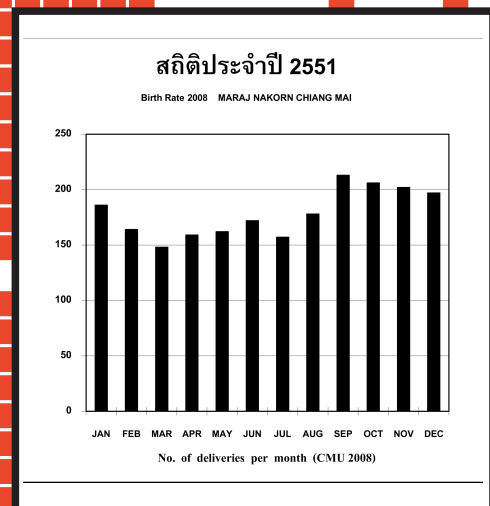


MATERNAL-FETAL MEDICINE 2008



หน่วยเวชศาสตร์มารดาและทารก
ภาควิชาสูติศาสตร์และนรีเวชวิทยา
คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

ANNUAL REPORT 2009
MATERNAL-FETAL MEDICINE
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY
FACULTY OF MEDICINE, CHIANG MAI UNIVERSITY
CHIANG MAI, THAILAND

MATERNAL-FETAL MEDICINE 2008

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อภิรดี ตรรกไพจิตร
อุบล เลี้ยวปรีชา

PREFACE

This annual report 2008 on maternal-fetal medicine has been published with great contribution from Dr. Pannee, Dr Theera and their colleagues in the MFM division. It reflects our work and advance in obstetric care and can be used as a benchmark for medical personnels involved in this field.

I would like appreciate and express my sincere thanks to my colleagues for their hardworking and dedication to our OB & GYN Department. I gratefully acknowledge Associate Professor Sirivatanapa, Chief of the MFM Division and Professor Theera Tongsong for ongoing this report.

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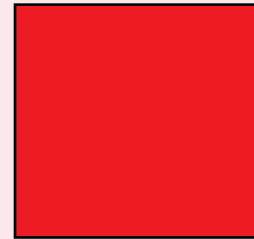
PREFACE

The 2008 annual report of Maternal-Fetal Medicine still presents various interesting data. This year our unit has established Down screening program with biochemical markers both in first and second trimester, as well as nuchal translucency in late first trimester.

Of interest, the total number of delivery is slightly increased and the number of perinatal work-ups are continuously increased. Moreover, we conducted several researches published via pubmed in the last year.

Our annual report has been presented online as seen on the homepage of our department as well as hard copy version. We hope that this report can be used as a benchmark for obstetricians in providing the best care to all pregnant women.

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CONTENT



Page

Section I Obstetric Mortality.....9

- Stillbirth9
- Neonatal Mortality10
- Perinatal Mortality..... 11
- Maternal Mortality 11

Section II General Obstetrics..... 13

- Singleton & Multifetal pregnancies13
- Categories of parturients.....13
- Deliveries per month14
- Distribution of maternal age16
- Distribution of parity19
- Distribution of the occupations of the parturients.....21
- Distribution of the Residences of the parturients.....24
- Gestational age at delivery of singleton pregnancy.....28
- Gestational age at delivery of twins pregnancy31
- Number of antenatal clinic attendance34
- Fetal presentations in labor38
- Modes of deliveries40
- Modes of deliveries in breech presentation.....42
- Frequency of cesarean deliveries according to diagnostic indication44

■ Forceps delivery : Indications	45
■ Vacuum delivery : Indications	46
■ Sex of the fetus, Fetal sex.....	47
■ Apgar score at 1 and 5 minutes of total neonates.....	48
■ Congenital anomalies of fetuses	50
■ Distribution of neonatal birth weight	52
■ Distribution of neonatal birth weight for each gestational period	56
■ Comparison of birth weight, gestational age between	60
singleton and multifetal pregnancies	
■ Postpartum hemorrhage.....	60

Section III High-risk Pregnancies 61

■ Frequencies of pregnancies with major complications.....	61
■ Pregnancies with heart diseases.....	62
■ Pregnancies with diabetes melitus	63
■ Pregnancies with thalassemia.....	65
■ Pregnancies with thyrotoxicosis.....	66
■ Pregnancies with hepatitis B antigen positive	68
■ Pregnancies with asthma	69
■ Pregnancies with chronic hypertension.....	71
■ Pregnancies-induced hypertension	72
■ Pregnancies with placenta previa	74
■ Pregnancies with acute pyelonephritis	76
■ Pregnancies with small-for-gestational-age fetuses.....	77
■ Pregnancies with HIV infection	79

Section IV Perinatal Investigations..... 85

■ Antepartum fetal testing.....	85
■ Prenatal diagnosis	85
■ Ultrasound service.....	86
■ Cordocentesis.....	87
■ Amniocentesis	88
■ Chorionic villous sampling.....	89
■ Thalassemia screening	90
■ High-risk pregnancies	92



ANNUAL REPORT



2008

MATERNAL-FETAL MEDICINE

Presentation : January 2009

DIVISION OF MATERNAL-FETAL MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

FACULTY OF MEDICINE, CHIANG MAI UNIVERSITY

CHIANG MAI, THAILAND

DATA SOURCE

Section I Obstetric Mortality Patient Record Charts

Section II General Obstetrics Delivery Records

Section III High-risk Pregnancies Patient Record Charts

Section IV Perinatal Investigations Statistics of the Division

Section I

OBSTETRIC MORTALITY

STILLBIRTH

Stillbirth (gestational age \geq 22 weeks)

37 cases of total births 2,144 cases

- *Gestational age between 22-27 weeks 19 cases (51.3 %)*

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total</i>
<i>Low risk</i>	-	-	-
<i>High risk</i>	7	12	19
<i>Autopsy</i>	2	6	8

Causes of death

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total cases</i>
1. Normally formed macerated stillbirth	1	3	4
2. Congenital malformations	3	4	7
3. Conditions associated with immaturity	3	2	5
4. Asphyxia developed in labor	-	-	-
5. Other specific conditions	-	-	-
6. Therapeutic termination related to PND	-	3	3

■ *Gestational age between ≥ 28 weeks 18 cases (48.6 %)*

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total</i>
<i>Low risk</i>	-	-	-
<i>High risk</i>	6	12	18
<i>Autopsy</i>	4	8	12

Causes of death

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total cases</i>
1. Normally formed macerated stillbirth	2	2	4
2. Congenital malformations	1	4	5
3. Conditions associated with immaturity	3	3	6
4. Asphyxia developed in labor	-	1	1
5. Other specific conditions	-	1	1
6. Therapeutic termination related to PND	-	1	1

Stillbirth rate :

Stillbirth rate = 8.39 per 1000 total births

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

Stillbirth rate = 17.25 per 1000 total births

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

Stillbirth rate = 15.39 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 18 cases (GA > 22 weeks) of total 2186 live births

■ **Gestational age between 22-27 weeks 4 cases (22.2%) (Livebirth 2186)**

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total</i>
<i>Low risk</i>	-	1	1
<i>High risk</i>	1	2	3
<i>Autopsy</i>	-	1	1

Causes of death

1. Normally formed macerated stillbirth	-	-	-	case
2. Congenital malformations	-	-	-	case
3. Conditions associated with immaturity	-	1	1	case
4. Asphyxia developed in labor	-	-	-	case
5. Other specific conditions	1	2	3	cases
6. Therapeutic termination related to PND-	-	-	-	case

■ **Gestational age \geq 28 weeks 14 cases (77.8%) (Livebirth 2186)**

	<i>CMU cases</i>	<i>Referred cases</i>	<i>Total</i>
<i>Low risk</i>	1	-	1
<i>High risk</i>	4	9	13
<i>Autopsy</i>	3	3	6

Causes of death

1. Normally formed macerated stillbirth	-	-	-	case
2. Congenital malformations	2	6	8	cases
3. Conditions associated with immaturity	1	-	1	case
4. Asphyxia developed in labor	-	-	-	case
5. Other specific conditions	2	3	5	cases
6. Therapeutic termination related to PND	-	-	-	case

Early neonatal death rate 6.40 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 8.23 per 1,000 live births

(\geq 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)

1. Gestational age ≥ 28 weeks (stillbirths + early neonatal death)
perinatal death rate = 14.6 per 1000 total births
2. Gestational age ≥ 22 weeks (stillbirths + neonatal death)
perinatal death rate = 10.5 per 1000 total births

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

MATERNAL DEATH

Total (All were referred cases) **2** **cases**

Maternal mortality rate 0.91 per 1000 livebirths

Causes of maternal death

Postpartum hemorrhage with shoulder dystocia	1 case
Postpartum hemorrhage due to uterine atony	1 case

Summary

DATA	2008
Total birth (neonates)	2186
Stillbirth	37
• 22-27 weeks	19
• ≥ 28 weeks	18
Stillbirth rate/1000 births	
• > 28 weeks / birthweight $>1,000$ gm	8.4
• > 22 weeks / birthweight >500 gm	17.3
Early neonatal death	18
• Early neonatal death rate / 1000 total birth (≥ 28 weeks)	6.4
• Early neonatal death rate / 1000 total birth (≥ 22 weeks)	8.2

Section II

GENERAL OBSTETRICS

TABLE 1 Distribution of Singleton & Multifetal Pregnancies

Type of pregnancy	Number	Percent
Singleton	2103	98.1
Twins	36	1.7
Triplet	3	0.1
Total	2144	100.0

TABLE 2 Categories of the Pregnant Women

	2007		2008	
	Number	Percent	Number	Percent
General Cases	1813	82.0	1785	83.3
Private Cases	399	18.0	359	16.7
Total	2212	100.0	2144	100.0

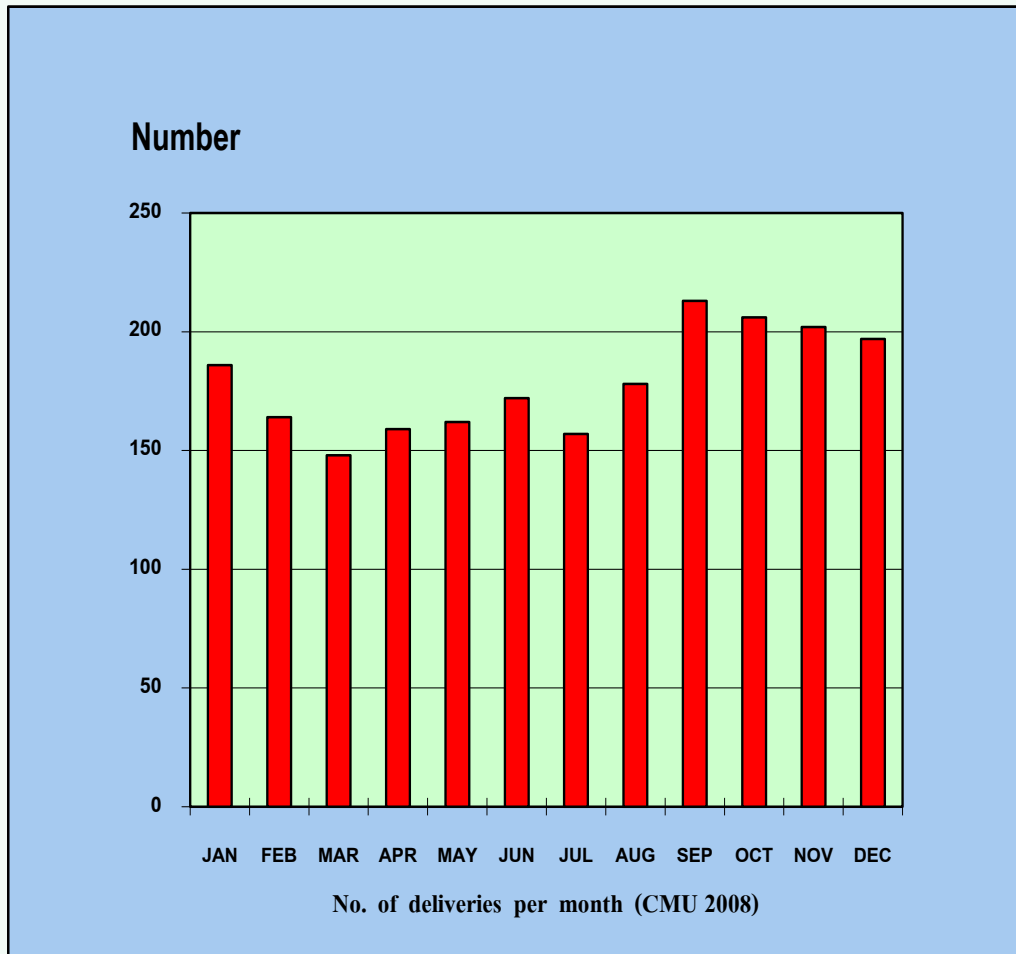
TABLE 3 Categories of the Pregnant Women

	Number	Percent
ANC at Maharaj Nakorn Chiang Mai Hospital	1215	56.7
Private Clinic	359	16.7
ANC at Other Hospitals	476	22.2
No ANC	84	3.9
Total	2134	99.5

TABLE 4 Number and Percentage of Deliveries per month

Month	Number (Neonates)	Percent
January	186	8.68
February	164	7.65
March	148	6.90
April	159	7.42
May	162	7.56
June	172	8.02
July	157	7.32
August	178	8.30
September	213	9.93
October	206	9.61
November	202	9.42
December	197	9.19
Total	2144	100.00

**FIGURE 1 Histogram : Number of Deliveries from
January to December 2008**



Total deliveries in 2001 = 3103 cases

Total deliveries in 2002 = 2815 cases

Total deliveries in 2003 = 2753 cases

Total deliveries in 2004 = 2654 cases

Total deliveries in 2005 = 2420 cases

Total deliveries in 2006 = 2013 cases

Total deliveries in 2007 = 2212 cases

Total deliveries in 2008 = 2144 cases

TABLE 5 Number and percentage of parturients by age

Age	Number	Percent	Age	Number	Percent
13	1	0.0	31	110	5.1
14	4	0.2	32	94	4.4
15	4	0.2	33	89	4.2
16	23	1.1	34	82	3.8
17	41	1.9	35	84	3.9
18	57	2.7	36	63	2.9
19	72	3.4	37	57	2.7
20	76	3.6	38	36	1.7
21	78	3.6	39	26	1.2
22	84	3.9	40	24	1.1
23	116	5.4	41	20	0.9
24	107	5.0	42	18	0.8
25	108	5.1	43	4	0.2
26	137	6.4	45	2	0.1
27	133	6.2	47	1	0.0
28	143	6.7	46	1	0.0
29	120	5.6	47	1	0.0
30	123	5.8			
Total				2137	100.0

Average age (Mean+Standard deviation) 27.86+6.1 years

TABLE 6 Number and percentage of parturients by age group

Age Group	Number	Percent
10-14	5	0.2
15-19	197	9.2
20-24	461	21.5
25-29	641	29.9
30-34	498	23.2
35-39	266	12.4
40-44	66	3.1
≥45	3	0.1
Total	2144	100.0

Summary : Age of parturients

- Adolescent Pregnancies (11-19 years) 202 (9.4%)
 - Early Adolescent Pregnancies (≤ 16 years) 32 (1.5 %)
 - Late Adolescent Pregnancies (17-19 years) 170 (7.9 %)
- Adult Pregnancies (20-34 years) 1600 (74.6 %)
- Elderly Pregnancies (≥ 35 years) 335 (15.6 %)

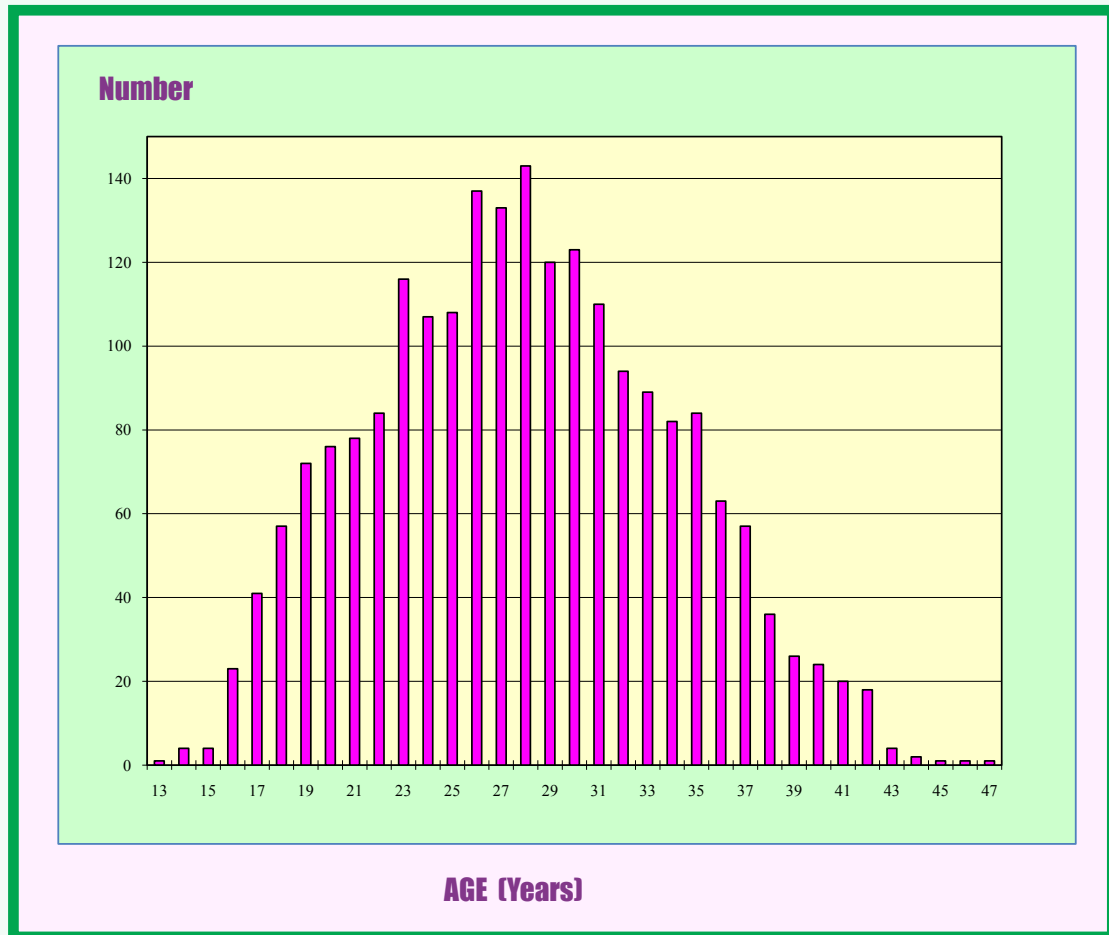
FIGURE 2 Histogram : Number of Parturients by Age

TABLE 7 Parity of parturients

Parity	Number	Percent
0	1231	57.4
1	709	33.1
2	160	7.5
3	23	1.1
4	15	.7
5	3	.1
6	1	.0
7	1	.0
Total	2143	100.0

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

Nulliparous 57.4 %

Multiparous 42.6 %

FIGURE 3 Histogram : Number of parturients by parity

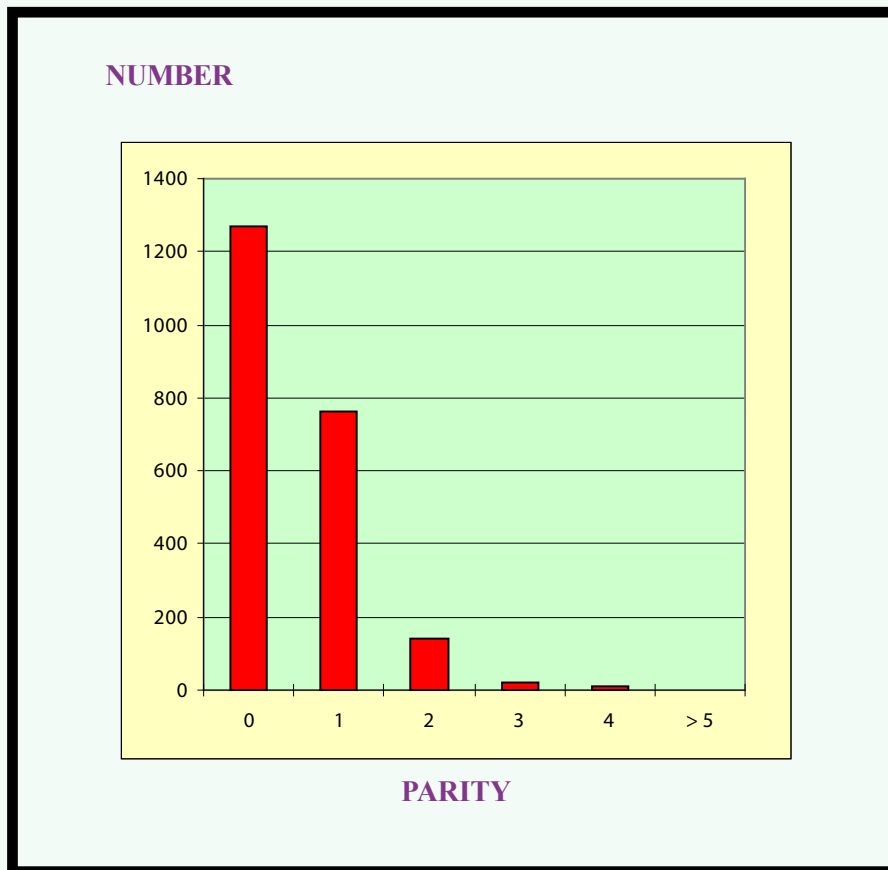
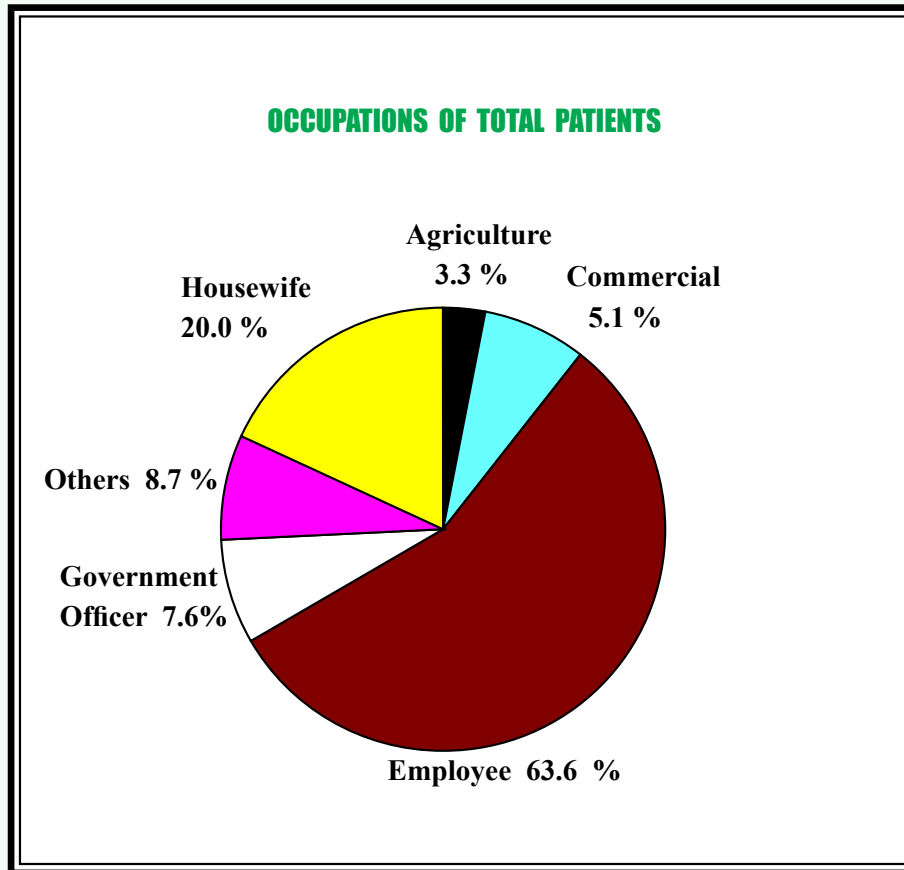
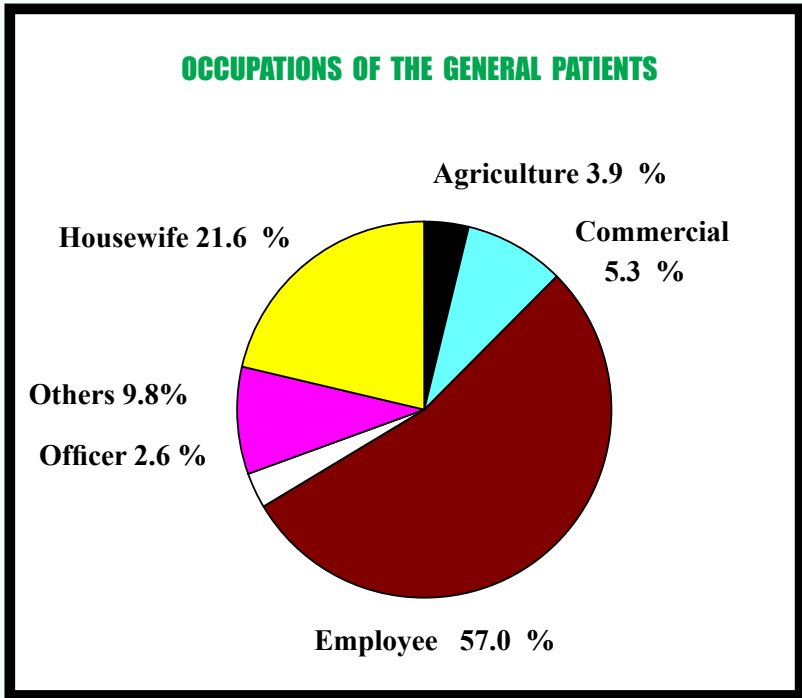


TABLE 8 Distribution of the occupations of the parturients

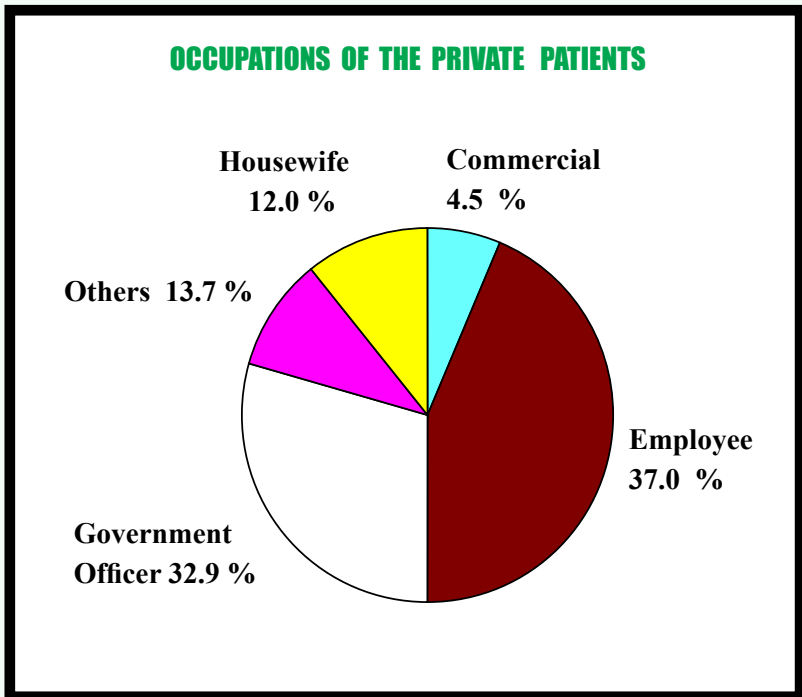
Occupations	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Agriculture	70	3.3	69	3.9	1	0.3
Commercial	110	5.1	94	5.3	16	4.5
Employee	1150	53.6	1017	57.0	133	37.0
Government Officer	164	7.6	46	2.6	118	32.9
Private Business	34	1.6	22	1.2	12	3.3
Housewife	428	20.0	385	21.6	43	12.0
Student	43	2.0	41	2.3	2	0.6
State Enterprise	7	0.3	3	0.2	4	1.1
Others	138	6.4	108	6.1	30	8.4
Total	2144	100.0	1785	100.0	359	100.0

FIGURE 4 Pie : Distribution of patient's occupations

OCCUPATIONS OF THE GENERAL PATIENTS



OCCUPATIONS OF THE PRIVATE PATIENTS

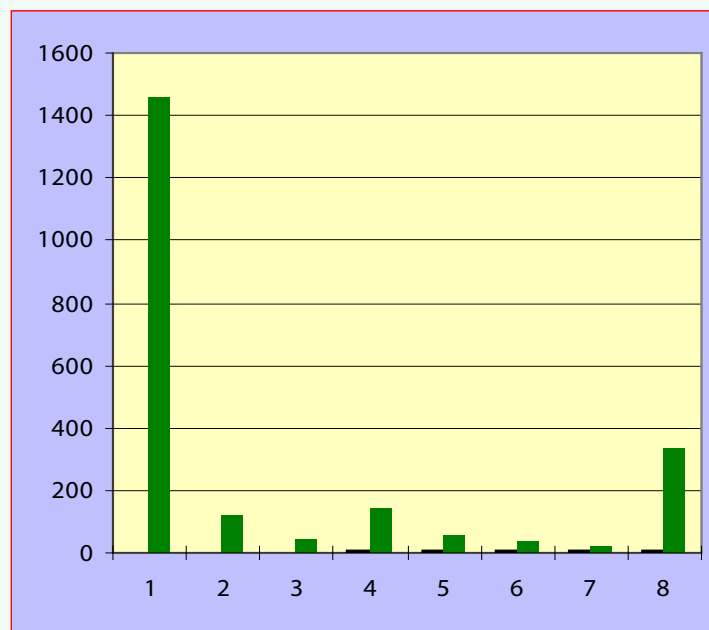


**TABLE 9 Distributions of the residence (province)
of the parturients**

Province	Number	Percent
Chiang Mai (เชียงใหม่)	1437	67.0
Chiang Rai (เชียงราย)	110	5.1
Lampang (ลำปาง)	36	1.7
Lamphun (ลำพูน)	130	6.1
Maehongsorn (แม่ฮ่องสอน)	72	3.4
Payao (พะเยา)	38	1.8
Prae (แพร่)	29	1.4
Others (อื่นๆ)	292	13.6
Total	2144	100.0

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

Number



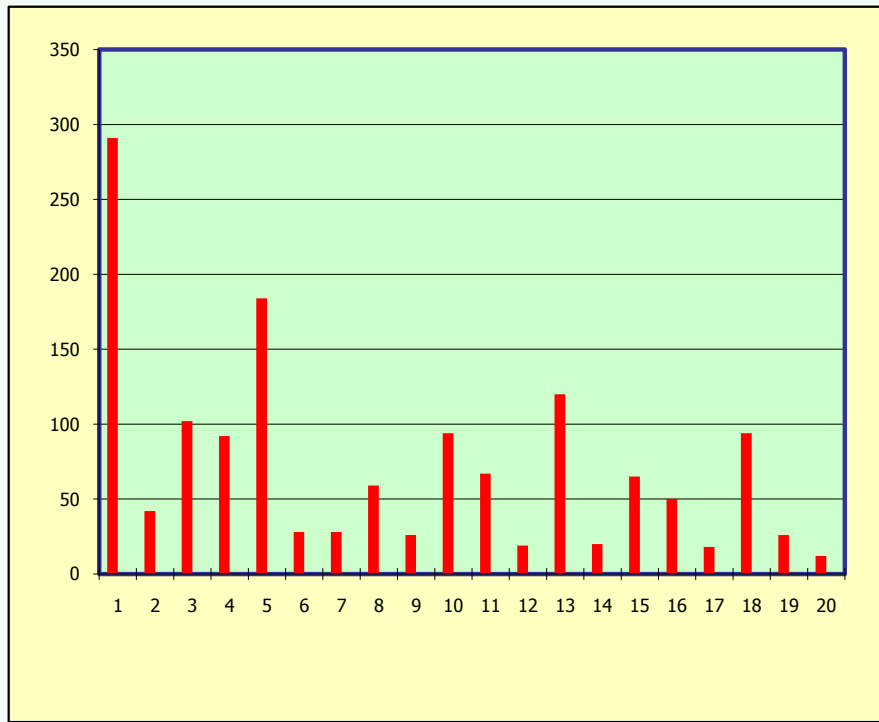
Province

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

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

Amphur	Number	Percent
1. Meung (เมือง)	291	20.3
2. Maerim (แมริม)	42	2.9
3. Doisaked (ดอยสะเก็ด)	102	7.1
4. Sanpatong (สันป่าตอง)	92	6.4
5. Hangdong (หางดง)	184	12.8
6. Jomtong (จอมทอง)	28	1.9
7. Mae-ai (แม่เมาะ)	28	1.9
8. Prao (พร้าว)	59	4.1
9. Hod (ฮอด)	26	1.8
10. Sarapee (สารภี)	94	6.5
11. Maetang (แม่แตง)	67	4.7
12. Omkoi (อมก๋อย)	19	1.3
13. Sankampang (สันกำแพง)	120	8.4
14. Samoeng (สะเมิง)	20	1.4
15. Chiangdao (เชียงดาว)	65	4.5
16. Phang (ฝาง)	50	3.5
17. Doitao (ดอยเต่า)	18	1.3
18. Santrai (สันทราย)	94	6.5
19. Maejam (แม่แจ่ม)	26	1.8
20. Chaiprakarn (ไชยปราการ)	12	0.8
Total	1437	100.0

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



AMPHUR OF PARTURIENTS IN CHIANG MAI PROVINCE

- | | | | |
|----------------|-------------|---------------|-----------------|
| 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	18	0.9	32	20	1.0
21	8	0.4	33	33	1.6
22	6	0.3	34	48	2.3
23	3	0.1	35	61	3.0
24	3	0.1	36	115	5.6
25	6	0.3	37	360	17.5
26	14	0.7	38	489	23.8
27	4	0.2	39	428	20.8
28	12	0.6	40	280	13.6
29	9	0.4	41	98	4.8
30	20	1.0	42	7	0.3
31	13	0.6			
Total				2133	100.0

Average of Gestational Age 37.36±3.4 Weeks

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

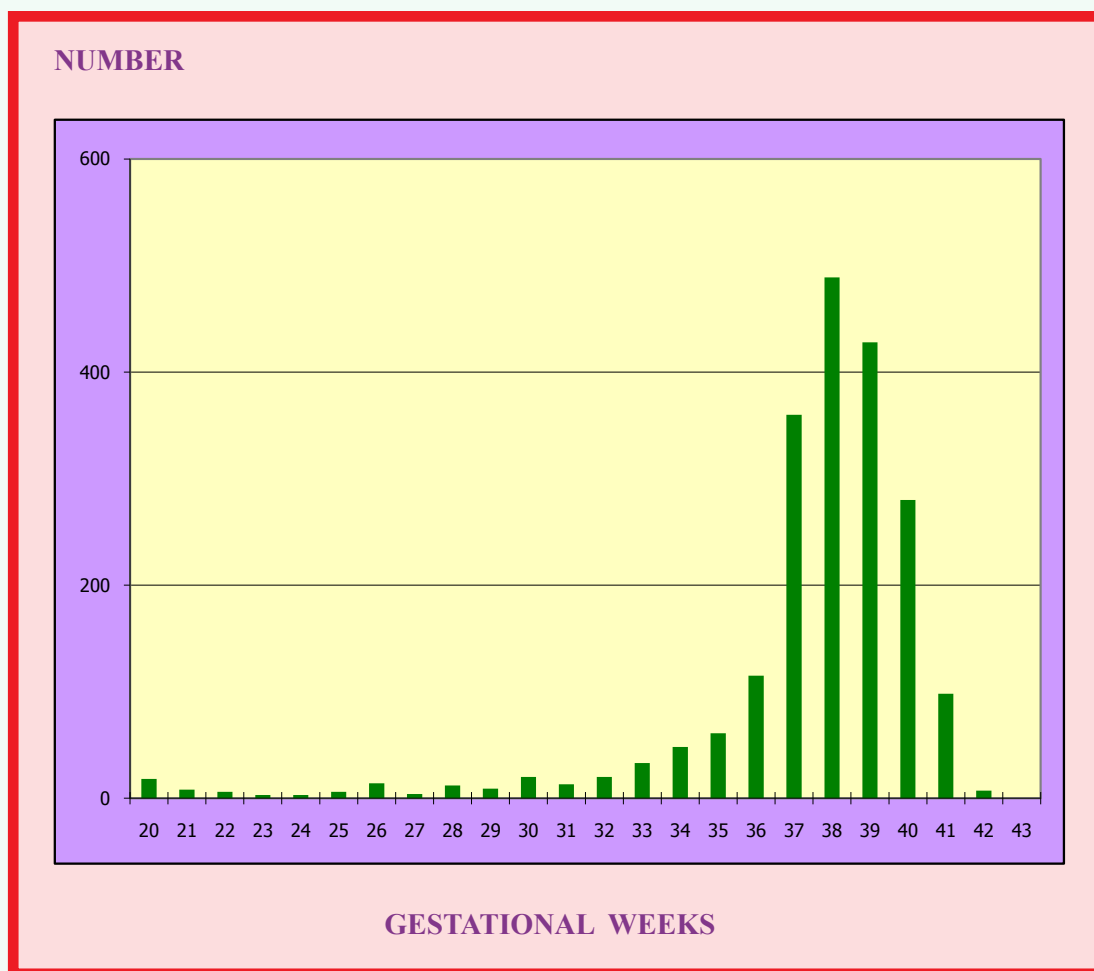


TABLE 12 Number and percentage of parturients by gestational age group in singleton pregnancies.

Gestational Age Group	Number	Percent
Immature (20-27 weeks)	62	3.0
Premature (28-36 weeks)	331	16.1
Term (37-41 weeks)	1655	80.5
Postterm (42 weeks or more)	7	0.3
Total	2055	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
28	3	8.3
29	2	5.6
30	3	8.3
31	2	5.6
32	8	22.2
33	5	13.9
34	2	5.6
35	3	8.3
36	3	8.3
37	2	5.6
38	1	2.8
39	2	5.6
Total	36	100

Average of Gestational Age 32.9 \pm 3.0 Weeks

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

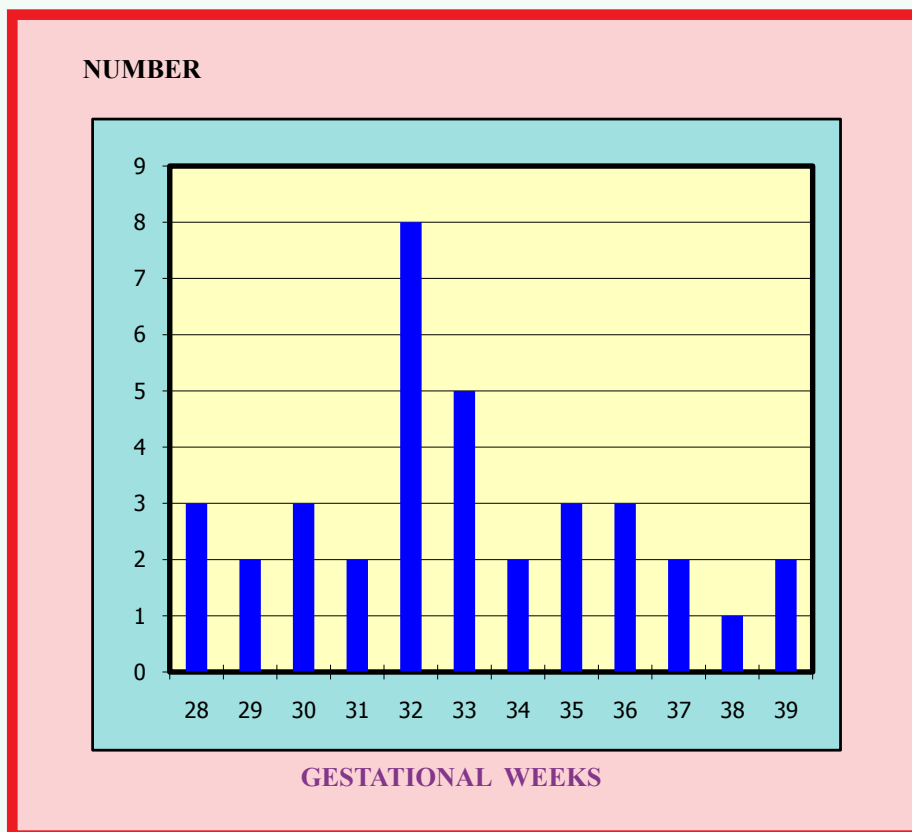


TABLE 14 Number and percentage of parturients by gestational age group in twin pregnancies.

Gestational Age Group	Number	Percent
Immature (20-27 weeks)	0	0.0
Premature (28-36 weeks)	31	86.1
Term (37-41 weeks)	5	13.9
Total	36	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	84	6.6
1	28	2.2
2	56	4.4
3	41	3.2
4	44	3.4
5	51	4.0
6	59	4.6
7	87	6.8
8	91	7.1
9	105	8.2
10	143	11.2
11	146	11.4
12	158	12.3
13	94	7.3
14	57	4.4
15	24	1.9
16	9	0.7
17	4	0.3
Total	1281	100.0

Attending ANC at other hospitals 16.8 % of total parturients

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

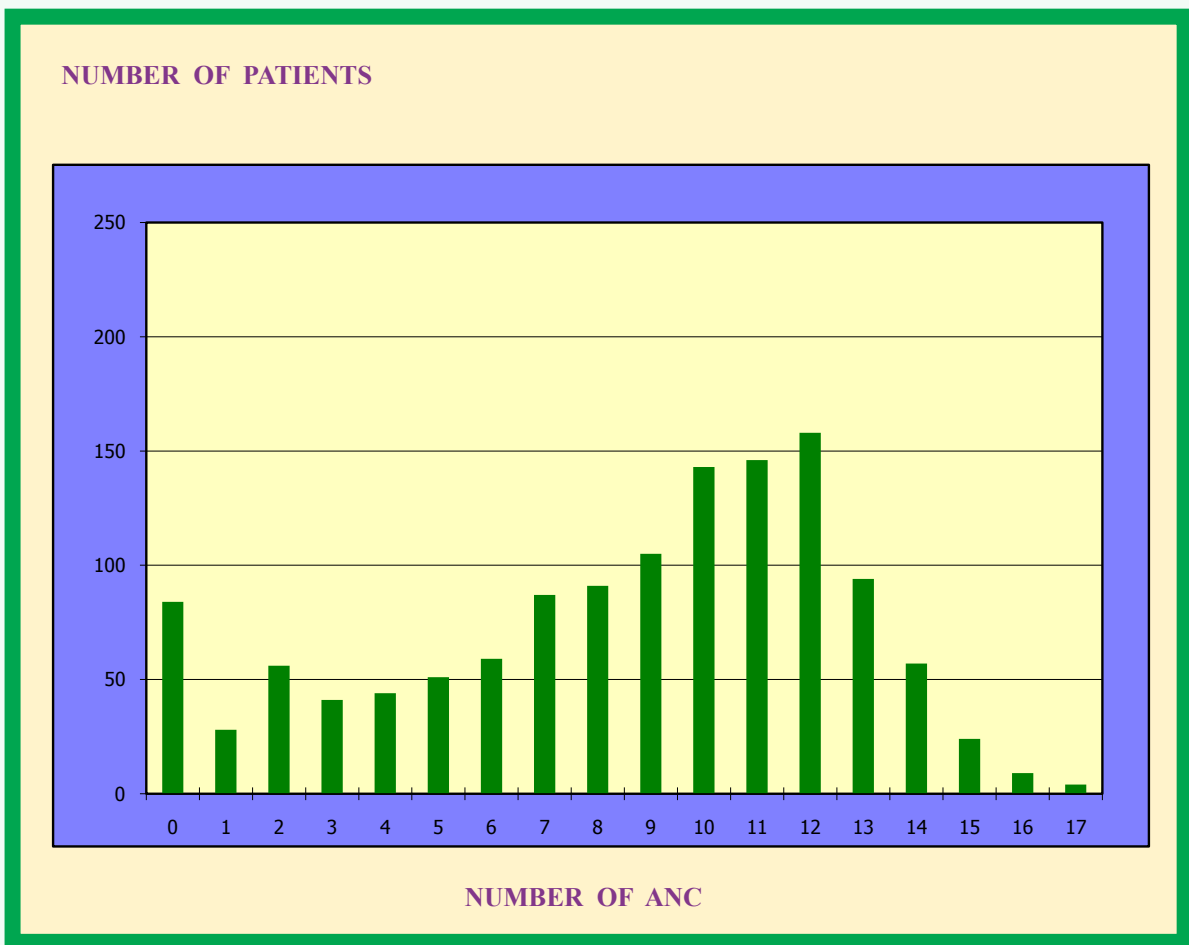


TABLE 16 Number of antenatal care attendance : General patients (not include the patients attending ANC at other hospitals)

Number of ANC	Number of Parturients	Percent
4 or more	1072	83.6
1-3	125	9.8
No ANC	84	6.6
Total	1281	100.0

Note ANC less than 4 is considered to be inadequate

Inadequate ANC 16.4%

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

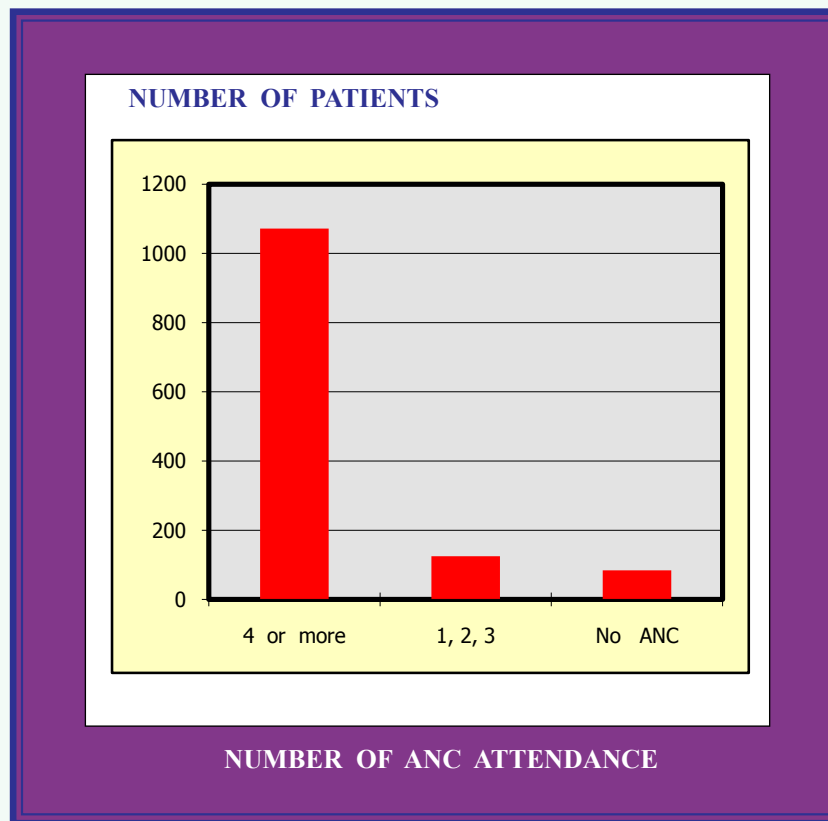
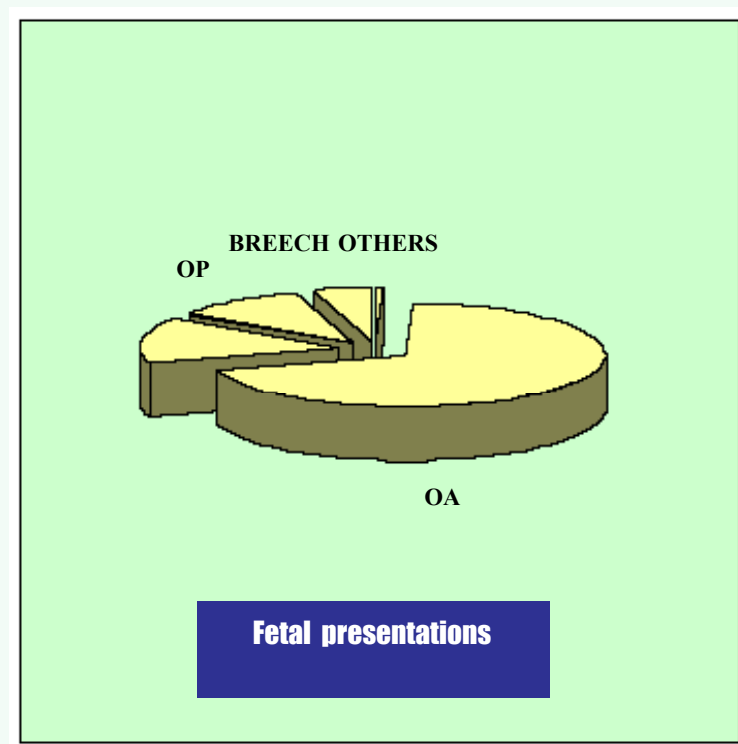


TABLE 17 Distribution of fetal presentations in labor (Singleton)

Fetal Presentation	Percent
Vertex	93.9
Breech	5.6
Transverse lie	0.2
Face	0.1
Compound	0.1

Breech Presentation was 5.6 % of Total Birth

FIGURE 11 Pie : 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**

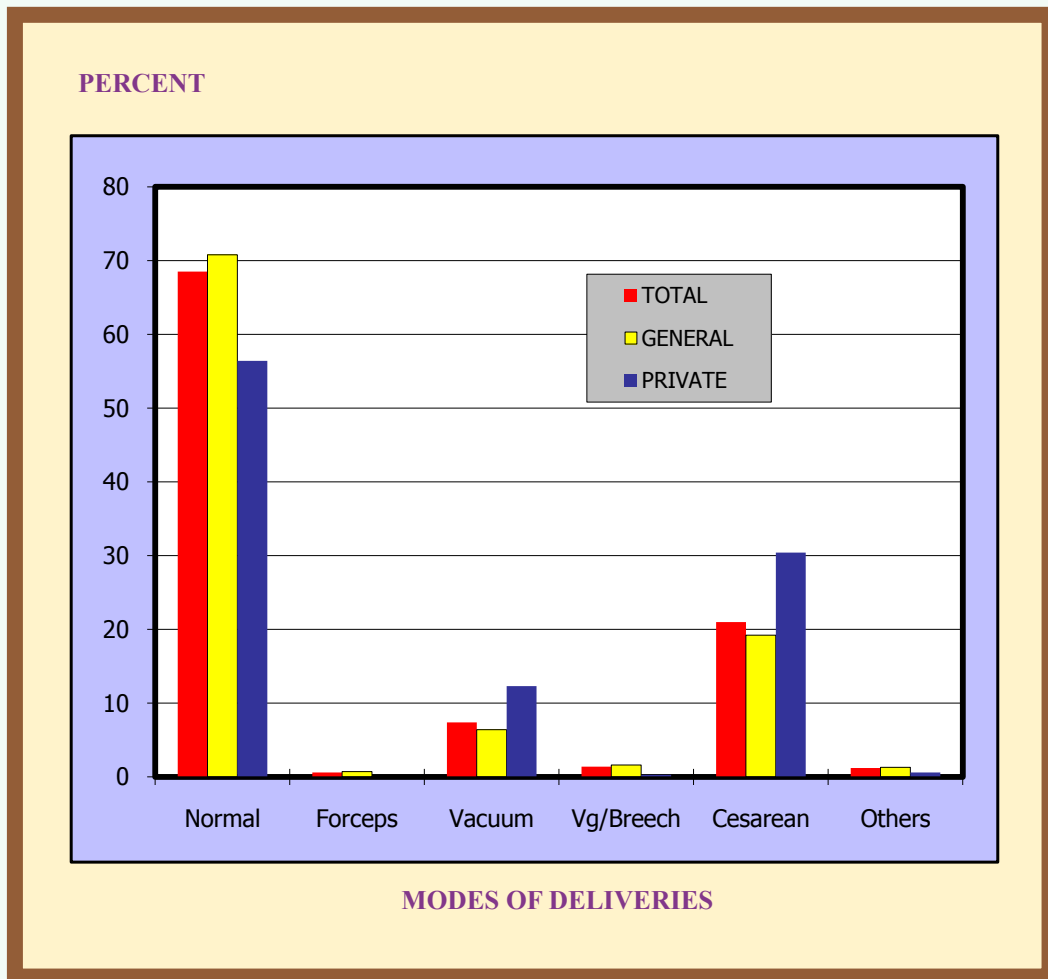
Mode of Delivery	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Normal Delivery	1441	68.5	1244	70.8	197	56.4
Forceps Delivery	12	0.6	12	0.7	-	-
Vacuum Delivery	155	7.4	112	6.4	43	12.3
Vaginal Breech Delivery	29	1.4	28	1.6	1	0.3
Cesarean Section	443	21.0	337	19.2	106	30.4
Other*	25	1.2	23	1.3	2	0.6
Total	2105	100.0	1756	100.0	349	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	24	66.7	16	57.1	8	100.0
Vaginal Delivery	12	33.3	12	42.9	0	0.0
Total	36	100.0	28	100.0	8	100.0

**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
1. Assisting (Mauriceau)	20	19.6	19	21.8	1	6.7
2. Assisting (Piper Forceps)	0	0.0	0	0.0	0	0.0
3. Total Extraction (Mauriceau-)	7	6.9	7	8.0	0	0.0
4. Spontaneous Breech	2	2.0	2	2.3	0	0.0
5. Cesarean Section	73	71.5	59	67.8	14	93.3
Total	102	100.0	87	100.0	15	100.0

Total Cesarean Section Rate in Breech presentation 71.5 %

(General patients; 67.8 %, Private patients; 93.3 %)

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

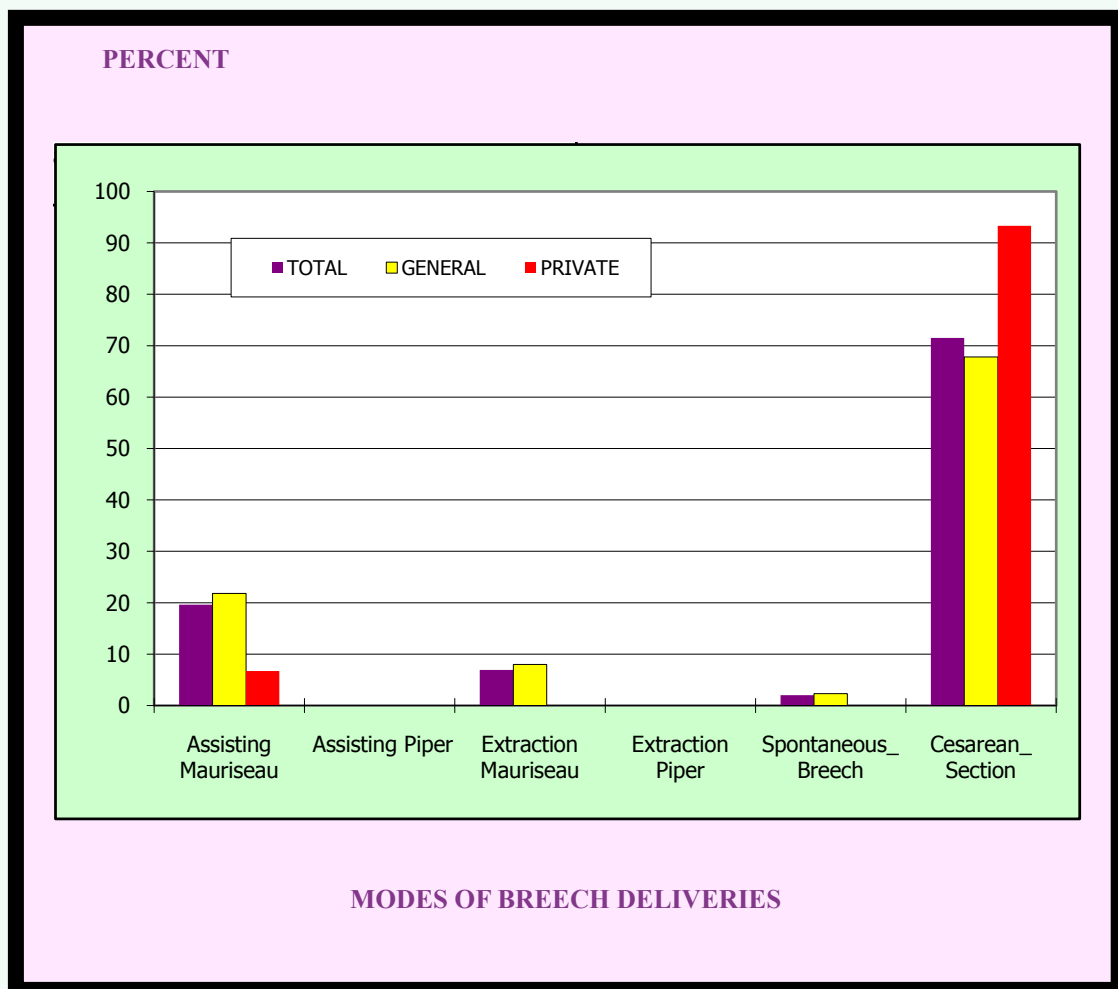


TABLE 20 Frequency of cesarean deliveries according to diagnostic indication (Singleton)

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
1. Previous C / S	141	31.8	101	30.0	40	37.7
2. CPD	153	34.5	118	35.0	35	33.0
3. Breech	73	16.5	59	17.5	14	13.2
4. Fetal distress	27	6.1	22	6.5	5	4.7
5. Placenta previa	15	3.4	10	3.0	5	4.7
6. Face presentation	1	0.2	-	-	1	0.9
7. Transverse lie	6	1.4	5	1.5	1	0.9
8. Prolapsed cord	5	1.1	3	0.9	2	1.9
9. HIV + ve	1	0.2	1	0.3	-	-
10. Others*	21	4.7	18	5.3	3	2.8
Total	443	100.0	337	100.0	106	100.0

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

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

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
1. Fetal distress	1	8.3	1	8.3	-	-
2. Expected prolonged second stage	1	8.3	1	8.3	-	-
3. Poor expulsive force & training	7	58.3	7	58.3	-	-
4. Maternal disease	3	25.0	3	25.0	-	-
5. Others (OPP, failed vacuum, etc)	-	-	-	-	-	-
Total	12	100.0	12	100.0	-	-

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

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
1. Fetal distress	11	7.1	7	6.3	4	9.3
2. Expected prolonged second stage	18	11.5	14	12.5	4	9.3
3. Poor expulsive force & training	74	47.7	45	40.2	29	67.4
4. Maternal disease (PIH, ect)	48	31.0	44	39.3	4	9.3
5. Others (OPP, OT, etc)	4	2.5	2	1.8	2	4.6
Total	155	100.0	112	100.0	43	100.0

TABLE 23 Sex of Fetuses (Including Multiple Pregnancies)

Sex	Number	Percent
Male	1136	52.0
Female	1009	46.2
Unspecified	38	1.7
Total	2183	100.0

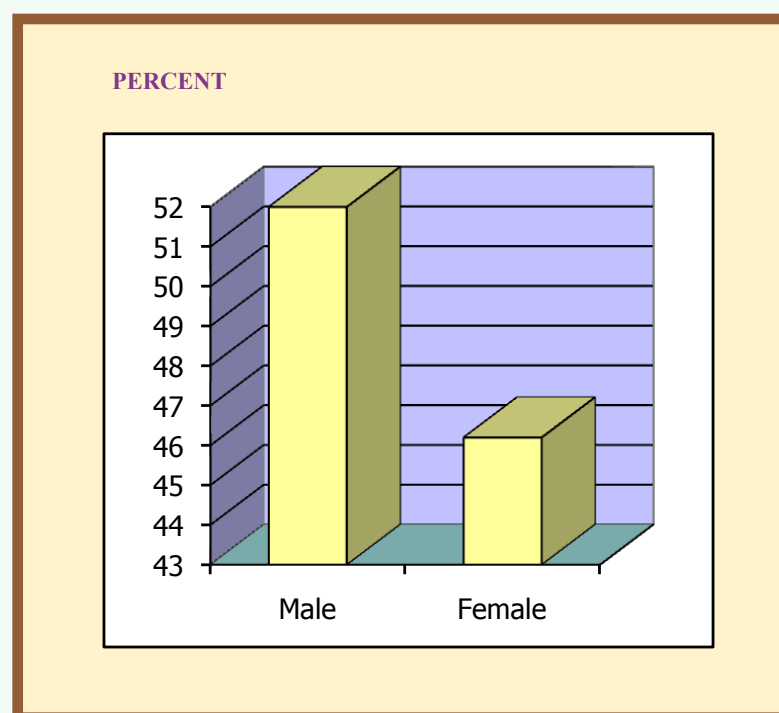
**FIGURE 14 Histogram : Distribution of fetal sex
(including twins)**

TABLE 24 Apgar score at 1 minute of total neonates

Apgar Scores	Number	Percent
0-3 (severe depression)	146	6.7
4-6 (mild depression)	123	5.6
7-10 (no depression)	1914	87.6
Total	2186	100.0

TABLE 25 Apgar score at 5 minutes of total neonates

Apgar Score	Number	Percent
0-3 (severe depression)	124	5.7
4-6 (mild depression)	21	1.0
7-10 (no depression)	2037	93.2
Total	2186	100.0

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

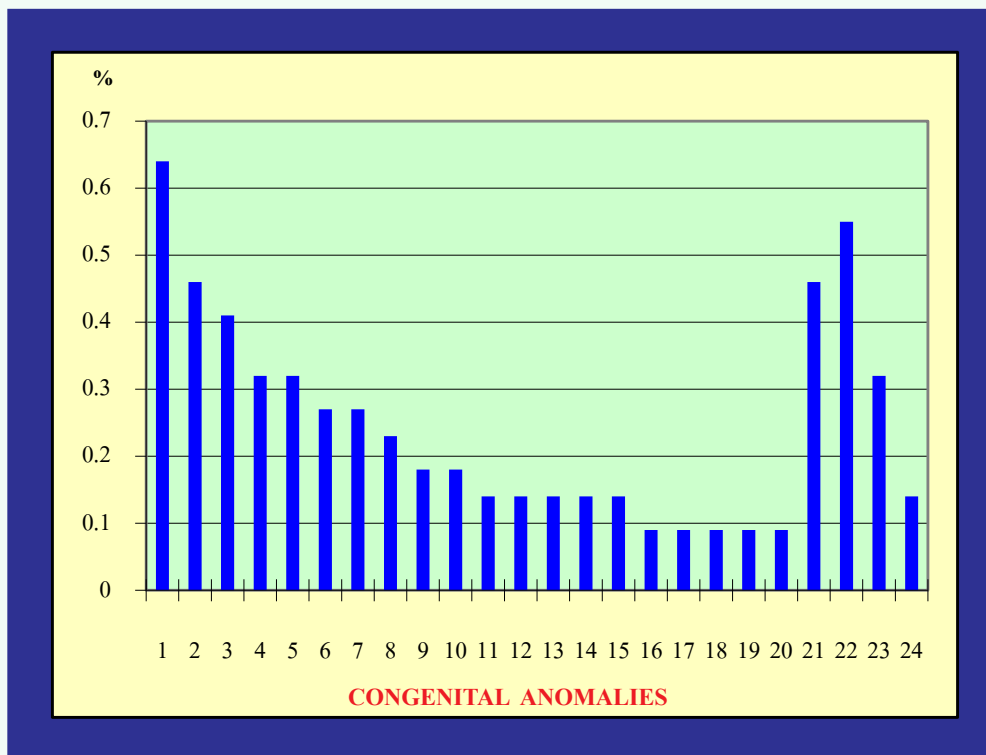
Apgar Score	1-Minute		5-Minute	
	Number	Percent	Number	Percent
0	111	5.1	114	5.2
1	14	0.6	5	0.2
2	7	0.3	1	0.0
3	14	0.6	4	0.2
4	15	0.7	2	0.1
5	51	2.3	8	0.4
6	57	2.6	11	0.5
7	101	4.6	22	1.0
8	183	8.4	48	2.2
9	892	40.9	190	8.7
10	738	33.8	1777	81.4
Total	2183	100.0	2186	100.0

TABLE 27 Prenatal sonographic diagnosis of anomalies*

Congenital Anomalies	Number	Percent
Non chromosome-related anomaly		
1. Hydrops fetalis (frank)	14	0.64
Hb Bart's	6	
Cystic hygroma	4	
Others (hemolysis, heart disease)	4	
2. Multiple malformations	10	0.46
3. Congenital heart disease	9	0.41
4. Gastroschisis	7	0.32
5. Abnormalities of extremities	7	0.32
6. Cystic hygroma	6	0.27
7. Hydrocephalus	6	0.27
8. Hydronephrosis (frank)	5	0.23
9. Porencephaly / Hydranencephaly	4	0.18
10. Omphalocele	4	0.18
11. Small bowel obstruction	3	0.14
12. Isolated cleft lip, cleft palate	3	0.14
13. Anencephaly & exencephaly	3	0.14
14. Cephalocele	3	0.14
15. Holoprosencephaly	3	0.14
16. Sacrococcygeal teratoma	2	0.09
17. Diaphragmatic hernia	2	0.09
18. Other brain disorders	2	0.09
19. Bladder outlet obstruction	2	0.09
20. Cystic adenomatoid malformations	2	0.09
21. Others	10	0.46
Chromosome-related Anomaly (structures)		
22. Trisomy 21	12	0.55
23. Trisomy 18	7	0.32
24. Othes chromosomes	3	0.14
Total	129	5.90

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

FIGURE 15 Histogram : Number of fetal congenital anomalies (not including chromosomal abnormalities)



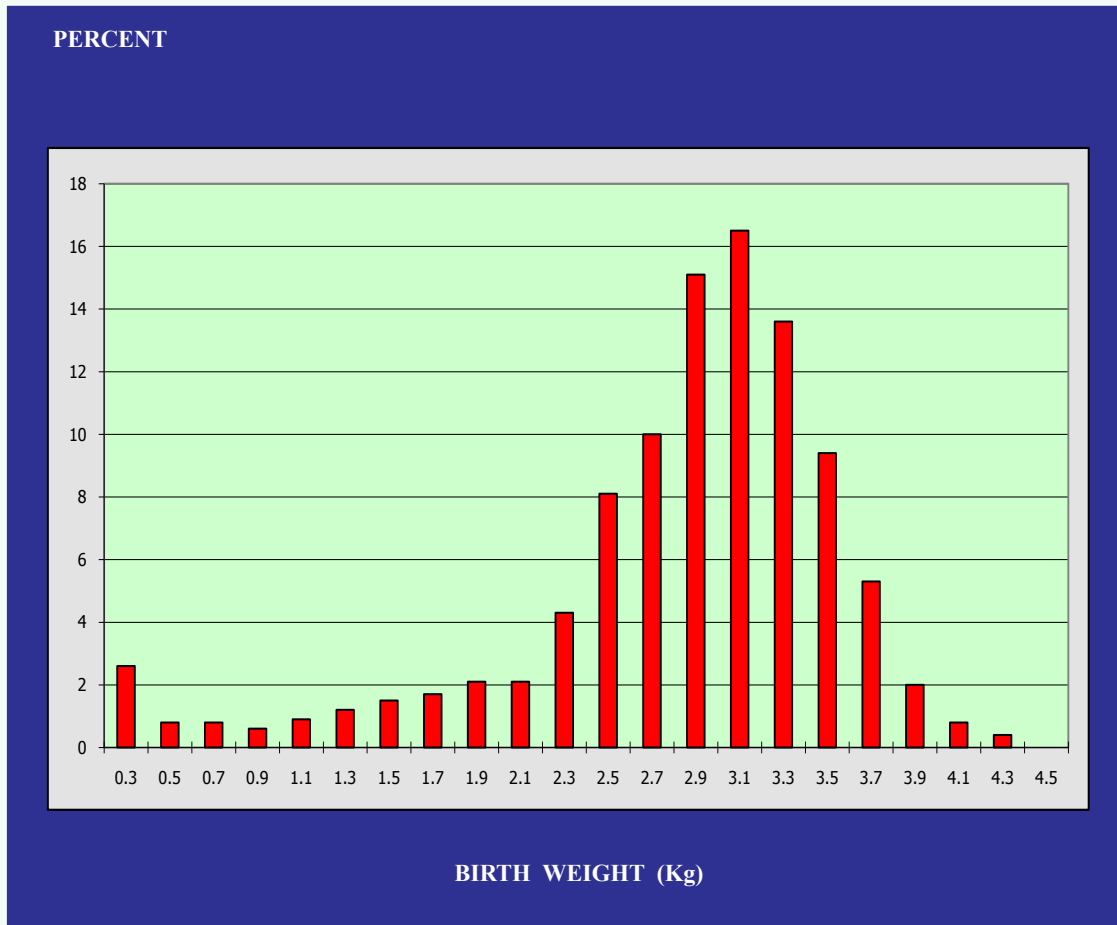
- | | |
|--|--|
| 1 <i>Hydrops fetalis (frank)</i> | 13 <i>Anencephaly & exencephaly</i> |
| 2 <i>Multiple malformations</i> | 14 <i>Cephaloccele</i> |
| 3 <i>Congenital heart disease</i> | 15 <i>Holoprosencephaly</i> |
| 4 <i>Gastroschisis</i> | 16 <i>Sacroccocygeal teratoma</i> |
| 5 <i>Abnormalities of extremities</i> | 17 <i>Diaphragmatic hernia</i> |
| 6 <i>Cystic hygroma</i> | 18 <i>Other brain disorders</i> |
| 7 <i>Hydrocephalus</i> | 19 <i>Bladder outlet obstruction</i> |
| 8 <i>Hydroneprosis (frank)</i> | 20 <i>Cystic adenomatoid malformations</i> |
| 9 <i>Porencephaly / Hydranencephaly</i> | 21 <i>Others</i> |
| 10 <i>Omphalocele</i> | 22 <i>Trisomy 21</i> |
| 11 <i>Small bowel obstruction</i> | 23 <i>Trisomy 18</i> |
| 12 <i>Isolated cleft lip, cleft palate</i> | 24 <i>Othes chromosomes</i> |

TABLE 28 Number and percentage of neonates by
birth weight*

Birth Weight (grams)	Number	Percent
< 400	57	2.6
400-599	18	0.8
600-799	17	0.8
800-999	14	0.6
1000-1199	20	0.9
1200-1399	27	1.2
1400-1599	33	1.5
1600-1799	37	1.7
1800-1999	45	2.1
2000-2199	45	2.1
2200-2399	93	4.3
2400-2599	176	8.1
2600-2799	217	10.0
2800-2999	329	15.1
3000-3199	360	16.5
3200-3399	297	13.6
3400-3599	204	9.4
3600-3799	115	5.3
3800-3999	44	2.0
4000-4199	18	0.8
4200-4399	9	0.4
4400-4599	1	0.0
Total	2176	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 (< 1000)	93	4.3
Very low birth weight (1000-1499)	66	3.0
Low birth weight (1500-2499)	324	14.8
Average birth weight (2500-3999)	1652	75.6
Macrosomia (> 4000)	28	1.3
Total	2186	100.0

** Including therapeutic termination of pregnancy*

Average Birth Weight of Total Infants 2852±679 grams
range 330-4580 grams

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

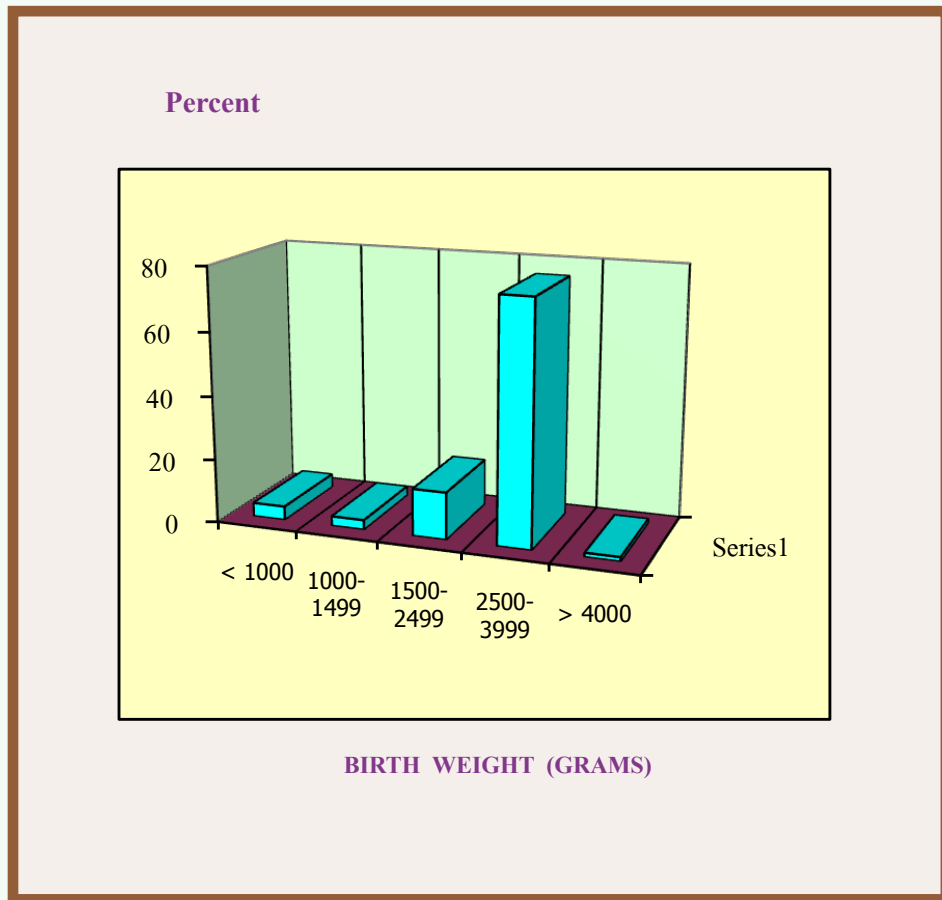
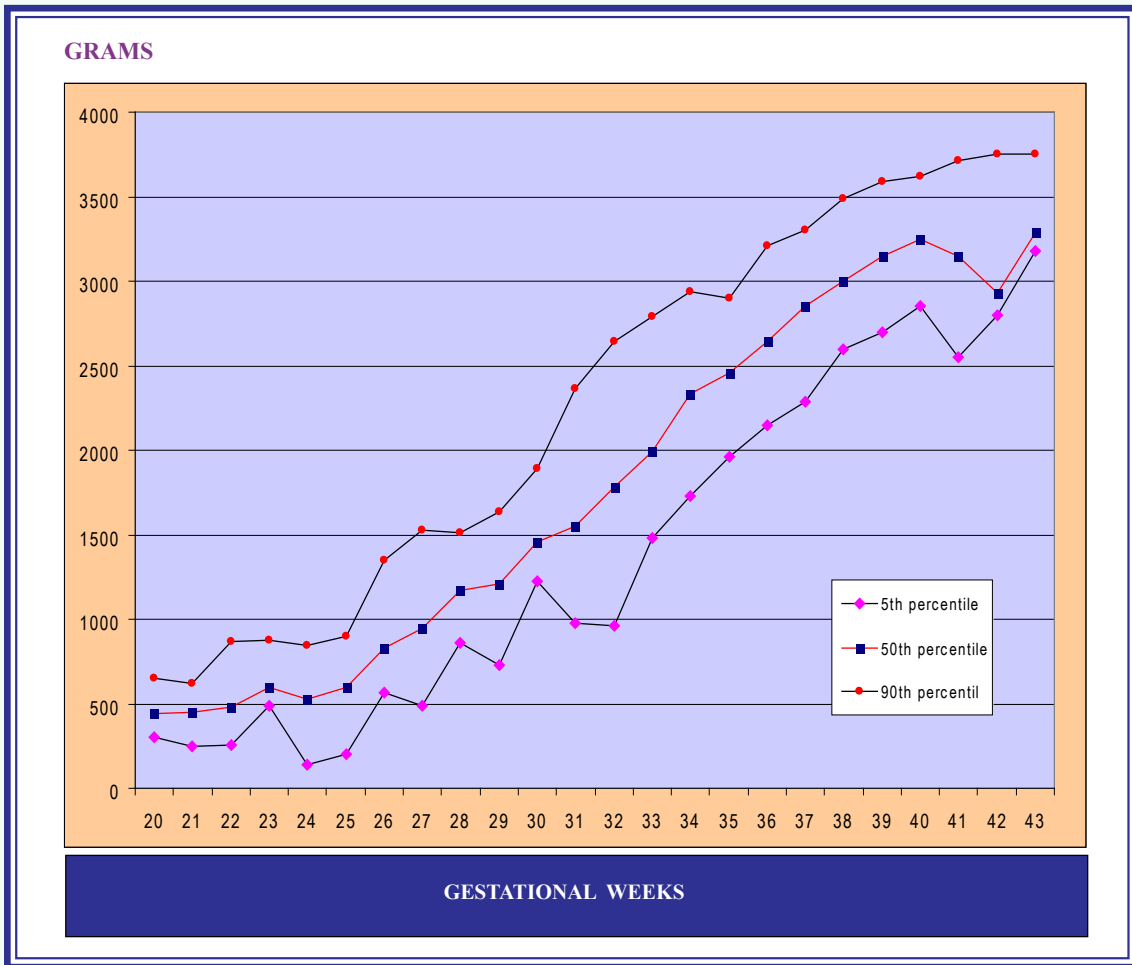


TABLE 30 Fetal weight (grams) : the 10th, 50th, 90th percentile at various gestational age

Gestational Age (weeks)	Weight (grams) 10th Percentile	Weight (grams) 50th Percentile	Weight (grams) 90th Percentile
20	236.00	350.00	660.00
21	250.00	445.00	.
22	300.00	525.00	.
23	400.00	600.00	.
24	690.00	735.00	.
25	290.00	850.00	.
26	582.00	900.00	1166.00
27	800.00	960.00	.
28	983.00	1190.00	1838.00
29	868.00	1300.00	1682.00
30	1072.00	1470.00	1900.00
31	1228.00	1495.00	2260.00
32	1179.00	1620.00	2156.00
33	1588.00	1960.00	2726.00
34	1700.00	2350.00	2771.00
35	1982.00	2400.00	3012.00
36	2144.00	2600.00	3174.00
37	2400.00	2850.00	3355.00
38	2550.00	3050.00	3550.00
39	2700.00	3150.00	3608.00
40	2800.00	3250.00	3749.00
41	2788.00	3350.00	3857.00
42	2770.00	3300.00	.

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**

Gestational Age (weeks)	Number of Neonates	Means (grams)	Standard Deviation
20	18	410	199
21	8	418	83
22	6	580	283
23	3	533	115
24	3	635	63
25	6	748	341
26	13	883	192
27	3	946	140
28	16	1268	398
29	13	1276	262
30	28	1501	372
31	20	1585	385
32	38	1651	412
33	43	2062	443
34	52	2281	420
35	67	2462	422
36	121	2637	400
37	364	2868	392
38	491	3050	396
39	431	3150	351
40	280	3258	371
41	98	3292	446
42	7	3417	481

**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
28	6	1119	152
29	4	1107	292
30	6	1369	321
31	4	1451	197
32	16	1576	336
33	10	1788	282
34	4	1860	172
35	6	2124	132
36	6	2285	316
37	4	2490	167
38	2	2400	169
39	4	2730	340

TABLE 33 Comparison of birth weight (singleton & twins)

Type	Means Birth Weight	Standard Deviation	Range
Singleton	2893	653	330-4580
Twins	1727	509	640-2850

TABLE 34 Comparison of gestational age (singleton & twins)

Type	Means Gestational Age	Standard Deviation	Range
Singleton	37.36	3.4	20-42
Twins	32.94	3.0	28-39

TABLE 35 Early postpartum hemorrhage

Cause	Number	Percent
Uterine Atony	18	0.84
Lacerations	5	0.23
Retained Pieces of Placenta	8	0.37
Placenta Adherens	5	0.23
Uterine infection	4	0.19
Total	40	1.87

Section III

HIGH RISK PREGNANCIES

TABLE 36 Major complications during pregnancy

Complications	Numbers	Prevalence (%)
Diabetes mellitus	169	7.88
Previous cesarean section	160	7.46
Small-for-gestational Age (SGA)	158	7.22
Hepatitis B antigen positive	148	6.90
Pregnancy-induced hypertension (PIH)	143	6.67
Prolonged PROM (> 18 hours)	58	2.71
Asthma	28	1.31
Placenta previa	24	1.12
Chronic Hypertension	23	1.07
Iron deficiency anemia	22	1.03
Anti-HIV positive	19	0.89
Upper urinary tract Infection	17	0.79
Marked obesity	16	0.75
Thyrotoxicosis	14	0.65
Myoma Uteri	14	0.65
Heart Disease	25	1.17
Thalassemia	15	0.70
Chorioamnionitis	10	0.47
Renal diseases	8	0.37
Epilepsy	6	0.28
SLE	6	0.28
Genital tract infection	6	0.28
Abruptio placentae	4	0.19
Autoimmune thrombocytopenia	4	0.19
Ovarian tumor	3	0.14

Pregnancy with Heart Disease

Total 25 cases (1.17 percent of total parturients)
All were singleton
(not included 3 cases of therapeutic abortion)

Age range 17-37 years
average 26.4±6.2 years
age of 35 years or more 3 cases (12.0 %)

Functional Class (At delivery 25 cases)

Class I	13	cases
Class II	8	cases
Class III	4	cases
Class IV	-	case

Gestational Age at Birth

range 26-40 weeks (not included therapeutic abortion)
average 36.9±2.8 weeks
premature delivery (before completed 37 weeks)
9 cases (36.0 %)

Birth Weight

range 1050-3590 grams
average 2739±565 grams
number of low birth weight fetus (less than 2,500 grams)
5 cases (20.0 %)

Apgar Scores at 1 minute (less than 7) 3 cases (12.0 %)

Apgar Scores at 5 minutes (less than 7) 2 cases (8.0 %)

Small-for-gestational-age (less than 10th percentile) 3 cases (15.0 %)

Perinatal death 2 cases (8.0 %) (immaturity)

Congenital Anomalies -

Other complications (No maternal death)

Diabetes mellitus 3 cases

Hepatitis B surface antigen positive 3 cases

Pregnancy-induced hypertension 2 cases

Previous cesarean section 1 case

Pregnancy with Diabetes Mellitus

Total 169 cases (7.88 percent of total parturients)
(Singleton : 168, Triplet : 1)

Note : Glucose challenge test was used as a screening test only in women at risk for diabetes melitus and age > 30 yr.

Age range 19-42 years
average 32.1±4.9 years
age of 35 years or more 55 cases (32.6 %)

Gestational Age at Birth
range 20-41 weeks
average 37.5±2.9 weeks
premature delivery (before completed 37 weeks)
32 cases (18.9 %)

Birth Weight
range 150-4230 grams
average 3007±590 grams
number of low birth weight fetus (less than 2,500 grams)
23 cases (13.6 %)

Apgar Scores at 1 minute (less than 7)	16 cases (9.5 %)
Apgar Scores at 5 minutes (less than 7)	3 case (1.8 %)
Small-for-gestational-age (less than 10th percentile)	13 cases (7.7 %)
Perinatal Death	3 cases (1.8 %)
Congenital Anomalies	2 cases (1.2 %) (cystic hygroma, hydronephrosis)

Other complications

<i>Pregnancy-induced hypertension</i>	16 cases
<i>Previous cesarean section</i>	15 cases
<i>Hepatitis B antigen positive</i>	14 cases
<i>Chronic hypertension</i>	7 cases
<i>Asthma</i>	6 cases
<i>Prolonged PROM (> 18 hours)</i>	4 cases
<i>Heart disease</i>	3 cases
<i>Condyloma</i>	2 cases
<i>Myoma uteri</i>	2 cases
<i>Placenta previa</i>	2 cases
<i>Oligohydramnios</i>	2 cases
<i>Polyhydramnios</i>	2 cases
<i>Epilepsy</i>	1 case
<i>Iron deficiency anemia</i>	1 case
<i>Thalassemia</i>	1 case
<i>Upper urinary tract infection</i>	1 case

Classifications

Pregestational DM (diagnosed before pregnancy)	28 cases (16.6 %)
<i>Chemical DM (Class A)</i>	2 cases
<i>Overt DM (Class B-T)</i>	26 cases
<i>Class B</i>	21 cases
<i>Class D, F, R</i>	5 cases
Gestational DM (diagnosed during pregnancy)	141 cases (83.4 %)
<i>Chemical DM (Class A1)</i>	101 cases
<i>Overt DM (Class A2)</i>	40 cases

Method of Glucose Control

Insulin	69 cases
Oral hypoglycemic drugs	4 cases
Oral hypoglycemic drugs & Insulin -	cases
Diet Control only	96 cases

Pregnancy with Thalassemia

Total 15 cases (0.70 percent of total parturients)
(All were singleton)

(Including only the patients with hemoglobin less than 10 gm%)

Type of Thalassemia

β-thalassemia / HbE	6 cases
alpha-thalassemia (HbH disease)	8 cases
HbH constant spring thalassemia	1 case

Age range 18-37 years
average 28.6±5.1 years
age of 35 years or more 1 cases (6.7 %)

Gestational Age at Birth

range 21-39 weeks
average 36.2±4.5 weeks
premature delivery (before completed 37 weeks)
3 case (20.0 %)

Birth Weight

range 400-3650 grams

average 2407±768 grams

number of low birth weight fetus (less than 2,500 grams)
7 cases (46.7 %)**Apgar Scores at 1 minute (less than 7)** 3 cases (20.0 %)**Apgar Scores at 5 minutes (less than 7)** 2 case (13.3 %)**Small-for-gestational-age (less than 10th percentile)** 4 cases (26.7 %)**Perinatal death** 2 cases (13.3 %)**Other complications***Diabetes mellitus* 1 cases*Oligohydramnios* 2 cases*Urinary tract infection* 1 case**Pregnancy with Thyrotoxicosis****Total** 14 cases (0.65 percent of total parturients)

All were singleton

Diagnosed before pregnancy 8 cases*Diagnosed during pregnancy* 6 cases

Age range 24-40 years
 average 32.6±4.8 years
 age of 35 years or more 6 cases (42.9 %)

Gestational Age at Birth

range 20-40 weeks
 average 35.9±7.2 weeks
 premature delivery (before completed 37 weeks)
 3 cases (21.4 %)

Birth Weight

range 250-3750 grams
 average 2753±1137 grams
 number of low birth weight fetus (less than 2,500 grams)
 3 cases (21.4 %)

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

Apgar Scores at 5 minutes (less than 7) 2 cases (14.3 %)

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

Perinatal death 2 cases (14.3%, anomaly)

Congenital Anomalies 1 case : *Trisomy 21*

Other complications

<i>Previous cesarean section</i>	5 cases
<i>Hepatitis B surface antigen</i>	2 cases
<i>Pregnancy-induced hypertension</i>	2 cases
<i>Oligohydramnios</i>	1 case
<i>Skin disease</i>	1 case

Pregnancy with Hepatitis B Antigen Positive

Total	148 cases (6.90 percent of total parturients) (singleton : 145; twins : 3)
Age	range 13-47 years average 27.9±6.1 years age of more than 35 years 17 cases (11.3 %)
Gestational Age at Birth	range 21-42 weeks average 36.8±4.7 weeks premature delivery (before completed 37 weeks) 29 cases (19.6 %)
Birth Weight	range 450-4580 grams average 2812±771 grams number of low birth weight fetus (less than 2,500 grams) 26 cases (17.6 %)
Apgar Scores at 1 minute (less than 7)	12 cases (8.1 %)
Apgar Scores at 5 minutes (less than 7)	3 cases (2.0 %)
Small-for-gestational-age (less than 10th percentile)	12 cases (9.7 %)
Perinatal Death	4 cases (2.7 %) (dead in utero 3 cases)
Congenital Anomalies	1 cases (<i>Prune-Belly syndrome, beta-thal/HbE disease</i>)

Other complications

<i>Diabetes melitus</i>	14 cases
<i>Previous cesarean section</i>	11 cases
<i>Pregnancy-induced hypertension</i>	10 cases
<i>Heart disease</i>	3 cases
<i>Prolonged PROM (> 18 hours)</i>	3 cases
<i>Thyrotoxicosis</i>	2 cases
<i>Asthma</i>	1 case
<i>Chronic hypertension</i>	1 case
<i>anti-HIV positive</i>	1 case
<i>Oligohydramnios</i>	1 case
<i>Placenta previa</i>	1 case
<i>Urinary tract infection</i>	1 case

Pregnancy with Asthma

Total 28 cases (1.31 percent of total parturients)
(All were singleton)

Activity of Disease

Well-controlled	30 cases
Poorly-controlled	7 cases

Age range 17-40 years
average 28.9±6.0 years
age of 35 years or more 6 cases (21.4%)

Gestational Age at Birth

range 37-41 weeks
 average 38.6 ± 1.2 weeks
 premature delivery (before completed 37 weeks)
 0 cases (0.0 %)

Birth Weight (not included abortion)

range 2250-4100 grams
 average 3034 ± 427 grams
 number of low birth weight fetus (less than 2,500 grams)
 2 cases (7.1 %)

Apgar Scores at 1 minute (less than 7) 4 cases (14.3%)

Apgar Scores at 5 minutes (less than 7) 1 case (3.6 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (7.1%)

Perinatal death 1 case (3.6 %)

Congenital Anomalies 0 case (0.0 %; multiple malformations)

Other complications

<i>Diabetes mellitus</i>	6 cases
<i>Pregnancy-induced hypertension</i>	2 cases
<i>Prolonged rupture of membranes</i>	2 cases
<i>Hepatitis B surface antigen</i>	1 case
<i>Iron deficiency anemia</i>	1 case

Pregnancy with Chronic Hypertension

Total 23 cases (1.07 percent of total parturients)
(All were singleton)

Severity of Hypertension

Severe (start treatment during pregnancy)	3	cases
Severe (controlled prior to pregnancy)	8	cases
Mild (no medication BP less than 160/90)	8	cases
Mild (BP less than 160/90 but treated with antihypertensive drug)	4	cases

Age range 23-42 years
average 34.1 ± 5.9 years
age of 35 years or more 12 cases (52.2 %)

Gestational Age at Birth

range 30-39 weeks
average 36.8 ± 2.1 weeks
premature delivery (before completed 37 weeks)
3 cases (13.0%)

Birth Weight range 1220-3800 grams
average 2764 ± 665 grams
number of low birth weight fetus (less than 2,500 grams)
7 cases (30.4 %)

Apgar Scores at 1 minute (less than 7) 1 cases (4.3 %)

Apgar Scores at 5 minutes (less than 7) 0 cases (0.0 %)

Small-for-gestational-age (less than 10th percentile) 5 cases (21.7%)

Perinatal death -

Congenital Anomalies -

Other complications

<i>Diabetes mellitus</i>	7 cases
<i>Pregnancy-aggravated hypertension</i>	6 cases
<i>Marked obesity</i>	5 cases
<i>Hepatitis B surface antigen</i>	1 case
<i>Previous cesarean section</i>	1 case

Pregnancy-induced Hypertension

Total 143 (6.67 percent of total parturients)
(Singleton : 138, Twins : 5)

Age range 16-42 years
average 29.8 ± 6.3 years
age of 35 years or more 38 cases (26.6%)

Gestational Age at Birth
range 22-42 weeks
average 36.6 ± 3.3 weeks
premature delivery (before completed 37 weeks)
46 cases (32.4%)

Classification of PIH

Gestational hypertension (without proteinuria)	48 cases (33.6 %)
Mild Preeclampsia	61 cases (42.7 %)
Severe Preeclampsia	26 cases (18.2 %)
Pregnancy-aggravated hypertension	6 cases (4.2 %)
Eclampsia	2 cases (1.4 %)
<i>First eclamptic attack before admission</i>	2 cases
<i>First eclamptic attack after admission</i>	0 case
<i>No ANC at Maharaj Nakorn Chiang Mai</i>	2 cases
<i>ANC at Maharaj Nakorn Chiang Mai</i>	0 case

Birth Weight range 550-4350 grams
average 2671±691 grams
number of low birth weight fetus (less than 2,500 grams)
46 cases (32.4 %)

Apgar Scores at 1 minute (less than 7) 25 cases (17.5 %)

Apgar Scores at 5 minutes (less than 7) 11 cases (6.3 %)

Small-for-gestational-age (less than 10th percentile) 23 cases (19.5 %)

Perinatal death 5 cases (3.5 %)

Congenital Anomalies

<i>Gastroschisis</i>	1 case
<i>Multiple anomalies</i>	1 case
<i>Omphalocele</i>	1 case
<i>Hydrops fetalis</i>	1 case

Other complications

<i>Diabetes Mellitus</i>	16 cases
<i>Hepatitis B antigen positive</i>	11 cases
<i>Previous cesarean section</i>	7 cases
<i>Chronic hypertension</i>	6 cases
<i>Prolonged ruptured membranes</i>	4 cases
<i>Marked obesity</i>	3 cases
<i>Oligohydramnios</i>	3 cases
<i>Urinary tract infection</i>	3 cases
<i>Heart disease</i>	2 cases
<i>Systemic lupus erythromatosus</i>	2 cases
<i>Asthma</i>	2 cases
<i>Thyrotoxicosis</i>	2 cases
<i>Transverse lie</i>	2 cases
<i>Iron deficiency</i>	1 case
<i>Placental previa</i>	1 case
<i>Anti-HIV positive</i>	1 case
<i>Myoma uteri</i>	1 case
<i>Condyloma acuminata</i>	1 case

Placenta Previa

Total	24 cases (1.12 percent of total parturients) All were singleton
Age	range 19-40 years average 31.0 ± 5.9 years age of 35 years or more 9 cases (37.5 %)

Gestational Age at Birth

range 20-41 weeks
 average 33.8 ± 5.0 weeks
 premature delivery (before completed 37 weeks)
 12 cases (48.0 %)

Birth Weight

range 800-4200 grams
 average 2433 ± 954 grams
 number of low birth weight fetus (less than 2,500 grams)
 11 cases (45.8 %)

Apgar Scores at 1 minute (less than 7) 6 cases (25.0 %)

Apgar Scores at 5 minutes (less than 7) 3 cases (12.5 %)

Small-for-gestational-age (less than 10th percentile) 5 cases (20.8 %)

Perinatal death 4 cases (16.7 %; 4 were immature, 1 dead in utero)

Congenital Anomalies 2 case (exencephaly, hydrops fetalis)

Other complications

<i>Previous cesarean section</i>	<i>6 cases</i>
<i>Diabetes mellitus</i>	<i>2 cases</i>
<i>Pregnancy-induced hypertension</i>	<i>1 case</i>
<i>Transverse lie</i>	<i>1 case</i>
<i>Hepatitis B surface antigen positive</i>	<i>1 case</i>
<i>Iron deficiency anemia</i>	<i>1 case</i>
<i>Myoma uteri</i>	<i>1 case</i>
<i>Urinary tract infection</i>	<i>1 case</i>

Pregnancy with Acute Pyelonephritis

Total	17 cases (0.79 percent of total parturients) (16 singleton, 1 twin pregnancy)	
Age	range 17-37 years average 27.0±5.3 years age of more than 35 years 2 cases (11.8 %)	
Gestational Age at Birth	range 20-41 weeks average 31.9±6.7 weeks premature delivery (before completed 37 weeks) 12 cases (70.6 %)	
Onset		
	First trimester	1 cases
	Second trimester	6 cases
	Third trimester	9 cases
	Postpartum	1 case
Number of Episodes		
	1	11 cases
	2	4 cases
	3	2 case
Birth Weight	range 860-3270 grams average 1951±922 grams number of low birth weight fetus (less than 2,500 grams) 9 cases (52.9 %)	

Apgar Scores at 1 minute (less than 7)	5 cases (29.4 %)
Apgar Scores at 5 minutes (less than 7)	3 cases (17.6 %)
Small-for-gestational-age (less than 10th percentile)	2 cases (9.1 %)
Perinatal death	3 case (17.6%) (immaturity)
Congenital Anomalies	2 cases (Hydrops fetalis)
Other complications	
<i>Iron deficiency</i>	4 cases
<i>Pregnancy-induced hypertension</i>	3 cases
<i>Placenta previa</i>	2 cases
<i>Previous cesarean section</i>	2 cases
<i>Chorioamnionitis</i>	2 cases
<i>Diabetes mellitus</i>	2 cases
<i>Hepatitis B surface antigen positive</i>	1 case
<i>Thalassemia</i>	1 case
<i>Polyhydramnios</i>	1 case

Small-for-Gestational-Age Fetuses

Birthweight less than 10th percentile

Total	158 (7.22 percent of total babies; 2186 fetuses)
	Singleton 135 fetuses
	Multiple pregnancies 23 fetuses
Age	range 15-45 years

average 28.7 ± 6.5 years
 age of 35 years or more 30 cases (18.9 %)

Gestational Age at Birth

range 25-41 weeks
 average 34.7 ± 7.9 weeks
 premature delivery (before completed 37 weeks)
 30 cases (18.9 %)

Birth Weight range 250-2620 grams
 average 2188 ± 712 grams
 number of low birth weight fetus (less than 2,500 grams)
 135 cases (85.4 %)

Apgar Scores at 1 minute (less than 7) 32 cases (20.3 %)

Apgar Scores at 5 minutes (less than 7) 9 cases (5.7 %)

Perinatal Death 6 in 158 cases (3.80 %)

Congenital Anomalies

<i>Chromosomal abnormalities</i>	5 cases
<i>Suspected of intrauterine infection</i>	5 cases
<i>Twin transfusion syndrome</i>	4 cases
<i>Multiple anomalies</i>	3 cases
<i>Congenital heart disease</i>	2 cases
<i>Gastroschisis</i>	1 case
<i>Omphalocele</i>	1 case

Other complications

<i>Pregnancy-induced hypertension</i>	23 cases
<i>Poor maternal weight gain</i>	20 cases
<i>Medical diseases</i>	25 cases

Pregnant women with HIV infection

Pregnant women with HIV infection at Maharaj Nakorn Chiang Mai Hospital (1989-1997) 1989-1996--> No ANC screening for anti HIV antibody 1997-now--> Voluntary screening for anti-HIV antibody among pregnant women and their husbands and antiviral prescription for +ve female cases

TABLE 37 Pregnant women with positive HIV antibody at Maharaj Nakorn Chiang Mai (1998-2008)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
No. of Deliveries	3690	3034	3105	3103	2815	2753	2628	2420	2013	2212	2144
No. of women with positive HIV Deliveries	90	55	36	38	25	39	29	20	41	37	19
Therapeutic abortion	10	7	1	2	-	-	3	1	2	-	-
Spontaneous abortion	-	-	-	1	-	-	-	-	-	-	-
Illegal abortion	-	1	1	1	-	-	-	-	-	-	-

TABLE 38 Voluntary screening (2008) among pregnant women for anti-HIV antibody

Pregnant women (Counselling)	1,659 cases
Voluntary screening	1,614 cases
+ve anti-HIV antibody	22 cases
% positive case	1.36 %

TABLE 39 Age of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Age (years)	No. of cases	Percent
15-19	1	5.3
20-24	5	26.3
25-29	7	36.8
30-34	4	21.1
35-39	2	10.5
40-45	-	-
Total	19	100
<i>Mean age (years)</i>	<i>27.21</i>	
<i>Standard deviation</i>	<i>4.66</i>	
<i>Range</i>	<i>18-35</i>	<i>years</i>

TABLE 40 Parity of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Parity	No. of cases	Percent
0	10	35.1
1	7	46.0
2	2	13.5
≥ 3	-	-
Total	19	100

TABLE 41 Age at first marriage of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Age (years)	No. of cases	Percent
15-19	5	26.3
20-24	5	26.3
25-29	1	5.3
30-34	1	5.3
Unknown	7	36.8
Total	19	100
<i>Mean age (years)</i>	<i>20.0</i>	
<i>Standard deviation</i>	<i>4.79</i>	
<i>Range</i>	<i>15-30</i>	<i>years</i>

TABLE 42 Number of marriages of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Number	No. of cases	Percent
1	7	36.8
2	9	47.4
3	2	10.5
5	1	5.3
Total	19	100

TABLE 43 Occupations of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Occupations	No. of cases	Percent
Employee	9	47.4
Housewife	3	15.8
Commercial	4	21.0
Officer	1	5.3
Others	2	10.5
Total	19	100

TABLE 44 Residence (province) of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Province	Number	Percent
Chiang Mai (เชียงใหม่)	16	84.2
Lamphun (ลำพูน)	2	10.5
Chiangrai (เชียงใหม่)	1	5.3
Total	19	100

TABLE 45 Complications of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

	Cases	Percent
Without complication	11	57.9
With complication	8	42.1
• Antepartum	8	
• Intrapartum	-	
• Postpartum	-	

TABLE 46 Birth weight in the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Birth weight (grams)	Number	Percent
< 1,499	1	7.3
1,500 - 1,999	2	4.9
2,000 - 2,499	3	9.7
2,500 - 2,999	6	53.7
3,000 - 3,499	5	19.5
3,500 - 3,999	2	4.9
Total	19	100

<i>Mean birthweight (grams)</i>	<i>2,791.05</i>
<i>Standard deviation (grams)</i>	<i>579.91</i>
<i>Range (grams)</i>	<i>1470-3,800</i>

TABLE 47 Postpartum contraception of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2008)

Method	No. of cases	Percent
Female sterilization	8	42.1
DMPA	1	5.3
Combined pills	4	21.0
Unknown	6	31.6
Total	19	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** 1392 tests

(OPD, 1277; LR, 95; OB2&3, 20)

Secondary Surveillance

Contraction stress test

or **Nipple stimulation test** 8 tests

Biophysical profile/ultrasonography 80 tests

Doppler velocimetry 350 tests

Prenatal Diagnosis

1. **Ultrasonography** 8,766 examinations
(~ 25 % for gynecologic and infertile examinations)
2. **Amniocentesis** 1,300 cases
3. **Cordocentesis** 439 cases
4. **Chorionic villous sampling** 120 procedures

OBSTETRIC ULTRASOUND SERVICE

Number of Patients undergoing sonographic examinations (OB&GYN) in 2,008

8,766 cases

Several examinations involved in the researches without specific indications

Indications for sonographic examinations

■ Uncertained date of gestation <i>uterine size incompatible with gestational age unrecognized last menstrual period</i>	10.4 %
■ Suspected intrauterine growth retardation	3.9 %
■ Bleeding in first half of pregnancy	2.0 %
■ Antepartum hemorrhage	0.3 %
■ Suspected fetal death	0.3 %
■ Rule out fetal anomalies	32.0 %
■ Fetal growth surveillance <i>twins, intrauterine growth restriction diabetic mother, mother complicated with medical diseases</i>	8.7 %
■ Gynecologic ultrasound	24.8 %
■ Infertility investigation	5.1 %
■ Perinatal research	6.1 %
■ Screening in menopausal women	6.4 %

Cordocentesis (2008)

Total 439 cases

Indications

	No.	(%)
1. Previous child with hydrops fetalis	4	(0.9)
2. Pregnancy at risk for Hb Bart's	65	(14.8)
3. Pregnancy with early signs of hydrops fetus	6	(1.4)
4. Previous child with β thal major	5	(1.1)
5. Pregnancy at risk for β thal major	46	(10.5)
6. Previous child with β thal Hb/E	11	(2.5)
7. Pregnancy at risk for β thal Hb/E	144	(32.8)
8. Chromosome analysis	59	(13.4)
9. Combined chromosome and risk for Hb Bart's, β thal major and β thal Hb/E	51	(11.6)
10. Combined chromosome and Previous child with Hb Bart's, β thal major and β thal Hb/E	8	(1.8)
11. Combined chromosome analysis and uncertain OFT	23	(5.2)
12. Uncertain OFT	3	(0.7)
13. Repeat for chromosome confirmation	12	(2.7)
14. Repeat for hemoglobin typing	2	(0.5)
Total	439	cases

Amniocentesis (2008)

Total 1,300 cases

Indications

1. Elderly gravida (age of more than 35 years)	1274 cases
<i>with no other obvious risk</i>	1273 cases
<i>with previous child with Down syndrome</i>	1 case
2. Pregnancy with -ve serum markers / sonomarkers	9 cases
3. Pregnancy with Down syndrome in previous child	8 cases
4. Pregnancy with abnormal chromosomes in previous child	3 cases
5. Pregnancy with fetal anomaly in previous child	2 cases
6. Pregnancy with previous child of other mental deficiency	2 cases
7. Others	4 cases

Chorionic Villous Sampling (2008)

Total 120 procedures (119 cases; 1 twin pregnancy)

Indications

1. Fetal chromosome study	42 cases
<i>Elderly gravida with no other obvious risk</i>	33 cases
<i>Thickened nuchal translucency</i>	3 cases
<i>Previous fetal trisomy</i>	2 cases
<i>Previous fetal anomaly</i>	2 cases
<i>Sonographic omphalocele</i>	1 case
<i>Elderly gravida with other obvious risks</i>	1 case
2. Risk for fetal severe thalassemia	59 cases
<i>Fetal risk for Hb Bart's disease</i>	23 cases
<i>Fetal risk for beta-thalassemia major</i>	4 cases
<i>Fetal risk for beta-thalassemia/HbE disease</i>	31 cases
<i>Fetal risk for Hb Bart's & b-thalassemia/HbE disease</i>	1 cases
3. Fetal chromosome & thalassemia diagnosis	19 cases
<i>Elderly gravida with fetal risk for beta-thal/HbE</i>	8 cases
<i>Elderly gravida with fetal risk for Hb Bart's disease</i>	5 cases
<i>Elderly gravida with fetal risk for beta-thal major</i>	5 cases
<i>Others</i>	1 cases

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
 - 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%, +ve % HbA₂ = HbA₂ > 4%

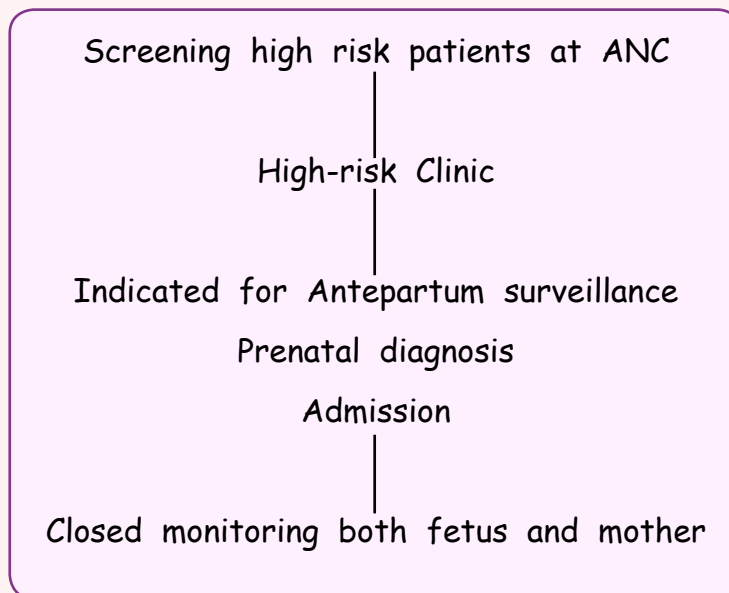
PROSPECTIVE SCREENING FOR THALASSEMIA PROGRAM 2008

■ Total number of pregnant screened	1,580 cases
■ Positive OFT or Hb E	633 cases
■ Number of couple at risk for thalassemia	32 couples
○ Risk for Hb Bart's	11 cases
○ Risk for Beta-Thalassemia major	4 cases
○ Risk for Beta-Thal HbE	16 cases
○ Risk for Hb Bart's & Beta-Thal HbE	1 case
■ The choice which selected by couples	
○ Cordocentesis	14 cases
○ Chorionic villous samplings	10 cases
○ No information	4 cases
○ Abortion before selection	1 cases
○ Others	3 cases
■ Result of PND	
○ Hb Bart's	3 cases
○ Beta-Thalassemia major	- case
○ Beta-Thal HbE	5 cases

High Risk Pregnancy

Number of patients approximately 480 cases

Management Guideline



High-risk patients at Maharaj Nakorn Chiang Mai Hospital in 2008

- | | |
|---|--------|
| 1. Elderly Gravida (age of 35 years or more) | 15.6 % |
| 2. Teenage Pregnancy (age of less than 20 years) | 9.4 % |
| <i>Early adolescence (age of less than 17 years)</i> | 1.5 % |
| <i>Late adolescence (age of 17-19 years)</i> | 7.9 % |
| 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.