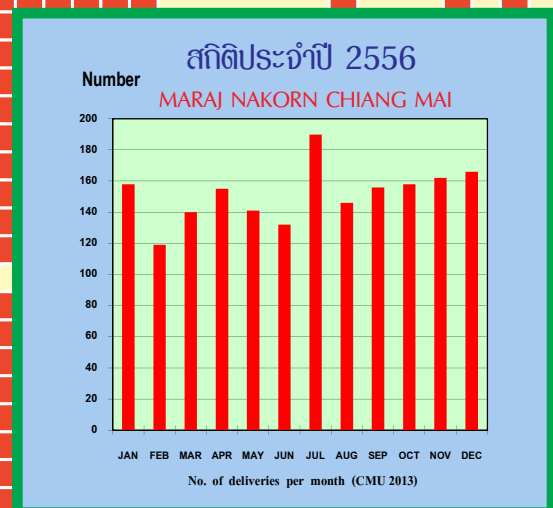


MATERNAL-FETAL MEDICINE 2013



หน่วยเวชศาสตร์มารดาและทารก

ภาควิชาสูติศาสตร์และนรีเวชวิทยา

คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

ANNUAL REPORT 2013

MATERNAL-FETAL MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

FACULTY OF MEDICINE, CHIANG MAI UNIVERSITY

CHIANG MAI, THAILAND

MATERNAL-FETAL MEDICINE 2013

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PREFACE

The Department of Obstetrics and Gynaecology was founded in 1958, the same time as the establishment of Faculty of Medicine which is the third medical school in Thailand. The Faculty of Medicine and Maharaj Nakorn Chiangmai Hospital, Chiangmai University has grown continuously and become the biggest medical school in Northern Thailand. The department consists of 26 staff responsible for teaching and training of 33 residents, 13 clinical fellows, 4 interns and 739 medical students. There is also a growing number of visiting residents, clinical fellows, interns and medical students from others departments and institutes.

This annual report shows obstetric data including low risk and high risk patients, obstetric procedures and obstetric complications. Moreover, it also contains prenatal diagnosis procedures and outcomes which were performed by the Maternal-Fetal Medicine (MFM) staff and their colleagues. During the recent years, the MFM unit acquired over 50 million bahts of funding from Thailand Research Fund (TRF) and National Research Council of Thailand (NRCT) into the department, generating hundreds of scientific publications and several textbooks. Associate Professor Pannee Sirivatanapa is the head of the MFM unit. This report was contributed mainly by Professor Theera Tongsong and his colleagues.

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PREFACE

The annual report on maternal fetal medicine of Department of Obstetrics and Gynecology, Faculty of Medicine, Chiang Mai University, has been established since 1990 for serving our 3 main missions: education, research and service. During the past 23 years, there are many changes of data that affect our mission especially educational programs for medical students, OB-GYN residency program and maternal-fetal medicine (MFM) fellowship training.

This 2013 annual report on maternal fetal medicine has some interesting data that affect educational programs as mentioned before. Firstly, the total number of delivery is less than 2,000 cases per year but most of them (about 94%) are non-private case. The route of delivery is 65% of normal delivery and 35% of abnormal delivery. The cesarean section rate in our institution still shows gradually and steady increasing from 15.8% in the year 2000 to 25.3% in the year 2013. This increasing rate may be reflected from the combination of parental expectation, legal issue and training program. The rate of adolescent pregnancy (11-19 years) or teenage pregnancy is still high nearly 10%. All of these mentioned figures are the alarming signs for the academic sector of faculty to forward planning regarding education for for medical students, OB-GYN residency program and maternal-fetal medicine (MFM) fellowship training. MFM's ultimate purposing is good maternal and fetal health outcome.

Finally, I would like to be grateful for all our active and dedicated staff members who have contributed to this report. I hope that this annual report will serve as the best evidence for education and research including service for our next generations.

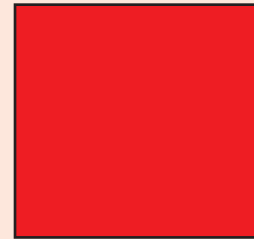
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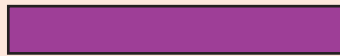
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ANNUAL REPORT



2013

MATERNAL-FETAL MEDICINE

Presentation : January 2014

DIVISION OF MATERNAL-FETAL MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

FACULTY OF MEDICINE, CHIANG MAI UNIVERSITY

CHIANG MAI, THAILAND

Section I

OBSTETRIC MORTALITY

STILLBIRTH

Stillbirth 2013: For gestational age ≥ 22 weeks
: 52 cases of total birth = 1860 cases)

■ *Gestational age between 22-27 weeks 37 cases (71.16 %)*

	CMU	Referred	Total
Low risk	-	-	-
High risk	11	26	37
Autopsy	5	11	16

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	0	0	0
2. Congenital malformations	4	7	11
3. Condition association with immaturity	4	13	17
4. Asphyxia developed in labor	0	0	0
5. Other specific conditions	0	0	0
6. therapeutic termination related to PND	3	6	9

Stillbirth 2013: For gestational age ≥ 22 weeks
: 52 cases of total birth = 1860 cases)

■ *Gestational age between ≥ 28 weeks 15 cases (28.85 %)*

	CMU	Referred	Total
Low risk	1	1	2
High risk	6	7	13
Autopsy	1	6	7

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	2	1	3
2. Congenital malformations	2	1	3
3. Condition association with immaturity	3	6	9
4. Asphyxia developed in labor	0	0	0
5. Other specific conditions	0	0	0
6. therapeutic termination related to PND	0	0	0

Stillbirth rate :

Stillbirth rate = 8.07 per 1000 total births

(by old WHO definition: ≥ 28 weeks or birth weight > 1000 grams)

Stillbirth rate = 27.96 per 1000 total births

(by new WHO definition : ≥ 22 weeks or birth weight > 500 grams)

Stillbirth rate = 23.12 per 1000 total births

(by new WHO definition : ≥ 22 weeks' gestation or birth weight > 500 grams, not included therapeutic termination due to fetal malformations)

NEONATAL DEATH

Neonatal death 2013 :

15 cases (GA > 22 weeks) of total 1860 live births

- *Gestational age between 22-27 weeks 7 cases (46.67 %)*
(Total livebirth 1808 cases)

	CMU	Referred	Total
Low risk	0	0	0
High risk	4	3	7
Autopsy	0	2	2

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	0	0	0
2. Congenital malformations	2	1	3
3. Condition association with immaturity	2	1	3
4. Asphyxia developed in labor	0	0	0
5. Other specific conditions	0	1	1
6. therapeutic termination related to PND	0	0	0

Neonatal death 2013 :

15 cases (GA > 22 weeks) of total 1860 live births

- *Gestational age between ≥ 28 weeks 8 cases (53.34%)
(Total livebirth 1808 cases)*

	CMU	Referred	Total
Low risk	3	0	3
High risk	3	2	5
Autopsy	0	0	0

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	0	0	0
2. Congenital malformations	1	1	2
3. Condition association with immaturity	2	0	2
4. Asphyxia developed in labor	1	1	2
5. Other specific conditions	2	0	2
6. therapeutic termination related to PND	0	0	0

Early neonatal death rate 4.43 per 1,000 live births

(up to 28 week's gestation or 1000 grams and died within first 7 days of life)

Early neonatal death rate 8.30 per 1,000 live births

(≥ 22 week's gestation or 500 grams and died within first 7 days of life)

The most common cause of perinatal death was related to congenital anomalies referred for diagnosis from regional areas and terminated at Maharaj Nakorn Chiang Mai Hospital

PERINATAL DEATH

Perinatal Mortality (including the referral cases)

- Gestational age ≥ 28 weeks (stillbirths + early neonatal death)
perinatal death rate = 12.37 per 1000 total births
- Gestational age ≥ 22 weeks (stillbirths + neonatal death)
perinatal death rate = 36.56 per 1000 total births

The most common related causes were fetal anomalies and immaturity (several cases associated with self attempt termination)

MATERNAL DEATH

Total 0 cases

Maternal mortality rate 0 per 1000 livebirths

Causes of maternal death: -

Summary

DATA	2013
Total birth (neonates)	1860
Stillbirth	52
22-27 weeks	37
≥ 28 weeks	15
Stillbirth rate/1000 births	
> 28 weeks / birthweight >1,000 gm	8.07
> 22 weeks / birthweight >500 gm	27.96
Early neonatal death	
• Early neonatal death rate / 1000 live birth (≥ 28 weeks)	4.43
• Early neonatal death rate / 1000 live birth (≥ 22 weeks)	8.30

Section II

GENERAL OBSTETRICS

TABLE 1 Distribution of Singleton & Multifetal Pregnancies

Type of pregnancy	Number	Percent
Singleton	1786	98.0
Twins	37	2.0
Total	1823	100.0

TABLE 2 Categories of the Pregnant Women

	2012		2012	
	Number	Percent	Number	Percent
General Cases	1932	93.8	1703	93.4
Private Cases	127	6.2	120	6.6
Total	2059	100.0	1823	100.0

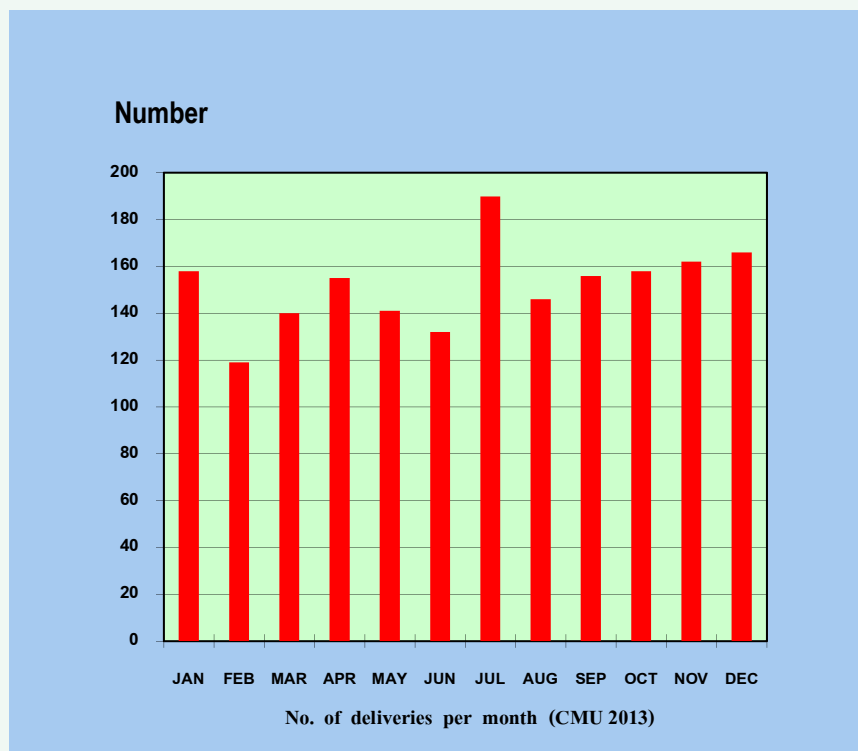
TABLE 3 Categories of the Pregnant Women

	Number	Percent
ANC at Maharaj Nakorn Chiang Mai Hospital	1145	62.8
Private Clinic	120	6.6
ANC at Other Hospitals	487	26.7
No ANC	57	3.1
Total	1809	99.2

TABLE 4 Number and Percentage of Deliveries per month

Month	Number (Mothers)	Percent
January	158	8.7
February	119	6.5
March	140	7.7
April	155	8.5
May	141	7.7
June	132	7.2
July	190	10.4
August	146	8.0
September	156	8.6
October	158	8.7
November	162	8.9
December	166	9.1
Total	1823	100.0

FIGURE 1 Histogram : Number of Deliveries from January to December 2013



Total deliveries in 2006 = 2013 cases

Total deliveries in 2007 = 2212 cases

Total deliveries in 2008 = 2144 cases

Total deliveries in 2009 = 2222 cases

Total deliveries in 2010 = 2089 cases

Total deliveries in 2011 = 1900 cases

Total deliveries in 2012 = 2059 cases

Total deliveries in 2013 = 1823 cases

TABLE 5 Number and percentage of parturients by age

Age	Number	Percent	Age	Number	Percent
14	3	0.2	31	111	6.1
15	7	0.4	32	100	5.5
16	18	1.0	33	99	5.4
17	34	1.9	34	78	4.3
18	35	1.9	35	58	3.2
19	78	4.3	36	52	2.9
20	79	4.3	37	36	2.0
21	78	4.3	38	44	2.4
22	81	4.4	39	23	1.3
23	69	3.8	40	18	1.0
24	81	4.4	41	16	0.9
25	101	5.5	42	10	0.5
26	87	4.8	43	4	0.2
27	100	5.5	44	3	0.2
28	107	5.9	45	3	0.2
29	105	5.8	46	2	0.1
30	100	5.5	47	3	0.2
Total				1823	100.0

Average age (Mean+Standard deviation) 27.98+6.2 years

TABLE 6 Number and percentage of parturients by age group

Age Group	Number	Percent
10-14	3	0.2
15-19	172	9.4
20-24	388	21.3
25-29	500	27.4
30-34	488	26.8
35-39	213	11.7
40-44	51	2.8
≥ 45	8	0.4
Total	1823	100.0

Summary : Age of parturients

- Adolescent Pregnancies (11-19 years) 175 (9.6 %)
 - Early Adolescent Pregnancies (≤ 16 years) 28 (1.5 %)
 - Late Adolescent Pregnancies (17-19 years) 147 (8.1 %)
- Adult Pregnancies (20-34 years) 1376 (75.5%)
- Elderly Pregnancies (≥ 35 years) 272 (14.9 %)

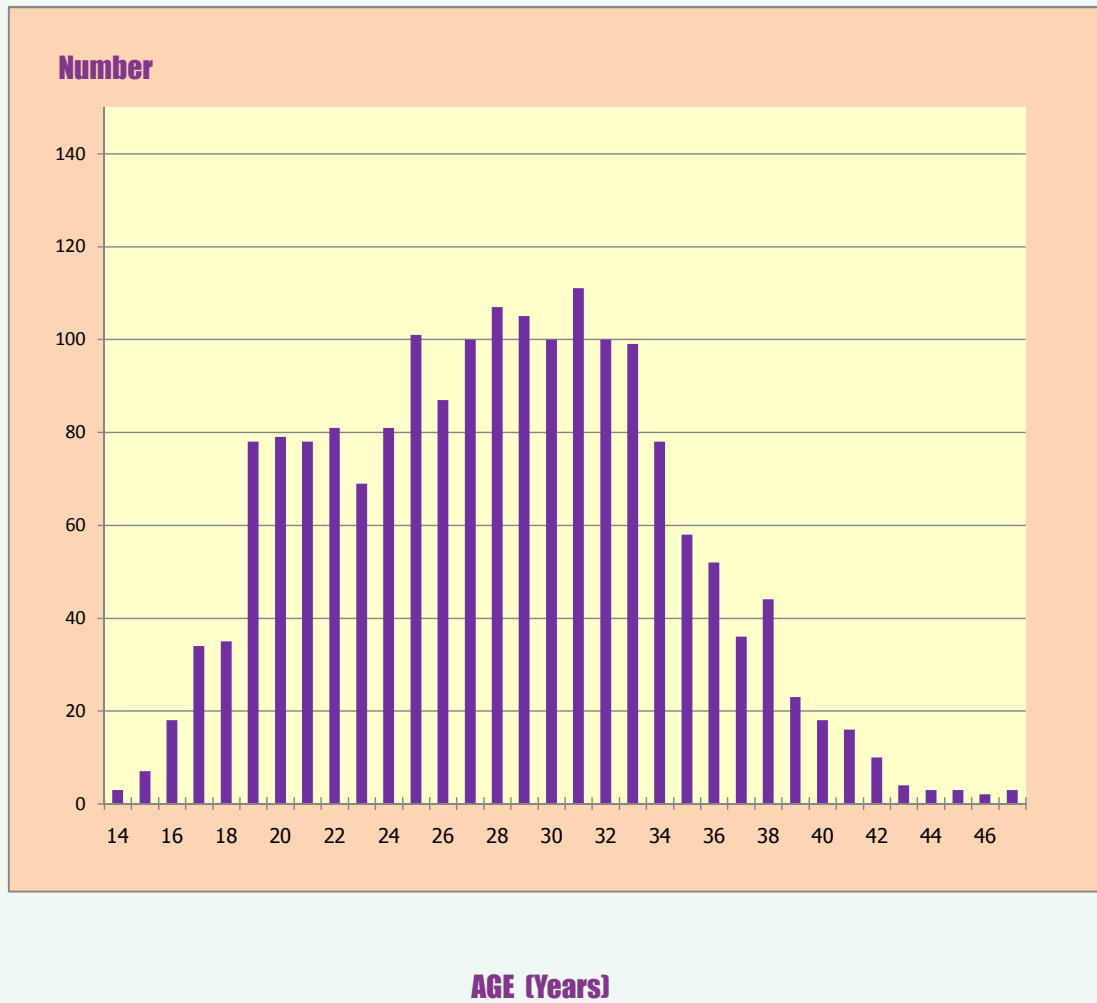
FIGURE 2 Histogram : Number of Parturients by Age

TABLE 7 Parity of parturients

Parity	Number	Percent
0	1001	54.9
1	657	36.0
2	131	7.2
3	27	1.5
4	5	0.3
5	1	0.1
9	1	0.1
Total	1823	100.0

Parity = Number of pregnancies reaching the stage of fetal viability (more than 20 weeks) in this report

Nulliparous 54.9 %

Multiparous 45.1 %

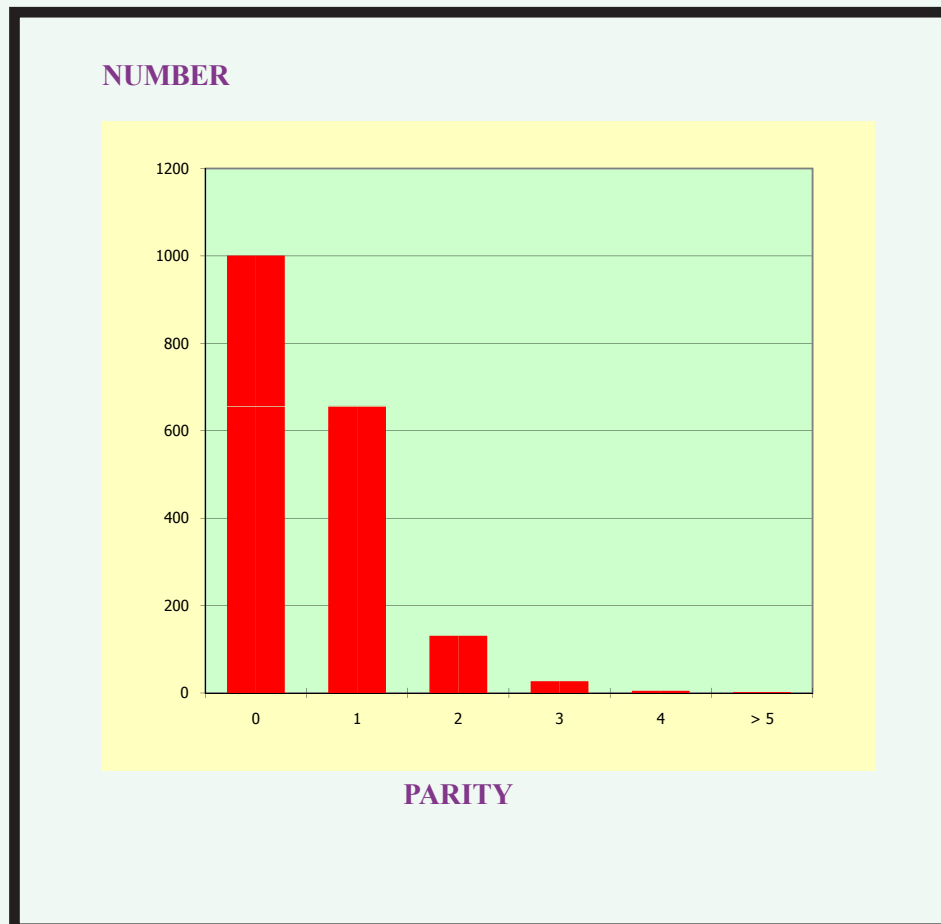
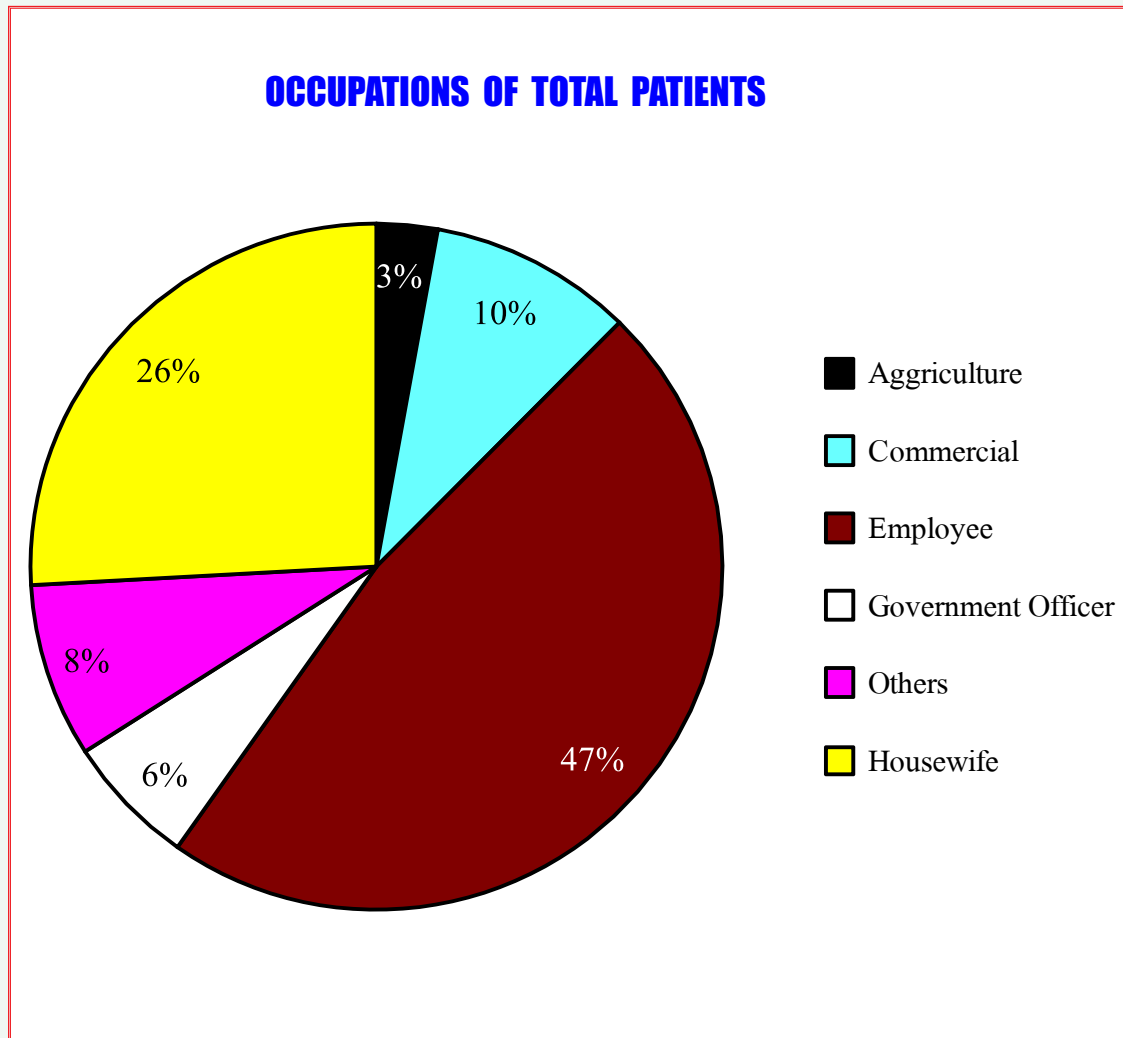
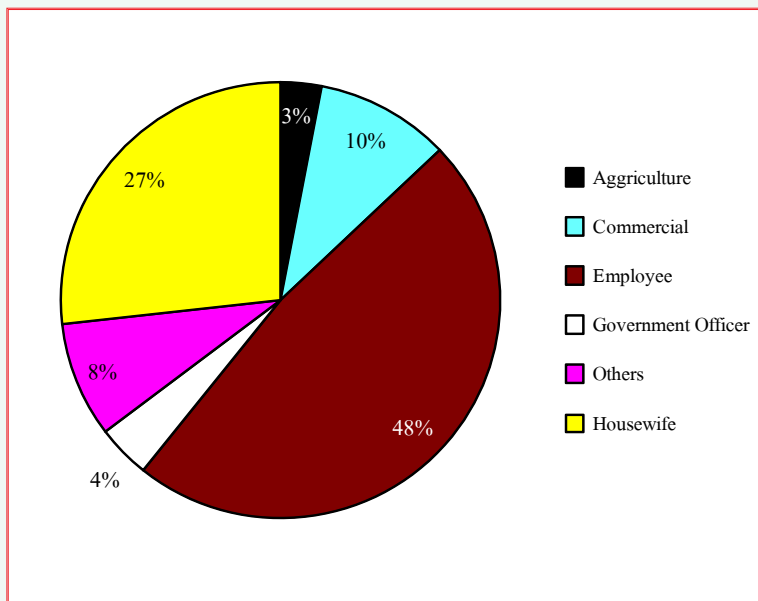
FIGURE 3 Histogram : Number of parturients by parity

TABLE 8 Distribution of the occupations of the parturients

Occupations	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Agriculture	44	2.5	44	2.6	-	-
Commercial	161	9	156	9.3	5	4.3
Employee	896	50.1	852	50.9	44	37.6
Government Officer	103	5.8	74	4.4	29	24.8
Private Business	61	3.4	57	3.4	4	3.4
Housewife	414	23.1	396	23.7	18	15.4
Student	71	4	69	4.1	2	1.7
State Enterprise	4	0.2	4	0.2	7	6
Others	36	2	21	1.2	8	6.8
Total	1790	100	1673	100	117	100

FIGURE 4 Pie : Distribution of patient's occupations

OCCUPATIONS OF THE GENERAL PATIENTS



OCCUPATIONS OF THE PRIVATE PATIENTS

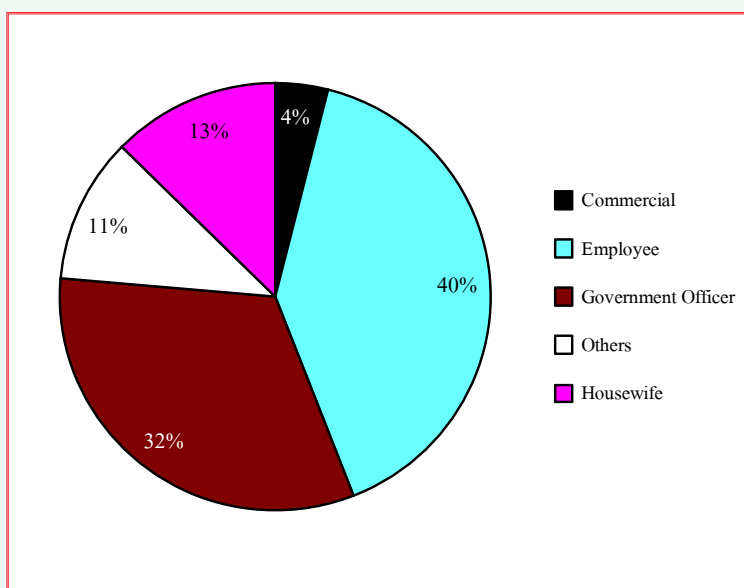
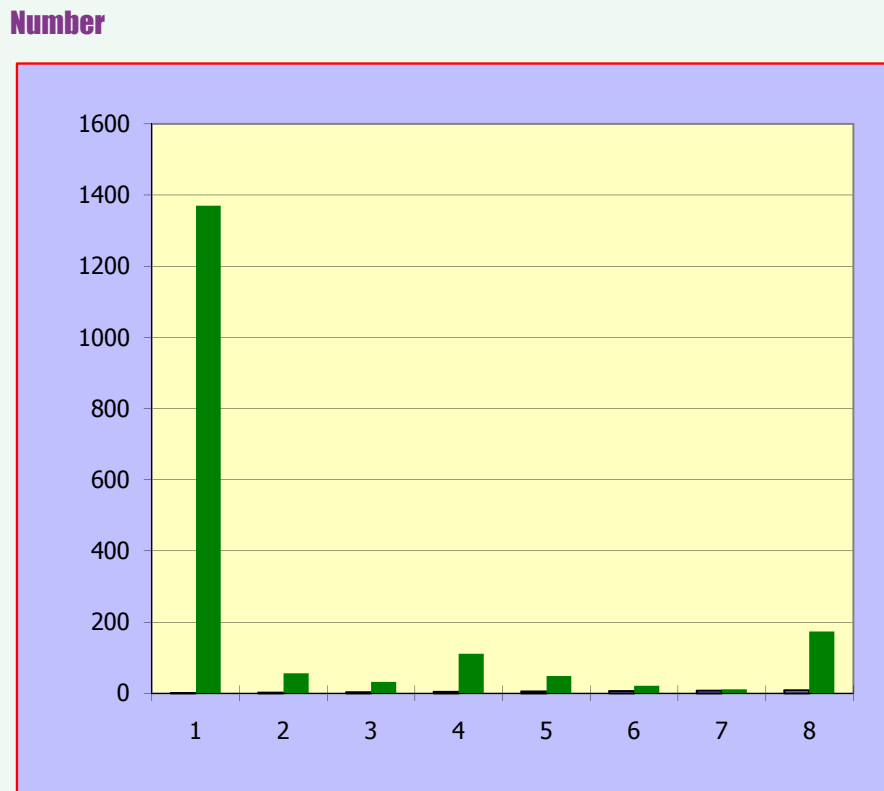


TABLE 9 Distributions of the residence (province)
of the parturients

Province	Number	Percent
Chiang Mai (เชียงใหม่)	1370	75.2
Chiang Rai (เชียงราย)	56	3.1
Lampang (ลำปาง)	32	1.8
Lamphun (ลำพูน)	111	6.1
Maehongson (แม่ฮ่องสอน)	48	2.6
Payao (พะเยา)	21	1.2
Phrae (แพร่)	11	0.6
Others (อื่นๆ)	174	9.5
Total	1823	100.0

FIGURE 5 Histogram : Distribution of parturients by province of the parturients



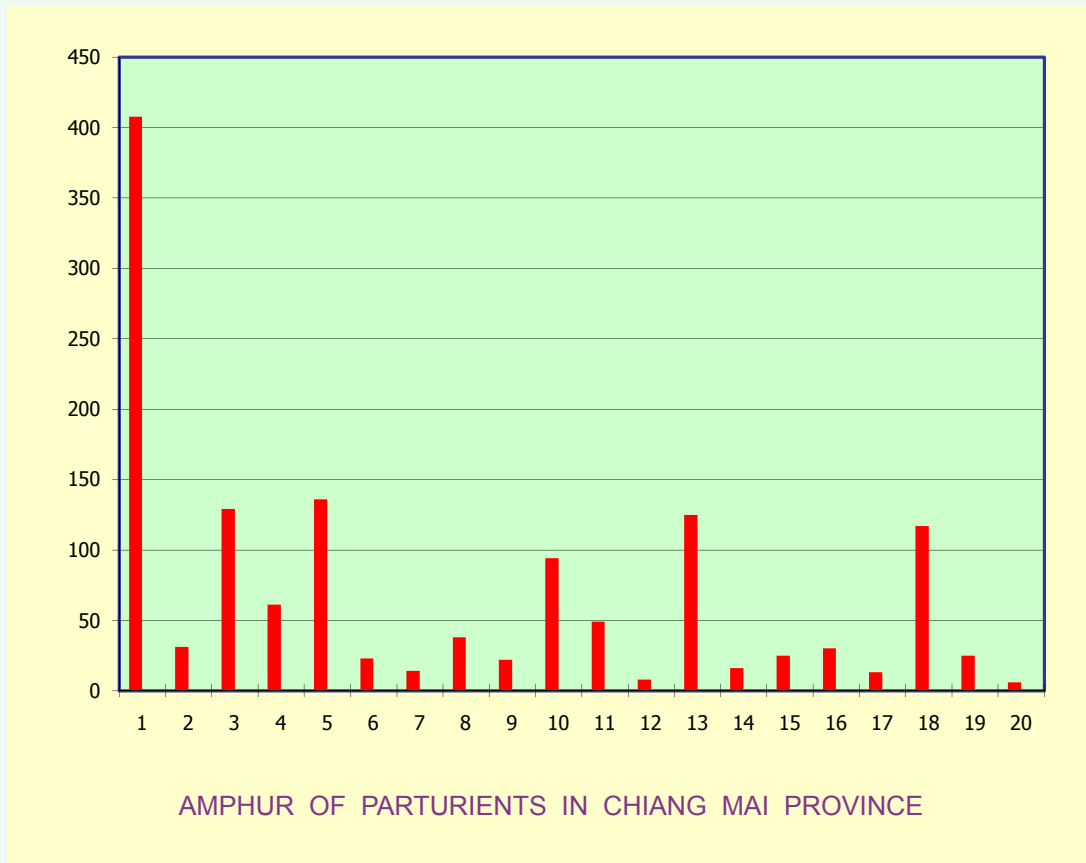
Province

- | | |
|-----------------------------|---------------------------|
| 1. Chiang Mai (เชียงใหม่) | 2. Chiang Rai (เชียงใหม่) |
| 3. Lampang (ลำปาง) | 4. Lamphun (ลำพูน) |
| 5. Maehongsorn (แม่ฮ่องสอน) | 6. Payao (พะเยา) |
| 7. Phrae (แพร่) | 8. Others (อื่นๆ) |

TABLE 10 Distributions of Amphur of the parturients in Chiang Mai province

	Amphur	Number	Percent
1.	Meung (เมือง)	408	29.8
2.	Maerim (แมริม)	31	2.3
3.	Doisaked (ดอยสะเก็ด)	129	9.4
4.	Sanpatong (สันป่าตอง)	61	4.5
5.	Hangdong (หางดง)	136	9.9
6.	Jomtong (จอมทอง)	23	1.7
7.	Mae-ai (แม่อาย)	14	1.0
8.	Prao (พร้าว)	38	2.8
9.	Hod (ฮอด)	22	1.6
10.	Sarapee (สารภี)	94	6.9
11.	Maetang (แม่แตง)	49	3.6
12.	Omkoii (อมก๋อย)	8	0.6
13.	Sankampang (สันกำแพง)	125	9.1
14.	Samoeng (สะเมิง)	16	1.2
15.	Chiangdao (เชียงดาว)	25	1.8
16.	Phang (ฝาง)	30	2.2
17.	Doitao (ดอยเต่า)	13	0.9
18.	Santrai (สันทราย)	117	8.5
19.	Maejam (แม่แจ่ม)	25	1.8
20.	Chaiprakarn (ไชยปราการ)	6	0.4
	Total	1370	100.0

FIGURE 6 Histogram: Number of parturients in each Amphur of Chiang Mai



- | | | | |
|----------------|-------------|---------------|-----------------|
| 1. Meung | 2. Maerim | 3. Doisaked | 4. Sanpatong |
| 5. Hangdong | 6. Jomtong | 7. Mae-ai | 8. Prao |
| 9. Hod | 10. Sarapee | 11. Maetang | 12. Omkoi |
| 13. Sankampang | 14. Samoeng | 15. Chiangdao | 16. Phang |
| 17. Doitao | 18. Santrai | 19. Maejam | 20. Chaiprakarn |

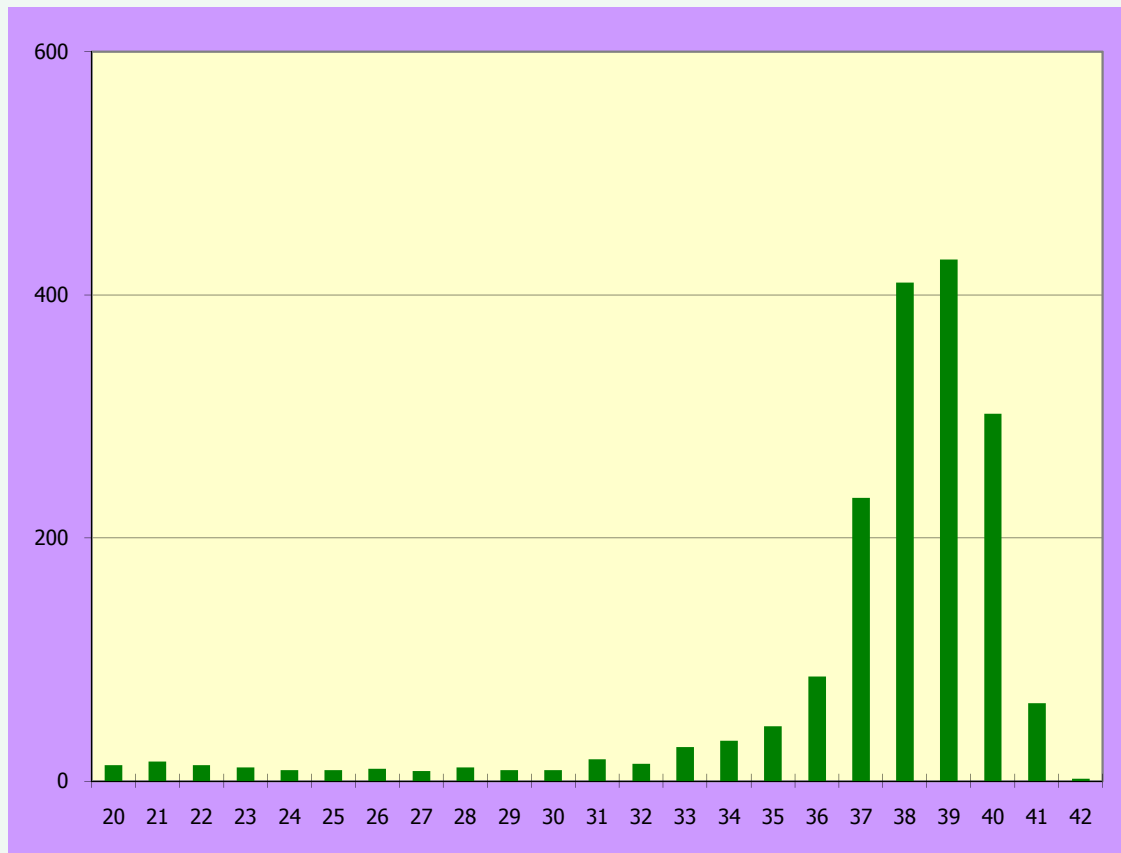
TABLE 11 Number and percentage of parturients by gestational age in singleton pregnancies

GA (Weeks)	Number	Percent	GA (Weeks)	Number	Percent
< 20	41	2.2	31	18	1.0
20	13	0.7	32	14	0.8
21	16	0.9	33	28	1.5
22	13	0.7	34	33	1.8
23	11	0.6	35	45	2.5
24	9	0.5	36	86	4.7
25	9	0.5	37	233	12.8
26	10	0.5	38	410	22.5
27	8	0.4	39	429	23.5
28	11	0.6	40	302	16.6
29	9	0.5	41	64	3.5
30	9	0.5	42	2	0.1
Total				1823	100.0

Average of Gestational Age 36.74 \pm 5.0 Weeks

FIGURE 7 Histogram : Number of parturients at various gestational age in singleton pregnancies

NUMBER



GESTATIONAL WEEKS

TABLE 12 Number and percentage of parturients by gestational age group in singleton pregnancies.

Gestational Age Group	Number	Percent
Abortion (< 20 weeks)	44	2.5
Immature (20-27 weeks)	83	4.6
Premature (28-36 weeks)	234	13.1
Term (37-41 weeks)	1423	79.7
Postterm (42 weeks or more)	2	0.1
Total	1786	100.0

Premature delivery included the referred cases

Immature cases included termination of pregnancies due to various indications especially serious anomalies.

TABLE 13 Number and percentage of parturients by gestational age in twin pregnancies

GA (Week)	Number (Twin sets)	Percent
≤ 20	1	2.7
20	1	2.7
22	1	2.7
23	1	2.7
26	1	2.7
27	2	5.4
28	1	2.7
31	5	13.5
32	2	5.4
33	2	5.4
34	4	10.8
35	3	8.1
36	2	5.4
37	6	16.2
38	4	10.8
40	1	2.7
Total	37	100.0

Average of Gestational Age 32.51±5.4 Weeks

FIGURE 8 Histogram : Number of parturients at various gestational week (in twin pregnancies)

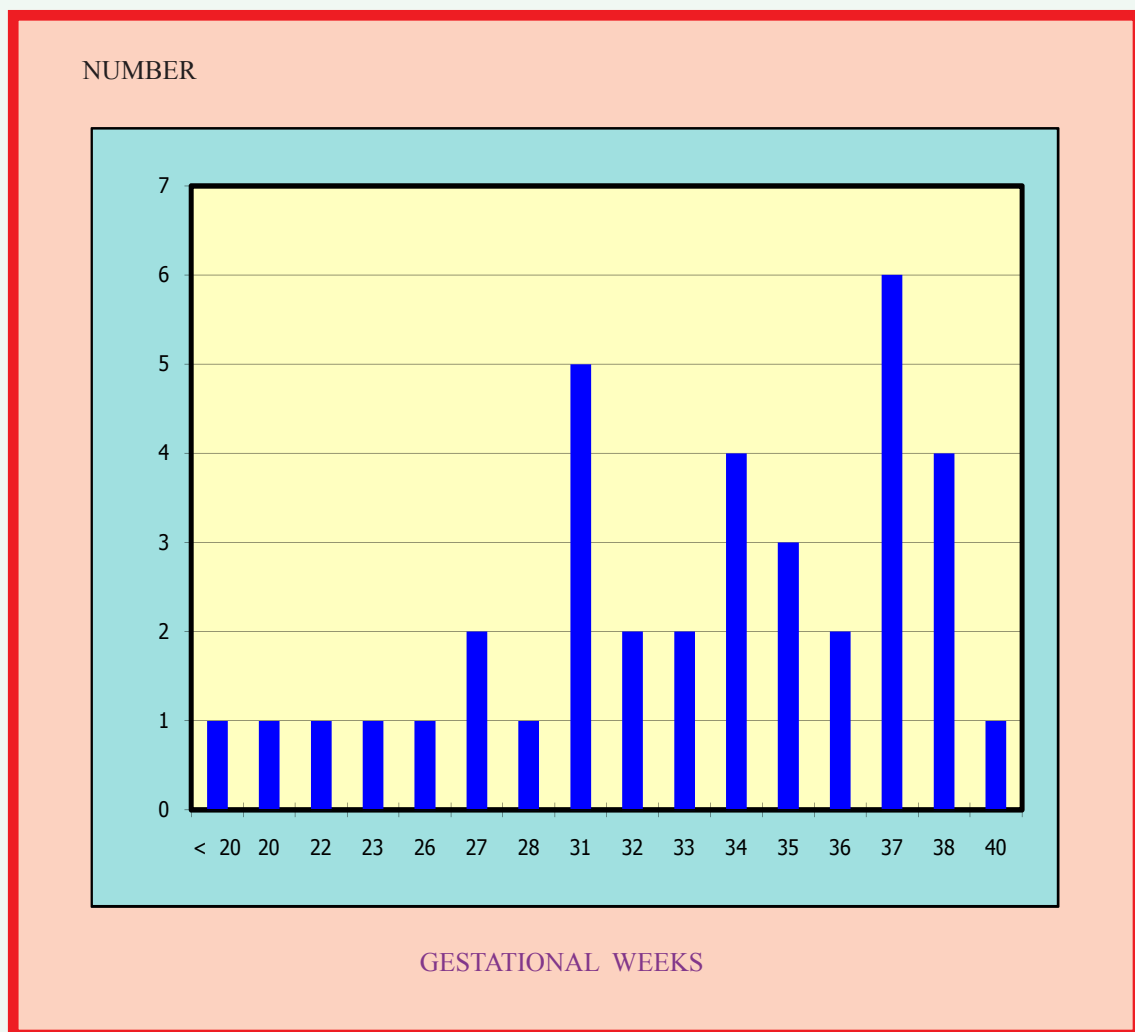


TABLE 14 Number and percentage of parturients by gestational age group in twin pregnancies.

Gestational Age Group	Number	Percent
Abort	1	2.7
Immature	6	16.2
Preterm	19	51.4
Term	11	29.7
Total	37	100.0

TABLE 15 Number and percentage of antenatal care attendance :
General patients (not included the patients attending at
other hospitals)

Number of ANC	Number of Parturients	Percent
0	57	4.8
1	38	3.2
2	52	4.4
3	38	3.2
4	56	4.7
5	45	3.8
6	58	4.9
7	65	5.5
8	66	5.6
9	94	7.9
10	138	11.7
11	147	12.4
12	133	11.2
13	91	7.7
14	46	3.9
15	37	3.1
16	12	1.0
17	6	0.5
18	4	0.3
19	1	0.1
Total	1184	100

Attending ANC at other hospitals 28.9% of total parturients

FIGURE 9 Histogram : Number of ANC attendance of general patients (excluding private patients and ANC at other hospitals)

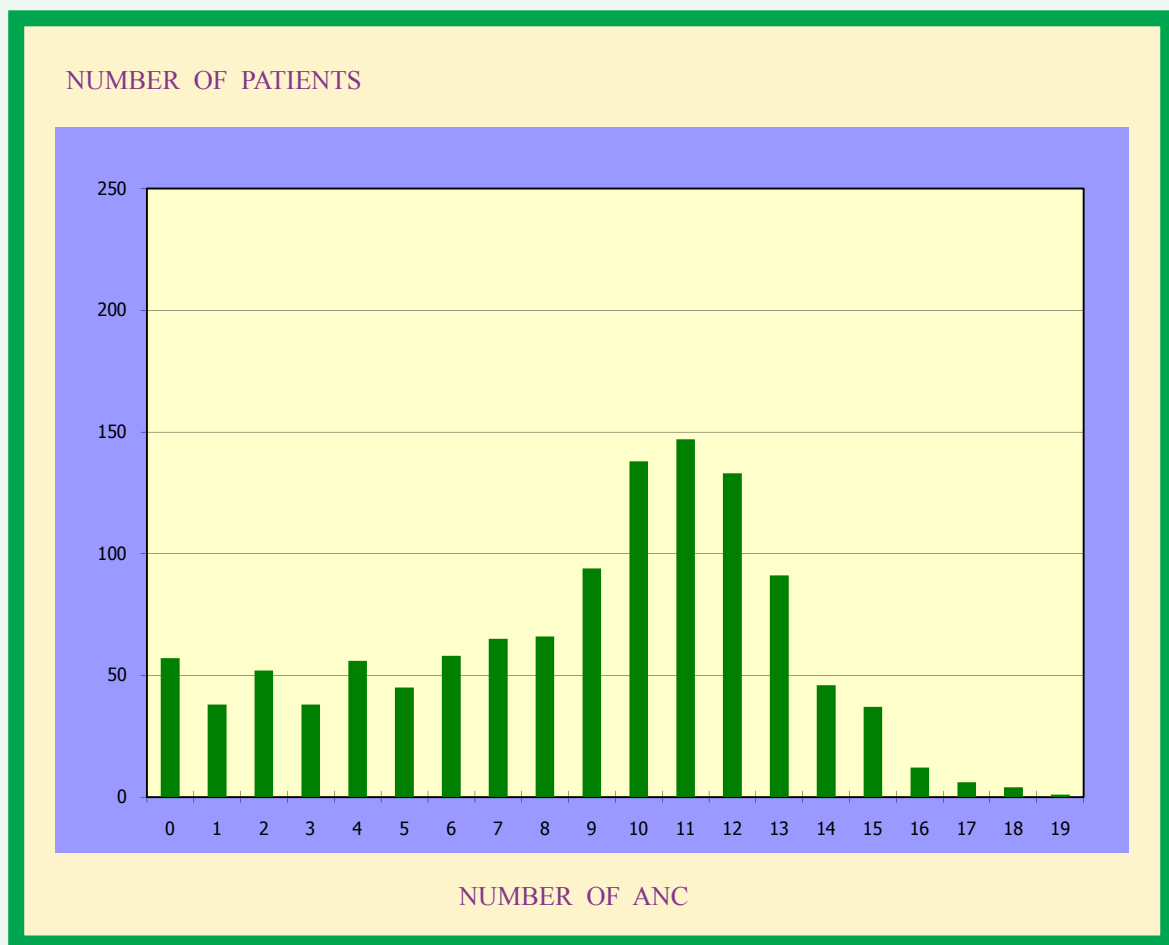


TABLE 16 Number of antenatal care attendance : General patients
(not include the patients attending ANC at other hospitals)

Number of ANC	Number of Parturients	Percent
4 or more	999	83.1
1-3	128	10.6
No ANC	75	6.2
Total	1202	100.0

Note ANC less than 4 is considered to be inadequate

Inadequate ANC 16.8%

FIGURE 10 Histogram : Number of ANC attendance of general patients (excluding private patients and ANC at other hospitals)

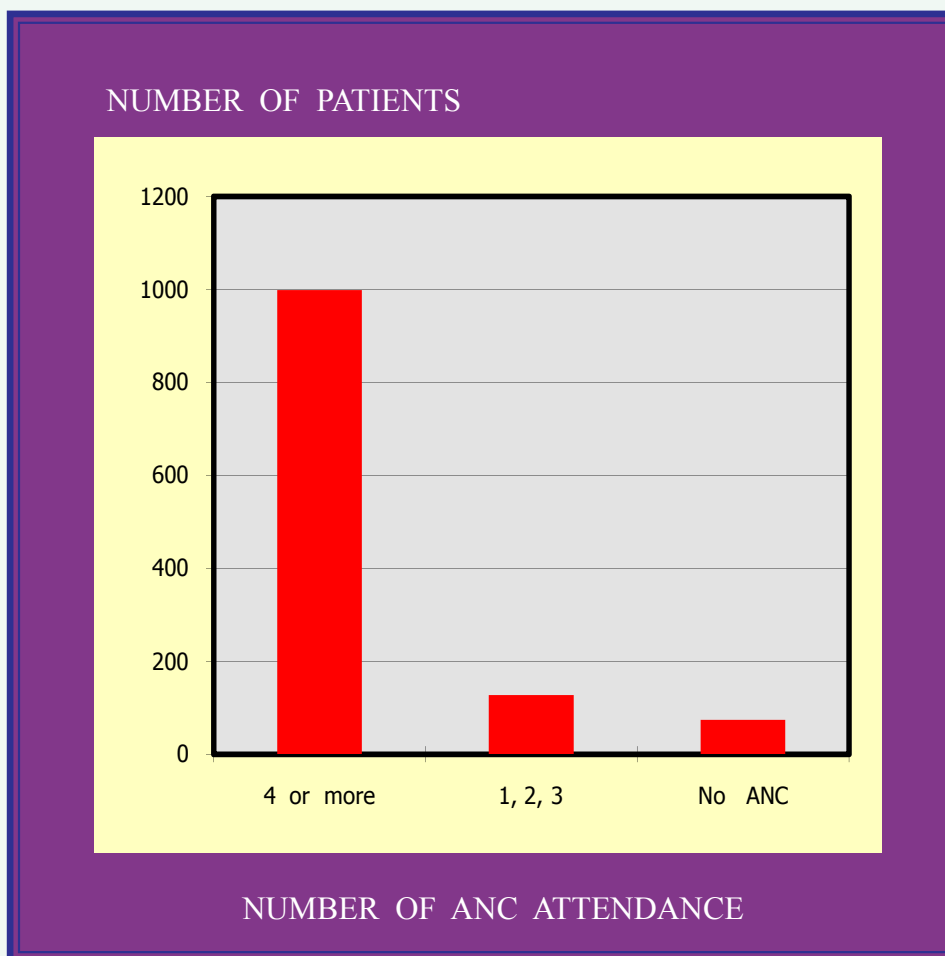
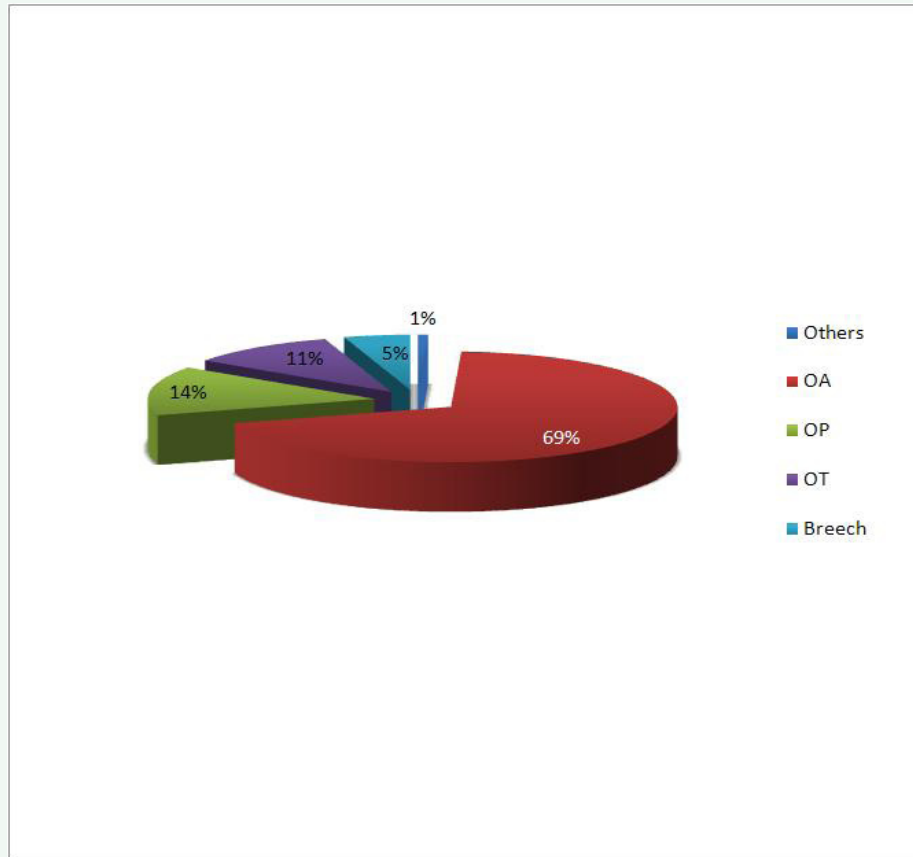


TABLE 17 Distribution of fetal presentations in labor (Singleton)

Fetal Presentation	Percent
Vertex	94.0
Breech	5.3
Transverse lie	0.3
Face	0.1
Others	0.3

Breech Presentation was 5.3 % of Total Birth

FIGURE 11 Proportion of fetal presentations during labor

OA = occiput anterior, OP = occiput posterior, OT = occiput transverse

TABLE 18 Mode of delivery: General and private patients**Singleton**

Mode of Delivery	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Normal Delivery	1160	64.9	1096	65.6	64	55.7
Forceps Delivery	12	0.7	11	0.7	1	0.9
Vacuum Delivery	121	6.8	115	6.9	6	5.2
Cesarean Section	452	25.3	410	24.5	42	36.5
Vaginal Breech Delivery	20	1.1	20	1.2	-	-
Other*	21	1.2	19	1.1	2	1.7
Total	1786	100.0	1671	100.0	115	100.0

* other = conduplicato corpore, hysterotomy, internal version, caul etc.

Twins

Mode of Delivery	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Cesarean Section	25	67.6	20	62.5	5	100.0
Vaginal Delivery	12	32.4	12	37.5	0	0.0
Total	37	100.0	32	100.0	5	100

FIGURE 12 Histogram : Distribution of modes of deliveries : general & private patients (Singleton)

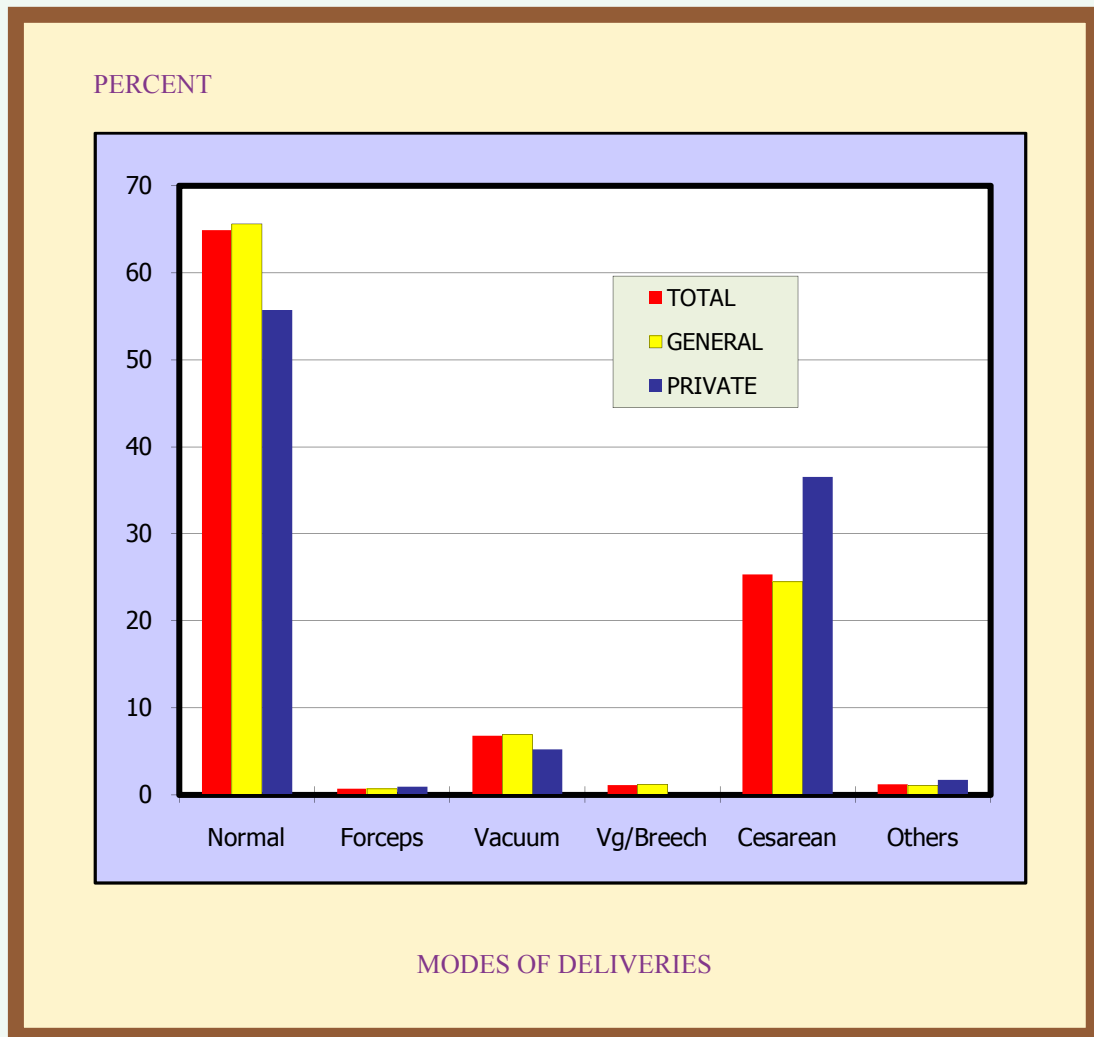


TABLE 19 Modes of deliveries in breech presentation : general and private patients (Singleton)

Mode of Deliveries	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Cesarean Section	76	79.2	73	78.5	3	100.0
Spontaneous Breech	1	1.0	1	1.1	-	-
Assisting Mauriceau-Smelliveit	14	14.6	14	15.1	-	-
Total Extraction Mauriceau-Smelliveit	5	5.2	5	5.4	-	-
Total	96	100.0	93	100.0	3	100.0

**Total Cesarean Section Rate in Breech presentation 79.2 %
(General patients; 78.5%, Private patients; 100.0%)**

FIGURE 13 Histogram : Distribution of modes of deliveries in breech presentation : general & private

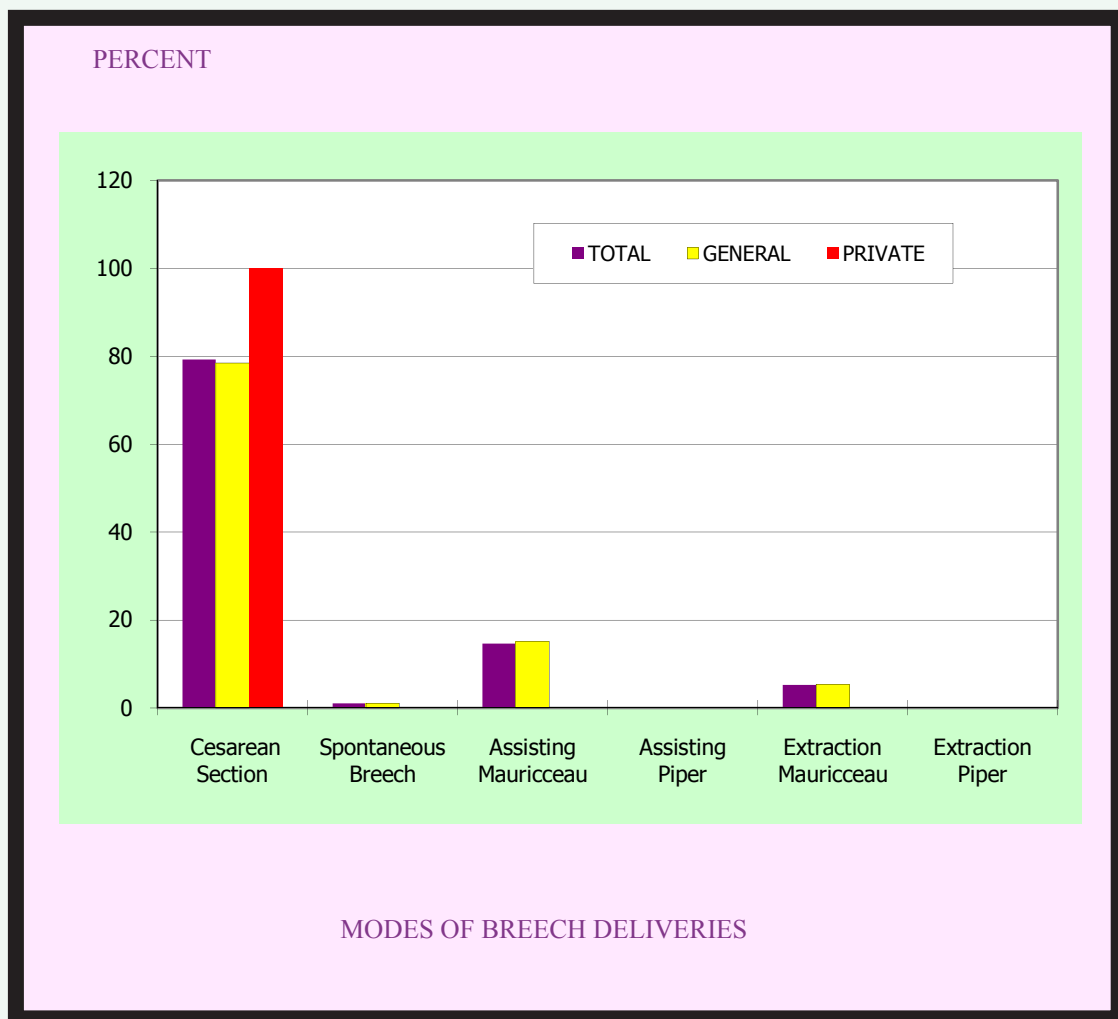


TABLE 20 Frequency of cesarean deliveries according to diagnostic indication (Singleton)

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
CPD	156	32.7	141	32.8	15	31.9
Previous C/S	142	29.8	124	28.8	18	38.3
Breech presentation	76	15.9	73	17.0	3	6.4
Fetal distress	35	7.3	32	7.4	3	6.4
Placenta previa	14	2.9	11	2.6	3	6.4
PIH	6	1.3	6	1.4	-	-
HIV positive	3	.6	3	.7	-	-
Abruptio placenta	2	.4	2	.5	-	-
Malpresentation	7	1.5	6	1.4	1	2.1
Others	23	4.8	19	4.4	4	8.5
Not recorded	13	2.7	13	3.0	-	-
Total	477	100.0	430	100.0	47	100.0

* Others = Vasa previa, IVF, Active herpes genitalis, Fetal anomalies with time schedule, HELLP syndrome etc.

TABLE 21 Indications of forceps deliveries : general & private patients (Singleton)

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Fetal distress	-	-	-	-	-	-
Expected prolonged second stage	-	-	-	-	-	-
Poor expulsive force & training	12	100.0	11	100.0	1	100.0
Maternal disease	-	-	-	-	-	-
Others (OPP, failed vacuum, etc)	-	-	-	-	-	-
Total	12	100.0	11	100.0	1	100.0

TABLE 22 Indications of vacuum deliveries : general & private patients (Singleton)

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Fetal distress	20	16.4	19	16.4	1	16.7
Expected prolonged second stage	31	25.4	31	26.7	-	-
Poor expulsive force & training	50	41.0	45	38.8	5	83.3
Maternal disease	18	14.8	18	15.5	-	-
Others	3	2.5	3	2.6	-	-
Total	122	100.0	116	100.0	6	100.0

TABLE 23 Sex of Fetuses (Including Multiple Pregnancies)

Sex	Number	Percent
Male	949	51.2
Female	872	47.0
Unspecified	33	1.8
Total	1854	100.0

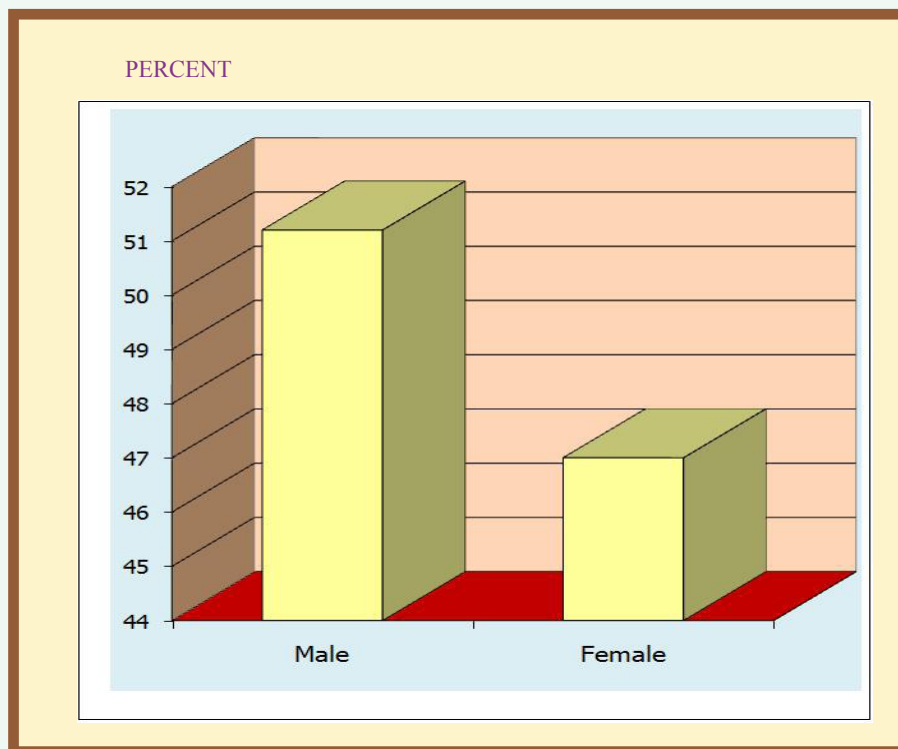
FIGURE 14 Histogram : Distribution of fetal sex (including twins)

TABLE 24 Apgar score at 1 minute of total neonates

Apgar Scores	Number	Percent
0-3 (severe depression)	184	9.9
4-6 (mild depression)	156	8.4
7-10 (no depression)	1515	81.5
Total	1860	100.0

TABLE 25 Apgar score at 5 minutes of total neonates

Apgar Score	Number	Percent
0-3 (severe depression)	148	8.0
4-6 (mild depression)	56	3.0
7-10 (no depression)	1652	88.8
Total	1860	100.0

TABLE 26 Apgar score at 1 and 5 minutes of total neonates

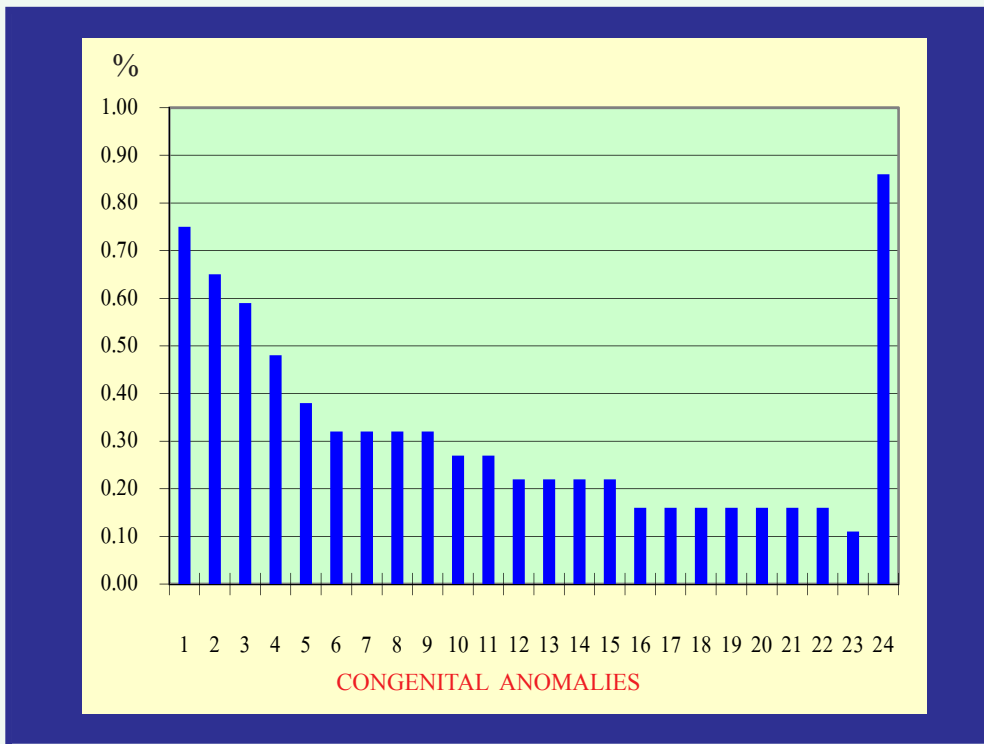
Apgar Score	1-Minute		5-Minute	
	Number	Percent	Number	Percent
0	127	6.8	128	6.9
1	30	1.6	8	.4
2	8	.4	6	.3
3	19	1.0	6	.3
4	31	1.7	3	.2
5	67	3.6	19	1.0
6	58	3.1	34	1.8
7	104	5.6	30	1.6
8	272	14.7	114	6.1
9	918	49.5	616	33.2
10	221	11.9	892	48.1
Total	1855	100.0	1856	100.0

TABLE 27 Prenatal sonographic diagnosis of structural anomalies*

	Congenital Anomalies	Number	Percent
1	Cardiac anomaly	14	0.75
2	Hb Bart's disease	12	0.65
3	Trisomy 21	11	0.59
4	Trisomy 18	9	0.48
5	Hydronephrosis	7	0.38
6	Hydrops fetalis (other causes)	6	0.32
7	Cleft lips	6	0.32
8	Cystic hygroma	6	0.32
9	Multiple anomalies	6	0.32
10	Gastroschisis	5	0.27
11	Anencephaly / Exencephaly	5	0.27
12	Omphalocele	4	0.22
13	Thal.Beta major	4	0.22
14	Hydrocephalus	4	0.22
15	Skeletal dysplasia	4	0.22
16	Holoprocensephaly	3	0.16
17	Diaphragmatic hernia	3	0.16
18	Renal agenesis	3	0.16
19	CCAM	3	0.16
20	Limb body wall complex	3	0.16
21	Porencenphaly	3	0.16
22	Brain atrophy	3	0.16
23	Trisomy 13	2	0.11
24	Others	16	0.86
		142	7.63

* Only diagnosed after 20 weeks and terminated at Maharaj Nakorn Chiang Mai, Most were referred cases

FIGURE 15 Histogram : Number of congenital anomalies (including chromosomal abnormalities with structural defects)



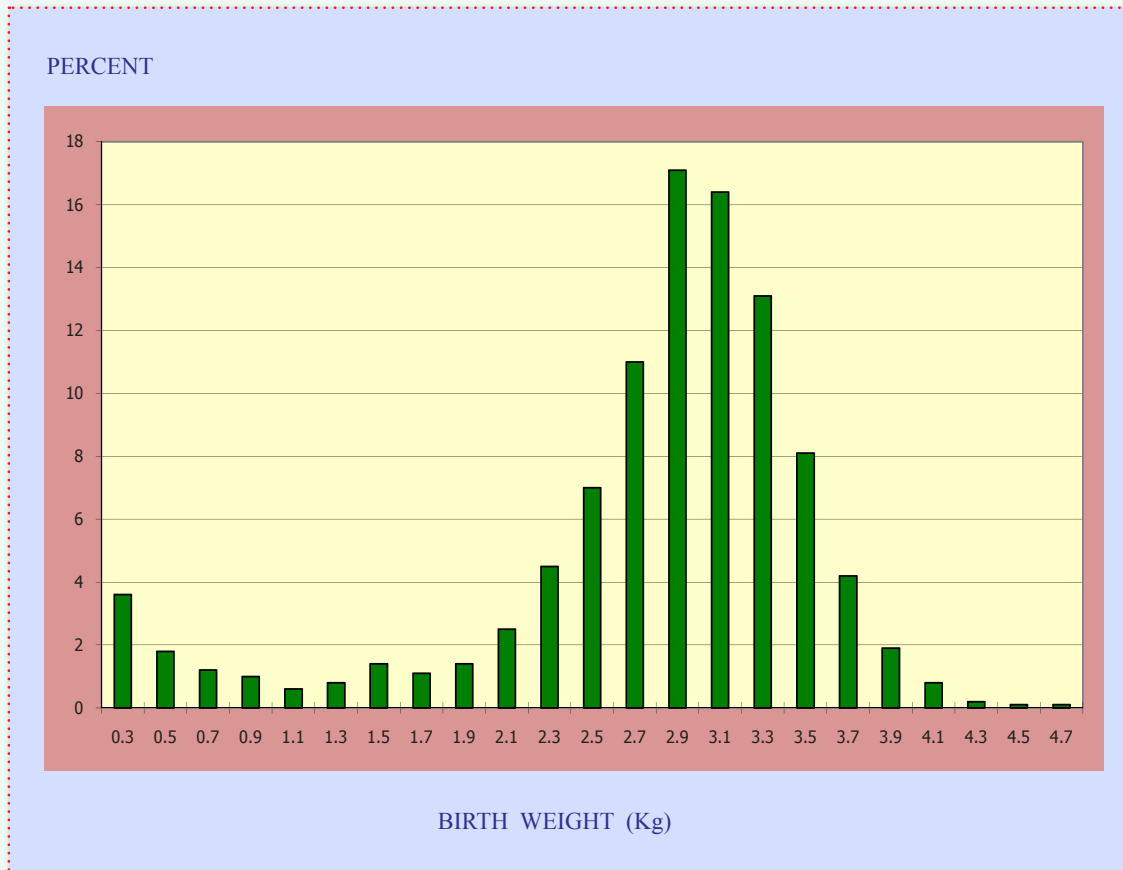
- | | |
|----------------------------------|---------------------------|
| 1 Cardiac anomaly | 13 Thal.Beta major |
| 2 Hb Bart's disease | 14 Hydrocephalus |
| 3 Trisomy 21 | 15 Skeletal dysplasia |
| 4 Trisomy 18 | 16 Holoprocensephaly |
| 5 Hydronephrosis | 17 Diaphragmatic hernia |
| 6 Hydrops fetalis (other causes) | 18 Renal agenesis |
| 7 Cleft lips | 19 CCAM |
| 8 Cystic hygroma | 20 Limb body wall complex |
| 9 Multiple anomalies | 21 Porencephaly |
| 10 Gastroschisis | 22 Brain atrophy |
| 11 Anencephaly / Exencephaly | 23 Trisomy 13 |
| 12 Omphalocele | 24 Others |

TABLE 28 Number and percentage of neonates by birth weight*

Birth Weight (grams)	Number	Percent
≤ 400	67	3.6
401-600	33	1.8
601-800	23	1.2
801-1000	19	1.0
1001-1200	12	0.6
1201-1400	15	0.8
1401-1600	25	1.4
1601-1800	20	1.1
1801-2000	25	1.4
2001-2200	47	2.5
2201-2400	84	4.5
2401-2600	130	7.0
2601-2800	203	11.0
2801-3000	316	17.1
3001-3200	303	16.4
3201-3400	242	13.1
3401-3600	149	8.1
3601-3800	77	4.2
3801-4000	35	1.9
4001-4200	15	.8
4201-4400	3	0.2
4401-4600	2	0.1
> 4600	2	0.1
Total	1847	100.0

* Including therapeutic termination of pregnancy

FIGURE 16 Histogram : Percentage of neonates at various points of birth weight



** Including therapeutic termination of pregnancy*

TABLE 29 Number and percentage of neonates by birth weight group (total)

Birth Weight (grams)	Number	Percent
Extremely low birth weight (500-999)	65	3.5
Very low birth weight (1000-1499)	41	2.2
Low birth weight (1500-2499)	218	11.7
Average birth weight (2500-3999)	1423	76.5
Macrosomia (> 4000)	26	1.4
Total	1860	100.0

** Including therapeutic termination of pregnancy*

**Average Birth Weight of Total Infants 2763 ± 847 grams
range 110-4660 grams**

FIGURE 17 Histogram : Percentage of neonates among various birth weight groups

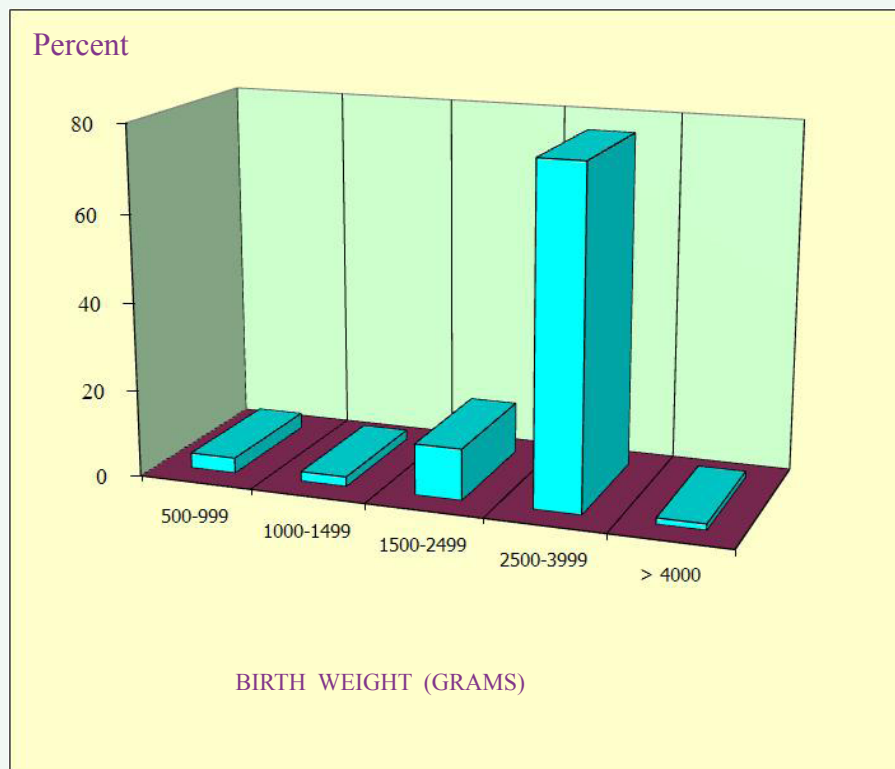


TABLE 30 Fetal weight (grams): the 10th, 50th, 90th percentile at various gestational age (singleton)

Gestational Age (weeks)	Weight (grams) 10th Percentile	Weight (grams) 50th Percentile	Weight (grams) 90th Percentile
20	180	325	461
21	170	420	579
22	221	500	667
23	278	630	885
24	400	600	
25	500	780	
26	600	880	
27	780	1000	
28	475	1025	1550
29	450	1110	
30	1050	1390	
31	1248	1660	2316
32	1156	2000	2499
33	1189	2080	2850
34	1590	2190	2610
35	2172	2540	3035
36	2150	2600	3190
37	2207	2855	3400
38	2600	3040	3565
39	2700	3120	3600
40	2750	3200	3746
41	2804	3300	3950
42	3350	3860	

FIGURE 18 Graph : The 10th, 50th, 90th percentiles of fetal weight at various gestational age

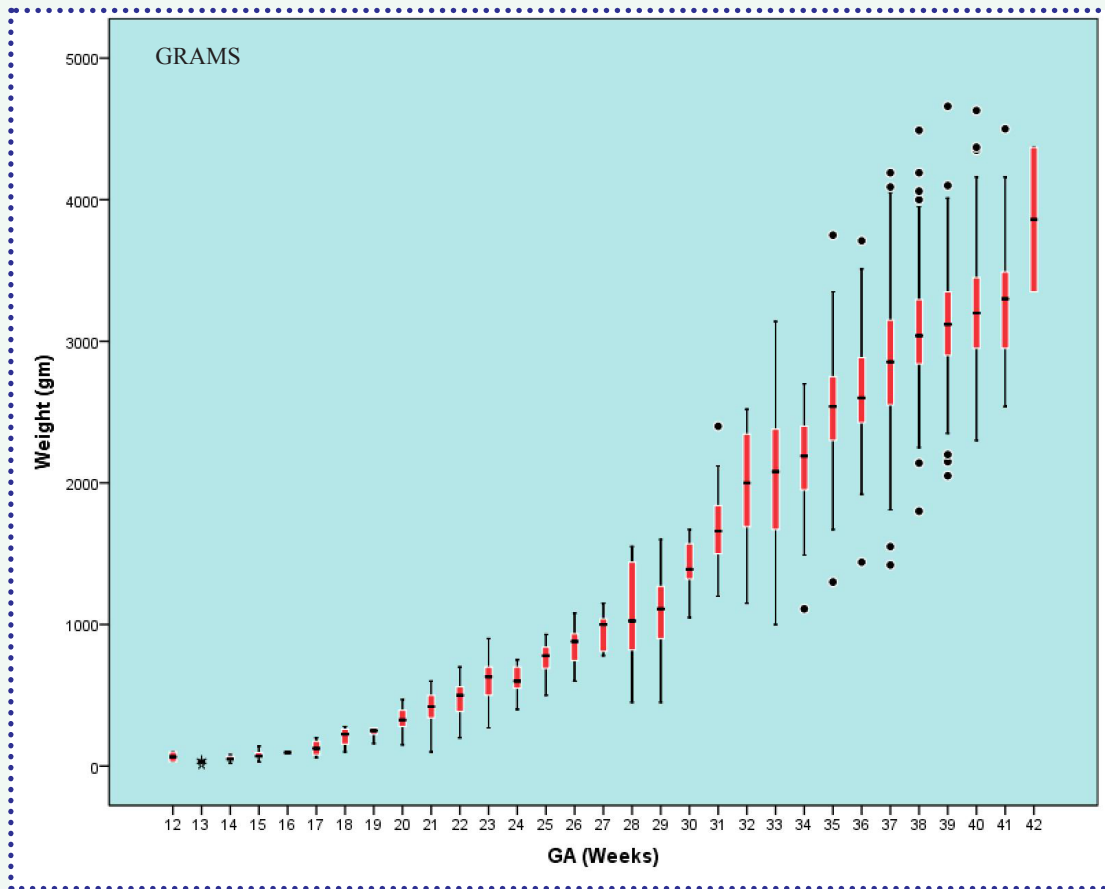


TABLE 31 Means and standard deviation of birth weight
at various gestational age (singleton)

Gestational Age (weeks)	Number of Neonates	Means (grams)	Standard Deviation
20	12	330.0	88.7
21	16	408.1	136.2
22	12	471.7	140.7
23	10	598.0	185.3
24	9	613.3	113.5
25	9	761.1	130.7
26	8	850.0	151.8
27	6	963.3	141.8
28	10	1072.0	374.5
29	9	1100.0	353.3
30	9	1431.1	206.1
31	12	1696.7	330.7
32	12	1946.7	463.8
33	26	2055.0	539.3
34	29	2145.2	375.9
35	42	2530.5	431.7
36	84	2647.1	395.8
37	226	2844.5	452.0
38	404	3062.4	364.4
39	428	3133.5	355.6
40	301	3219.7	381.6
41	63	3302.7	419.2
42	2	3860.0	721.2
Total	1777	2802.1	823.8

TABLE 32 Means and standard deviation of birth weight
at various gestational age (twins)

Gestational Age (weeks)	Number of Twin Sets	Means (grams)	Standard Deviation
18	2	210.0	42.4
20	1	40.0	
22	2	490.0	42.4
23	2	475.0	35.4
26	1	750.0	
27	4	955.0	244.2
28	2	515.0	572.8
31	10	1454.0	353.3
32	4	1257.5	622.9
33	4	1672.5	198.6
34	7	2081.4	311.1
35	6	2193.3	1004.3
36	4	2350.0	229.1
37	12	2494.2	379.3
38	7	2525.7	432.9
40	2	2690.0	113.1

TABLE 33 Comparison of birth weight (singleton & twins)

Type	Means Birth Weight	Standard Deviation	Range
Singleton	2802.1	824	110-4660
Twins	1776.7	850	100-3470

TABLE 34 Comparison of gestational age (singleton & twins)

Type	Means Gestational Age	Standard Deviation	Range
Singleton	36.83	5.0	16-42
Twins	32.51	5.4	18-40

TABLE 35 Early postpartum hemorrhage

Cause	Number	Percent
Uterine Atony	11	0.60
Lacerations	6	0.33
Retained Pieces of Placenta	8	0.44
Placenta Adherens	2	0.11
Uterine infection	2	0.11
Total	29	1.59

Section III

HIGH RISK PREGNANCIES

TABLE 36 Major complications during pregnancy

Complications	Numbers	Prevalence (%)
Diabetes mellitus	225	12.34
Previous cesarean section	170	9.33
HBsAg positive	106	5.81
Breech presentation	94	5.16
Pregnancy-induced hypertension	85	4.66
Chronic hypertension	45	2.47
Prolonged PROM (> 18 hours)	42	2.30
HIV positive	38	2.08
Iron deficiency anemia	31	1.70
Placenta previa	24	1.32
Asthma	23	1.26
Marked obesity	22	1.21
Thyrotoxicosis	18	0.99
Heart disease	14	0.77
Severe polyhydramnios	14	0.77
Myoma uteri	14	0.77
Systemic lupus erythematosus	13	0.71
Chorioamnionitis	10	0.55
Abruptio placentae	9	0.49
Severe oligohydramnios	8	0.44
Urinary tract infection	7	0.38
Epilepsy	7	0.38
Condyloma accuminata	6	0.33
Transverse lie	5	0.27
Thalassemia	4	0.22

Pregnancy with Heart Disease

Total 14 cases (0.77 percent of total parturients)
 singleton :14, twins : 0
 (not included 3 cases of therapeutic abortion)

Age range 19-47 years
 average 29.4±8.2 years
 age of 35 years or more 3 cases (21.4 %)

Functional Class (At delivery 20 cases)

Class I	7	cases
Class II	5	cases
Class III	2	cases
Class IV	-	case

Gestational Age at Birth

range 23-41 weeks (not included therapeutic abortion)
 average 36.1±4.8 weeks
 premature delivery (before completed 37 weeks)
 5 cases (35.7 %)

Birth Weight

range 270-3670 grams
 average 2512±907 grams
 number of low birth weight fetus (less than 2,500 grams)
 4 cases (28.6 %)

Apgar Scores at 1 minute (less than 7) 2 cases (14.3 %)

Apgar Scores at 5 minutes (less than 7) 1 cases (7.1 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (14.3 %)

Perinatal death 2 (14.3%)

Congenital Anomalies -

Other complications (No maternal death)

<i>Diabetes mellitus</i>	<i>4 cases</i>
<i>Pregnancy-induced hypertension</i>	<i>2 cases</i>
<i>Prolonged PROM</i>	<i>1 case</i>
<i>Compound presentation</i>	<i>1 cases</i>

Pregnancy with Diabetes Mellitus

Total 196 cases (12.34 percent of total parturients)

(Singleton : 225, Twins : 6)

Note : Glucose challenge test was used as a screening test only in women at risk for diabetes melitus and age > 25 yr.

Age range 16-47 years

average 31.5±5.7 years

age of 35 years or more 66 cases (29.3%)

Gestational Age at Birth

range 20-41 weeks

average 37.5±2.8 weeks

premature delivery (before completed 37 weeks)

38 cases (16.9%)

Birth Weight

range 300-4490 grams

average 2920±649 grams

number of low birth weight fetus (less than 2,500 grams)

42 cases (18.7 %)

Apgar Scores at 1 minute (less than 7)	28 cases (12.4 %)
Apgar Scores at 5 minutes (less than 7)	10 cases (4.4 %)
Small-for-gestational-age (less than 10th percentile)	15 cases (6.7 %)
Perinatal Death	4 cases (1.8 %) (2 : death fetus in utero)
Congenital Anomalies	1 cases (0.4 %) (ear abnormalities)

Other complications

<i>Previous cesarean section</i>	33 cases
<i>Pregnancy-induced hypertension</i>	18 cases
<i>Chronic hypertension</i>	16 cases
<i>Hepatitis B antigen positive</i>	10 cases
<i>Prolonged PROM (> 18 hours)</i>	5 cases
<i>Asthma</i>	6 cases
<i>Heart disease</i>	4 cases
<i>HIV positive</i>	4 cases
<i>Marked obesity</i>	4 cases
<i>Thyrotoxicosis</i>	3 cases
<i>Fever of unknown causes</i>	3 cases
<i>Iron def. anemia</i>	2 cases
<i>Placenta previa</i>	2 cases
<i>Teenage pregnancy</i>	2 cases
<i>Myoma Uteri</i>	2 cases
<i>Chorioamnionitis</i>	2 cases
<i>Polyhydramnios</i>	2 cases
<i>Systemic lupus erythematosus</i>	1 case
<i>Cervical incompetence</i>	1 case

Classifications

Pregestational DM (diagnosed before pregnancy)	38 cases (16.9 %)
<i>Chemical DM (Class A)</i>	4 cases
<i>Overt DM (Class B-T)</i>	34 cases
<i>Class B</i>	30 cases
<i>Class D, F, R</i>	4 cases

Gestational DM (diagnosed during pregnancy)	182 cases (80.9 %)
<i>Chemical DM (Class A1)</i>	<i>144 cases</i>
<i>Overt DM (Class A2)</i>	<i>38 cases</i>

Method of Glucose Control

Insulin	74 cases
Oral hypoglycemic drugs	6 cases
Oral hypoglycemic drugs & Insulin	15 cases
Diet Control only	130 cases

Pregnancy with Systemic Lupus Erythomatosus

Total 13 cases (0.71 percent of total parturients)
(All were singleton)

Activity of the disease

Remission before pregnancies	8 cases
Active disease during pregnancies	5 cases
Hypertension	4 cases
Lupus nephritis	5 cases

Age range 19-34 years

average 27.3 ± 5.7 years

age of 35 years or more 0 cases (0.0 %)

Gestational Age at Birth

range 29-39 weeks

average 35.9 ± 2.9 weeks

premature delivery (before completed 37 weeks)

5 cases (38.5 %)

Birth Weight

range 900-3300 grams

average 2331±775 grams

number of low birth weight fetus (less than 2,500 grams)

6 cases (46.2 %)

Apgar Scores at 1 minute (less than 7) 4 cases (30.8 %)**Apgar Scores at 5 minutes (less than 7)** 4 cases (30.8 %)**Small-for-gestational-age (less than 10th percentile)** 2 cases (15.4 %)**Perinatal death** -**Congenital Anomalies** -**Other complications***Iron deficiency anemia* 2 cases*Pregnancy-induced hypertension* 2 cases*Previous cesarean section* 2 cases*Diabetes mellitus* 1 case**Pregnancy with Thyrotoxicosis****Total** 18 cases (0.99 percent of total parturients)

All were singleton

Diagnosed before pregnancy 10 cases*Diagnosed during pregnancy* 8 cases

Age range 17-38 years
 average 28.0 ± 5.4 years
 age of 35 years or more 1 cases (5.6 %)

Gestational Age at Birth

range 30-41 weeks
 average 37.4 ± 2.7 weeks
 premature delivery (before completed 37 weeks)
 4 cases (22.2 %)

Birth Weight

range 1570-3850 grams
 average 2975 ± 713 grams
 number of low birth weight fetus (less than 2,500 grams)
 4 cases (22.2 %)

Apgar Scores at 1 minute (less than 7) 2 cases (11.1 %)

Apgar Scores at 5 minutes (less than 7) 1 case (5.6 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (11.1 %)

Perinatal death -

Congenital Anomalies -

Other complications

<i>Diabetes Mellitus</i>	3 cases
<i>Previous cesarean section</i>	1 case
<i>Teenage pregnancy</i>	1 case
<i>Chronic hypertension</i>	1 case
<i>Fever of unknown cause</i>	1 case
<i>Pregnancy-induced hypertension</i>	1 case
<i>Prolonged PROM</i>	1 case

Pregnancy with Hepatitis B Antigen Positive

Total 106 cases (5.81 percent of total parturients)
(singleton : 105 (99.1%); twins : 1 (0.9%))

Age range 16-42 years
average 29.5±4.8 years
age of 35 years or more 17 cases (16.0 %)

Gestational Age at Birth
range 24-41 weeks
average 37.9±2.9 weeks
premature delivery (before completed 37 weeks)
15 cases (14.2 %)

Birth Weight
range 600-4160 grams
average 2985±616 grams
number of low birth weight fetus (less than 2,500 grams)
13 cases (12.3 %)

Apgar Scores at 1 minute (less than 7) 11 cases (10.4 %)

Apgar Scores at 5 minutes (less than 7) 5 cases (4.7 %)

Small-for-gestational-age (less than 10th percentile) 16 cases (13.4 %)

Perinatal Death 5 cases (4.7 %)

Congenital Anomalies 4 cases
(*cleft lip, renal agenesis, trisomy 18, hydrops fetalis*)

Other complications

<i>Diabetes melitus</i>	10 cases
<i>Previous cesarean section</i>	8 cases
<i>Pregnancy-induced hypertension</i>	5 cases
<i>Iron deficiency anemia</i>	5 cases
<i>Asthma</i>	4 cases
<i>HIV positive</i>	3 cases
<i>Fever of unknown causes</i>	2 cases
<i>Prolonged PROM (> 18 hours)</i>	2 cases
<i>Abruptio placentae</i>	1 case
<i>Chronic hypertension</i>	1 case
<i>Marked obesity</i>	1 case
<i>Teenage pregnancy</i>	1 case
<i>Urinary tract infection</i>	1 case
<i>Myoma Uteri</i>	1 case
<i>Polyhydramnios</i>	1 case

Pregnancy with Asthma

Total 23 cases (1.26 percent of total parturients)
(All were singleton)

Activity of Disease

Well-controlled	19 cases
Poorly-controlled	4 cases

Age range 17-39 years

average 27.7 ± 5.6 years

age of 35 years or more 3 cases (13.0 %)

Gestational Age at Birth

range 22-41 weeks
 average 37.1 ± 3.9 weeks
 premature delivery (before completed 37 weeks)
 4 cases (17.4 %)

Birth Weight (not included abortion)

range 420-4160 grams
 average 2890 ± 951 grams
 number of low birth weight fetus (less than 2,500 grams)
 6 cases (26.1 %)

Apgar Scores at 1 minute (less than 7) 4 cases (17.4 %)

Apgar Scores at 5 minutes (less than 7) 4 cases (17.4 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (8.7%)

Perinatal death 1 case (4.3 %)

Congenital Anomalies 1 case (4.3% : exencephaly)

Other complications

<i>Diabetes mellitus</i>	6 cases
<i>Hepatitis B antigen positive</i>	4 cases
<i>Previous cesarean section</i>	2 cases
<i>Teenage pregnancy</i>	1 case
<i>Chronic hypertension</i>	1 case
<i>Iron deficiency anemia</i>	1 case
<i>Pregnancy-induced hypertension</i>	1 case
<i>Urinary tract infection</i>	1 case

Pregnancy with Chronic Hypertension

Total 45 cases (2.47 percent of total parturients)

Singleton : 44 (97.8%); Twins : 1 (2.2%)

Severity of Hypertension

Severe (start treatment during pregnancy)	8	cases
Severe (controlled prior to pregnancy)	18	cases
Mild (no medication BP less than 160/90)	8	cases
Mild (BP less than 160/90 but treated with antihypertensive drug)	10	cases

Age range 24-46 years

average 32.9±5.4 years

age of 35 years or more 20 cases (44.4 %)

Gestational Age at Birth

range 26-40 weeks

average 36.1±3.7 weeks

premature delivery (before completed 37 weeks)

12 cases (26.7 %)

Birth Weight

range 780-3860 grams

average 2688±852 grams

number of low birth weight fetus (less than 2,500 grams)

12 cases (26.7 %)

Apgar Scores at 1 minute (less than 7) 8 cases (17.8 %)

Apgar Scores at 5 minutes (less than 7) 3 cases (6.7 %)

Small-for-gestational-age (less than 10th percentile) 7 cases (15.6 %)

Perinatal death 1 cases (2.2 %)

Congenital Anomalies 1 cases (2.2 %) : VSD

Other complications

<i>Diabetes mellitus</i>	<i>16 cases</i>
<i>Marked obesity</i>	<i>8 cases</i>
<i>Previous cesarean section</i>	<i>7 cases</i>
<i>HIV positive</i>	<i>2 cases</i>
<i>Thyrotoxicosis</i>	<i>1 case</i>
<i>Hepatitis B surface antigen positive</i>	<i>1 case</i>
<i>Pregnancy-aggravated hypertension</i>	<i>7 cases</i>
<i>Placenta previa</i>	<i>1 case</i>
<i>Breech presentation</i>	<i>2 cases</i>
<i>Psoriasis</i>	<i>1 case</i>
<i>Urinary tract infection</i>	<i>1 case</i>
<i>Prolonged PROM (> 18 hours)</i>	<i>1 case</i>

Pregnancy-induced Hypertension

Total 85 (4.66 percent of total parturients)

Singleton : 84 (98.8%); Twins : 1 (1.2%)

Age range 15-47 years

average 29.3±6.0 years

age of 35 years or more 12 cases (14.1 %)

Gestational Age at Birth

range 23-41 weeks
 average 36.5 ± 3.4 weeks
 premature delivery (before completed 37 weeks)
 26 cases (30.6 %)

Classification of PIH

Gestational hypertension (without proteinuria)	21 cases (24.7 %)
Mild Preeclampsia	38 cases (44.7 %)
Severe Preeclampsia	18 cases (21.2 %)
Pregnancy-aggravated hypertension	7 cases (8.2 %)
Eclampsia	1 cases (1.2 %)
<i>First eclamptic attack before admission</i>	<i>0 case</i>
<i>First eclamptic attack after admission</i>	<i>1 case</i>
<i>No ANC at Maharaj Nakorn Chiang Mai</i>	<i>0 case</i>
<i>ANC at Maharaj Nakorn Chiang Mai</i>	<i>1 case</i>

Birth Weight range 350-4190 grams

average 2644 ± 783 grams
 number of low birth weight fetus (less than 2,500 grams)
 27 cases (31.8 %)

Apgar Scores at 1 minute (less than 7) 21 cases (24.7 %)

Apgar Scores at 5 minutes (less than 7) 11 cases (12.9 %)

Small-for-gestational-age (less than 10th percentile) 17 cases (20.0 %)

Perinatal death 5 cases (5.9 %)

Congenital Anomalies 4 case (4.7%) (hydronephrosis, renal agenesis,
 hydrosph fetalis due to Hb Bart's disease : 2 cases)

Other complications

<i>Diabetes Mellitus</i>	18 cases
<i>Chronic hypertension</i>	7 cases
<i>Previous cesarean section</i>	6 cases
<i>Hepatitis B antigen positive</i>	5 cases
<i>Marked obesity</i>	5 cases
<i>Systemic lupus erythematosus</i>	2 cases
<i>Heart disease</i>	2 cases
<i>Teenage pregnancy</i>	2 cases
<i>Fever of unknown cause</i>	2 cases
<i>Prolonged ruptured membranes</i>	2 cases
<i>Thalassemia</i>	1 case
<i>HIV positive</i>	1 case
<i>Chorioamnionitis</i>	1 case
<i>Asthma</i>	1 case
<i>Thyrotoxicosis</i>	1 case
<i>Urinary tract infection</i>	1 case

Placenta Previa

Total 24 cases (1.32 percent of total parturients)

Singleton : 23, Twins : 1

Age range 16-41 years

average 30.1 ± 6.5 years

age of 35 years or more 6 cases (25.0 %)

Gestational Age at Birth

range 15-39 weeks

average 31.7 ± 6.6 weeks

premature delivery (before completed 37 weeks)

16 cases (66.7 %)

Birth Weight range 110-4660 gramsaverage 2103 ± 1165 grams

number of low birth weight fetus (less than 2,500 grams)

14 cases (58.3 %)

Apgar Scores at 1 minute (less than 7) 12 cases (50.0 %)**Apgar Scores at 5 minutes (less than 7)** 8 cases (33.3 %)**Small-for-gestational-age (less than 10th percentile)** 3 cases (12.5 %)**Perinatal death** 4 cases (16.7 %)**Congenital Anomalies** -**Other complications**

<i>Previous cesarean section</i>	3 cases
<i>Diabetes mellitus</i>	2 cases
<i>Iron deficiency anemia</i>	1 case
<i>Epilepsy</i>	1 case
<i>Myoma uteri</i>	1 case
<i>Teenage pregnancy</i>	1 case
<i>Chronic hypertension</i>	1 case
<i>Breech presentation</i>	1 case
<i>Transverse lie</i>	1 case
<i>Chronic hypertension</i>	1 case

Pregnancy with Acute Pyelonephritis

Total 7 cases (0.38 percent of total parturients)
(All were singleton)

Age range 22-38 years
average 28.9±6.1 years
age of more than 35 years 1 cases (14.3 %)

Gestational Age at Birth
range 31-39 weeks
average 37.0±2.8 weeks
premature delivery (before completed 37 weeks)
2 cases (28.6 %)

Onset

First trimester	-	case
Second trimester	3	cases
Third trimester	4	cases
Postpartum	-	case

Number of Episodes

1	6	cases
2	1	case
3	-	case

Birth Weight range 2400-3550 grams
average 2935.7±410 grams
number of low birth weight fetus (less than 2,500 grams)
1 cases (14.3 %)

Apgar Scores at 1 minute (less than 7)	2 cases (18.2 %)
Apgar Scores at 5 minutes (less than 7)	1 case (9.1 %)
Small-for-gestational-age (less than 10th percentile)	1 cases (9.1 %)
Perinatal death	1 case (9.1 %)
Congenital Anomalies	-
Other complications	
<i>Asthma</i>	2 cases
<i>Fever of unknown cause</i>	2 cases
<i>Chronic hypertension</i>	1 case
<i>Transverse lie</i>	1 case
<i>Polyhydramnios</i>	1 case
<i>Hepatitis B antigen positive</i>	1 case
<i>Pregnancy-induced hypertension</i>	1 case

Small-for-Gestational-Age Fetuses

Birthweight less than 10th percentile

Total 117 (6.29 percent of total babies; 1860 fetuses)
 Singleton 102 fetuses
 Multiple pregnancies 15 fetuses

Age range 15-46 years
 average 28.4±6.9 years
 age of 35 years or more 21 cases (17.9 %)

Gestational Age at Birth

range 21-41 weeks
 average 35.5±4.9 weeks
 premature delivery (before completed 37 weeks)
 45 cases (38.5 %)

Birth Weight range 110-2610 grams
 average 1822±745 grams
 number of low birth weight fetus (less than 2,500 grams)
 99 cases (84.6 %)

Apgar Scores at 1 minute (less than 7) 39 cases (33.3 %)

Apgar Scores at 5 minutes (less than 7) 29 cases (24.8 %)

Perinatal Death 11 in 117 cases (9.4 %)

Congenital Anomalies

<i>Gastroschisis</i>	2 cases
<i>Multiple anomalies</i>	2 cases
<i>Trisomy 18</i>	2 cases
<i>Skeletal dysplasia</i>	1 case
<i>Acardiac twins</i>	1 case
<i>Amniotic band synddrome</i>	1 case
<i>Omphalocele</i>	1 case
<i>Suspected of intrauterine infection</i>	7 cases

Other complications

<i>Medical diseases</i>	24 cases
<i>Pregnancy-induced hypertension</i>	17 cases
<i>Poor maternal weight gain</i>	24 cases

TABLE 38 Voluntary screening (2013) among pregnant women for anti-HIV antibody

Pregnant women (Counselling)	1643	cases
Voluntary screening	1643	cases
+ve anti-HIV antibody	46	cases
% positive case	2.8	%

TABLE 39 Age of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

Age (years)	No. of cases	Percent
15-19	1	2.8
20-24	9	25
25-29	10	27.8
30-34	11	30.5
35-39	5	13.9
40-44	-	-
45-49	-	-
Total	36	100

Mean age (years) 28.81

Standard deviation 5.242

Range 17-38 years

TABLE 42 Number of marriages of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

Number	No. of cases	Percent
1	5	13.9
2	25	69.4
3	4	11.1
4	2	5.6
Unknown	-	-
Total	36	100

TABLE 43 Occupations of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

Occupations	No. of cases	Percent
Employee	13	36.1
Housewife	14	38.9
Commercial	6	16.7
Business	0	0
Governor	2	5.6
Student	1	2.7
Total	36	100

TABLE 44 Residence (province) of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

Province	Number	Percent
Chiang Mai (เชียงใหม่)	29	80.6
Lamphun (ลำพูน)	4	11.1
Chiang Rai (เชียงราย)	1	2.8
Maehongson (แม่ฮ่องสอน)	2	5.5
Total	36	100

TABLE 45 Complications of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

	Cases	Percent
Without complicaiton	13	36.1
With complication	23	63.9
● Antepartum	21	
● Intrapartum	2	
● Postpartum	1	
Total	36	100

TABLE 46 Birth weight in the pregnant women with posi-tive HIV at Maharaj Nakorn Chiang Mai (2013)

Birth weight (grams)	Number	Percent
< 1,499	-	-
1,500 - 1,999	2	5.6
2,000 - 2,499	8	22.2
2,500 - 2,999	16	44.4
3,000 - 3,499	7	19.5
3,500 - 3,999	3	8.3
Total (twins =1)	36	100

Mean birthweight (grams) 2,761.94
Standard deviation (grams) 513.358
Range (grams) 1670-3,950

TABLE 47 Postpartum contraception of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2013)

Method	No. of cases	Percent
Female sterilization	18	50
DMPA	4	11.1
Oral contraception	5	13.9
Condom	3	8.3
Male sterilization	1	2.8
Unknown	5	13.9
Total	36	100

Section IV

PRENATAL INVESTIGATION

Antepartum Fetal Testing

Primary Surveillance

Fetal Movement Count: For low-risk and high-risk pregnancies

Non-stress test

or **Acoustic stimulation test** 1812 tests

(*OPD4 = 1451 ; LR = 239; OB2&3 = 122*)

Secondary Surveillance

Contraction stress test

or **Nipple stimulation test** 5 tests

Biophysical profile/ultrasonography 90 tests

Doppler velocimetry 320 tests

Prenatal Diagnosis

1. **Ultrasonography** 8,251 examinations
(~ 25 % for gynecologic and infertile examinations)
2. **Amniocentesis** 1,297 cases
3. **Cordocentesis** 403 cases
4. **Chorionic villous sampling** 123 procedures

OBSTETRIC ULTRASOUND SERVICE

Number of Patients undergoing sonographic examinations (OB&GYN) in 2,013

8,251 cases

Several examinations involved in the researches without specific indications

Indications for sonographic examination	
■ Uncertained date of gestation	3.9 %
■ Suspected intrauterine growth retardation	1.4 %
■ Bleeding in first half of pregnancy	1.3 %
■ Antepartum hemorrhage	0.6 %
■ Suspected fetal death	0.5 %
■ Rule out fetal anomalies	42.7 %
■ Fetal growth surveillance	6.6 %
■ Gynecologic ultrasound	24.5 %
■ Infertile investigation	1.6 %
■ Perinatal research	14.7 %
■ Screening in menopausal women	2.2 %

Cordocentesis (2013)

Total 403 cases

Indications	No.	%
1. Previous child with hydrops fetalis	3	0.7
2. Pregnancy at risk for Hb Bart's	80	19.9
3. Early sign of hydrops fetalis	3	0.7
4. Previous child with β thal major	1	0.2
5. Pregnancy at risk for β thal major	49	12.1
6. Previous child with β thal / Hb E	3	0.7
7. Pregnancy at risk for β thal / HbE	145	36
8. Pregnancy at risk for Hb Bart's and risk for β thal Hb/E	3	0.7
9. Pregnancy at risk for Hb Bart's and risk for β thal major	1	0.2
10. Pregnancy at risk for β thal/HbE and risk for β thal major	1	0.2
11. Uncertain OFT	3	0.7
12. Chromosome analysis	34	8.4
13. Combined chromosome and risk for Hb bart's , β thal major, and β thal Hb/E	67	16.6
14. Combined chromosome and previous child with Hb bart's, β thal major and β thal Hb/E	3	0.07
15. Combined chromosome analysis and uncertain OFT	4	1
16. Repeat for chromosome confirmation	3	0.7
Total	403	100

Amniocentesis (2013)

Total 1,297 cases

Indications for amniocentesis	
Elderly gravida (age of more than 35 years)	1071
Pregnancy with high risk for Down syndrome screening	198
■ <i>Pregnancy with Down syndrome in previous child</i>	5
■ <i>Pregnancy with fetal anomaly in previous child</i>	2
■ <i>Pregnancy with fetal anomaly and sonomarkers</i>	3
■ <i>Pregnancy with Down syndrome in family</i>	20
■ <i>Others (Polyhydramnios)</i>	5

Chorionic Villous Sampling (2013)

Total 123 Procedures

Indications	Number
1. Fetal chromosome study	15
■ elderly gravid	5
■ Thickened nuchal translucency	5
■ Previous fetal trisomy	1
■ Fetal cystic hygroma	3
■ Fetal heart anomaly	1
2. Risk for fetal severe thalassemia	97
■ Risk for Hb Bart's disease	29
■ Risk for beta thalassemia major	11
■ Risk for beta thalassemia/Hb E disease	57
3. Fetal chromosome study and thalassemia diagnosis	11
■ Elderly gravida with fetal risk for Hb Bart's disease	6
■ Elderly gravida with fetal risk for homozygous betathalassemia	1
■ Elderly gravida with beta thalassemia/Hb E disease	3
■ Previous trisomy 21 with fetal risk for homozygous beta	1

Prevention and Control Thalassemia Program

Chiang Mai strategy

- 1) Genetic counseling
- 2) Identification of pregnancy at risk
 - 2.1 Retrospective screening (history review for known risk)
 - 2.2 Prospective screening
 - Screening test
 - MCV or 2 min OF (2-minute osmotic fragility test)
 - HbE screening test (only if 2 min OF is negative)
 - Diagnostic test (if both of the couple are positive screening test)
 - HbA₂ level & PCR for α -thal1 if 2 min OF is positive
 - HbA₂ level (negative 2 min OF but positive Hb E)
- 3) Prenatal diagnosis for pregnancy at risk
 - 3.1 Prenatal counseling
 - 3.2 Cordocentesis (16-22 weeks of gestation)
 - 3.3 Fetal blood analysis (checking maternal blood with acid elution test and hemoglobin typing with HPLC)
- 4) Counseling and termination of affected pregnancy

+ve OFT = OFT < 60%, MCV +ve = ≤ 78 fl +ve % HbA₂ = HbA₂ > 4%

PROSPECTIVE SCREENING FOR THALASSEMIA PROGRAM 2013

	Number
Total number of pregnant screened	1,215
Positive MCV or Hb E	373
Number of couple at risk for thalassemia	27
■ Risk for Hb Bart's	8
■ Risk for Beta-thalassemia major	4
■ Risk for Beta thalassemia/Hb E	15
The choice which selected by couples	
■ Cordocentesis	12
■ Chorionic villus samplings	7
■ Amniocentesis	2
■ Ultrasonography	1
■ Not PND [risk for beta+ thal/ Hb E disease]	1
■ Advanced gestational age	1
■ Abortion before selection	1
■ Refused PND [twin }	1
■ No information	1
Result of PND	
■ Hb bart's	3
■ Beta thalassemia major	1
■ Beta thalassemia/Hb E	3

Down Syndrome Screening (2013)

Total 9,460 tests

Low risk : 6785 tests

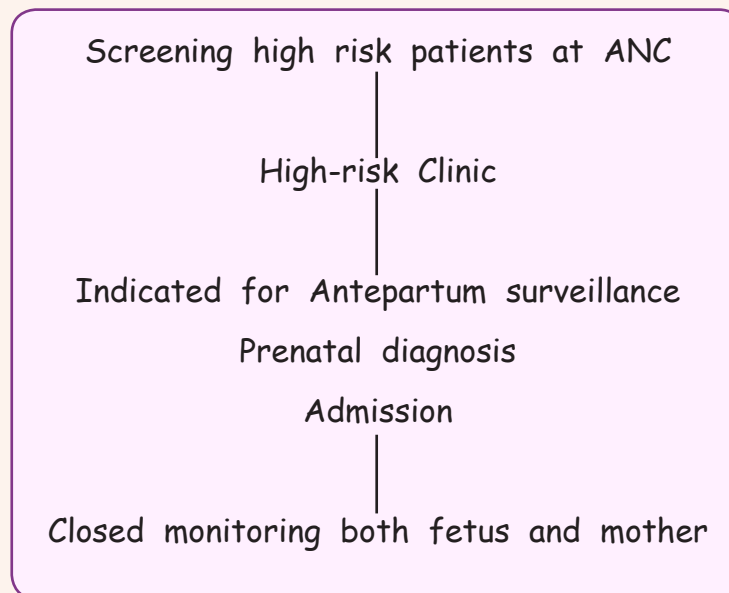
High risk: 708 tests

Trimester	Risk			Total
	Low	Intermediate	High	
First	2,767	1967 (41.31%)	28 (0.59%)	4,762
Second	4,018	-	680 (14.47%)	4,698
Summary	6,785	1,967	708	9,460

High Risk Pregnancy

Number of patients approximately 420 cases

Management Guideline



High-risk patients at Maharaj Nakorn Chiang Mai Hospital in 2013

- | | |
|---|--------|
| 1. Elderly Gravida (age of 35 years or more) | 14.9 % |
| 2. Teenage Pregnancy (age of less than 20 years) | 9.6 % |
| <i>Early adolescence (age of less than 17 years)</i> | 1.5 % |
| <i>Late adolescence (age of 17-19 years)</i> | 8.1 % |
| 3. Pregnancy complicated with medical or obstetrical diseases | 8.5 % |

Note Some high-risk pregnancies were not included in the high-risk clinic and in this report e.g. maternal short stature, breech presentation, and previous cesarean section.