NATIONAL OBSTETRICS REGISTRY

2ND REPORT 2010

Editors:
Ravichandran Jeganathan
Shamala Devi Karalasingam

CRC
MINISTRY OF HEALTH MALAYSIA
Research that matters to patients

NATIONAL OBSTETRICS REGISTRY

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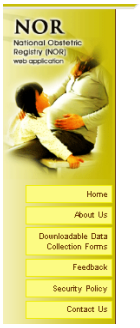
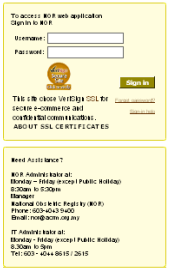
- Our source data providers for their timely data collection and hard work.
- Steering committee members and governance board for their tireless effort and expertise dedicated to this registry
- Clinical Research Centre National for its leadership, supervision and technical support.
- The registry coordinating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

NOR Web Application

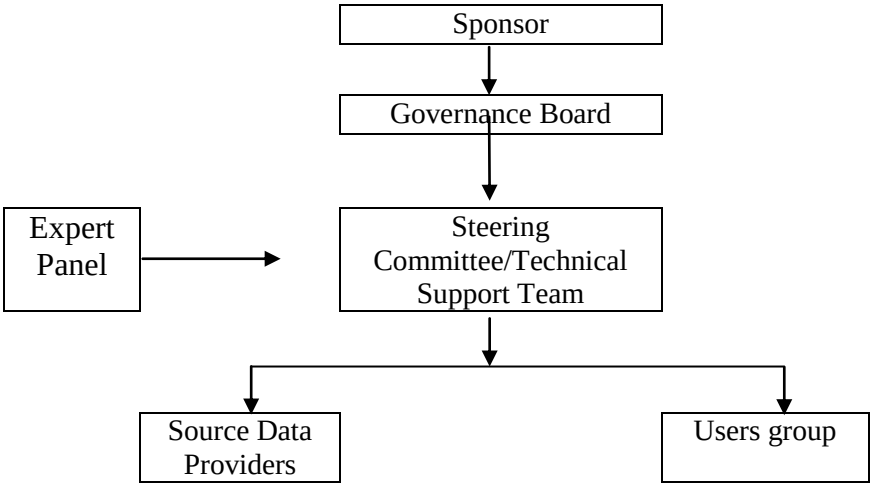
- Go to ***www.acrm.gov.my*** and click on NOR
- Login to NOR
- Select Patient and fill up NOR notification and relevant details.
- Print out reports.





Organization of NOR

The organizational structure for the registry is depicted below.



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NOR SOURCE DATA PROVIDERS 2010

The current source data providers for NORM are:

No.	Hospital	Site investigators	Second person-in-charge
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10	Tengku Ampuan Afzan Hospital , Pahang	Dr.Sudesan Raman	Sister Noorlidah bt Jusoh
11	Tuanku Ja'afar Hospital Negeri Sembilan	Dr. Nazura Bt. Karim	
12	Pulau Pinang Hospital		Sister Islyana Bt Azar Sister Norzuraini Bt Zulkifili
13	Likas Hospital Kota Kinabalu Sabah	Dr. Carol Lim	Matron Anita Malek
14	Hospital Umum Sarawak	Dr Muniswaran G	

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Patient Registry Unit :	Dr. Jaya Purany Stanley Ponniah Nurul Shuhada Mohd Ali

LETTER FROM THE PRINCIPAL INVESTIGATOR

The National Obstetrics Registry was inaugurated in July 2009. Since then the registry has grown in strength. It is presently one of the registries with the largest active database.

We are very proud that we are able to publish this 2nd report. The total data captured from the 14 Site Data Providers in 2010 was 138,315. Analysing and coming come with this report was no easy task. I take this opportunity to congratulate the entire team involved from the data collection to data entry and finally to the actual writing of this report.

The data collected resulted in 11 posters for the NCCR conference 2012 organized by Clinical Research Centre, Malaysia. We are delighted to inform that the National Obstetric Registry had the highest number of posters presented at this conference. This data was also utilized by students from Perdana University for two manuscripts. There have also been numerous requests from the various institutions of higher learning in Malaysia to utilize our data.

Presently we are in the process of expanding our sites as well as in the process of cooperating with other registries to streamline and synchronize the data capture. The success of NOR is due to the collective collaboration, hard work and support from all Site coordinators and Site assistances in data collection.

Our heartfelt thanks to the Director General of Health and Clinical Research Centre, Malaysia for their continuous support for the National Obstetric Registry.

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

Sudesan Raman[1] , Ganesh R Vaiyapuri[2], Noorlida bt Jusoh[3]
1,2,3 Hospital Tengku Ampuan Afzan Kuantan pahang

1.1 Summary

There were 138,315 deliveries recorded for the year 2010 from 14 state hospitals nationwide. The vaginal deliveries amounted to 99,639 which represents 72.04 % of the total deliveries captured by NOR.

1.2 Introduction

Participating Hospitals	n	%
Hospital Likas, Sabah	14,889	10.76
Hospital Sultanah Aminah, Johor	12,671	9.16
Hospital Raja Perempuan Zainab II, Kelantan	12,356	8.93
Hospital Sultanah Nur Zahirah, Terengganu	12,122	8.76
Hospital Kuala Lumpur	11,894	8.60
Hospital Umum Sarawak	11,065	8.00
Hospital Tengku Ampuan Rahimah, Selangor	10,719	7.75
Hospital Sultanah Bahiyah, Kedah	10,524	7.61
Hospital Melaka	10,462	7.56
Hospital Tengku Ampuan Afzan, Pahang	9,402	6.80
Hospital Raja Permaisuri Bainun, Perak	8,070	5.83
Hospital Tuanku Jaafar, Seremban	5,754	4.16
Hospital Pulau Pinang	4,626	3.34
Hospital Tuanku Fauziah, Perlis	3,761	2.72
Total	**138,315**	**100.00**

Table 1.1: Total deliveries by Centre, January – December 2010.

Table 1.1 shows total deliveries by center. Hospital Likas recorded the highest delivery rate at 10.76 % followed closely by Hospital Sultanah Aminah, Johor at 9.16% whilst Hospital Tuanku Fauziah, Perlis recorded the lowest delivery rate at 2.72 %.

1.3 Type of Deliveries

Delivery	Types	n	%
Vaginal	SVD	98,976	99.33
	Breech	654	0.66
	Not Available	9	0.01
Total		**99,639**	**72.04**
Instrumental	Vacuum	5,050	87.66
	Forceps	711	12.34
Total		**5,761**	**4.17**
Caesarean Section	LSCS	31,738	99.41
	Classical	165	0.52
	Hysterotomy	24	0.08
Total		**31,927**	**23.08**
Not Available		20	0.01
Missing		968	0.70
Total		**138,315**	**100.00**

Table 1.2: Distribution of total deliveries by Type of Deliveries, January-December 2010

Vaginal deliveries accounted for 76.21 % of total deliveries whilst Instrumental deliveries accounted for 4.17% of total deliveries. Vacuum extraction was more popular compared to Forceps delivery. Caesarean Section rate from the 2010 NOR data was at 23.08% and this has slightly risen as seen from the NOR preliminary report 2009 at 22.4%.

Type of Caesarean	Hysterectomy (*n*)	%
LSCS	54	0.17
Classical	8	4.85
Hysterotomy	4	16.67
Total	**66**	0.21

Table 1.3 : Type of Caesarean Section with Hysterectomy

In total 0.21% of patients had Hysterectomy as a complication of Caesarean Section.

1.4 Patient Demography

Types of Delivery	Age in years (*n*)					
	10 – 20	21 - 30	31 – 40	41 - 50	51 – 55	Missing
Vaginal	8,499	58,789	29,397	2,228	13	58
%	8.59	59.39	29.70	2.25	0.01	0.06
Instrumental	513	3,882	1,241	83	0	7
%	8.96	67.80	21.67	1.45	0.00	0.12
Caesarean	1,471	16,678	11,881	1,127	2	20
%	4.72	53.49	38.11	3.61	0.01	0.06
Not Available	0	13	7	0	0	0
%	0.00	65.00	35.00	0.00	0.00	0.00
Missing	90	518	302	41	0	0
%	9.46	54.47	31.76	4.31	0.00	0.00
Total	**10,573**	**79,880**	**42,828**	**3,479**	**15**	**85**
%	**7.6**	**57.8**	**31.0**	**2.5**	**0.011**	**0.1**

Table 1.4: Distribution of total deliveries by Age Group, January-December 2010.

In total 57.8% of all deliveries were women in the second decade of life followed by women in their third decade of life at 31%.Instrumental and Caesarean Sections were also noted to be higher in women in the second decade of life.

Participating Center	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Hospital Tuanku Fauziah, Perlis	2,781	73.94	19	0.51	1	0.03	128	3.40	9	0.24	788	20.95	33	0.88	1	0.03	0	0.00	1	0.03	3,761	2.72
Hospital Sultanah Bahiyah, Kedah	6,781	64.43	38	0.36	1	0.01	735	6.98	25	0.24	2,713	25.78	10	0.10	1	0.01	1	0.01	219	2.08	10,524	7.61
Hospital Pulau Pinang	3,027	65.43	12	0.26	0	0.00	103	2.23	2	0.04	1,473	31.84	4	0.09	3	0.06	0	0.00	2	0.04	4,626	3.34
Hospital Raja Permaisuri Bainun, Perak	5,287	65.51	33	0.41	2	0.02	88	1.09	37	0.46	2,605	32.28	3	0.04	0	0.00	7	0.09	8	0.10	8,070	5.83
Hospital Tengku Ampuan Rahimah, Selangor	7,206	67.23	69	0.64	2	0.02	509	4.75	296	2.76	2,607	24.32	4	0.04	0	0.00	0	0.00	26	0.24	10,719	7.75
Hospital Kuala Lumpur	8,069	67.84	64	0.54	0	0.00	280	2.35	20	0.17	3,417	28.73	7	0.06	2	0.02	1	0.01	34	0.29	11,894	8.60
Hospital Tuanku Jaafar, Seremban	4,094	71.15	17	0.30	0	0.00	137	2.38	21	0.36	1,319	22.92	14	0.24	0	0.00	7	0.12	145	2.52	5,754	4.16
Hospital Melaka	7,816	74.71	51	0.49	0	0.00	422	4.03	43	0.41	2,112	20.19	15	0.14	1	0.01	0	0.00	2	0.02	10,462	7.56
Hospital Sultanah Aminah, Johor	8,052	63.55	104	0.82	1	0.01	1,073	8.47	89	0.70	3,302	26.06	20	0.16	6	0.05	1	0.01	23	0.18	12,671	9.16
Hospital Tengku Ampuan Afzan, Pahang	6,675	71.00	29	0.31	0	0.00	368	3.91	53	0.56	2,264	24.08	7	0.07	1	0.01	0	0.00	5	0.05	9,402	6.80
Hospital Sultanah Nur Zahirah, Terengganu	9,657	79.67	86	0.71	1	0.01	141	1.16	23	0.19	2,046	16.88	10	0.08	5	0.04	2	0.02	151	1.25	12,122	8.76
Hospital Raja Perempuan Zainab II, Kelantan	9,870	79.88	73	0.59	0	0.00	63	0.51	18	0.15	2,300	18.61	11	0.09	1	0.01	0	0.00	20	0.16	12,356	8.93
Hospital Umum Sarawak	7,997	72.27	53	0.48	1	0.01	470	4.25	61	0.55	2,444	22.09	26	0.23	3	0.03	1	0.01	9	0.08	11,065	8.00
Hospital Likas, Sabah	11,664	78.34	6	0.04	0	0.00	533	3.58	14	0.09	2,348	15.77	1	0.01	0	0.00	0	0.00	323	2.17	14,889	10.76
Total	**98,976**	**71.56**	**654**	**0.47**	**9**	**0.01**	**5,050**	**3.65**	**711**	**0.51**	**31,738**	**22.95**	**165**	**0.12**	**24**	**0.02**	**20**	**0.01**	**968**	**0.70**	**138,315**	**100.00**

Table 1.5 Distribution of types of delivery, January-Disember 2010

Highest Caesarean Section rate was seen from Hospital Raja Permaisuri Bainun, Perak at 32.3% followed by Hospital Pulau Pinang at 31.8%. Hospital Likas Sabah had the lowest Caesarean Section rates in spite of having the highest delivery rate in the country.

Risk Level at Booking	Hysterectomy	
	N	%
Red	2	0.01
Yellow	7	0.02
Green	34	0.11
White I	0	0.00
White II	3	0.01
No Code	5	0.02
Unknown	3	0.01
Not Available	4	0.01
Missing	8	0.03
Total	**66**	**0.21**

Table 1.6 Colour coding and risk of Hysterectomy

A small percentage of patients who were color coded White II allowing home delivery or at the alternative Birthing Center had undergone Hysterectomy. Patients who are low risk can still have problems intrapartum as well as in postpartum. Well trained and efficient staff managing patients in labour is vital.

Ethnicity	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Malay	67,651	72.38	465	0.50	6	0.01	3,139	3.36	461	0.49	21,064	22.54	122	0.13	16	0.02	11	0.01	528	0.56	93,463	68.29
Chinese	5,895	67.16	35	0.40	1	0.01	490	5.58	65	0.74	2,237	25.48	9	0.10	2	0.02	3	0.03	41	0.47	8,778	6.41
Indian	4,171	61.02	35	0.51	1	0.01	262	3.83	76	1.11	2,244	32.83	10	0.15	0	0.00	3	0.04	34	0.50	6,836	5.00
Kadazan/Dusun	3,329	75.83	4	0.09	0	0.00	141	3.21	4	0.09	819	18.66	1	0.02	0	0.00	0	0.00	92	2.10	4,390	3.21
Murut	236	68.80	2	0.58	0	0.00	14	4.08	0	0.00	80	23.32	0	0.00	0	0.00	0	0.00	11	3.21	343	0.25
Bajau	2,507	80.87	2	0.06	0	0.00	108	3.48	4	0.13	421	13.58	1	0.03	0	0.00	0	0.00	57	1.84	3,100	2.27
Melanau	95	79.17	0	0.00	0	0.00	8	6.67	0	0.00	16	13.33	0	0.00	0	0.00	0	0.00	1	0.83	120	0.09
Iban	1,725	73.78	13	0.56	1	0.04	100	4.28	11	0.47	478	20.44	4	0.17	1	0.04	0	0.00	5	0.21	2,338	1.71
Bidayuh	1,252	70.10	8	0.45	0	0.00	64	3.58	12	0.67	439	24.58	6	0.34	2	0.11	0	0.00	3	0.17	1,786	1.31
Orang Asli (Peninsular Malaysia)	652	68.20	7	0.73	0	0.00	23	2.41	6	0.63	260	27.20	1	0.10	0	0.00	0	0.00	7	0.73	956	0.70
Other indigenous group in Sabah & Sarawak	1,965	74.97	2	0.08	0	0.00	115	4.39	8	0.31	489	18.66	0	0.00	0	0.00	0	0.00	42	1.60	2,621	1.92
Other	1,331	77.16	6	0.35	0	0.00	71	4.12	2	0.12	292	16.93	0	0.00	0	0.00	0	0.00	23	1.33	1,725	1.26
Foreigners	7,388	72.26	60	0.59	0	0.00	482	4.71	50	0.49	2,126	20.79	9	0.09	3	0.03	2	0.02	104	1.02	10,224	7.47
Unknown	32	78.05	0	0.00	0	0.00	2	4.88	1	2.44	5	12.20	0	0.00	0	0.00	0	0.00	1	2.44	41	0.03
Not Available	22	75.86	0	0.00	0	0.00	0	0.00	0	0.00	7	24.14	0	0.00	0	0.00	0	0.00	0	0.00	29	0.02
Missing	73	68.87	1	0.94	0	0.00	3	2.83	2	1.89	24	22.64	0	0.00	0	0.00	1	0.94	2	1.89	106	0.08
Total	**98,324**	**71.84**	**640**	**0.47**	**9**	**0.01**	**5,022**	**3.67**	**702**	**0.51**	**31,001**	**22.65**	**163**	**0.12**	**24**	**0.02**	**20**	**0.01**	**951**	**0.69**	**136,856**	**100.00**

Table 1.7 Distribution of total deliveries by Ethnicity, January-December 2010

Delivery rates were the highest among the Malays at 68.29% of total deliveries followed by Foreigners and Chinese at 7.47% and 6.43% respectively.

Parity	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	31,537	65.65	181	0.38	5	0.01	3,311	6.89	542	1.13	12,093	25.17	48	0.10	5	0.01	3	0.01	313	0.65	48,038	34.73
2 - 5	60,920	74.46	408	0.50	4	0.00	1,617	1.98	161	0.20	17,999	22.00	104	0.13	17	0.02	16	0.02	574	0.70	81,820	59.15
≥ 6	6,308	76.89	61	0.74	0	0.00	116	1.41	6	0.07	1,620	19.75	13	0.16	2	0.02	0	0.00	78	0.95	8,204	5.93
Unknown	211	83.40	4	1.58	0	0.00	6	2.37	2	0.79	26	10.28	0	0.00	0	0.00	1	0.40	3	1.19	253	0.18
Total	**98,976**	**71.56**	**654**	**0.47**	**9**	**0.01**	**5,050**	**3.65**	**711**	**0.51**	**31,738**	**22.95**	**165**	**0.12**	**24**	**0.02**	**20**	**0.01**	**968**	**0.70**	**138,315**	**100.00**

Table 1.8 Distribution of total deliveries by parity Jan-December 2010

The above table shows that delivery rate was highest in women Para2-5 and similarly Caesarean Section was also higher in this group of women.

Medical Problems	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Diabetes	**8,338**	**8.48**	**57**	**8.91**	**0**	**0.00**	**440**	**8.76**	**82**	**11.68**	**4,564**	**14.72**	**21**	**12.88**	**4**	**16.67**	**2**	**10.00**	**52**	**5.47**	**13,560**	**9.91**
Pre-existing	608	0.62	5	0.78	0	0.00	37	0.74	6	0.85	349	1.13	0	0.00	0	0.00	0	0.00	4	0.42	1,009	0.74
Gestational	7,281	7.41	47	7.34	0	0.00	386	7.69	74	10.54	3,991	12.87	21	12.88	3	12.50	2	10.00	43	4.52	11,848	8.66
Not Available	213	0.22	3	0.47	0	0.00	10	0.20	2	0.28	98	0.32	0	0.00	1	4.17	0	0.00	1	0.11	328	0.24
Missing	236	0.24	2	0.31	0	0.00	7	0.14	0	0.00	126	0.41	0	0.00	0	0.00	0	0.00	4	0.42	375	0.27
Hypertension	**4,073**	**4.14**	**45**	**7.03**	**0**	**0.00**	**280**	**5.58**	**55**	**7.83**	**3,050**	**9.84**	**16**	**9.82**	**8**	**33.33**	**1**	**5.00**	**30**	**3.15**	**7,558**	**5.52**
Pre-existing	635	0.65	10	1.56	0	0.00	41	0.82	19	2.71	441	1.42	2	1.23	0	0.00	0	0.00	8	0.84	1,156	0.84
Gestational	**2,803**	**2.85**	**22**	**3.44**	**0**	**0.00**	**205**	**4.08**	**32**	**4.56**	**2,120**	**6.84**	**9**	**5.52**	**6**	**25.00**	**1**	**5.00**	**14**	**1.47**	**5,212**	**3.81**
Pre-eclampsia	352	0.36	4	0.63	0	0.00	34	0.68	3	0.43	618	1.99	5	3.07	3	12.50	1	5.00	2	0.21	1,022	0.75
Eclampsia	15	0.02	0	0.00	0	0.00	4	0.08	0	0.00	53	0.17	0	0.00	0	0.00	0	0.00	0	0.00	72	0.05
Heart Disease	**503**	**0.51**	**3**	**0.47**	**0**	**0.00**	**53**	**1.06**	**11**	**1.57**	**169**	**0.55**	**2**	**1.23**	**0**	**0.00**	**0**	**0.00**	**4**	**0.42**	**745**	**0.54**
NYHA I	288	0.29	2	0.31	0	0.00	32	0.64	7	1.00	58	0.19	0	0.00	0	0.00	0	0.00	2	0.21	389	0.28
NYHA II	36	0.04	0	0.00	0	0.00	2	0.04	2	0.28	19	0.06	1	0.61	0	0.00	0	0.00	0	0.00	60	0.04
NYHA III	3	0.00	0	0.00	0	0.00	3	0.06	0	0.00	8	0.03	0	0.00	0	0.00	0	0.00	0	0.00	14	0.01
NYHA IV	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.01	0	0.00	0	0.00	0	0.00	0	0.00	3	0.00
Not Available	125	0.13	0	0.00	0	0.00	12	0.24	1	0.14	57	0.18	1	0.61	0	0.00	0	0.00	0	0.00	196	0.14
Missing	50	0.05	1	0.16	0	0.00	4	0.08	1	0.14	25	0.08	0	0.00	0	0.00	0	0.00	2	0.21	83	0.06
Others	**5,669**	**5.77**	**40**	**6.25**	**0**	**0.00**	**288**	**5.73**	**36**	**5.13**	**1,828**	**5.90**	**10**	**6.13**	**2**	**8.33**	**0**	**0.00**	**23**	**2.42**	**7,896**	**5.77**
TB	29	0.03	0	0.00	0	0.00	2	0.04	0	0.00	11	0.04	0	0.00	0	0.00	0	0.00	0	0.00	42	0.03
Blood Disorder	309	0.31	0	0.00	0	0.00	13	0.26	1	0.14	88	0.28	0	0.00	0	0.00	0	0.00	0	0.00	411	0.30
Collagen Disease	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Asthma	1,665	1.69	12	1.88	0	0.00	67	1.33	6	0.85	663	2.14	2	1.23	0	0.00	0	0.00	6	0.63	2,421	1.77
Renal Disease	23	0.02	1	0.16	0	0.00	1	0.02	0	0.00	21	0.07	0	0.00	0	0.00	0	0.00	0	0.00	46	0.03
None	**46,444**	**47.24**	**356**	**55.63**	**6**	**66.67**	**2,288**	**45.56**	**363**	**51.71**	**12,801**	**41.29**	**70**	**42.94**	**5**	**20.83**	**9**	**45.00**	**218**	**22.92**	**62,560**	**45.71**

Table 1.9 Distribution of total deliveries by Medical disorders complicating pregnancy January-December 2010

8.66% of deliveries were complicated by Gestational Diabetes followed by Hypertension at 5.52%.

Caesarean Section rate was also noted to be high in this group. Bronchial Asthma had the highest prevalence compared to other medical disorders.

	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Apgar at 1 min																						
≤ 7	3,161	3.19	177	27.06	0	0.00	740	14.65	98	13.78	3,246	10.23	28	16.97	8	33.33	2	10.00	19	1.96	7,479	5.41
> 7	92,776	93.74	336	51.38	6	66.67	4,161	82.40	600	84.39	27,673	87.19	128	77.58	6	25.00	14	70.00	174	17.98	125,874	91.01
Missing	3,039	3.07	141	21.56	3	33.33	149	2.95	13	1.83	819	2.58	9	5.45	10	41.67	4	20.00	775	80.06	4,962	3.59
Total	**98,976**	**100.00**	**654**	**100.00**	**9**	**100.00**	**5,050**	**100.00**	**711**	**100.00**	**31,738**	**100.00**	**165**	**100.00**	**24**	**100.00**	**20**	**100.00**	**968**	**100.00**	**138,315**	**100.00**
Apgar at 5 min																						
≤ 7	673	0.68	87	13.30	0	0.00	116	2.30	21	2.95	649	2.04	9	5.45	5	20.83	1	5.00	3	0.31	1,564	1.13
> 7	82,118	82.97	406	62.08	5	55.56	4,171	82.59	656	92.26	27,411	86.37	142	86.06	9	37.50	15	75.00	169	17.46	115,102	83.22
Missing	16,185	16.35	161	24.62	4	44.44	763	15.11	34	4.78	3,678	11.59	14	8.48	10	41.67	4	20.00	796	82.23	21,649	15.65
Total	**98,976**	**100.00**	**654**	**100.00**	**9**	**100.00**	**5,050**	**100.00**	**711**	**100.00**	**31,738**	**100.00**	**165**	**100.00**	**24**	**100.00**	**20**	**100.00**	**968**	**100.00**	**138,315**	**100.00**

Table 1.10Distribution of total deliveries to Apgar score, January-December 2010

93.74% of babies with spontaneous vertex delivery had Apgar score of > 7 at 1 min and 27.06% of vaginal breech babies had Apgar score of ≤ 7 at 1 min.

Complications	Vaginal						Instrumental				Caesarean						Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Prematurity	6,745	6.86	265	41.41	1	11.11	138	2.75	59	8.40	3,677	11.86	27	16.56	12	50.00	10,924	7.98
Foetal Distress	204	0.21	5	0.78	0	0.00	3,826	76.18	471	67.09	10,081	32.52	49	30.06	2	8.33	14,638	10.70
Retained Placenta	370	0.38	8	1.25	0	0.00	11	0.22	0	0.00	7	0.02	0	0.00	0	0.00	396	0.29
PPH	**326**	**0.33**	**5**	**0.78**	**0**	**0.00**	**23**	**0.46**	**5**	**0.71**	**239**	**0.77**	**5**	**3.07**	**2**	**8.33**	**605**	**0.44**
< 1500 mls	276	0.28	4	0.63	0	0.00	20	0.40	5	0.71	128	0.41	2	1.23	0	0.00	435	0.32
≥ 1500 mls	26	0.03	0	0.00	0	0.00	2	0.04	0	0.00	93	0.30	3	1.84	2	8.33	126	0.09
Not Available	4	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	0.01	0	0.00	0	0.00	7	0.01
Missing	20	0.02	1	0.16	0	0.00	1	0.02	0	0.00	15	0.05	0	0.00	0	0.00	37	0.03
Cord Prolapse	36	0.04	2	0.31	0	0.00	6	0.12	2	0.28	177	0.57	1	0.61	0	0.00	224	0.16
IUGR	249	0.25	7	1.09	0	0.00	12	0.24	3	0.43	286	0.92	2	1.23	0	0.00	559	0.41
PPROM	1,950	1.98	28	4.38	1	11.11	91	1.81	12	1.71	360	1.16	1	0.61	1	4.17	2,444	1.79
Amniotic Fluid Embolism	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.00
DVT	0	0.00	0	0.00	0	0.00	1	0.02	0	0.00	1	0.00	0	0.00	0	0.00	2	0.00
Uterine Inversion	5	0.01	1	0.16	0	0.00	0	0.00	0	0.00	1	0.00	0	0.00	0	0.00	7	0.01
Uterine Rupture	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	4	0.01	0	0.00	0	0.00	5	0.00
Uterine Atony	68	0.07	0	0.00	0	0.00	6	0.12	0	0.00	43	0.14	0	0.00	0	0.00	117	0.09
Others	1,377	1.40	68	10.63	2	22.22	200	3.98	41	5.84	3,278	10.57	21	12.88	6	25.00	4,993	3.65
None	66,842	67.98	322	50.31	2	22.22	2,035	40.52	276	39.32	13,152	42.42	71	43.56	4	16.67	82,704	60.43

Table 1.11Distribution of total deliveries by complication, January-December 2010

Fetal distress was the most commonest indication for Caesarean Section at 32.52%. and 11.86 % of premature babies were delivered by Caesarean Section .Incidence of Massive Postpartum Haemorrhage was noted to be associated more with Classical Caesarean Section and Hysterotomy

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Delivery By	Vaginal						Instrumental				Caesarean						Not Available		Missing		Total	
	SVD		Breech		Not Available		Vacuum		Forceps		LSCS		Classical		Hysterotomy							
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Specialist	571	0.58	72	11.01	1	11.11	521	10.32	197	27.71	1,482	4.67	17	10.30	10	41.67	0	0.00	1	0.10	2,872	2.08
MO>6 months O&G experience	7,337	7.41	418	63.91	1	11.11	3,580	70.89	461	64.84	25,037	78.89	126	76.36	12	50.00	1	5.00	0	0.00	36,973	26.73
MO<6 months O&G experience	7,568	7.65	57	8.72	1	11.11	143	2.83	11	1.55	466	1.47	2	1.21	0	0.00	2	10.00	0	0.00	8,250	5.96
MO no O&G experience	405	0.41	2	0.31	0	0.00	5	0.10	1	0.14	20	0.06	1	0.61	0	0.00	1	5.00	0	0.00	435	0.31
Other MO	1,777	1.80	19	2.91	0	0.00	34	0.67	2	0.28	39	0.12	1	0.61	0	0.00	0	0.00	0	0.00	1,872	1.35
Staff Nurse	40,156	40.57	31	4.74	2	22.22	13	0.26	4	0.56	43	0.14	0	0.00	0	0.00	2	10.00	0	0.00	40,251	29.10
Community Nurse / Governmen	16,620	16.79	10	1.53	0	0.00	7	0.14	0	0.00	6	0.02	0	0.00	0	0.00	2	10.00	0	0.00	16,645	12.03
Trained Traditional Birth Attend	56	0.06	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	56	0.04
Untrained Traditional Birth Atte	28	0.03	0	0.00	0	0.00	0	0.00	0	0.00	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	29	0.02
Unattended	145	0.15	0	0.00	1	11.11	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	146	0.11
Others	6,511	6.58	9	1.38	1	11.11	5	0.10	1	0.14	6	0.02	0	0.00	0	0.00	0	0.00	0	0.00	6,533	4.72
Unknown	30	0.03	0	0.00	0	0.00	1	0.02	0	0.00	2	0.01	0	0.00	0	0.00	0	0.00	0	0.00	33	0.02
Not Available	55	0.06	1	0.15	0	0.00	1	0.02	0	0.00	11	0.03	0	0.00	0	0.00	3	15.00	0	0.00	71	0.05
Missing	17,717	17.90	35	5.35	2	22.22	740	14.65	34	4.78	4,625	14.57	18	10.91	2	8.33	9	45.00	967	99.90	24,149	17.46
Total	**98,976**	**100**	**654**	**100**	**9**	**100**	**5,050**	**100**	**711**	**100**	**31,738**	**100**	**165**	**100**	**24**	**100**	**20**	**100**	**968**	**100**	**138,315**	**100**

Table 1.12 Distribution of total deliveries by categories of staff, January-December 2010

40% of the spontaneous vertex deliveries were conducted by Staff Nurses and 76.36% of Caesarean Sections were conducted by Medical Officers with more than 6 months experience in O&G

1.5 Conclusion

Fourteen tertiary hospitals contributed data to the National Obstetric Registry. In 2010 the total delivery reported was 138,315 and this accounted for 34.4% of total deliveries for the country from the public sector as well as 27% of total delivery for the country in 2010. We also see a slight increase in the Caesarean Section rates compared to the 2009 NOR report.

1.6 Recommendation

1. To improve CRF with mandatory fields for comprehensive and complete data entry
2. To expand coverage of NOR by stages to achieve a true annual delivery rate.

1.7 References

1. Preliminary report of National Obstetric Registry 2009
2. National Healthcare establishments and workforce statistics 2010

CHAPTER 2

CAESAREAN SECTION

Chapter 2 CAESAREAN SECTION

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2.1 Summary

Caesarean section accounted for 23.04% of all deliveries in the participating hospitals in Malaysia. Women of Indian ethnicity, primigravida and women in their 40's had the highest Caesarean rates. The commonest indication for Caesarean section was fetal distress followed by poor progress and macrosomi

2.2 Introduction

Participating Hospitals	Total Deliveries (*n*)	Total Caesarean Section				LSCS Rates %
		Elective	Emergency	Not Available	Missing	
Hospital Tuanku Fauziah, Perlis	3,761	233	589	0	0	21.86
Hospital Sultanah Bahiyah, Kedah	10,524	809	1,914	1	0	25.88
Hospital Pulau Pinang	4,626	339	1,141	0	0	31.99
Hospital Raja Permaisuri Bainun, Perak	8,070	658	1,949	1	0	32.32
Hospital Tengku Ampuan Rahimah, Selangor	10,719	638	1,973	0	0	24.36
Hospital Kuala Lumpur	11,894	782	2,644	0	0	28.80
Hospital Tuanku Jaafar, Seremban	5,754	315	1,017	1	0	23.17
Hospital Melaka	10,462	702	1,426	0	0	20.34
Hospital Sultanah Aminah, Johor	12,671	654	2,673	0	1	26.26
Hospital Tengku Ampuan Afzan, Pahang	9,402	645	1,627	0	0	24.17
Hospital Sultanah Nur Zahirah, Terengganu	12,122	467	1,593	0	1	17.00
Hospital Raja Perempuan Zainab II, Kelantan	12,356	344	1,967	1	0	18.71
Hospital Umum Sarawak	11,065	379	2,093	0	1	22.35
Hospital Likas, Sabah	14,889	438	1,910	1	0	15.78
Total	**138,315**	**7,403**	**24,516**	**5**	**3**	**23.08**

Table 2.1: Caesarean section rates by participating hospitals 2010

Caesarean section accounted for 23.08% of all deliveries in the 14 tertiary Hospitals in Malaysia. There has been a slight rise in this rate from 2009 which was at 22.4%. We also see a marked variation in the Caesarean section rates, the highest rate was from Hospital Raja Permaisuri Bainun, Perak at 32.32% and the lowest rate was from Hospital Likas, Sabah at 15.78% and this similar trend was also seen from the year before.

2.3 Patient Demographics

Ethnicity	Total Deliveries (n)	Total Caesarean section				CS Rates %
		Elective	Emergency	Not Available	Missing	
Malay	93,463	5,023	16,175	3	1	22.68
Chinese	8,778	678	1,568	1	1	25.61
Indian	6,836	524	1,730	0	0	32.97
Kadazan/Dusun	4,390	164	655	1	0	18.68
Murut	343	17	63	0	0	23.32
Bajau	3,100	82	340	0	0	13.61
Melanau	120	7	9	0	0	13.33
Iban	2,338	65	418	0	0	20.66
Bidayuh	1,786	57	389	0	1	25.03
Orang Asli (Peninsular Malaysia)	956	42	219	0	0	27.30
Other indigenous group in Sabah & Sarawak	2,621	105	384	0	0	18.66
Other	1,725	65	227	0	0	16.93
Foreigners	10,224	364	1,774	0	0	20.91
Unknown	41	1	4	0	0	12.20
Not Available	29	1	6	0	0	24.14
Missing	106	0	24	0	0	22.64
Total	**136,856**	**7,195**	**23,985**	**5**	**3**	**22.79**
Age (years)						
10 - 20	10,572	161	1,310	0	0	13.91
21 - 30	79,879	3,126	13,556	2	0	20.89
31 - 40	42,827	3,599	8,278	2	3	27.74
41 - 50	3,478	305	823	1	0	32.46
51 - 55	15	1	1	0	0	13.33
Missing	85	3	17	0	0	23.53
Parity						
1	48,038	1,428	10,717	1	0	25.28
2 - 5	81,820	5,606	12,509	3	2	22.15
≥ 6	8,204	365	1,268	1	1	19.93
Unknown	253	4	22	0	0	10.28

Table 2.2: Distribution of Caesarean section by ethnicity, age and parity 2010

Among the 3 major ethnic groups in the country, the Caesarean section rate was highest among the Indians at 32.97% followed by Chinese and Malays at 25.61% and 22.68% respectively. This has been consistent with the NOR 2009 report. Of the 10,224 foreigners that delivered in all the major Hospitals in the country 20.91% were delivered by Caesarean section.

There has been a low Caesarean section rate among the teenagers and women in the 5th decade of life. Rates in the Primigravida were the highest at 25.28% as compared to the multiparous women and women in the 40's had a high caesarean Section rate at 32.46%.

Risk Level at Booking	Total *n*	Caesarean						Total	
		LSCS		Classical		Hysterotomy			
		n	%	*n*	%	*n*	%	*n*	%
Red	2949	1,107	3.57	9	5.52	5	20.83	1,121	3.59
Yellow	10255	3,601	11.62	21	12.88	0	0.00	3,622	11.61
Green	67448	16,099	51.93	92	56.44	10	41.67	16,201	51.95
White II	4223	505	1.63	4	2.45	1	4.17	510	1.64
White I	18738	3,345	10.79	21	12.88	2	8.33	3,368	10.80
No Code	4741	1,072	3.46	2	1.23	0	0.00	1,074	3.44
Unknown	980	242	0.78	1	0.61	3	12.50	246	0.79
Not Available	1874	485	1.56	1	0.61	1	4.17	487	1.56
Missing	25648	4,545	14.66	12	7.36	2	8.33	4,559	14.62
Total	**136856**	**31,001**	**100.00**	**163**	**100.00**	**24**	**100.00**	**31,188**	**100.00**

Table 2.3: Relationship between Risk level at booking and mode of delivery

1.64% of patients that had been color coded White 11 for delivery at home or at an Alternative Birthing Centre had ended up in a Caesarean section. There was also a large number of missing data and therefore these figures may not be accurate. However, the appropriateness of the color code for these patients should be reviewed

2.4 Indications for Caesarean section

Medical Problems	Total Deliveries (*n*)	Total Caesarean Section				CS Rates%
		Elective	Emergency	Not Available	Missing	
Diabetes	**13,560**	**1,253**	**3,336**	**0**	**0**	**14.71**
Pre-existing	1,009	108	241	0	0	1.12
Gestational	11,848	1,074	2,941	0	0	12.87
No Available	328	32	67	0	0	0.32
Missing	375	39	87	0	0	0.40
Hypertension	**7,558**	**487**	**2,586**	**0**	**1**	**9.86**
Pre-existing	1,156	84	359	0	0	1.42
Gestational	**5,212**	**315**	**1,819**	**0**	**1**	**6.85**
Pre-eclampsia	1,022	36	589	0	1	2.01
Eclampsia	72	1	52	0	0	0.17
HeartDisease	**745**	**70**	**101**	**0**	**0**	**0.55**
NYHA I	389	20	38	0	0	0.19
NYHA II	60	10	10	0	0	0.06
NYHA III	14	3	5	0	0	0.03
NYHA IV	3	0	2	0	0	0.01
Not Available	196	26	32	0	0	0.19
Missing	83	11	14	0	0	0.08
Others	**7,896**	**457**	**1,382**	**0**	**1**	**5.90**
TB	42	3	8	0	0	0.04
BloodDisorder	411	30	58	0	0	0.28
CollagenDisease	0	0	0	0	0	0.00
Asthma	2,421	155	510	0	0	2.13
Renal Disease	46	8	13	0	0	0.07
None	**62,560**	**3,012**	**9,862**	**1**	**1**	**41.29**

Table 2.4: Distribution of Medical Problems and CS rates

33.84% of all diabetic cases had a Caesarean section and this accounted for 14.71 % of all Caesarean sections. 40.67% of all Hypertension complicating pregnancy had a Caesarean section and this accounted for 9.86% of all Caesarean sections. This was mainly due to Preeclampsia as seen from the table above. Hence 41.29% of all caesarean sections were complicated by medical disorders

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Complications of Delivery	Total Deliveries (*n*)	Total Caesarean Section				LSCS rates %
		Elective	Emergency	Not Available	Missing	
Fetal Distress	10,132	133	9,998	1	0	32.49
Secondary Arrest	755	4	751	0	0	2.42
Prolonged Second Stage	671	5	666	0	0	2.15
CPD	143	41	102	0	0	0.46
Poor Progress	2,864	20	2,844	0	0	9.18
Abruption Placenta	225	2	223	0	0	0.72
Placenta Previa Major and Minor	1,347	564	782	1	0	4.32
Maternal Request	857	519	338	0	0	2.75
Failed Induction	1,287	76	1,210	1	0	4.13
Cord Prolapse / Presentation	178	6	172	0	0	0.57
Failed Instrumentation	0	0	0	0	0	0.00
Severe Pregnancy Induced Hypertension	455	66	389	0	0	1.46
Impending Eclampsia	449	23	426	0	0	1.44
Eclampsia	212	7	205	0	0	0.68
Macrosomia	1,835	719	1,116	0	0	5.88
Retroviral Disease	90	49	41	0	0	0.29
Chorioamnionitis	160	6	154	0	0	0.51
Refused Trial of Scar	540	315	224	1	0	1.73
Fetal Anomaly	115	48	67	0	0	0.37
Polyhydramnious	55	20	35	0	0	0.18
Oligohydramnious	298	83	215	0	0	0.96
Preterm Labour	397	22	375	0	0	1.27
Heart Disease	70	46	24	0	0	0.22
Others	1,086	574	512	0	0	3.48

Table 2.5: Indications for Caesarean Section

The commonest indication for Caesarean section was fetal distress which accounted for 32.49% of all Caesarean section followed by Poor progress at 9.18 % . Macrosomia accounted for 5.88 % of Caesarean section followed by Placenta previa at 4.32%. Only 2.75% of Caesarean section was due to maternal request.

Delivery By	Caesarean						Total	
	LSCS		Classical		Hysterotomy			
	n	%	n	%	*n*	%	*n*	%
Specialist	1,482	4.67	17	10.30	10	41.67	1,509	4.73
MO>6 months O&G experience	25,037	78.89	126	76.36	12	50.00	25,175	78.85
MO<6 months O&G experience	466	1.47	2	1.21	0	0.00	468	1.47
MO no O&G experience	20	0.06	1	0.61	0	0.00	21	0.07
Other MO	39	0.12	1	0.61	0	0.00	40	0.13
Staff Nurse	43	0.14	0	0.00	0	0.00	43	0.13
Community Nurse / Government Midwife / JD	6	0.02	0	0.00	0	0.00	6	0.02
Trained Traditional Birth Attendant	0	0.00	0	0.00	0	0.00	0	0.00
Untrained Traditional Birth Attendant	1	0.00	0	0.00	0	0.00	1	0.00
Unattended	0	0.00	0	0.00	0	0.00	0	0.00
Others	6	0.02	0	0.00	0	0.00	6	0.02
Unknown	2	0.01	0	0.00	0	0.00	2	0.01
Not Available	11	0.03	0	0.00	0	0.00	11	0.03
Missing	4,625	14.57	18	10.91	2	8.33	4,645	14.55
Total	**31,738**	**100.00**	**165**	**100.00**	**24**	**100.00**	**31,927**	**100.00**

Table 2.6: Category of staff involved with Caesarean section

83.58% of all Caesarean sections were done by Specialist and Medical officers of more than 6 months experience in O&G and 2.55% of cases were complicated by a Caesarean Hysterectomy

2.5 Outcome

	Caesarean						Total	
	LSCS		Classical		Hysterotomy			
	n	%	*n*	%	*n*	%	*n*	%
Apgar at 1 min								
≤ 7	3,246	10.23	28	16.97	8	33.33	7,479	5.41
> 7	27,673	87.19	128	77.58	6	25.00	125,874	91.01
Missing	819	2.58	9	5.45	10	41.67	4,962	3.59
Total	**31,738**	**100.00**	**165**	**100.00**	**24**	**100.00**	**138,315**	**100.00**
Apgar at 5 min								
≤ 7	649	2.04	9	5.45	5	20.83	1,564	1.13
> 7	27,411	86.37	142	86.06	9	37.50	115,102	83.22
Missing	3,678	11.59	14	8.48	10	41.67	21,649	15.65
Total	**31,738**	**100.00**	**165**	**100.00**	**24**	**100.00**	**138,315**	**100.00**

Table 2.7: Apgar Score in relation to Caesarean section

More than 80% of cases undergoing a Caesarean section had an Apgar score of > 7 at 1 min and 5 mins.

2.6 Conclusion

Caesarean sections are on the rise globally and in Malaysia too the rate has been gradually increasing. From the National Healthcare establishment and workforce statistics 2008-2009, the Caesarean section rates were reported at 20.8%. This rate was inclusive of the private and public sector and the highest rate was from Wilayah Persekutuan, Kuala Lumpur. (1).In 2010 the Caesarean section rates reported by National Healthcare establishments and workforce statistics 2010 was 21.89 %. (2) Form the NOR 2009 data the caesarean section rates were 22.4 % (3) and in 2010 at 23.08%. This shows that there has been a slight increase from the year before. Hospital Likas had the lowest Caesarean section rates and this has been the same as in 2009. Women of Indian ethnicity, Primigravida and women in their 40's had the highest caesarean section rates. Fetal distress accounted for a third of the Caesarean section which is similar to the NOR 2009 report. More than 40% of patients with medical disorders complicating pregnancy had a Caesarean section as the mode of delivery. Maternal request for Caesarean section was low at 2.75% and babies delivered by caesarean section had a good outcome. Approximately 80% of all Caesarean section were done by specialist and medical officers of more than 6 months experience in O&

2.7 Recommendation

1. Due to the variation in Caesarean section rates, all hospitals should have a Caesarean Section audit at the departmental level. A nationally agreed format for the audit should be used to enable comparisons to be made
2. Decision for Caesarean sections should ideally be by the Specialist/Consultant after patient has been reviewed.
3. Caesarean section is not the safest option for delivery unless it is being done for a valid obstetric indication. Therefore steps must be taken to reduce primary Caesarean section.

2.5 References

1. National Healthcare establishments and workforce statistics 2008-2009. Maternity services in Malaysian Hospitals. Ravindran J, Soon R, Jamil MA, J. Ravichandran, Gazali I, Mymoon A, Arpah A, Lee KY.
2. National Healthcare establishments and workforce statistics 2010
3. Preliminary report of National Obstetric Registry July –Dec 2009.Chapter 4 – Caesarean Section.

CHAPTER 3

MASSIVE PRIMARY POSTPARTUM HAEMORRHAGE

Chapter 3 MASSIVE PRIMARY POSTPARTUM HAEMORRHAGE

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3.1 Summary

Massive Postpartum Haemorrhage is a KPI in the Ministry of Health and the standards were achieved at the 14 participating Hospitals in 2010. Women who had Massive Postpartum Haemorrhage were found to be anaemic at booking as well as just before delivery. Highest incidence was among the Bidayuhs, women in the 40s and those with Placenta Preavia as well as due to genital tract trauma.

3.2 Introduction

Participating Centre	Primary PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
Hospital Tuanku Fauziah, Perlis	26	0.70	16	0.43	0	0.00	3	0.08
Hospital Sultanah Bahiyah, Kedah	6	0.06	3	0.03	1	0.01	2	0.02
Hospital Pulau Pinang	20	0.44	1	0.02	0	0.00	1	0.02
Hospital Raja Permaisuri Bainun, Perak	16	0.20	11	0.14	0	0.00	1	0.01
Hospital Tengku Ampuan Rahimah, Selangor	16	0.15	1	0.01	0	0.00	0	0.00
Hospital Kuala Lumpur	24	0.20	13	0.11	1	0.01	1	0.01
Hospital Tuanku Jaafar, Seremban	1	0.02	2	0.04	0	0.00	0	0.00
Hospital Melaka	20	0.19	9	0.09	1	0.01	2	0.02
Hospital Sultanah Aminah, Johor	49	0.39	12	0.10	0	0.00	2	0.02
Hospital Tengku Ampuan Afzan, Pahang	5	0.05	8	0.09	1	0.01	1	0.01
Hospital Sultanah Nur Zahirah, Terengganu	46	0.38	11	0.09	2	0.02	4	0.03
Hospital Raja Perempuan Zainab II, Kelantan	111	0.91	24	0.20	1	0.01	12	0.10
Hospital Umum Sarawak	89	0.81	13	0.12	0	0.00	7	0.06
Hospital Likas, Sabah	6	0.04	2	0.01	0	0.00	1	0.01
Total	**435**	**0.32**	**126**	**0.09**	**7**	**0.01**	**37**	**0.03**

Table 3.1 Primary Postpartum Haemorrhage by Participating Hospitals 2010

Massive Primary Postpartum Haemorrhage is a National indicator as well as a Key Performance Indicator and the recommended standard set by Ministry of Health is ≤ 0.5% of total deliveries(1). Total deliveries for 2010 were 138,315 and the KPI for Massive Postpartum Haemorrhage from the 14 participating Hospitals in Malaysia was at 0.09%. The highest rate of Postpartum Haemorrhage was from Hospital Raja Perempuan Zainab II, Kelantan at 0.91% followed by Hospital Umum Sarawak, Kuching at 0.81%

3.3 Patient demographics

Age (years)	PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	*n*	%	*n*	%	*n*	%
10 - 20	19	0.18	1	0.01	0	0.00	0	0.00
21 - 30	207	0.26	40	0.05	1	0.00	14	0.02
31 - 40	190	0.44	75	0.18	4	0.01	19	0.04
41 - 50	19	0.55	10	0.29	2	0.06	4	0.12
51 - 55	0	0.00	0	0.00	0	0.00	0	0.00
Missing	0	0.00	0	0.00	0	0.00	0	0.00
Total	**435**	**0.32**	**126**	**0.09**	**7**	**0.01**	**37**	**0.03**

Table 3.2 Primary Postpartum Haemorrhage in relation to age 2010

Ethnicity	Total Deliveries (*n*)	Primary PPH							
		<1500 mls		≥1500 mls		Not Available		Missing	
		n	%	n	%	n	%	n	%
Malay	93,463	341	0.36	101	0.11	5	0.01	32	0.03
Chinese	8,778	28	0.32	8	0.09	1	0.01	1	0.01
Indian	6,836	7	0.10	1	0.01	0	0.00	0	0.00
Kadazan/Dusun	4,390	4	0.09	2	0.05	0	0.00	0	0.00
Murut	343	0	0.00	0	0.00	0	0.00	0	0.00
Bajau	3,100	0	0.00	0	0.00	0	0.00	0	0.00
Melanau	120	1	0.83	0	0.00	0	0.00	0	0.00
Iban	2,338	13	0.56	2	0.09	0	0.00	0	0.00
Bidayuh	1,786	14	0.78	3	0.17	0	0.00	3	0.17
Orang Asli (Peninsular Malaysia)	956	3	0.31	2	0.21	0	0.00	0	0.00
Other indigenous group in Sabah & Sarawak	2,621	4	0.15	0	0.00	0	0.00	1	0.04
Other	1,725	2	0.12	0	0.00	0	0.00	0	0.00
Foreigners	10,224	17	0.17	7	0.07	1	0.01	0	0.00
Unknown	41	0	0.00	0	0.00	0	0.00	0	0.00
Not Available	29	0	0.00	0	0.00	0	0.00	0	0.00
Missing	106	1	0.94	0	0.00	0	0.00	0	0.00
Total	**136,856**	**435**	**0.32**	**126**	**0.09**	**7**	**0.01**	**37**	**0.03**

Table 3.3 Primary Postpartum Haemorrhage in relation to Ethnicity 2010

Massive Postpartum Haemorrhage rate was highest among the indigenous group, the Bidayuh and this was also similar to what was reported in NOR 2009 report. Massive Postpartum Haemorrhage was also high among the Malays at 0.11%. There was no significant difference in the Massive Postpartum Haemorrhage rates among the different parities but was more common in women in their 40s.

Parity	PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
1	121	0.25	16	0.03	1	0.00	8	0.02
2 - 5	261	0.32	97	0.12	5	0.01	23	0.03
≥ 6	53	0.65	13	0.16	1	0.01	6	0.07

Table 3.4 Primary Postpartum Haemorrhage in relation to Parity 2010

3.4 Risk Factors for Postpartum haemorrhage

Risk Factor for PPH	PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
Anaemia (At Booking)	127	29.20	38	30.16	1	14.29	9	24.32
Anaemia (at delivery)	45	10.34	19	15.08	0	0.00	3	8.11
Macrosomia	21	4.83	5	3.97	1	14.29	4	10.81
Multiple Pregnancy	15	3.45	5	3.97	0	0.00	0	0.00
Prolonged Labour	5	1.15	1	0.79	0	0.00	2	5.41

Table 3.5 Risk factors for Primary Postpartum Haemorrhage 2010

Patients with Massive Postpartum haemorrhage were Anaemic at booking and prior to delivery. Research has shown that women who are severely Anaemic are not at a greater risk of PPH than women who are not anaemic. However they are much less able to tolerate blood loss postpartum (2). Macrosomia and multiple pregnancy contributed to 3.97% of Massive Postpartum Haemorrhage.

3.5 Causes of Postpartum haemorrhage

Cause of PPH	PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
Uterine atony	47	10.80	15	11.90	1	14.29	10	27.03
Uterine inversion	2	0.46	0	0.00	0	0.00	1	2.70
Placenta preavia	8	1.84	20	15.87	0	0.00	3	8.11
Abruption placenta	5	1.15	6	4.76	0	0.00	1	2.70
Retained placenta	12	2.76	5	3.97	1	14.29	2	5.41
Genital trauma	176	40.46	14	11.11	3	42.86	10	27.03
Uterine rupture	1	0.23	1	0.79	0	0.00	0	0.00

Table 3.6 Causes of Primary Postpartum Haemorrhage 2010

Placenta Preavia and Uterine Atony contributed to 15.87% and 11.90% of Massive Postpartum Haemorrhage. Significantly genital tract trauma also contributed to a high percentage of Massive Postpartum Haemorrhage.

Mode of Delivery	PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
Vaginal	**280**	**0.28**	**26**	**0.03**	**4**	**0.00**	**21**	**0.02**
Instrumental	**25**	**0.44**	**2**	**0.03**	**0**	**0.00**	**1**	**0.02**
Caesarean	**130**	**0.42**	**98**	**0.31**	**3**	**0.01**	**15**	**0.05**
LSCS	128	0.41	93	0.30	3	0.01	15	0.05
Classical	2	1.23	3	1.84	0	0.00	0	0.00
Hysterotomy	0	0.00	2	8.33	0	0.00	0	0.00
Total	**435**	**0.32**	**126**	**0.09**	**7**	**0.01**	**37**	**0.03**

Table 3.7 Postpartum Haemorrhage in relation to mode of delivery 2010

Massive Postpartum Haemorrhage was higher in patients with Caesarean section as compared to Vaginal and Instrumental delivery. Those who had Hysterotomy and Classical Section had a rate of 8.33% and 1.84 % respectively

Delivery conducted By	Primary PPH							
	<1500 mls		≥1500 mls		Not Available		Missing	
	n	%	n	%	n	%	n	%
Specialist	20	4.60	31	24.60	1	14.29	3	8.11
MO>6 months O&G experience	160	36.78	76	60.32	4	57.14	13	35.14
MO<6 months O&G experience	31	7.13	2	1.59	0	0.00	1	2.70
MO no O&G experience	3	0.69	0	0.00	0	0.00	0	0.00
Other MO	2	0.46	0	0.00	0	0.00	2	5.41
Staff Nurse	134	30.80	8	6.35	1	14.29	11	29.73
Community Nurse / Government Midwife / JD	56	12.87	3	2.38	1	14.29	2	5.41
Trained Traditional Birth Attendant	0	0.00	0	0.00	0	0.00	0	0.00
Untrained Traditional Birth Attendant	0	0.00	0	0.00	0	0.00	0	0.00
Unattended	1	0.23	0	0.00	0	0.00	0	0.00
Others	15	3.45	2	1.59	0	0.00	1	2.70
Unknown	0	0.00	0	0.00	0	0.00	0	0.00
Not Available	0	0.00	0	0.00	0	0.00	0	0.00
Missing	13	2.99	4	3.17	0	0.00	4	10.81
Total	**435**	**100.00**	**126**	**100.00**	**7**	**100.00**	**37**	**100.00**

Table 3.8 Massive Postpartum Haemorrhage in relation to delivery conducted by different categories of Staff 2010

Specialist and Medical officers with more than 6 months O&G experience were involved with the delivery of patients with Massive Postpartum Haemorrhage and rates were 24.60% and 60.32% respectively.

3.6 Outcome

	Maternal Death				
Mode of Delivery	Alive	Dead	Not Available	Missing	Total
Vaginal	98384	4	24	561	98973
Instrumental	5685	0	1	38	5724
Caesarean	30988	1	4	195	31188
Not Available	18	0	2	0	20
Missing	3	0	0	948	951
Total	**135078**	**5**	**31**	**1742**	**136856**

Table 3.9 Maternal Deaths in relation to Mode of Delivery

Of the deaths captured in NOR 2010 none were due to Massive Postpartum Haemorrhage. However these numbers may not be accurate due to missing data.

3.7 Conclusion

Postpartum Haemorrhage remains the leading cause of maternal mortality and morbidity in Malaysia. In this report there was no maternal mortality reported due to Postpartum Haemorrhage reported from the 14 tertiary hospitals in Malaysia. Total deliveries for 2010 were 138,315 and the incidence rate for Massive Postpartum Haemorrhage from the 14 major Hospitals in Malaysia was 0.09% and this met the standards set by the Key Performance Indicator. Comparing from the previous report in 2009, Massive Postpartum Haemorrhage was still the highest in the Bidayuh community. More research needs to be done to see why this trend is occurring in this community. Recognizing blood loss and initiating prompt treatment is vital to prevent maternal mortality and morbidity.

3.8 Recommendation

1. Correction of Anaemia in the antenatal period is important to prevent further Compromise if there is Postpartum Haemorrhage.
2. Regular emergency drills for Postpartum Haemorrhage in the Labour ward to increase awareness among junior staff.
3. Experienced Medical Officers and Nursing Staff should guide junior doctors and nurses on the proper delivery techniques to prevent genital tract trauma.
4. Regular audit and discussion of cases with Massive Postpartum Haemorrhage should be carried out at departmental level.

3.9 Reference

1. Manual National Indicator Approach (NIA) and Key Performance Indicators. Obstetric and Gynaecology, Ministry of Heath 2010.

CHAPTER 4

DIABETES MELLITUS IN PREGNANCY

CHAPTER 4: DIABETES MELLITUS IN PREGNANCY

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4.1 Summary

The incidence of Diabetes in pregnancy was 9.9% of all deliveries in 14 participating public Hospitals in Malaysia. Highest incidence of diabetic pregnancies were seen in Indian ethnicity at 14.39%, and in women between 41-50 years, at 23.35%.Macrosomia was doubled in diabetic patients. Caesarean section rates were also higher in diabetic patients and shoulder dystocia increased 3 folds in diabetic patients as compared to non-diabetic.patients.

4.2 Introduction

Total deliveries in all 14 participating hospitals in Malaysia contributing data to the National Obstetric Registry (NOR) were 138,315. The incidence of diabetes was 9.9% and this was slightly lower compared to previous NOR report at 11.1%., The highest incidence of diabetic pregnancy was seen in Pahang (17.2%) and the lowest was in Sabah (0.01%). Sabah had the highest number of deliveries but the number of diabetic patients was very low. Similar findings were also noted in the NOR 2009 report. Further studies need to be done in Sabah to see why the incidences of diabetic pregnancies are low in this state.

Participating Hospitals	Total number of women who delivered (*n*)	Diabetes Mellitus								Total of DM	% DM by state
		Pre-existing		Gestational		Not available		Missing			
		n	%	*n*	%	*n*	%	*n*	%	*n*	
Hospital Tengku Ampuan Afzan, Pahang	9,297	100	1.08	1,334	14.35	130	1.40	37	0.40	1,601	17.2
Hospital Melaka	10,355	85	0.82	1,369	13.22	28	0.27	33	0.32	1,515	14.6
Hospital Tuanku Fauziah, Perlis	3,739	68	1.82	422	11.29	28	0.75	15	0.40	533	14.3
Hospital Sultanah Aminah, Johor	12,507	143	1.14	1,490	11.91	20	0.16	26	0.21	1,679	13.4
Hospital Tengku Ampuan Rahimah, Selangor	10,586	137	1.29	1,237	11.69	3	0.03	24	0.23	1,401	13.2
Hospital Raja Perempuan Zainab II, Kelantan	12,200	102	0.84	1,224	10.03	2	0.02	51	0.42	1,379	11.3
Hospital Sultanah Nur Zahirah, Terengganu	12,007	53	0.44	1,249	10.40	5	0.04	28	0.23	1,335	11.1
Hospital Kuala Lumpur	11,771	62	0.53	1,192	10.13	27	0.23	34	0.29	1,315	11.2
Hospital Raja Permaisuri Bainun, Perak	7,983	67	0.84	639	8.00	8	0.10	59	0.74	773	9.7
Hospital Umum Sarawak	10,969	53	0.48	777	7.08	49	0.45	26	0.24	905	8.3
Hospital Pulau Pinang	4,567	1	0.02	304	6.66	28	0.61	8	0.18	341	7.5
Hospital Tuanku Jaafar, Seremban	5,694	35	0.61	320	5.62	0	0.00	6	0.11	361	6.3
Hospital Sultanah Bahiyah, Kedah	10,404	103	0.99	290	2.79	0	0.00	28	0.27	421	4.0
Hospital Likas, Sabah	14,777	0	0.00	1	0.01	0	0.00	0	0.00	1	0.01
Total	**136,856**	**1,009**	**0.74**	**11,848**	**8.66**	**328**	**0.24**	**375**	**0.27**	**13,560**	**9.9**

Table 4.1: Incidence of Diabetes in various states of Malaysia

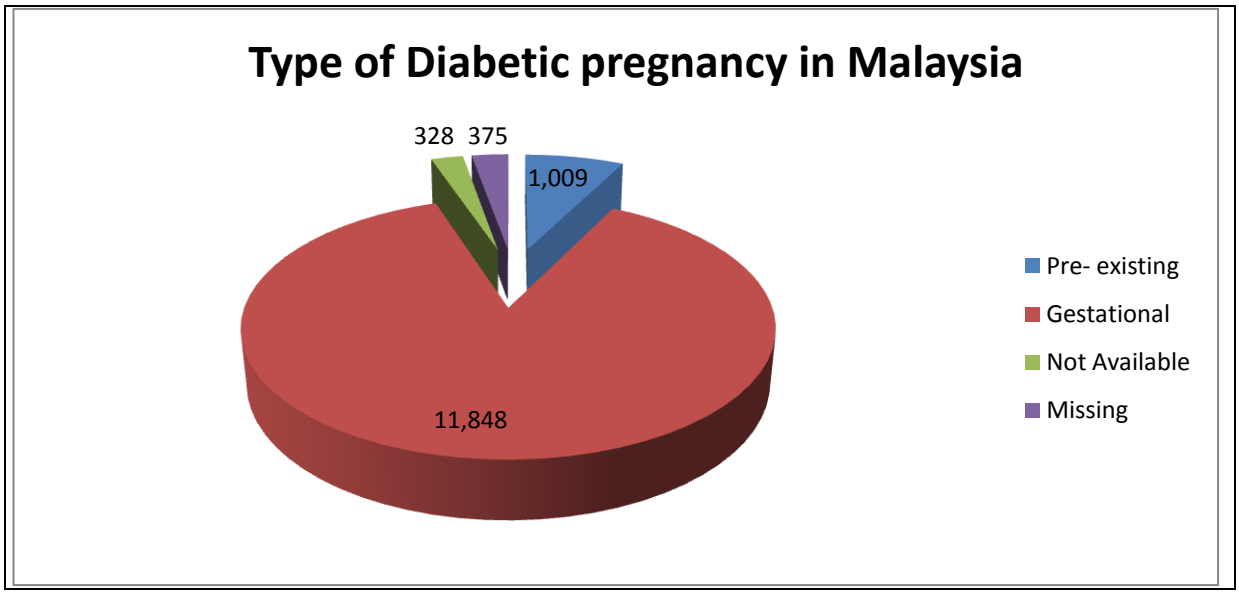

Chart 4.1: Types of Diabetes in Pregnancy in Malaysia

8.66% of total cases were Gestational Diabetes whilst pre gestational diabetes account for 0.74% of total deliveries.

4.3: Patient Demographic

Age (years)	Total number of Patients (*n*)	Total of DM		
		n	% by total number of diabetic mother	% by specific age group
10 - 20	10,572	278	2.05	2.63
21 - 30	79,879	5,918	43.64	7.41
31 - 40	42,827	6,543	48.25	15.28
41 - 50	3,478	812	5.99	23.35
51 - 55	15	1	0.01	6.67
Missing	85	8	0.06	9.41
Total	**136,856**	**13,560**	**100**	

Table 4.2: Diabetes by Age groups

48.25% of total diabetic patients were in the age group 31- 40 years. However, percentage by specific age group, the highest rate was seen in 41-50 years at 23.35%

Ethnicity	Total number of Patients (*n*)	Total number of DM	Percentage (%)
Malay	93,463	10,633	11.37
Chinese	8,778	913	10.4
Indian	6,836	984	14.39
Kadazan/Dusun	4,390	28	0.64
Murut	343	4	1.17
Bajau	3,100	14	0.45
Melanau	120	10	8.33
Iban	2,338	180	7.70
Bidayuh	1,786	108	6.05
Orang Asli (Peninsular Malaysia)	956	75	7.85
Other indigenous group in Sabah & Sarawak	2,621	20	0.76
Other	1,725	85	4.93
Foreigners	10,224	495	4.84
Unknown	41	2	4.88
Not Available	29	3	10.34
Missing	106	6	5.66
Total	**136,856**	**13,560**	**99.76**

Table 4.3: Diabetes by Ethnics Group

Diabetes in pregnancy was highest among the Indians at 14.39%, followed by the Malays at 11.37% and the Chinese at 10.4%.

Parity	Total number of Deliveries (*n*)	Total of DM		
		n	% by total number of diabetic mother	% by parity
1	47,573	3,693	27.23	7.76
2 - 5	80,925	8,460	62.39	10.45
≥ 6	8,106	1,400	10.32	17.27
Unknown	252	7	0.05	2.78
Total	**136,856**	**13,560**	**100**	

Table 4.4: Distribution by parity

Diabetic pregnancy was more common in multipara at 62.39% and by parity specific was highest in grand multipara at 17.27%. This correlates with increase maternal age with advanced parity.

4.4: Outcomes

Mode of Delivery	Total number of Patients (n)	Total number of DM	Percentage by mode of delivery
Vaginal	99,639	8456	8.5
Instrumental	5,761	525	9.1
Caesarean	31,927	4682	14.7

Table 4.5: Mode of deliveries for diabetic pregnancy

In diabetic patients, Caesarean section rates were higher at 14.7% as compared to vaginal deliveries at 8.5%.

Birth Weight (gms)	Total number of Deliveries (*n*)	Total number of DM		
		n	% by total number of diabetic mother	% by specific birth weight
≤ 1000	1,931	164	1.26	8.49
1001 -1500	1,578	132	1.01	8.36
1501 - 2000	3,681	305	2.34	8.29
2001 - 2500	15,767	1235	9.50	7.83
2501 - 3000	48,822	4003	30.78	8.20
3001 - 3500	48,108	4733	36.39	9.84
3501 - 3999	13,932	1696	13.04	12.17
≥ 4000	4,496	738	5.67	16.41
Total	**138,315**	**13,006**	**100**	

Table 4.6: Distribution of diabetic pregnancy by birth weight

36.4% of diabetic mothers delivered babies weighing 3001 – 3500 grams however, percentage by birth weight specific had a rate of 16.4% for babies with birth weight of 4 kg and above

	DM		Non DM		Total	
	n	%	*n*	%	*n*	%
Macrosomia (Birth Weight ≥ 4 kg)	766	5.58	3,730	2.99	4,496	3.25
Birth Weight < 4 kg	12,954	94.42	120,865	97.01	133,819	96.75
Total	13,720	100.00	124,595	100.00	138,315	100.00

Table 4.7: Comparison of macrosomic baby in diabetic and non diabetic

We see a two fold increase in macrosomia in diabetic patients at 5.58%. In non-diabetic patients, incidence of macrosomia was at 2.99%. This could partly be the reason contributing to increase caesarean section rates in diabetic patients.

	DM		Non DM		Total	
	n	%	*n*	%	*n*	%
Shoulder dystocia weight ≥4kg	28	34.15	56	25.93	84	28.19
shoulder dystocia weight < 4kg	54	65.85	160	74.07	214	71.81
Total	82	100	216	100	298	100

Table 4.8: Shoulder Dystocia

Incidence of shoulder dystocia in diabetic patients was 0.6% and in non-diabetic patients, the incidence of shoulder dystocia was at 0.17%. Diabetic mothers had 3 times higher risk of shoulder dystocia than non-diabetics

Total number of delivery (*n*)	Total number of diabetic mother (*n*)	Total number of asphyxia with DM (*n*)	%	Total number of non diabetic mother (*n*)	Total number of asphyxia without DM (*n*)	%
138315	13720	741	5.71	124595	6,696	5.37

Table 4.9: Comparison of birth asphyxia between diabetic and non-diabetics

There was no difference in birth asphyxia (Apgar score ≤7 at 1 min) rates in diabetic as well as non diabetic patients

Fetal Outcome	Pre-existing Diabetes	GDM	Total DM	Total Non-Diabetic	Total
MSB	10	86	96	626	722
FSB	2	18	20	301	321
Total Stillbirth	12	104	116	927	1043
Stillbirth Rate per 1000 LB	**0.09**	**0.76**	**0.84**	**6.75**	**7.6**

Table 4.10: Stillbirth (Macerated Still Birth and Fresh Still Birth)

Total stillbirth rate was 7.6 per 1000 live births as seen from the 2010 NOR data. Stillbirth rates in diabetic patients were 0.84 per 1000 live births and this contributed to 11% of total stillbirths. Causes of stillbirth can be multifactorial and majority of them cannot be explained.

4.5 Conclusion

The overall incidence of Diabetic pregnancy from data obtained from National Obstetric Registry in year 2010 involving 14 major state government hospitals was 9.9%. This rate was slightly lower compared to the previous NOR report in 2009. The overall prevalence of diabetes mellitus in National Health Morbidity Survey III (NHMS III) was reported at 11.6%. Indian ethnicity had a higher prevalence at 14.39%, followed by the Malays and Chinese at 11.37% and 10.4% respectively.
In diabetic patients, incidence of macrosomia was doubled, caesarean section rate were higher and shoulder dystocia increased by 3 folds as compared to non-diabetic patients and there was no difference in birth asphyxia incidence.

4.6 Recommendation

1. Pre-pregnancy counseling for women with diabetes and to have good glycaemic control before they plan for a pregnancy.
2. Detection of diabetes at booking in women with risks factors to reduce maternal and perinatal morbidity and mortality.
3. Women with diabetes in pregnancy should have good glycaemic control throughout pregnancy to prevent macrosomia and its associated complications.

4.7 References

1. NICE Clinical Guideline 63 – Diabetes in Pregnancy, March 2008.
2. Prevalence of Diabetes in the Malaysian National Health Morbidity Survey III 2006.
3. National Obstetric Registry 2009.

CHAPTER 5

BREECH

Chapter 5 : BREECH

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5.1 Summary

The incidence of breech deliveries is 3.19%. 11.9% of Caesarean section was due to breech. Percentage of birth asphyxia in vaginal breech delivery among babies weighing less that 1000gms was higher compared to caesarean breech deliveries. 1.2% of vaginal breech delivery had ECV. In the current practice breech babies are increasingly delivered by caesarean section.

5.2 Introduction

Participating Hospitals	Vaginal Breech (*n*)	%
Hospital Tuanku Fauziah, Perlis	19	2.91
Hospital Sultanah Bahiyah, Kedah	38	5.81
Hospital Pulau Pinang	12	1.83
Hospital Raja Permaisuri Bainun, Perak	33	5.05
Hospital Tengku Ampuan Rahimah ,Selangor	69	10.55
Hospital Kuala Lumpur	64	9.79
Hospital Tuanku Jaafar,Seremban	17	2.60
Hospital Melaka	51	7.80
Hospital Sultanah Aminah, Johor	104	15.90
Hospital Tengku Ampuan Afzan, Pahang	29	4.43
Hospital Sultanah Nur Zahirah, Terengganu	86	13.15
Hospital Raja Perempuan Zainab II, Kelantan	73	11.16
Hospital Umum Sarawak	53	8.10
Hospital Likas, Sabah	6	0.92
Total	654	100

Table 5.1: Distribution of Total breech deliveries by centre

The incidence of breech is 3.19%. Some of the participating hospitals show a much higher proportion of fetuses delivered as breech (up to 16%) There may be bias reporting as some multiple pregnancies with breech presentations have been included. There have been a lower proportion of fetuses delivered as breech and this may be due to under reporting Issues related to reporting have been identified and address.

5.3 Patient Demographic

Ethnicity	Vaginal Breech		Caesarean Breech		Total	
	n	%	*n*	%	*n*	%
Malay	477	72.94	2,569	68.32	3,046	69.01
Chinese	35	5.35	283	7.53	318	7.20
Indian	35	5.35	157	4.18	192	4.35
Kadazan/ Dusun	5	0.76	117	3.11	122	2.76
Murut	2	0.31	13	0.35	15	0.34
Bajau	2	0.31	66	1.76	68	1.54
Melanau	0	0.00	1	0.03	1	0.02
Iban	13	1.99	80	2.13	93	2.11
Bidayuh	9	1.38	59	1.57	68	1.54
Orang Asli (Peninsular Malaysia)	7	1.07	48	1.28	55	1.25
Other indigenous group in Sabah & Sarawak	2	0.31	64	1.70	66	1.50
Foreigner	60	9.17	261	6.94	321	7.27
Others	7	1.07	40	1.06	47	1.06
Unknown	0	0.00	1	0.03	1	0.02
Not Available	0	0.00	1	0.03	1	0.02
Total	654	100	3,760	100	4,414	100

Table 5.2: Distribution of Total breech deliveries by ethnicity

Vaginal breech deliveries were highest among the Malay ethnicity. Caesarean section as a mode of delivery for breech presentation was 68.32%. The incidence of breech was low among the indigenous groups in Malaysia. Caesarean section as a mode of delivery for breech presentation was 6.98% in the foreigners.

11.9% of Caesarean section was due to breech. and this was because the Term Breech Trial endorsed planned Caesarean section was a safer option than a planned vaginal delivery .This increasing trend has continued in spite of the Royal College of Obstetrics and Gynaecology suggesting vaginal breech is still an option in carefully selected cases. The number of Caesarean sections needed to prevent a perinatal death was estimated to be 175 in a Dutch Study. In the current environment of Labour Room staffs being inexperienced in delivering breech and further compounded by an increasing number of medico legal litigations for adverse fetal outcomes the rates are expected to increase. It has to be emphasized more training in delivering breech vaginally before we forget this essential skill which Obstetricians are proud of . This will also reduce maternal morbidity and possible long term sequel of Caesarean Sections such as Placenta Previa and Placenta Accreta

Age (years)	Vaginal Breech		Caesarean Breech		Total	
	n	%	*n*	%	*n*	%
10-20	59	9.02	255	6.78	314	7.11
21-30	311	47.55	2,080	55.32	2,391	54.17
31-40	256	39.14	1,288	34.26	1,544	34.98
41-50	27	4.13	135	3.59	162	3.67
Missing	1	0.15	2	0.05	3	0.07
Total	654	100	3,760	100	4,414	100

Table 5.3: Distribution of Total breech deliveries by Age

47.55% of patients in the 21-30 years age group had a vaginal breech delivery and this was similar to the findings reported in the NOR 2009 report. 55.32% of patients in this age group had a caesarean section as mode of delivery.

5.4 Outcomes

Weight (grams)	Vaginal Breech		Apgar score		Caesarean Breech		Apgar score	
			1min ≤7	5min ≤7			1min ≤7	5min ≤7
	n	%	*n* (%)	*n* (%)	*n*	%	*n* (%)	*n* (%)
<1000	158	24.16	60 (33.90)	50 (57.47)	44	1.17	21 (04.98)	9 (20.45)
1001-1500	45	6.88	17 (09.60)	8 (09.20)	76	2.02	36 (08.53)	7 (15.91)
1501-2000	75	11.47	24 (13.56)	9 (10.34)	175	4.65	56 (13.27)	9 (20.45)
2001-2500	145	22.17	27 (15.25)	6 (06.90)	660	17.55	88 (20.85)	10 (22.73)
2501-3000	158	24.16	29 (16.38)	5 (05.75)	1,451	38.59	109 (25.83)	5 (11.36)
3001-3500	54	8.26	13 (07.34)	5 (05.75)	1,012	26.91	77 (18.25)	3 (06.82)
3501-4000	8	1.22	4 (02.26)	2 (02.30)	275	7.31	27 (06.40)	0 (00.00)
>4000	11	1.68	3 (01.69)	2 (02.30)	67	1.78	8 (01.90)	1 (02.27)
Total	654	100	175 (100)	87 (100)	3,760	100	422 (100)	44 (100)

Table 5.4: Distribution of Total breech deliveries by weight

The women suitable for vaginal delivery should have fetuses weight between 2.5 kg to 4 kg Looking at this group it is encouraging that outcomes are similar between the group which had achieved a vaginal delivery and that which had a Caesarean section. About 3/5 of all births were below 2.5 kg. This is expected as most fetuses which are preterm present in breech presentation. The number of fetuses below 1 kg

delivered vaginally may be due to the fact that they are extremely premature with probably poor perinatal outcome.

Presentation	**Total Deliveries (*n*)**	ECV			Total Caesarean Section		**Vaginal Breech delivery**	
		Successful	Not Successful	Not Done	Elective (*n*)	Emergency (n)	***n***	**%**
Breech	**654**	**2**	**6**	**646**	1,429	2,331	**654**	**100**

Table 5.5: Indications of Caesarean Section poster

External Cephalic Version (ECV) is a trans abdominal manual rotation of the fetus into cephalic presentation. 1.2% of vaginal breech delivery had ECV. In the current practice breech babies are increasingly delivered by caesarean section.

5.5 Complications

Complications of pregnancy and delivery	Vaginal Breech		Caesarean Breech	
	n	%	*n*	%
Congenital Abnormality	32	34.41	3	2.26
Prematurity	45	48.39	95	71.43
IUD	3	3.23	34	25.43
Genital tract trauma	13	13.98	-	-
Birth injuries	0	0.00	1	0.75
Total	93	100	133	100

Table 5.6: Distribution of Total breech deliveries by complications

34.41% of vaginal breech deliveries were complicated by congenital abnormality. There were no birth injuries reported for vaginal breech delivery, however this may be under reporting. 13.98 % of vaginal breech cases had been complicated by genital trauma.

5.6 Conclusion

Vaginal breech delivery requires an experienced obstetrician and midwife as there is an increase rate of perinatal morbidity and mortality. ECV is an alternative to vaginal breech delivery and at the same time the rational is to avoid caesarean section as a mode of delivery. Only 1.2% of vaginal breech delivery had ECV done.

5.7 Recommendation

1. Women should be counseled that ECV reduces the chance of breech presentation at delivery.
2. Women should be informed that ECV lowers their chances of having a Caesarean section.
3. ECV should be offered from 36 weeks in nulliparous women and from 37 weeks in multiparous women.
4. Policies should be implemented to increase the number of ECV offered.

5.8 References

1. External cephalic version and reducing the incidence of breech presentation. RCOG Guideline No 20 a, 2010
2. Is there a place for selective vaginal breech delivery in Malaysian Hospitals: experiences from the Ipoh Hosp. Journal of Maternal Fetal and Neonatal Medicine. Feb 2009

CHAPTER 6

STILLBIRTH

CHAPTER 6 STILLBIRTH

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6.1 Summary

A total of 1043 Stillbirth were reported from 138,315 deliveries from 14 tertiary public hospitals throughout Malaysia.

6.2 Introduction

Stillbirth is defined as birth of an infants 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. Overall, over one third of Stillbirths are small-for-gestational-age fetuses with almost half of its causes are unknown. The 8th Annual Report of the Confidential Enquiries into Stillbirths and Deaths in Infancy (CESDI) identified some component of suboptimal care in half of these pregnancies. Further breakdown for differences in macerated and Fresh Stillbirth will not be assessed in this chapter.

Participating Hospitals	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
Hospital Tuanku Fauziah, Perlis	3,761	17	5	5.88
Hospital Sultanah Bahiyah, Kedah	10,524	61	21	7.85
Hospital Pulau Pinang	4,626	14	10	5.22
Hospital Raja Permaisuri Bainun, Perak	8,070	37	20	7.11
Hospital Tengku Ampuan Rahimah, Selangor	10,719	43	36	7.42
Hospital Kuala Lumpur	11,894	122	41	13.89
Hospital Tuanku Jaafar, Seremban	5,754	19	9	4.89
Hospital Melaka	10,462	37	19	5.38
Hospital Sultanah Aminah, Johor	12,671	68	41	8.68
Hospital Tengku Ampuan Afzan, Pahang	9,402	47	23	7.50
Hospital Sultanah Nur Zahirah, Terengganu	12,122	80	21	8.40
Hospital Raja Perempuan Zainab II, Kelantan	12,356	76	29	8.57
Hospital Umum Sarawak	11,065	53	25	7.10
Hospital Likas, Sabah	14,889	48	21	4.66
Total	**138,315**	**722**	**321**	**7.60**

Table 6.1: Stillbirth rate from Participating Hospitals

The overall Stillbirth rate from the participating hospitals was 7.54 per 1000 live birth , with the lowest rate from Hospital Likas, Sabah at 4.86 /1000 live births and the highest rate from Hospital Kuala Lumpur at 13.89/1000 live births. The rate has

remained the same as reported in the NOR 2009 report. The gross differences among these participating hospitals could be most likely due to its position as centre of referral for the region in handling cases such as Macerated Stillbirth and Lethal Congenital Anomalies.

6.3 Patient demographics

Age (years)	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
10 - 20	10,648	48	26	7.00
21 - 30	80,691	364	166	6.61
31 - 40	43,352	260	115	8.73
41 - 50	3,524	50	14	18.50
51 - 55	15	0	0	0.00
Missing	85	0	0	0.00
Total	**138,315**	**722**	**321**	**7.60**

Table 6.2: Distribution of stillbirth by Age

Table 6.2 shows the correlation between age and Stillbirth rates. The highest Stillbirth rate was seen in women in their forties which is reported at 18.50/1000 live births as compare to 7.00 and 6.61/1000 live births respectively in the age group of 10-20 years and 21-30 years respectively. There is also a slight increase of Stillbirth rates in the age group 31-40 years which recorded at 8.73/1000 live births when compared to the NOR 2009 report. These results are congruent with literature and studies that show women less than 35 years of age, the Stillbirth rate increases by two-folds for women between 35–39 years of age, and 3 to 4 folds for women aged above 40 years. While some age associated risk is due to higher rates of maternal complications, in uncomplicated pregnancies there may be a 50 percent increased risk associated only with maternal age 35 years and more. For older women, Stillbirth risk increases as gestational age increases 37 weeks and beyond.

Ethnicity	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
Malay	94,451	502	198	7.47
Chinese	8,897	40	22	7.02
Indian	6,932	45	23	9.91
Kadazan/Dusun	4,425	11	5	3.63
Murut	345	3	1	11.73
Bajau	3,123	12	6	5.80
Melanau	122	0	0	0.00
Iban	2,361	6	11	7.25
Bidayuh	1,799	15	0	8.41
Orang Asli (Peninsular Malaysia)	963	8	4	12.62
Other indigenous group in Sabah & Sarawak	2,641	9	6	5.71
Other	1,743	6	3	5.19
Foreigners	10,337	64	42	10.36
Unknown	41	0	0	0.00
Not Available	29	0	0	0.00
Missing	106	1	0	9.52
Total	**138,315**	**722**	**321**	**7.60**

Table 6.3: Distribution of stillbirth by Ethnicity

Table 6.3 shows Stillbirth rates between different ethnicity in Malaysia The highest stillbirth rate was among the indigenous groups in Malaysia, namely, Orang Asli (Peninsular Malaysia) and Murut which was at 12.62 and 11.73/1000 live birth respectively. However, when compared to the 2009 NOR report , the Still birth rates in Orang Asli (Peninsular Malaysia)had declined from 20.00 to 12.42/ 1000 live births. Among the 3 major ethnic groups, Indians still have the highest Stillbirth rates at 9.91/ 1000 live births.

	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
Diabetes	**13,720**	**98**	**25**	**9.05**
Pre-existing	1,018	10	2	11.93
Gestational	11,988	86	18	8.75
Hypertension	**7,688**	**84**	**39**	**16.26**
Pre-existing	1,186	15	4	16.28
Gestational	**5,293**	**51**	**24**	**14.37**
Pre-Eclampsia	1,050	13	14	26.39
Eclampsia	74	1	1	27.78

Table 6.4: Diabetes mellitus and hypertensive disorder in pregnancy associated to stillbirth

Table 6.4 shows Diabetes and Hypertension in pregnancy associated with Stillbirth. Hypertensive disorder in pregnancy accounted for highest Stillbirth rate at 16.26/1000 live births and Diabetes in pregnancy accounted for 9.05/1000 live births. Pregnancy induced hypertension accounted for Stillbirth rates at 14.37/1000 live births .These results are consistent with most studies.

Hypertensive disorders have a strong adverse impact on Stillbirth suggesting that early diagnosis during pregnancy and adequate medical intervention may reduce the risk of Stillbirth. Women with Diabetes complicating pregnancy have an increased risk of second and third trimester Stillbirths. It is important to have good glycemic control in these patients and management of these patients should involve the Endocrinologist, Neonatologist and Dietician to improve survival rates

6.4 Stillbirth and risk level at booking

Risk Level at Booking	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
Red	2,998	37	18	18.69
Yellow	10,431	67	20	8.41
Green	68,273	342	141	7.12
White II	4,232	16	5	4.99
White I	18,844	84	39	6.57
No Code	4,797	51	21	15.24
Unknown	994	13	13	26.86
Not Available	1,890	20	17	19.97
Missing	25,856	92	47	5.40
Total	**138,315**	**722**	**321**	**7.60**

Table 6.5: Color coding at booking associated with stillbirth

Antenatal risk coding was to identify pregnancies that are of greater risk and to appropriately manage these women. Table 6.5 shows patients coded red had a high Stillbirth rate at 18.469/1000 live births. Since this field was not a mandatory field in the CRF the missing data is high and the results available may not be accurate.

6.5 Stillbirth and Birth weight

Birth Weight (grams)	Total deliveries (n)	Macerated Stillbirth (n)	Fresh Stillbirth (n)	Stillbirth Rate
< 1000	1,931	287	124	270.39
1000 - 1500	1,578	104	38	98.89
1501 - 2000	3,681	93	36	36.32
2001 - 2500	15,767	86	47	8.51
2501 - 3000	48,822	68	31	2.03
3001 - 3500	48,108	51	30	1.69
3501 - 4000	13,932	15	9	1.73
> 4000	4,496	18	6	5.37
Total	**138,315**	**722**	**321**	**7.60**

Table 6.6: Stillbirth and Birth weight

Table 6.6 shows Stillbirth rates to birth weight. Majority of the Stillbirths had Low Birth Weight (i.e. Birth weight of less than 2500gm) Stillbirth rates in extremely Low Birth Weight group (i.e. Birth weight of less than 1000gm) was at 270.39/1000 live births . Stillbirth rates among fetuses with birth weight of more than 4000gm, was 6.2/1000 live births

6.5: Conclusion

The Stillbirth rate was at 7.60 per 1000 live births from the data obtained from the 14 tertiary hospitals in Malaysia is higher compare to the Stillbirth rates for the country however the rates remained static from 2009, as reported in the Preliminary report of the National Obstetric Registry .Advanced maternal age, Diabetes Mellitus and Hypertension complicating pregnancy had higher Stillbirth rates and these are consistent with most studies. Stillbirth rates in the indigenous people in Peninsular Malaysia were the highest at 12.62 per 1000 live births and among the 3 major ethnic groups, Indians had the highest Stillbirth rates at 9.91/ 1000 live births. Overall stillbirth rates were higher in mothers with color code Red at booking.

6.6: Recommendation

1. All mothers with advanced maternal age should have early booking and follow up at hospitals with specialists which offers prenatal screening
2. Early initiation of treatment and optimizing treatment for medical disorder in pregnancy plays a vital role in reducing stillbirth rates.

6.7 : Reference

1. Work up of Stillbirth: A review of the evidence. National Institute of Health, United State May 2007
2. Reducing Stillbirths: Prevention and management of medical disorders and infections during pregnancy. A systematic review 2009. BMC Pregnancy and Childbirth
3. Late Intrauterine Fetal Death and Stillbirth (Green-top 55),RCOG, United Kingdom

CHAPTER 7

PREMATURITY

CHAPTER 7: PREMATURITY

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Hospital Sultanah Nur Zahirah Kuala Terengganu

7.1 Summary

Incidence of preterm delivery rates vary from 6% to 15% worldwide with rate increasing in the recent years. In the participating 14 tertiary public hospitals in Malaysia, preterm delivery birth in 2010 was 8.1%. The incidence was higher in Indian population at 10% and more commonly occurred in mothers at extremes of age and higher parity. 37% of patients with hypertensive disorder were induced and had preterm delivery. About half of the preterm babies were born with good birth weight of more than 2000 grams and were discharged well to mother at birth. 61% of preterm babies successfully delivered vaginally.

7.2 Introduction

Preterm birth is defined as delivery between 22 to 37 completed weeks (259 days) based on WHO classification. However, many developed countries now officially register all deliveries with a birth weight above 500 g. 70% of preterm delivery is due to spontaneous preterm labour with the remaining are indicated preterm deliveries , undertaken for obstetric reasons such as severe hypertensive disorder and intrauterine growth retardation. As outcome of preterm birth varies according to gestation, it can be classified into mild preterm (32^{+0} to 36^{+6}), moderately preterm (28^{+0} to 31^{+6}) and extremely preterm birth (24^{+0} to 27^{+6}). The risk of disability and neurological impairment notably increase with decreasing gestational age.

Premature Birth	No	%
Total preterm delivery	11,219	8.1
Total delivery	138,315	100.0

Table 7.1: Total number of premature delivery in year 2010

There were a total of 11,219 preterm deliveries which accounted for 8.1% of all deliveries in the 14 participating hospitals.

Participating Hospitals	n	%
Hospital Tuanku Fauziah, Perlis	430	3.84
Hospital Sultanah Bahiyah, Kedah	4	0.04
Hospital Pulau Pinang	546	4.87
Hospital Raja Permaisuri Bainun, Perak	963	8.59
Hospital Tengku Ampuan Rahimah, Selangor	1,267	11.30
Hospital Kuala Lumpur	1,502	13.39
Hospital Tuanku Jaafar, Seremban	388	3.46
Hospital Melaka	1,111	9.91
Hospital Sultanah Aminah, Johor	1,343	11.97
Hospital Tengku Ampuan Afzan, Pahang	59	0.53
Hospital Sultanah Nur Zahirah, Terengganu	1,136	10.13
Hospital Raja Perempuan Zainab II, Kelantan	1,252	11.16
Hospital Umum Sarawak	1,218	10.86
Hospital Likas, Sabah	0	0.00
Total	**11,219**	100.00

Table 7. 2: Distribution of total prematurity birth based on Hospital

Hospital Kuala Lumpur had the highest preterm delivery rate at 13.4%. The least number of preterm deliveries was from Hospital Sultanah Bahiyah, Kedah and Hospital Tengku Ampuan Afzan, Pahang at 0.1% and 0.5% respectively, whereas there was no case reported in Hospital Likas. The wide discrepancy in the number of preterm delivery in different hospitals was possibly due to underreporting.

7.3 Patient Demographic

Majority of the preterm deliveries were seen in maternal age group of 21-30 years and among multiparous women. The highest rate were seen among the Malay ethnicity

Age (years)	Preterm delivery		Total delivery	
	n	%	N	%
10 – 20	1,057	9.9	10,572	10.1
21 – 30	5,672	53.2	79,879	7.1
31 – 40	3,526	33.1	42,827	8.2
41 – 50	399	3.8	3,478	11.5
51 – 55	0	0	15	<0.1
Missing	8	0.1	85	9.4
Total	**10,662**	**100.0**	**136,856**	

Parity	Preterm delivery		Total delivery	
	n	%	N	%
1	4126	36.8	48,038	8.6
2-5	6271	65.9	81,820	7.7
≥ 6	818	7.3	8,204	10.0
Unknown	4	0.1	253	1.6
Total	**11219**	**100.0**	**138315**	

Ethnicity	Preterm delivery		Total delivery	
	n	%	N	%
Malay	7,833	73.5	93,463	8.4
Chinese	671	6.3	8,778	7.6
Indian	765	7.2	6,836	11.1
Kadazan/Dusun	18	0.2	4,390	0.4
Murut	7	0.1	343	2.0
Bajau	27	0.3	3,100	0.8
Melanau	14	0.1	120	1.7
Iban	291	2.7	2,338	12.4
Bidayuh	161	1.5	1,786	9.0
Orang Asli (Peninsular Malaysia)	91	0.9	956	9.5
Other indigenous group in Sabah & Sarawak	31	0.3	2,621	1.2
Other	78	0.7	1,725	4.5
Foreigners	661	6.2	10,224	6.5
Unknown	3	<0.1	41	7.3
Not Available	1	<0.1	29	3.4
Missing	10	0.1	106	9.4
Total	**10,662**	**100.0**	**136,856**	

Table 7.3: Distribution of total premature deliveries (POG < 37 weeks) by age group and parity and ethnicity

The preterm delivery rates were 7.3% in grand multiparous women. Preterm deliveries was seen at 7.2% in Indians and in foreigners the rate was at 6.2%.The rates were the lowest in the indigenous group Murut at 0.1%

Multiple pregnancy	Preterm delivery	
	n	%
Singleton	10121	90.2
Twin	1052	9.4
Triplets	42	0.4
Others	4	0.1
Total	**11219**	**100.0**

Table 7.4: Distribution of total premature deliveries (POG < 37 weeks) by number of pregnancy

The incidence of preterm deliveries were higher in singleton pregnancies at 90.2% as compared to higher order pregnancies

Birthweight (grams)	Total Preterm Delivery	
	n	%
≤ 1000	694	6.2
1001 – 1500	930	8.3
1501 – 2000	1,784	15.9
2001 – 2500	3,130	27.9
2501 – 3000	2,911	25.9
3001 - 3500	1,319	11.8
3501 – 4000	267	2.3
≥ 4001	184	1.6
Total	**11,219**	**100.0**

Table 7.5: Distribution of total premature deliveries (POG < 37 weeks) by birth weight

Of the total number of preterm babies, 27.9% had birth weight ranging from 2001-2500 grams and 25.9% had birth weight ranging from 2501-3000 grams. Only 6.2% had birth weight of less than 1000 grams.

7.4 Contributing factors for preterm deliveries

Medical Problem History	n	%
Diabetes	**1,377**	**37.8**
Pre-existing	113	3.3
Gestational	1,199	32.9
Not Available	30	0.8
Missing	35	0.9
Hypertension	**1,352**	**37.1**
Pre-existing	206	5.7
Gestational	**890**	**24.4**
PIH without Proteinuria	337	9.3
Pre Eclampsia	383	10.5
Eclampsia	30	0.8
Chronic HPT with superimpose PE	183	5.0
Unclassified	13	0.4
Not Available	24	0.7
Missing	36	0.9
Heart Disease	**84**	**2.3**
TB	6	0.1
Blood Disorder	38	1.0
Collagen Disease	0	0.0
Asthma	244	6.7
Renal Disease	15	0.4
Others	524	14.4
Total	**3640**	

Table 7.6: Distribution of total preterm deliveries (POG < 37 weeks) based on underlying medical disorder

The percentage of preterm deliveries was 37.8 % in women with diabetes and 37.1% in women with Hypertension in pregnancy

Delivery By	Total Preterm Delivery	
	n	%
Specialist	589	5.2
MO>6 months O&G experience	4,591	40.9
MO<6 months O&G experience	1,032	9.2
MO no O&G experience	40	0.4
Other MO	184	1.6
Staff Nurse	2,779	24.8
Community Nurse / Government Midwife / JD	1,104	9.8
Trained Traditional Birth Attendant	7	0.1
Untrained Traditional Birth Attendant	7	0.1
Unattended	34	0.3
Others	404	3.6
Unknown	4	<0.1
Not Available	5	<0.1
Missing	439	3.9
Total	**11,219**	

Table 7.7: Distribution of total premature deliveries (POG < 37 weeks) based on operator

Out of 11219 preterm deliveries, 40.9% were conducted by medical officers with more than 6 months O&G experience and 24.8% were conducted by staff nurses.

7.5 Mode of delivery

Birthweight (grams)	Total Preterm Delivery	
	n	%
Vaginal	**7,064**	**60.6**
SVD	6,802	60.6
Breech	261	2.3
Not Available	1	<0.1
Instrumental	**207**	**1.8**
Forceps	64	0.5
Vacuum	143	1.3
Caesarean	**3,892**	**34.2**
Classical	26	0.2
LSCS	3,855	34.2
Hysterotomy	11	<0.1
Not Available	**2**	**<0.1**
Missing	**54**	**<0.1**
Total	**11,219**	**100%**

Table 7.8: Distribution of total preterm deliveries (POG < 37 weeks) by mode of delivery

60.6 % of preterm deliveries had a spontaneous vertex deliveries and 34.2 % had a Caesarean section.

7.6 Complications and outcomes

Baby Discharged To	Total Preterm Delivery	
	n	%
Mother	5,565	49.6
Admitted to NICU	2,422	21.6
Nursery	2,690	24.0
Mortuary	501	4.5
Not Available	40	<0.1
Missing	1	<0.1
Total	**11,219**	

Table 7.9: Distribution of total preterm deliveries (POG < 37 weeks) by birth status

Preterm babies discharged to mother was 49.6% and 21.6% was admitted to NICU.

Birthweight (grams)	Total Preterm Delivery					
	Apgar 1 min			Apgar 5 min		
	≤ 7	> 7	Missing	≤ 7	> 7	Missing
≤ 1000	291	142	261	189	221	284
1001 - 1500	355	495	80	119	698	113
1501 - 2000	358	1,345	81	81	1,584	119
2001 - 2500	308	2,766	56	41	2,963	126
2501 - 3000	186	2,697	28	42	2,770	99
3001 - 3500	88	1,219	12	14	1,274	31
3501 - 4000	21	241	5	2	257	8
≥ 4001	30	115	39	9	131	44
Total	**1,637**	**9,020 (80.4%)**	**562**	**497**	**9,898 (88.2%)**	**824**

Table 7.10: Distribution of total premature deliveries (POG < 37 weeks) by birth weight and Apgar score

Of the total number of preterm babies, 80.4 % had Apgar score more than 7 at 1 minute and 88.2% had Apgar score of more than 7 at 5 minutes.

7.7 Conclusion

The incidence of preterm deliveries in all the participating hospitals was 8.1% and it is among the lowest worldwide. However it is an important issue to be addressed because preterm birth causes significant morbidity and mortality. Improvement in any intervention to prevent preterm deliveries is vital in assuring better neonatal outcome globally. In addition, lack of adequate data collected may also hamper effective policies and research planning.

7.8 Recommendation

1) Improvement in data collection may be achieved by strengthening the existing data collection mechanisms and by increasing the compliance with the standard definitions of gestational age.

2) Increase in obstetric intervention such as tocolysis will reduce the risk of morbidities. Further research is needed in assessing the most effective tocolysis for cases of threatened preterm labour.

3) Analysis on the effect of preterm births compared to term deliveries may help to identify the risk of mortality and morbidity and also may able to separate direct from indirect risks.

7.9 Reference

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CHAPTER 8

ANAEMIA

Chapter 8: ANAEMIA

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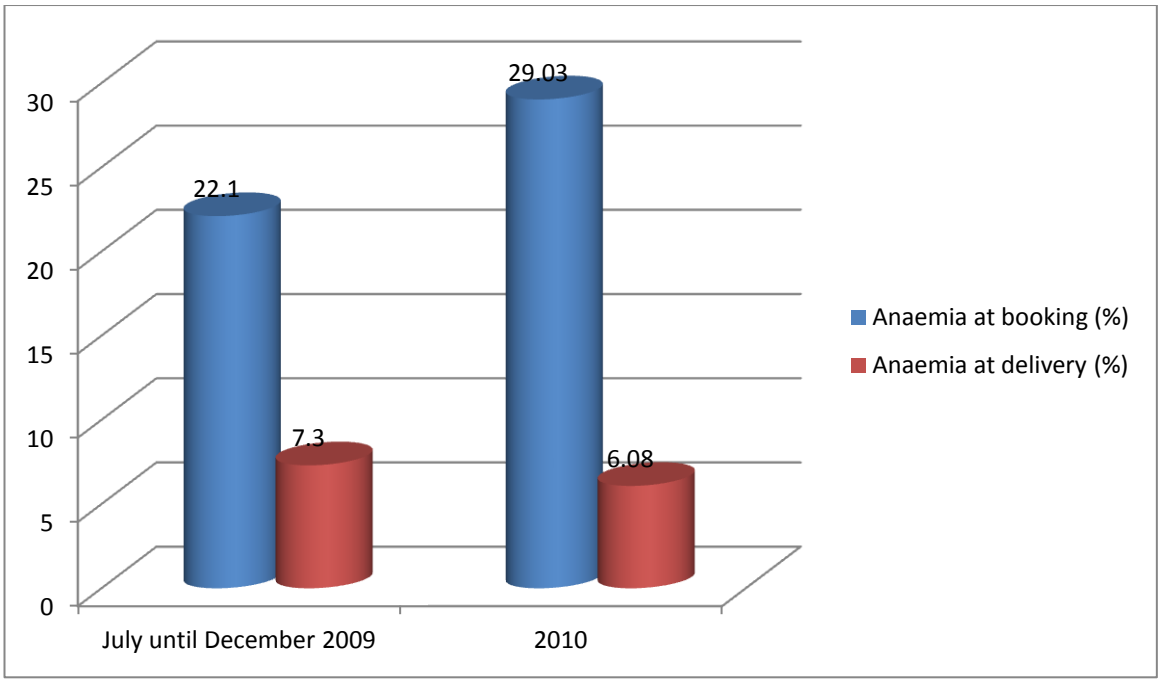
8.1 Summary

The incidence of anaemia at booking was 29.03% and this reduced to 6.08% at delivery. In comparison to the 2009 NOR report the cases with anaemia at booking were higher but we also see an improvement in the management as the number of cases at delivery are less compared to 2009. Indian ethnicity had the highest rate of anaemia at booking followed by the Orang Asli (Peninsular Malaysia).The highest rate of anaemia at delivery was also seen in the Orang Asli (Peninsular Malaysia) Patients in age group 10-20 years and parity of 6 and more had the highest incidence of anaemia at booking.



Graph 8.1: Anaemia at booking and anaemia at delivery from July until December 2009 and in 2010

8.2 Introduction

During pregnancy, plasma volume increases disproportionately in comparison to the increase of red cell mass, leading to the physiological change of lower haemoglobin (Hb) level. NICE guidelines defines anaemia as haemoglobin of 11g/dL at first contact, 10.5g/dL at 28 weeks gestation and 10.0g/dL at postpartum. In this report, the reference level of <11g/dL was taken as anaemia. 85% of anaemia is due to iron-deficiency

Category	N (Total number of mother)	Total of deliveries	%
Anaemia at booking	39,734	136,856	29.03
Anaemia at delivery	8,325	136,856	6.08

Table 8.1 Anaemia at booking and delivery in 2010

From the above table 29.03% of pregnant mothers were anaemic at booking and due to effective management the incidence reduced to 6.08% at delivery

8.3 Patient Demographic

Participating Hospitals	Total number of patients	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
Hospital Tuanku Fauziah, Perlis	3,739	875	23.40	874	23.38
Hospital Sultanah Bahiyah, Kedah	10,404	2,762	26.55	81	0.78
Hospital Pulau Pinang	4,567	1,430	31.31	583	12.77
Hospital Raja Permaisuri Bainun, Perak	7,983	2,636	33.02	1,392	17.44
Hospital Tengku Ampuan Rahimah, Selangor	10,586	3,675	34.72	195	1.84
Hospital Kuala Lumpur	11,771	4,033	34.26	2,041	17.34
Hospital Tuanku Jaafar, Seremban	5,694	1,716	30.14	82	1.44
Hospital Melaka	10,355	3,313	31.99	1,051	10.15
Hospital Sultanah Aminah, Johor	12,507	3,334	26.66	72	0.58
Hospital Tengku Ampuan Afzan, Pahang	9,297	2,359	25.37	669	7.20
Hospital Sultanah Nur Zahirah, Terengganu	12,007	2,963	24.68	989	8.24
Hospital Raja Perempuan Zainab II, Kelantan	12,200	3,580	29.34	208	1.70
Hospital Umum Sarawak	10,969	2,960	26.99	37	0.34
Hospital Likas, Sabah	14,777	4,098	27.73	51	0.35
Total	**136,856**	**39,734**	**29.03**	**8,325**	**6.08**

Table 8.2 Distribution of Anaemia at booking and at delivery by center

The highest incidence of anaemia at booking was from Hospital Tengku Ampuan Rahimah, Selangor at 34.72% followed by Hospital Kuala Lumpur and Hospital Raja Permaisuri Bainun, Perak at 34.26% and 33.02% respectively. Anaemia at delivery, was the highest from Hospital Tuanku Fauziah, Perlis at 23.38% and this was followed by Hospital Raja Permaisuri Bainun, Perak and Hospital Kuala Lumpur at 17.44% and 17.34% respectively. It is an interesting finding that both the incidence rate of anaemia at booking and anaemia at delivery in 2010 remained the same for Hospital Tuanku Fauziah, Perlis.

Participating Hospitals	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
Malay	93,463	26,346	28.19	6,372	6.82
Chinese	8,778	2,290	26.09	339	3.86
Indian	6,836	2,865	41.91	714	10.44
Kadazan/Dusun	4,390	1,268	28.88	52	1.18
Murut	343	95	27.70	8	2.33
Bajau	3,100	936	30.19	29	0.94
Melanau	120	31	25.83	5	4.17
Iban	2,338	585	25.02	33	1.41
Bidayuh	1,786	435	24.36	20	1.12
Orang Asli (Peninsular Malaysia)	956	351	36.72	124	12.97
Other indigenous group in Sabah & Sarawak	2,621	737	28.12	9	0.34
Other	1,725	476	27.59	70	4.06
Foreigners	10,224	3,265	31.93	539	5.27
Unknown	41	12	29.27	2	4.88
Not Available	29	8	27.59	1	3.45
Missing	106	34	32.08	8	7.55
Total	**136,856**	**39,734**	**29.03**	**8,325**	**6.08**

Table 8.3 Distribution of anaemia at booking and at delivery by ethnicity

Indian ethnicity had the highest rate of anaemia at booking at 41.91% and this was followed by Orang Asli in Peninsular Malaysia.at 36.72%. Orang Asli (Peninsular Malaysia) also had the highest rate of anaemia at delivery and this was followed by Indians. This finding is similar to the data obtained from NOR 2009 report. The lower socio-economic background and poor dietary intake may explain the lack of improvement of the incidence rate of anaemia at delivery among the Orang Asli in Peninsular Malaysia.

Age yrs	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
10 - 20	10,572	4,167	39.42	672	6.36
21 - 30	79,879	21,996	27.54	4,920	6.16
31 - 40	42,827	12,392	28.94	2,520	5.88
41 - 50	3,478	1,155	33.21	207	5.95
51 - 55	15	4	26.67	0	0.00
Missing	85	20	23.53	6	7.06
Total	**136,856**	**39,734**	**29.03**	**8,325**	**6.08**

Table 8.4 Distribution of anaemia at booking and at delivery by age

Anaemia in pregnancy is a common problem in teenage pregnancy. The above data is similar to the NOR 2009 report. The incidence rate of anaemia in this age group reduced to 6.4% at time of delivery. Ignorant about pre-pregnancy care and unstable socio-economic status may attribute to the high percentage of anaemia in this 10-20 year-old age group.

Parity	Total	Anemia at booking		Anemia at delivery	
	N	N	%	N	%
1	47,573	13,233	27.82	2,649	5.57
2 - 5	80,925	23,368	28.88	5,119	6.33
≥ 6	8,106	3,056	37.70	554	6.83
Unknown	252	77	30.56	3	1.19
Total	**136,856**	**39,734**	**29.03**	**8,325**	**6.08**

Table 8.5 Distribution of Anaemia at booking and at delivery by parity

When we analyze anaemia in pregnancy based on the parity, it was noted that parity 6 and more had the highest incidence rate of anaemia at booking. However, this incidence rate reduced to 6.83% at delivery, which was similar to other parity groups. Considering the fact that grandmultiparity is strongly related to uterine atony and post-partum haemorrhage, it is crucial for early identification of anaemia and treatment.

8.4 Complications and Outcome

Mode of delivery	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
Vaginal	**98,973**	**29,662**	**29.97**	**5,631**	**5.69**
SVD	98,324	29,469	29.97	5,600	5.70
Breech	640	191	29.84	31	4.84
Not Available	9	2	22.22	0	0.00
Instrumental	**5,724**	**1,501**	**26.22**	**224**	**3.91**
Vacuum	5,022	1,318	26.24	26	0.52
Forceps	702	183	26.07	198	28.21
Caesarean	**31,188**	**8,303**	**26.62**	**2,447**	**7.85**
LSCS	31,001	8,255	26.63	2,425	7.82
Classical	163	42	25.77	21	12.88
Hysterotomy	24	6	25.00	1	4.17
Not Available	**20**	**10**	**50.00**	**0**	**0.00**
Missing	**951**	**258**	**27.13**	**23**	**2.42**
Total	**136,856**	**39,734**	**29.03**	**8,325**	**6.08**

Table 8.6 Distribution of anaemia at booking and at delivery by mode of delivery

4.17% of patients who had a hysterotomy were anaemic 12.88% of patients that had a classical Caesarean section and 7.82% of patients that required a lower segment

Caesarean section were anaemic at delivery. Decreased haemoglobin concentration places the patients requiring surgical intervention at higher risk and therefore it is vital to identify and treat anaemia effectively antenatally.

Mode of delivery	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
Hysterectomy	65	22	33.85	13	20.00

Table 8.7 Distribution of Anaemia at booking and at delivery among the patients that require hysterectomy

Among patients that required hysterectomy at the time of delivery, 20% of them were anaemic. Thus, the importance of identifying and treating anaemia in pregnancy cannot be stressed enough.

Complications	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
PPH <1500 mls	435	127	29.20	45	10.34
PPH ≥ 1500 mls	126	38	30.16	19	15.08
IUGR	176	45	25.57	18	10.23
Prematurity	9,491	3,035	31.98	811	8.54
Fetal Demise	1,010	286	28.32	67	6.63

Table 8.8 Distribution of Anaemia at booking and at delivery and complications of delivery

Table 8.8 analyses the distribution of patient with anaemia at booking and anaemia at delivery in relation to Postpartum Haemorrhage, IUGR, prematurity and fetal demise. 15.08% of the patients with Massive Postpartum Haemorrhage were anaemic at time of delivery.

Mode of delivery	Total	Anaemia at booking		Anaemia at delivery	
	N	N	%	N	%
Apgar score 1min ≤7	7,479	2,080	27.81	520	6.95
Apgar score 1min >7	125,874	36,852	29.28	7,811	6.21
Missing	4,962	1,287	25.94	109	2.20
Apgar score 5min ≤7	1,564	450	28.77	125	7.99
Apgar score 5min >7	115,102	33,889	29.44	7,844	6.81
Missing	21,649	5,880	27.16	471	2.18

Table 8.9 Distribution of Anaemia at booking and at delivery and Apgar scores

Table 8.9 shows the correlation of maternal anaemia and fetal outcome. There was no significant relation between Apgar score and Anaemia from the table above.

8.5 Conclusion

The incidence of Anaemia at booking was 29.03% and this reduced to 6.08% at delivery. Indian ethnicity had the highest rate of Anaemia at booking but Orang Asli had the highest rate of anaemia at delivery. Patients within the age group of 10-20 and parity of 6 and more had the highest incidence of anaemia at booking. Grand multipara had the highest incidence rate of Anaemia at booking at 37.70% and at delivery at 6.83%. 7.85% of the patients that required Caesarean section were diagnosed to have Anaemia at the time of delivery. Anaemia in pregnancy can be treated by oral or parenteral iron supplement but blood transfusion may be required in certain cases.

8.6 Recommendation

1. Prenatal care should include counseling of dietary intake of iron to optimized prior to pregnancy.
2. To prevent further compromise of patients due to Massive Postpartum Haemorrhage , anemia once identified must be treated aggressively.
3. Contraceptive advice should be given to all postpartum mothers. Spacing of pregnancy will help replenish iron stores before she embarks on her next pregnancy.
4. Future NOR should include further analysis of types of Anaemia, such as iron deficiency anaemia, thalassemia and sickle cell Anaemia.

8.7 Reference

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