	366	0.7	5350	10.7	584	1.2	6300	50088	12.6
Chinese	39	0.7	491	8.8	65	1.2	595	5535	10.7
Indian	52	1.3	546	13.4	28	0.7	626	4068	15.3
Kadazan/ Dusun	0	0.0	19	0.8	5	0.2	24	2275	1.1
Murut	1	0.2	5	0.1	0	0.0	6	160	3.8
Bajau	0	0.0	10	0.5	0	0.0	10	2080	0.5
Melanau	0	0.0	3	5.5	2	3.6	5	55	9.1
Iban	4	0.3	67	5.1	53	4.1	124	1303	9.5
Bidayuh	8	0.9	47	5.0	39	4.2	94	935	10.0
Orang Asli (Peninsular Malaysia)	3	0.6	43	8.6	5	1.0	51	499	10.2

Other indigenous group in Sabah & Sarawak	1	0.2	11	2.1	4	0.8	16	522	3.1
Other	12	0.2	232	4.3	41	0.8	285	5435	5.2
Unknown	0	0.0	5	3.6	1	0.7	6	139	4.3
Not Available	0	0.0	0	0.0	0	0.0	0	1	0.0
Total	486		6829		827		8142	7305	11.1

Diabetes in pregnancy was highest among the Indians at 15.3% followed by the Malays at 12.5% and the Chinese at 10.7%

In the National Health Morbidity Survey III (NHMS III) the prevalence of diabetics among Indians were higher and this may be due to the dietary habits among Indians. The incidence among the Chinese was lower and this may not be the true reflection of the incidence in the country as many deliver in private hospitals and the data is not captured. The Ibans have an incidence of 9.5% while the Bidayus are at 10.0%. The foreigners who delivered in the participating hospitals accounted for 5.2% of cases with Diabetes in pregnancy but this figures are probably inaccurate as many have not been diagnosed as they come late for booking or in labour.

Table 5.5: Distribution of total deliveries with diabetes mellitus by parity, July-December 2009

Parity	Pre Existing	%	GDM	%	Missing	%	Total DM	Grand Total	%
0	125	0.5	1810	7.1	310	1.2	2245	25524	8.8
1	103	0.6	1438	7.7	225	1.2	1766	18639	9.5
≥10	3	1.5	43	20.9	1	0.5	47	206	22.8
Missing	0	0.0	1	1.8	0	0.0	1	57	1.8
Total	486		6829		827		8142	73095	11.1

From Table 5.5 Diabetes in pregnancy was 22.8% in grandmultipara and this is probably due to correlation between advancing maternal age and diabetes.

5.4 Complications and Outcomes

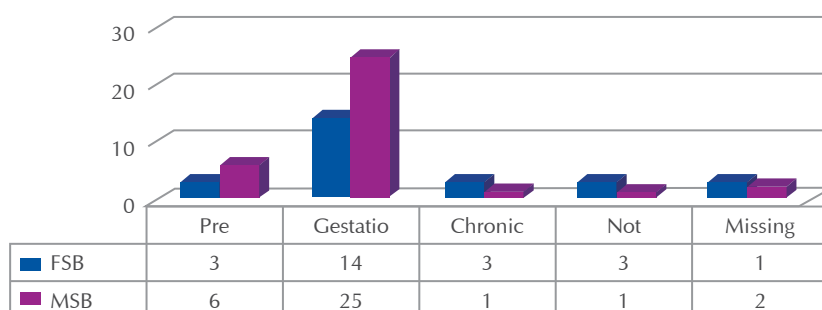


Figure 5.1: Distribution of diabetes mellitus by type of stillbirth's incidents, July-December 2009

Diabetes complicating pregnancy was seen in 11.1% of total number of deliveries and 14.6% of this is complicated with stillbirths. The stillbirth rate is at 6.2 per 1000 live births). Patients with gestational diabetics had more number of stillbirths in comparisons to patients in the pre-existing diabetes group.

Since more cases of stillbirth occurred in the gestational diabetes group there needs to be further evaluation to see if these cases were probably having preexisting diabetes mellitus as it is known that fetal outcome is poor in the diabetes group.

Vigilant antenatal care for optimal glycemic control is required in this group.

These patients will benefit from combined care with the endocrinologist to reduce morbidity and stillbirth rates.

Table 5.6: Distribution of Diabetes Mellitus by mode of delivery, July-December 2009

Mode of Delivery	Pre Existing (n=491)		GDM (n=6912)		Not Available (n=838)		Total DM	Total	
	No.	%	No.	%	No.	%	No.	No.	%
Vaginal	274	0.6	4329	8.1	603	1.1	5206	53954	9.6
Instrumental	15	0.6	228	8.3	34	1.2	277	2746	10.1
Caesarean	202	1.2	2355	14.4	201	1.2	2758	16389	16.8
Total	491	0.7	6912	9.5	838	1.2	8241	73095	11.3

In the Diabetic group, 0.6% with pre existing diabetes delivered vaginally as compared to 8.1% from the gestational diabetes. Of those who delivered by caesarean section 1.2% are from the pre existing diabetes group as compared to 14.4% from the gestational diabetes group. The incidence of caesarean section was higher in patients with diabetes in pregnancy as compared to vaginal deliveries In Chapter 4 we see that caesarean section for macrosomia accounted for 5.4% of the total caesarean section done.

Only 3.4% patients with diabetes mellitus in pregnancy had babies weighing more than 4kg from our data and this is probably due to good glycemic control throughout the pregnancy.

NICE guidelines states that pregnant mothers with diabetes who have a normally grown fetus should be offered elective birth through induction of labour or by caesarean section if indicated after 38 completed weeks and hospitals under MOH follow this guidelines.

Table 5.7: Distribution of Diabetes mellitus by Gestation, July-December 2009

Gestation (weeks)	Pre Existing	%	GDM	%	Missing	%	Total	%
<26	0	0.0	3	0.0	3	0.4	6	0.1
26 - 30	3	0.6	16	0.2	5	0.6	24	0.3
>30 - <34	3	0.6	33	0.5	7	0.9	43	0.5
34 - <37	15	3.1	185	2.7	44	5.3	244	3.0
37 - 40	115	23.7	1862	27.3	238	28.8	2215	27.2
>40	1	0.2	16	0.2	17	2.1	34	0.4
Missing	349	71.8	4714	69.0	513	62.0	5576	68.5
Total	486	6.0	6829	83.9	827	10.2	8142	100.0

Most of the babies were delivered between 37-40 weeks and this accounted for 27%.of the total number of cases.68.5% of cases could not be analyzed as no data was available since this was not a mandatory field when the CRF was developed however the mothers were most probably induced and delivered either vaginally or by caesarean section at 38 weeks of gestation for diabetes in pregnancy and gestational diabetes mellitus on insulin. This reduces the incidence of macrosomic babies and complications associated with it.

Table 5.8: Distribution of Diabetes Mellitus by birth weight, July-December 2009

Births weight group (grams)	Pre Existing	%	GDM	%	Missing	%	Total DM	%	Total Delivery	%
<1000	6	0.7	58	6.5	19	2.1	83	1.0	888	9.3
1000-<1500	8	1.0	65	7.7	13	1.6	86	1.0	840	10.2
1500-<2000	18	1.0	145	8.2	25	1.4	188	2.3	1761	10.6
2000-<2500	44	0.6	601	8.3	97	1.4	742	9.0	7202	10.3
2500-<3000	136	0.6	1982	8.3	281	1.2	2399	29.1	24021	10.0
3000-<3500	168	0.6	2621	9.3	296	1.1	3085	37.4	28134	11.0
3500-≤4000	88	0.9	1185	12.3	100	1.0	1373	16.7	9673	14.2
>4000	22	1.8	251	20.1	7	0.6	280	3.4	1252	22.4
Missing	1	1.2	4	4.8	0	0.0	5	0.1	84	6.0
Total	491	0.7	6912	9.4	838	1.1	8241	100.0	73855	11.2

From table 5.9, 22.4% of babies delivered to patients with Diabetes complicating pregnancy, had birth weight more than 4 kg.

Table 5.9: Correlating Apgar score to Diabetes in pregnancy, July-December 2009

Apgar score at 1 min	Pre Existing	%	GDM	%	Missing	%	Total DM	%
<7	16	0.8	221	10.3	32	1.5	269	3.3
≥7	468	0.7	6593	9.4	799	1.1	7860	96.1
Missing	1	0.2	48	8.3	2	0.4	51	0.6
TOTAL(Alive Births)	485	0.7	6862	9.4	833	1.1	8180	100
	Pre		GDM		Missing		Total	%
Apgar score at 5 min	Existing							
<7	3	0.6	43	9.0	10	2.1	56	0.7
≥7	481	0.7	6768	9.4	820	1.1	8069	98.6
Missing	1	0.2	51	8.1	3	0.5	55	0.7
Total (Alive Births)	485	0.7	6862	9.4	833	1.1	8180	100

Due to the high incidence of neonatal complications in diabetic pregnancies we assessed apgar score at birth. In 98.6% of our cases, babies of diabetic mothers had good outcome and this is probably due to the excellent care given to these mothers during the antenatal and intrapartum period.

Table 5.10: Risk and complications associated with diabetes in pregnancy, July-December 2009

Complications of pregnancy/delivery	Pre Existing	%	GDM	%	Missing	%	Total	%
Cord prolapse	1	0.2	16	0.2	4	0.5	21	0.3
Foetal distress	42	8.6	405	5.9	26	3.1	473	5.8
Maternal collapse	1	0.2	1	0.0	0	0.0	2	<0.0
Eclampsia	4	0.8	28	0.4	2	0.2	34	0.4
Pyrexia	2	0.4	8	0.1	0	0.0	10	0.1
Shoulder dystocia	2	0.4	20	0.3	1	0.1	23	0.3
Retained placenta	1	0.2	47	0.7	2	0.2	50	0.6
Prolonged Labour	8	1.7	89	1.3	13	1.6	110	1.4
Ruptured Membranes	8	1.7	85	1.2	11	1.3	104	1.3
Failed instrumentation	1	0.2	11	0.2	2	0.2	14	0.2
Placenta praevia	3	0.6	49	0.7	7	0.9	59	0.7
Abruptio placenta	0	0.0	18	0.3	3	0.4	21	0.3
Preterm labour	24	4.9	220	3.2	35	4.2	279	3.4
Uterine atony	1	0.2	11	0.2	0	0.0	12	0.2
Primary postpartum haemorrhage	4	0.8	76	1.1	6	0.7	86	1.1
Genital Tract trauma	9	1.9	149	2.2	4	0.5	162	2.0
Uterine scar dehiscence	0	0.0	4	0.1	1	0.1	5	0.1
Uterine rupture	0	0.0	2	<0.0	0	0.0	2	0.0
Deep vein thrombosis	0	0.0	1	<0.0	0	0.0	1	0.0
Pulmonary embolism	1	0.2	3	0.0	0	0.0	4	0.1
Indeterminate APH	1	0.2	4	0.1	1	0.1	6	0.1
Breech	1	0.2	4	0.1	1	0.1	6	0.1
Intrauterine death IUD	0	0.0	1	<0.0	0	0.0	1	<0.0
Others, specify	28	5.8	332	4.9	40	4.8	400	4.9

Fetal distress was the commonest complication at 5.8% followed by genital tract trauma at 2.0% and shoulder dystocia at 0.3%. The complication rate is low in our data as when the CRF was first developed these entries were not mandatory.

5.5 Conclusion

The overall incidence of Diabetes in pregnancy is 11.1% from the data obtained from the 14 participating hospitals which is same as in NHMS III. The overall National incidence is about 10.1%. In Hospital Likas the incidence was only 0.3%. For a comprehensive analysis all fields in the CRF needs to be mandatory.

In the Malaysian women the incidence of Diabetes in pregnancy is highest in the 40-50 years age group at 27.3%. It was also found to be common in the Indian population at 15.3% followed by the Malays at 12.6%. and lowest among the indigenous group Bajau at 0.5%. Diabetes in pregnancy was seen more in grandmultipara, Para >10 and this is probably due to advanced maternal age in this group of patients. The overall C-section rates in diabetics were 16.8%. Of this about 5.4% patients had caesarean section for macrosomia. The commonest complication seen in this group of patients was fetal distress as compared to shoulder dystocia which was the least. Diabetes mellitus is a major cause of perinatal morbidity and mortality, as well as maternal morbidity and therefore early detection is vital. As seen in our data more stillbirth occurred in the gestational age group as compared to the diabetic group and this is probably due to late detection in patients that may be having preexisting diabetes.

5.6 Recommendation

1. Early detection of diabetes in women with risk factors for to reduce incidence of stillbirth and perinatal morbidity and mortality.
2. Women with diabetes mellitus should receive preconception counseling(1) as major fetal malformations is as a result of poor glycemic control before and during the early weeks of gestation.
3. Folic acid supplement should be given prior to conception to reduced neural tube defects.

5.7 References

1. NICE Clinical Guideline 63 .Diabetes in pregnancy. March 2008.

CHAPTER 6

PREMATURITY

CHAPTER 6 : PREMATURITY

6.1 Summary

Preterm birth is the most important single determinant of adverse infant outcome in terms of both survival and quality of life. Preterm birth accounted for 3.0% of all deliveries in the major government hospitals in Malaysia. It was more common in the extreme age group (10-<20 years and 50-<55 years) as well as among the indigenous people, Orang Asli (Peninsular Malaysia), Bidayuh and Iban population. It was also more prevalent in multiple pregnancies. Majority of these preterm babies were born with birth weight of >1500 grams and had good Apgar score at birth.

6.2 Introduction

Preterm birth is defined as birth at less than 37+6 weeks of gestation(1) Preterm birth rates have been reported to range from 5% to 7% of live births in some developed countries but are estimated to be substantially higher in developing countries.(2) Premature delivery can be the result of preterm labor and preterm premature rupture of the membranes (PPROM) or can be due to maternal indications pregnancy-induced hypertension, severe pre-eclampsia, etc.

Preterm birth is one of the most significant problems in perinatology. Premature babies are at increased risk for newborn health complications, such as breathing problems, and even death. Most premature babies require care in a newborn intensive care unit (NICU), which has specialized medical staff and equipment that can deal with the multiple problems faced by premature infants.

Premature babies also face an increased risk of lasting disabilities, such as mental retardation, learning and behavioral problems, cerebral palsy, lung problems and vision and hearing loss. Two recent studies suggest that premature babies may be at increased risk of symptoms associated with autism (social, behavioral and speech problems) (2, 3). Studies also suggest that babies born very prematurely may be at increased risk of certain adult health problems, such as diabetes, high blood pressure and heart disease (4).

Table 6.1: Total number of premature delivery, July-December 2009

Premature births	No.	%
Total Prematurity Delivery	2260	3.1
Total Delivery	73095	100.0

There were a total of 2260 premature deliveries which accounted for 3.1% of all deliveries in the 14 participating hospitals (Table 6.1) from data obtained in the second half of 2009.

Table 6.2: Distribution of total prematurity births (POG < 37 weeks) by Centre, July-December 2009

Contact institution label	SDP Code	No.	%
Hospital Sultanah Aminah	1001	566	23.6
Hospital Sultanah Bahiyah	1002	109	4.5
Hospital Raja Perempuan Zainab II	1003	148	6.2
Hospital Melaka	1004	59	2.5
Hospital Tuanku Jaafar	1005	19	0.8
Hospital Tengku Ampuan Afzan (HTAA)	1006	454	18.9
Hospital Raja Permaisuri Bainun	1007	90	3.8
Hospital Tuanku Fauziah	1008	82	3.4
Hospital Pulau Pinang	1009	168	7.0
Hospital Umum Sarawak	1011	245	10.2
Hospital Tengku Ampuan Rahimah	1012	212	8.8
Hospital Sultanah Nur Zahirah	1013	91	3.8
Hospital Kuala Lumpur	1014	158	6.6
Total		2401	100.0

Hospital Sultanah Aminah had the highest number of preterm deliveries at 23.6% and Hospital Tuanku Jaafar had the least number of preterm deliveries at 0.8%.

6.3 Patients Demographic

Majority of the premature delivery were seen in age group 20-<30 years and in the Malay population.

Table 6.3: Distribution of total prematurity deliveries (POG < 37 weeks) by Age group and Ethnicity, July-December 2009

Age group (years)	n	%	Total delivery (n)	%
10-<20	255	11.3	3824	6.7
20-<30	1152	51.0	39822	2.9
30-<40	721	31.9	26215	2.8
40-<50	115	5.1	2841	4.0
50-<55	1	0.0	14	7.1
<10 / >=55 / Missing	16	0.7	379	4.2
Total	2260	100.0	73095	

Ethnicity	n	%	Total delivery (n)	%
Malay	1643	72.7	50088	3.3
Chinese	180	8.0	5535	3.3
Indian	132	5.8	4068	3.2
Kadazan/ Dusun	15	0.7	2275	0.7
Murut	0	0.0	160	0.0
Bajau	7	0.3	2080	0.3
Melanau	1	0.0	55	1.8
Iban	66	2.9	1303	5.1
Bidayuh	33	1.5	935	7.1
Orang Asli (Peninsular Malaysia)	40	1.8	499	8.0
Other indigenous group in Sabah & Sarawak	14	0.6	522	2.7
Other	123	5.4	5435	2.3
Unknown	6	0.3	139	4.3
Not Available	0	0.0	1	<0.0
Total	2260	100.0	73095	

The percentage of premature deliveries were higher in the extreme age group, age group 10-<20 years (6.7%), and 50-<55 years (7.1%). Premature deliveries were also higher among the Orang Asli (Peninsular Malaysia) (8.01%), Bidayuh (7.1%) and Iban (5.1%) population as compared to the other ethnic groups.

Table 6.4: Distribution of total prematurity deliveries (POG < 37 weeks by Gravida and Parity groups, July-December 2009

Gravida	No.	%	Total delivery	%
1	895	39.6	23386	3.8
≥10	23	1	515	4.5
0/missing	2	0.1	62	3.2
Total	2260	100	73095	

Premature deliveries were more prevalent among the nulliparous

Table 6.5: Distribution of total prematurity deliveries (POG < 37 weeks) by Multiple pregnancies, July-December 2009

Multiple Pregnancy	No.	%	Total delivery	%
Single	2116	93.6	72270	2.9
Twins	139	6.2	809	17.2
Triplet	5	0.2	16	31.3
Total	2260	100	73095	51.4

The incidence of premature deliveries were higher in triplet pregnancies, 31.2%, followed by twin pregnancies at 17.2% and least in singleton pregnancies, 2.9%.

6.4 Complications and Outcomes

Out of 2401 premature births, 94.5% or 2270 babies were born alive.

Table 6.6: Distribution of total prematurity births (POG < 37 Weeks) by births status, July-December 2009

Baby status	No.	%
Alive	2270	94.5
Deaths	128	5.3
NA/Missing	1	0.0
Total	2401	100.0

Out of the 2270 live births for premature deliveries, 96.3% had Apgar score ≥ 7 at 5 mins.

Table 6.7: Distribution of total prematurity births (POG < 37 weeks) by births Weight and Apgar score, July-December 2009

Births weight (grams)	No.	%
<1000	156	6.5
1000-<1500	234	9.8
1500 - <2000	436	18.2
2000-<2500	733	30.5
2500-<3000	583	24.3
3000-<3500	194	8.1
3500-≤4000	46	1.9
>4000	15	0.6
Missing	4	0.2
Total	2401	100.0
Apgar 1 min	No.	%
1min <7	222	9.8
1min ≥7	2041	89.9
Missing	7	0.3
Total (Alive Births)	2270	100.0
Apgar 5min	No.	%
5min <7	70	3.1
5min ≥7	2185	96.3
Missing	15	0.7
Total (Alive Births)	2270	100.0

Of the total number of premature babies 30.5% had birth weight ranging from 2000 to <2500 grams, and 24.3% had birth weight ranging from 2500-<3000 grams. Only 6.5% had birth weight < 1000grams.

6.5 Conclusion

Premature deliveries accounted for 3.1% of all deliveries in major government hospitals in Malaysia and this is low when compared with reports from other develop countries to figures reported by other population.

It is seen more in the extreme age group, (10-<20 years and 50-<55 years) and among the indigenous people the Orang Asli (Peninsular Malaysia), Bidayuh and Iban population. It was also more common in multiple pregnancies as compared to singletons. Majority of these babies had birth weight ranging from 2000 to 2500 grams

6.6 Recommendation

1. The cause of preterm delivery was not analyzed from our data. Identifying preventable cause of preterm delivery should be a priority as it causes significant perinatal health problems not only in terms of associated mortality but also with regards to short- and long-term morbidity and financial implications for the healthcare system.
2. Since preterm deliveries are more common among the indigenous groups, studies need to be done to see why this is common in this group of people in view of the financial implication.
3. From our data 30.5% of preterm babies' weight between 2000grams-2500grams The estimated time of delivery has always been calculated from the first day of the last menstrual period Every pregnant mother should have a first trimester scan for accurate dating as the percentage of preterm deliveries may not be accurate since a significant amount of babies were of good size

6.7 References

1. Tocolysis for women in preterm labour (Green-top Guideline No.1b February 2011).
2. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity Bulletin of the World Health Organization 2010,88:31-38.10.2471 / BLT.08.06255

CHAPTER 7

MASSIVE PRIMARY POST PARTUM HAEMORRHAGE

CHAPTER 7 : Massive Primary Post Partum Haemorrhage

7.1 Summary

Massive Primary Post Partum Haemorrhage is one of the leading cause of Maternal mortality in Malaysia. It was common among multiparous women who were in the 4th decade of life and in the Bidayus an indigenous group of people in Sarawak.

The incidence was higher in women with Placenta Previa as well as in patients who had caesarean section as their mode of delivery. Uterine atony also contributed to a significant amount of patients with Massive PPH.

7.2 Introduction

Massive Primary Post Partum Haemorrhage is a National Indicator (NIA) in the Patient Care Services QAP (Quality Assurance Programme) as well as a Key Performance Indicator (KPI) in the Ministry of Health (MOH). This indicator reflects the efficiency of labour management and effectiveness of interventional measures as well as used to assess the overall performance of the services provided by the O&G units under MOH.

It was proposed as an indicator of the quality of obstetric care because Postpartum Haemorrhage (PPH) is a leading cause of maternal death and prompt management should prevent massive PPH.(1)

The average blood loss during a normal vaginal delivery has been estimated at 500 mls and caesarean section at 1000mls. The WHO definition of PPH is any blood loss from the genital tract during delivery above 500mls (2)

Massive PPH is blood loss of more than 1.5 liters and the standard set for NIA and KPI is <0.5% of total deliveries

Table 7.1: Distribution of total deliveries with PPH

Participating Institution	≥ 1500		PPH but no available volume	
	N	%	N	%
Hospital Sultanah Aminah	6	6.1	0	0.0
Hospital Sultanah Bahiyah	2	2.0	1	4.4
Hospital Raja Perempuan Zainab II	9	9.1	4	17.4
Hospital Melaka	14	14.1	5	21.7
Hospital Tuanku Jaafar	6	6.1	1	4.4
Hospital Tengku Ampuan Afzan (HTAA)	6	6.1	1	4.4
Hospital Raja Permaisuri Bainun	13	13.1	0	0.0
Hospital Tuanku Fauziah	6	6.1	1	4.4
Hospital Pulau Pinang	2	2.0	0	0.0
Hospital Likas	3	3.0	0	0.0
Hospital Umum Sarawak	12	12.1	4	17.4
Hospital Tengku Ampuan Rahimah	6	6.1	1	4.4
Hospital Sultanah Nur Zahirah	9	9.1	2	8.7
Hospital Kuala Lumpur	5	5.1	3	13.0
Total	99	100.0	23	100.0

Total deliveries during the study period were 73095. The incidence of PPH in the 14 participating hospitals that accounted for 30% of deliveries in the country was 0.13% which is below the standard set for NIA and KPI. However this doesn't reflect the true picture of Massive Primary Postpartum Haemorrhage as there was a small percentage where the volume of blood loss was not captured. Hospital Melaka had the highest number of cases of Massive PPH followed by Hospital Raja Permaisuri Bainum and Hospital Umum Sarawak respectively.

7.3 Patient Demographic

Massive Primary Post Partum Haemorrhage was common among the Bidayuhs who are amongst the indigenous people of Sarawak at 0.6%

Table 7.2: Blood loss according to Ethnicity

Ethnicity	≥ 1500		PPH but no available volume		Total deliveries	
	N	%	N	%	N	%
Malay	63	0.1	17	<0.0	50088	68.5
Chinese	9	0.2	1	<0.0	5535	7.6
Indian	6	0.2	1	<0.0	4068	5.6
Kadazan/ Dusun	2	0.1	0	0.0	2275	3.1
Murut	0	0.0	0	0.0	160	0.2
Bajau	1	0.1	0	0.0	2080	2.9
Melanau	0	0.0	0	0.0	55	0.1
Iban	2	0.2	1	0.1	1303	1.8
Bidayuh	6	0.6	2	0.2	935	1.3
Orang Asli (Peninsular Malaysia)	0	0.0	0	0.0	499	0.7
Other indigenous group in Sabah & Sarawak	0	0.0	0	0.0	522	0.7
Other	7	0.1	0	0.0	5435	7.4
Unknown	0	0.0	0	0.0	139	0.2
Not Available	0	0.0	0	0.0	1	0.0
Total	96	0.1	22	<0.0	73095	100.0

Table 7.3: Blood loss according to Age

Age group (Years)	≥ 1500		Blood Loss PPH but no available volume		Total deliveries	
	N	%	N	%	N	%
<20	2	0.1	0	0.0	3824	5.2
20-<30	29	0.1	12	<0.0	39822	54.5
30-<40	55	0.2	9	<0.0	26215	35.9
40-<50	9	0.3	1	<0.0	2841	3.9
50-<55	0	0.0	0	0.0	14	0.0
> 55 / Missing	1	0.3	0	0.0	379	0.5
Total	96	0.1	22	<0.0	73095	100.0

Massive Primary Post Partum Haemorrhage was found to be more common in women who were in their 4th decade of life as compared in younger aged women.

Table 7.4: Blood loss according to Parity

Para	≥ 1500		Blood Loss PPH but no available volume		Total deliveries with PPH	
	N	%	N	%	N	%
1	19	0.1	5	<0.0	118	0.2
2-5	57	0.2	12	0.1	241	0.3
6-9	5	0.2	1	0.1	19	<0.0
>=10	0	0.0	0	0.0	0	0.0
Total	96	0.1	22	<0.0	500	0.7

Multiparous women had a higher incidence of PPH as compared to women who were Para 1. In future we need to correlate parity to the cause of massive Primary Postpartum Haemorrhage which has not been captured in our data.

Parity 2 and above records the highest incidence of PPH of 0.9% followed by Para 1 with the incidence of 0.6%. This is expected as the higher the parity the higher the risk to the mother. The incidence of PPH is lower among the Primigravida which is only 0.5%.

7.4 Complications and Outcomes

Table 7.5: Complications of pregnancy associated with PPH

Complications of pregnancy/ delivery	≥ 1500		PPH but no available volume	
	N	%	N	%
Uterine atony	10	10.4	1	4.6
Placenta praevia	21	21.9	1	4.6
Abruptio placenta	5	5.2	1	4.6
Retained placenta	3	3.1	3	13.6
Genital Tract trauma	3	3.1	0	0.0
Uterine Inversion	0	0.0	0	0.0
Uterine rupture	3	3.1	0	0.0
Prolonged labour	1	1.0	0	0.0
Eclampsia	0	0.0	0	0.0
Clinical evidence of DIVC	7	7.3	0	0.0
Indeterminate APH	1	1.0	0	0.0
Others	6	6.3	0	0.0

The incidence of Massive Postpartum Haemorrhage was highest at 21.9% in patients with Placenta Praevia and this was followed closely at 10.4% due to uterine atony.

Table 7.6: Causes of PPH by mode of delivery

Mode of Delivery	≥ 1500		PPH but no available volume		Total deliveries with PPH	
	N	%	N	%	N	%
Vaginal	17	17.7	10	45.5	229	45.8
Instrumental	2	2.1	3	13.6	32	6.4
Caesarean	77	80.2	9	40.9	239	47.8
Total	96	19.2	22	4.4	500	100.0

Patients who had caesarean section had a higher incidence of massive primary PPH at 15.36% whilst incidence with vaginal delivery was at 3.39%

Table 7.7: Maternal outcome following PPH

Mother status	PPH ≥ 1500		PPH but no available volume	
	n	%	n	%
Maternal death	1	1.0	0	0.0
Admitted to ICU	17	17.9	3	13.6
Admitted to HDW	23	24.2	1	4.6
Admitted to general ward	52	54.7	16	72.7
Missing data	3	3.2	2	9.1

From the data analyzed there was one maternal death following Massive Primary Postpartum Haemorrhage. 42.1% of patients with Massive Primary Post Partum Haemorrhage needed close monitoring in the ICU and HDW.

7.5 Conclusion

As PPH remains the leading cause of Maternal mortality in Malaysia the effectiveness and efficiency of care of these patient is measured using the NIA and KPI standards set by MOH. The NIA and KPI for Massive Postpartum Haemorrhage from the 14 major Hospital contributing data to the NOR showed that there was no shortfall in the quality of care as the recommended standard set by MOH is $\leq 0.5\%$ of total deliveries where else our data showed the percentage at 0.13%. This however cannot be considered the true incidence as there was 4.4% of the total number of cases that couldn't be analyzed due to incomplete data entry.

There were two maternal deaths due to PPH during this period of which one death was due to Massive Primary postpartum Haemorrhage.

The Confidential Enquiry into Maternal Death (CEMD) was first in existence in the United Kingdom since 1950 and it provided useful information on Maternal Mortality Trends. In Malaysia the CEMD was introduced in 1991 and its objective was to identify shortfalls in care and recommend remedial measures. From the last report (2001-2005) the Maternal death due to postpartum haemorrhage was at 13.6% and this has reduced from the first report, where Maternal mortality was high at 27.2%. Lessons learned from this report shows that preventing mortality from Post Partum Haemorrhage depends on prompt treatment, of its cause to prevent further bleeding and replacement of blood loss to maintain circulation.

7.6 Recommendation

1. Regular drills in Labour ward
2. Active management of third stage to minimize blood loss in high risk patients.
3. Patients with PPH must be managed by experienced Medical officer with involvement of Specialist/Consultant and not to be left to be handled by the most junior Medical officer/ House officer.
4. Early intervention and fluid/ blood replacement before patient is compromised
5. Caesarean section for Placenta praevia to be done by an experienced surgeon to minimize blood loss.

7.7 References

1. Manual National Indicator Approach(NIA) and Key Performance Indicators. Obstetric and Gynaecology, Ministry of health 2010
2. Postpartum Haemorrhage: A continuing tragedy in Malaysia. K.Siva Achaana, 2011.

CHAPTER 8

STILLBIRTH

CHAPTER 8 : STILLBIRTH

8.1 Summary

A total of 564 stillbirths were reported from the 73095 deliveries from the 14 hospitals contributing data to the obstetric registry.

8.2 Introduction

Stillbirth is a birth of an infant with birth weight equal to or more than 500gm (or 22 completed weeks of pregnancy if birth weight is not known) with no sign of life. The stillbirth rate fluctuated between 4.8 and 5.2 per 1000 total births from 2003-2006 (1). The main causes of stillbirth are normally formed macerated stillbirths and lethal congenital malformation. Perinatal mortality includes both stillbirth and early neonatal death, however it is not assessed in this chapter.

Table 8.1: Stillbirth Rate by State, July-December 2009

Participating Institution	Total stillbirth	Total No of Births	Stillbirth Rate
Hospital Sultanah Aminah	62	6699	9.2
Hospital Sultanah Bahiyah	49	5328	9.1
Hospital Raja Perempuan Zainab II	54	6646	8.1
Hospital Melaka	27	5507	4.9
Hospital Tuanku Jaafar	7	3726	1.8
Hospital Tengku Ampuan Afzan (HTAA)	35	4804	7.2
Hospital Raja Permaisuri Bainun	42	4627	9.0
Hospital Tuanku Fauziah	9	2269	3.9
Hospital Pulau Pinang	13	2630	4.9
Hospital Likas	57	7444	7.6
Hospital Umum Sarawak	48	6048	7.9
Hospital Tengku Ampuan Rahimah	48	6092	8.2
Hospital Sultanah Nur Zahirah	41	5971	7.8
Hospital Kuala Lumpur	64	6064	10.55
TOTAL	564	73855	7.6

The total stillbirths from the 14 major hospitals that contributed data is shown in Table 8.1. The stillbirth rate was at 7.6 per 1000 live births from the data collected. This was much higher than the overall rate as reported in the Stillbirths and Neonatal Deaths Report published in 2009.

8.3 Patient Demographic

Table 8.2: Age Distribution among Stillbirths, July-December 2009

Maternal age	Total stillbirth	Total births	Stillbirth rate
10-<20	25	3824	6.5
20-<30	279	39822	7.0
30-<40	198	26215	7.55
40-<50	46	2841	16.1
50-<55	1	14	71.4
<10 / ≥55 / Missing	3	379	7.9

Table 8.2 shows the stillbirth rate to be the lowest in the 10-<20 yrs age group. The highest still birth rate was recorded in the age group 50-<55yrs at 71.4 per 1000 total births. Women with advanced maternal age have an increased risk of stillbirth. (2)(3). Chromosome abnormalities, especially trisomies 13, 18, and 21, and sex chromosome aneuploidies, increase exponentially with maternal age and some of these contribute to the higher stillbirth rate in women with advanced maternal age.

Table 8.3: Distribution of Stillbirth by Ethnicity, July-December 2009

Ethnicity	Total stillbirth	Total births	Stillbirth rate
Malay	358	50088	7.1
Chinese	35	5535	6.3
Indian	42	4068	10.3
Kadazan/ Dusun	9	2275	4.0
Murut	2	160	12.5
Bajau	15	2080	7.2
Melanau	0	55	0.0
Iban	16	1303	12.3
Bidayuh	4	935	4.3
Orang Asli (Peninsular Malaysia)	10	499	20
Other indigenous group in Sabah & Sarawak	5	522	9.6
Other	54	5435	9.9
Unknown	2	139	14.3
Not Available	0	1	0.0
Total	552	73095	100

The highest incidence of stillbirth was seen in the indigenous group, the Orang Asli of Peninsular Malaysia at 20 per 1000 live births. Among the other indigenous groups, the Muruts and Iban the stillbirths rates were at 12.5 and 12.3 per 1000 live births respectively. Among the 3 major ethnic groups in Malaysia the stillbirth rate was high among the Indians at 10.3 per 1000 live birth.

8.4 Complications and Outcomes

Table 8.4: Maternal conditions associated to stillbirth, July-December 2009

Maternal condition	Total stillbirths	Total Deliveries	Stillbirth rate
Diabetes	51	8142	6.2
Hypertension	63	4967	12.6

From Table 8.7 stillbirth rate was the highest among women with Hypertension complicating pregnancy at 12.6 per 1000 live births and this is consistent with most studies. Early diagnosis of this condition followed by increased surveillance is important. Recognizing the severity of the disease for early delivery to reduce stillbirth rates is crucial.

The stillbirth rate with diabetes was at 6.2 per 1000 live births. as compared to the to the rates with hypertension. This is probably due to improved diabetic care and due to the multidisciplinary approach to management of these patients. Fetal surveillance as well good glycemic control is important in reducing stillbirth rates in this group of patients.

In future reports, the correlation between the stillbirth and other maternal conditions like anaemia, thyroid disease as well as renal disease should also be assessed.

Table 8.5: Stillbirth by type of personnel conducting delivery, July-December 2009

Delivered by	Total stillbirth
Specialist	32
Medical Officer with > 6 months O&G experience	133
Medical Officer with < 6 months O&G experience	95
Medical Officer with no O&G experience	3
Staff Nurse	127
Community nurse/ Government Midwife / JD	30
Trained Traditional Birth Attendant	1
Untrained Traditional Birth Attendant	0
Unattended	4
Other medical officer	19
Others, specify	39
Unknown/NA/Missing	69
TOTAL	552

From table 8.5 about 50% of the cases were conducted by doctors.

8.5 Conclusion

The stillbirth rate was at 7.6 per 1000 live birth from the data obtained from the 14 major hospital in Malaysia and this is higher than the stillbirth rates for the country. This is because these cases are referred to the tertiary hospitals for further assessment and management of case with macerated stillbirth and lethal congenital malformation. With advanced maternal age the stillbirth rate was higher and this is consistent with most studies. The stillbirth rate in the indigenous people of Peninsular Malaysia was high at 20.04 per 100 live births. The rate was higher in women with hypertension as compared to women with Diabetes. In subsequent analysis we should look into the type of lethal congenital malformations associated with stillbirth as well the cause of stillbirth.

8.6 Recommendation

1. All mothers with advanced maternal age should be offered prenatal screening test.
2. As the stillbirth rates are high among the indigenous people early booking and follow up should be encouraged so that complications can be identified early and dealt with accordingly. Home visits to be done if patient defaults and refer early to tertiary centres if patients are high risk.
3. Recognition of women at high risk of preeclampsia and referral in early pregnancy for screening and prophylaxis.
4. The main cause of stillbirths are normally formed macerated stillbirths and lethal congenital malformation and this should be analysed in subsequent reports.

8.7 Reference

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