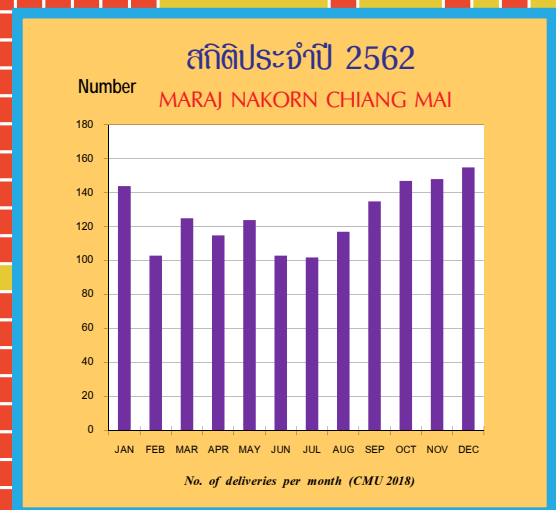


MATERNAL-FETAL MEDICINE 2019



หน่วยเวชศาสตร์มารดาและทารก
ภาควิชาสูติศาสตร์และนรีเวชวิทยา
คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

ANNUAL REPORT 2019

MATERNAL-FETAL MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

FACULTY OF MEDICINE, CHIANG MAI UNIVERSITY

CHIANG MAI, THAILAND

MATERNAL-FETAL MEDICINE 2019

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PREFACE

Maternal-Fetal Medicine (MFM) division is one of the major field of our Department (Obstetrics and Gynecology) that serves many patients with major obstetric complications, mainly referred from the Northern part of Thailand. MFM Division is very famous for academic professionals. They produced many researches in each year and also there are many elective fellows from other institutes visiting this unit regularly.

This annual report 2019 presents their summarized hard-working outputs in the last year. It is divided into 4 parts as follows; the obstetric mortality, the general obstetrics, the high-risk pregnancies, and the perinatal investigations. The number of total delivery is 1,495 cases that was decreased from the last year while the cesarean section rate was increased to 30.6%. This was the highest rate ever since in our department. About one-fourth of pregnant women were older than 35 years old. This increasing rate in advanced maternal age might explain the increasing number of high risk pregnancy with diabetes mellitus and hypertension in this year. Besides this, many of specialized prenatal investigations were carried out with the impressive outcomes.

Associate Professor Chanane Wanapirak is the head of the MFM unit. This report has been contributed mainly by Professor Theera Tongsong and his colleagues. I have admired all MFM team for their hard-working in this field.

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PREFACE

The annual report of maternal fetal medicine unit, 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 25 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 2020 annual report has some interesting data that affect educational programs as mentioned above. Firstly, the total number of delivery is lowest since we started our service but close to 70% of cases considered high risk cases. This may show the obstetrics service in this area has been changed from our center to other hospitals which our graduated residents take responsibility. The cesarean section rate in our institution still shows gradually increasing from 15.8% in the year 2000 to 26.9% in the year 2016, again a new record. This increasing rate may be reflected from the combination of parental expectation, legal issue and training program. The rate of elderly pregnancy and other complicated pregnancies are on the rise. Trend of the technique using for prenatal diagnosis also shift to different one. All of these information are the signal for the academic sector of faculty to plan for medical students curriculum, OB-GYN residency program and maternal-fetal medicine (MFM) fellowship training. MFM's ultimate purpose is better maternal and fetal outcome, this goal might not be achieved if our management do not consider the fact which some of them are present in this report.

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

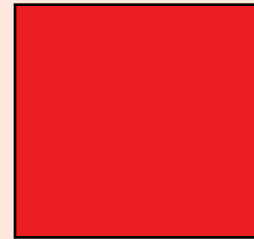
Chanane Wanapirak, M.D.

Associate Professor,

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ANNUAL REPORT



2019

MATERNAL-FETAL MEDICINE

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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 2019: For gestational age ≥ 22 weeks
: 30 cases of total birth = 1,495 cases)

■ *Gestational age between 22-27 weeks 27 cases (90.00 %)*

	CMU	Referred	Total
Low risk	2	9	11
High risk	7	9	16
Autopsy	2	2	4

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	2	1	3
2. Congenital malformations	1	5	6
3. Condition associated with immaturity	3	3	6
4. Asphyxia developed in labor	0	0	0
5. Other specific conditions	1	1	2
6. Therapeutic termination related to PND	2	8	10

Stillbirth 2019: For gestational age ≥ 28 weeks
: 3 cases of total birth = 1,495 cases)

■ *Gestational age between ≥ 28 weeks 3 cases (10.00%)*

	CMU	Referred	Total
Low risk	0	0	0
High risk	1	2	3
Autopsy	0	1	1

Causes of death

Causes of death	CMU	Referred	Total
1. Normally formed macerated stillbirth	0	1	1
2. Congenital malformations	1	1	2
3. Condition associated with immaturity	0	0	0
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 = 2.01 per 1000 total births
(by old WHO definition: ≥ 28 weeks or birth weight > 1000 grams)

Stillbirth rate = 20.07 per 1000 total births
(by new WHO definition : ≥ 22 weeks or birth weight > 500 grams)

Stillbirth rate = 13.38 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 2019 :

3 cases (GA > 22 weeks) of total 1,424 live births

- *Gestational age between 22-27 weeks 0 cases (45.45 %)*
(Total livebirth 1424 cases)

	CMU	Referred	Total
Low risk	0	0	0
High risk	0	0	0
Autopsy	0	0	0

Causes of death

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

Neonatal death 2019 :

3 cases (GA > 28 weeks) of total 1,424 live births

- *Gestational age between ≥ 28 weeks 3 cases (100.00 %)
(Total livebirth 1424 cases)*

	CMU	Referred	Total
Low risk	0	0	0
High risk	1	2	3
Autopsy	0	2	2

Causes of death

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

Early neonatal death rate 2.11 per 1,000 live births

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

Early neonatal death rate 2.11 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 = 4.01 per 1000 total births
- Gestational age ≥ 22 weeks (stillbirths + neonatal death)
perinatal death rate = 22.07 per 1000 total births

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

MATERNAL DEATH

Total 1 case

Maternal mortality rate 0 per 1,424 livebirths

Causes of maternal death: (Referred case)

Placenta previa totalis with postpartum hemorrhage with DIC

Summary

DATA	2019
Total birth	1,495
Stillbirth	30
22-27 weeks	27
≥ 28 weeks	3
Stillbirth rate/1000 births	
> 28 weeks / birthweight >1,000 gm	2.01
> 22 weeks / birthweight >500 gm	20.07
Early neonatal death	
• Early neonatal death rate / 1000 live birth (≥ 28 weeks)	2.11
• Early neonatal death rate / 1000 live birth (≥ 22 weeks)	2.11

Section II

GENERAL OBSTETRICS

TABLE 1 Distribution of Singleton & Multifetal Pregnancies

Type of pregnancy	Number	Percent
Singleton	1452	97.1
Twins	40	2.7
Triplet	3	.2
Total	1495	100.0

TABLE 2 Categories of the Pregnant Women

	2018		2019	
	Number	Percent	Number	Percent
General Cases	1430	94.2	1418	94.8
Private Cases	88	5.8	77	5.2
Total	1518	100.0	1495	100.0

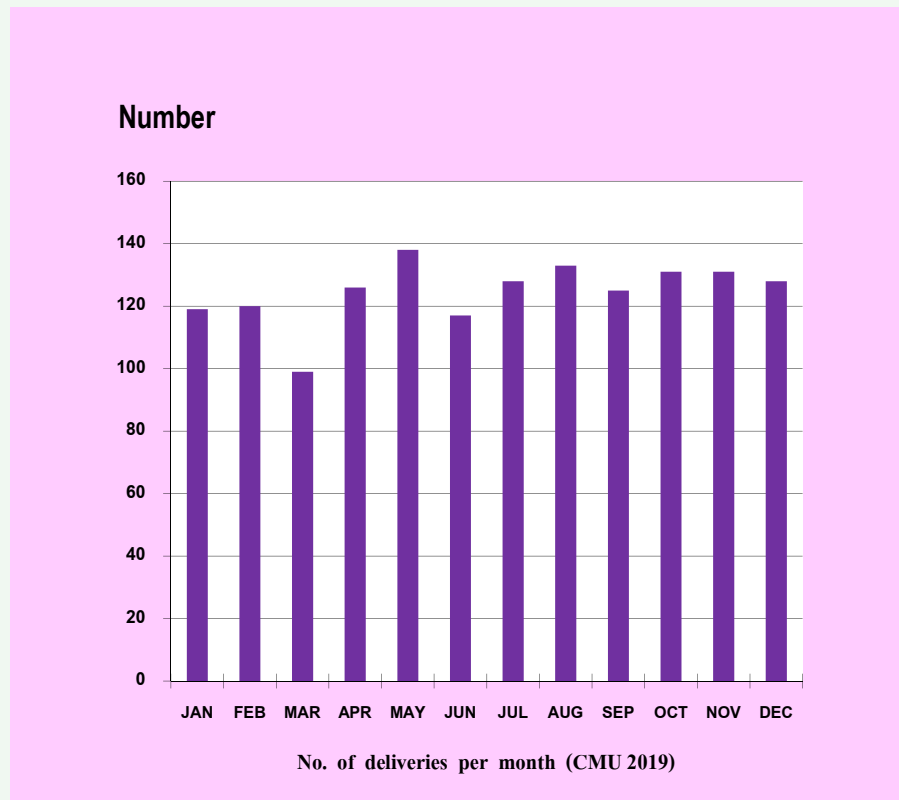
TABLE 3 Categories of the Pregnant Women

	Number	Percent
ANC at Maharaj Nakorn Chiang Mai Hospital	1212	81.1
Private Clinic	76	5.1
ANC at Other Hospitals	181	12.1
No ANC	26	1.7
Total	1495	100.0

TABLE 4 Number and Percentage of Deliveries per month

Month	Number (Mothers)	Percent
January	119	8.0
February	120	8.0
March	99	6.6
April	126	8.4
May	138	9.2
June	117	7.8
July	128	8.6
August	133	8.9
September	125	8.4
October	131	8.8
November	131	8.8
December	128	8.6
Total	1495	100.0

FIGURE 1 Histogram : Number of Deliveries from January to December 2019



Total deliveries in 2011 = 1900 cases

Total deliveries in 2012 = 2059 cases

Total deliveries in 2013 = 1823 cases

Total deliveries in 2014 = 1686 cases

Total deliveries in 2015 = 1572 cases

Total deliveries in 2016 = 1431 cases

Total deliveries in 2017 = 1539 cases

Total deliveries in 2018 = 1518 cases

Total deliveries in 2019 = 1495 cases

TABLE 5 Number and percentage of parturients by age

Age	Number	Percent	Age	Number	Percent
12	1	0.1	30	73	4.9
14	1	0.1	31	97	6.5
15	1	0.1	32	92	6.2
16	5	0.3	33	89	6.0
17	3	0.2	34	82	5.5
18	7	0.5	35	95	6.4
19	17	1.1	36	76	5.1
20	26	1.7	37	57	3.8
21	31	2.1	38	52	3.5
22	52	3.5	39	38	2.5
23	66	4.4	40	26	1.7
24	64	4.3	41	9	0.6
25	64	4.3	42	10	0.7
26	79	5.3	43	8	0.5
27	95	6.4	44	4	0.3
28	93	6.2	45	2	0.1
29	78	5.2	46	1	0.1
Total				1494	100.0

Average age (Mean±Standard deviation) 30.16±5.7 (12-46) years

TABLE 6 Number and percentage of parturients by age group

Age Group	Number	Percent
10-14	2	0.1
15-19	33	2.2
20-24	239	16.0
25-29	409	27.4
30-34	433	29.0
35-39	318	21.3
40-44	57	3.8
≥ 45-50	3	0.2
Total	1494	100.0

Summary : Age of parturients

1. Adolescent Pregnancies (11-19 years) 35 (2.3%)
 - Early Adolescent Pregnancies (\leq 16 years) 8 (0.5 %)
 - Late Adolescent Pregnancies (17-19 years) 27 (1.8 %)
2. Adult Pregnancies (20-34 years) 1081 (72.3%)
3. Elderly Pregnancies (\geq 35 years) 378 (25.3%)

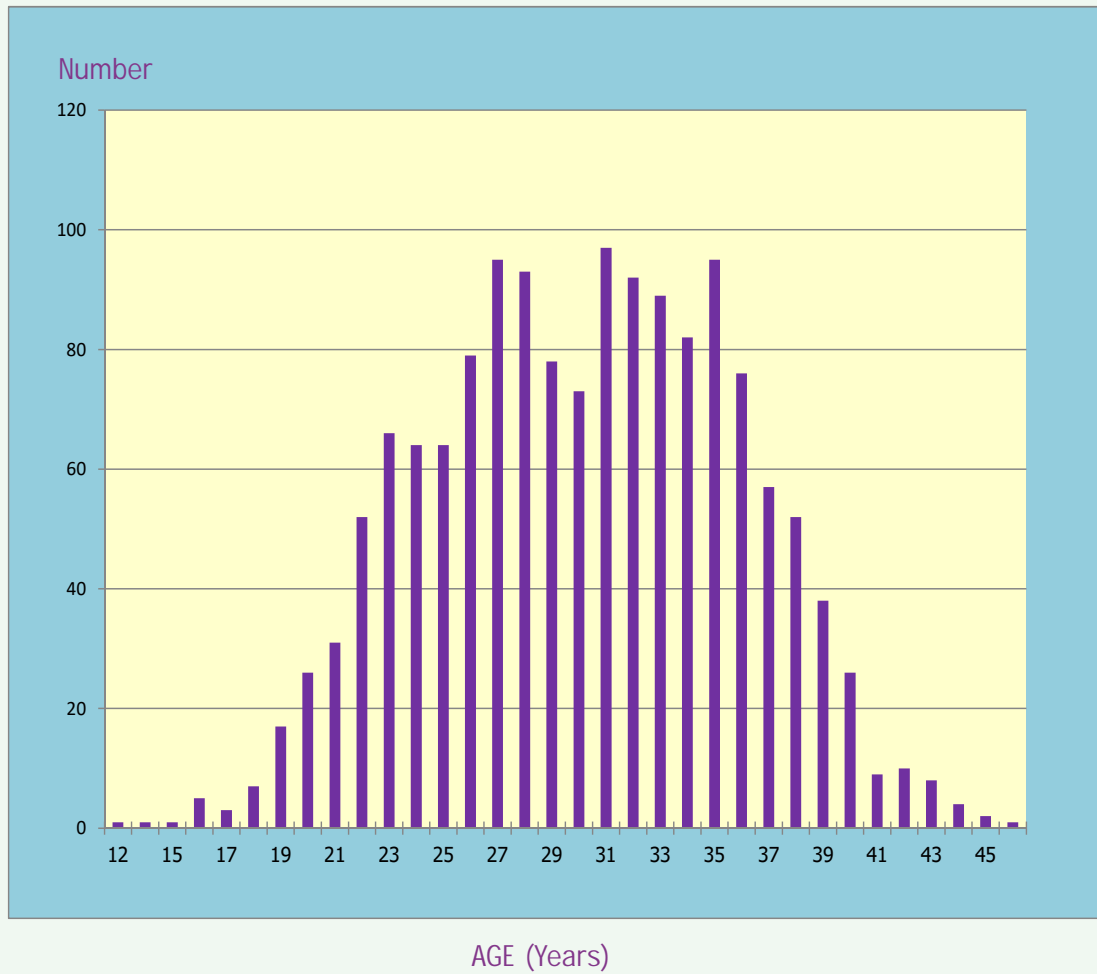
FIGURE 2 Histogram : Number of Parturients by Age

TABLE 7 Parity of parturients

Parity	Number	Percent
0	813	54.5
1	553	37.0
2	105	7.0
3	19	1.3
4	1	0.1
6	2	0.1
Total	1493	100.0

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

Nulliparous 54.5 %

Multiparous 45.5 %

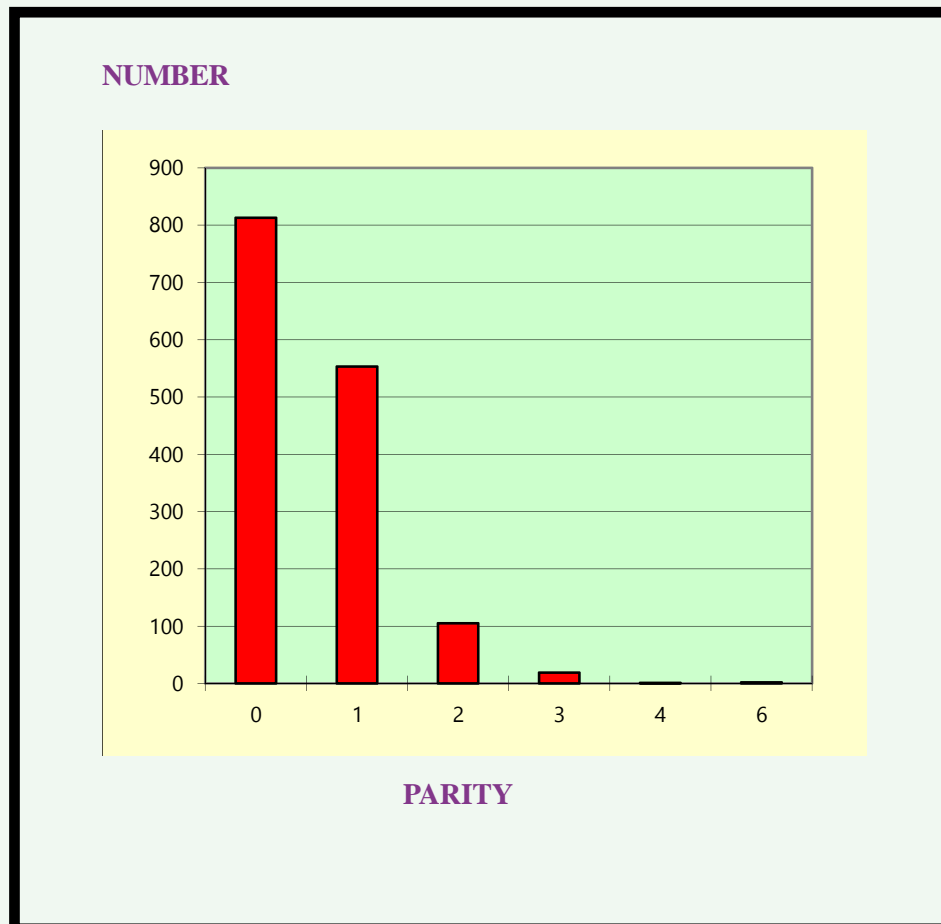
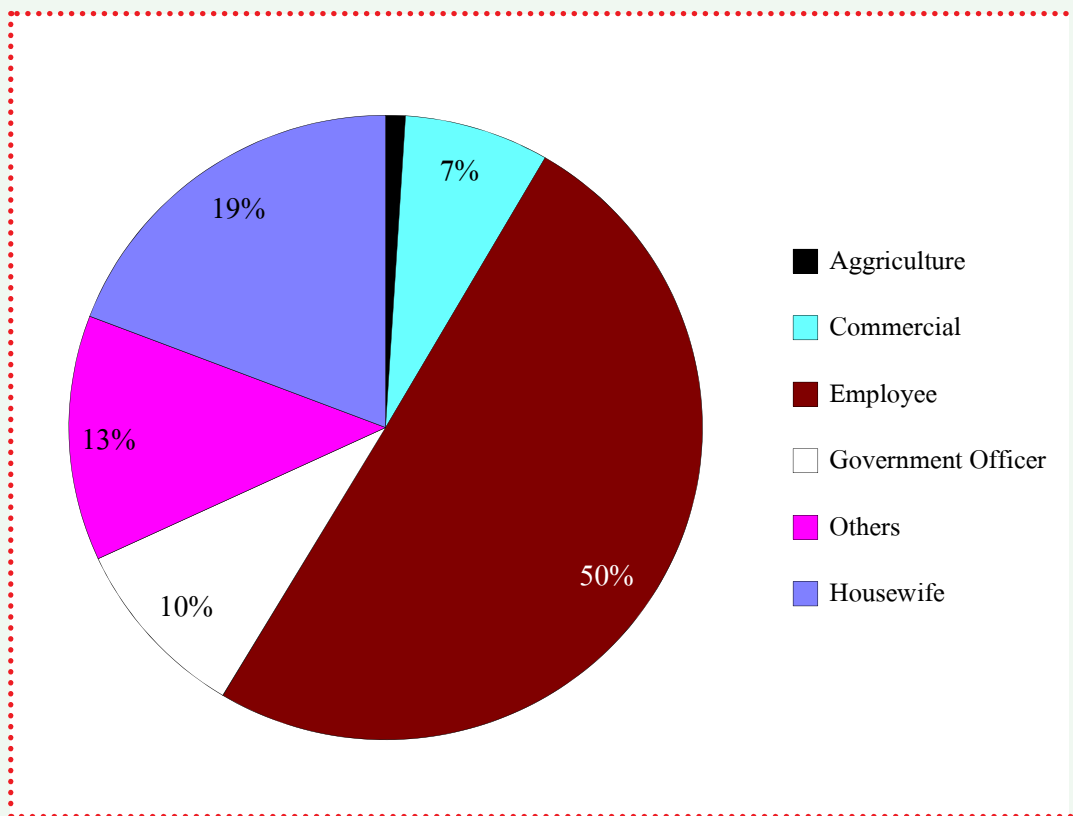
FIGURE 3 Histogram : Number of parturients by parity

TABLE 8 Distribution of the occupations of the parturients

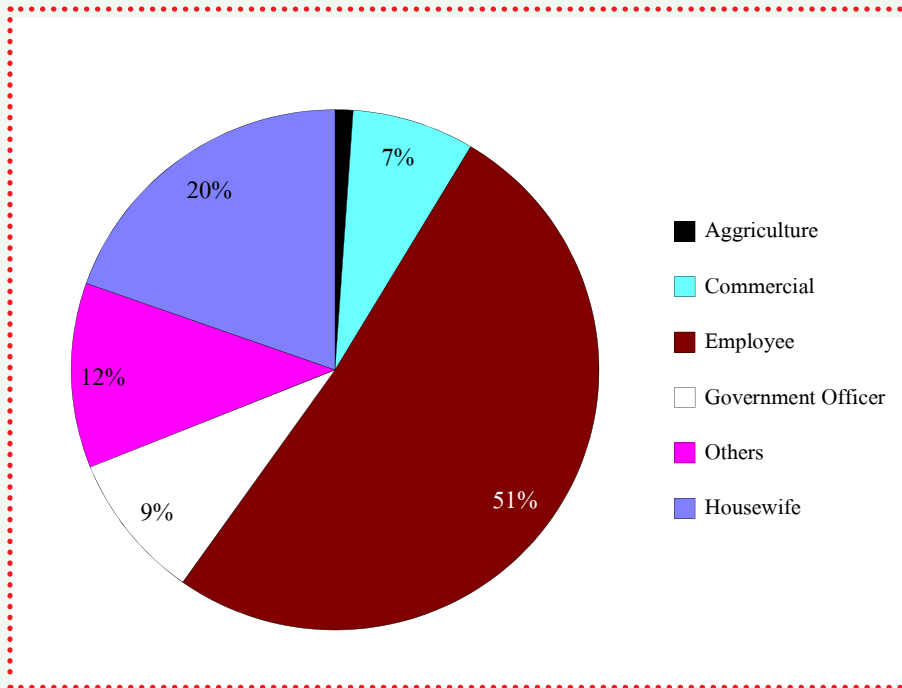
Occupations	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Aggriculture	15	1.0	15	1.1	0	0.0
Commercial	110	7.4	106	7.5	4	5.2
Employee	747	50.2	723	51.2	24	31.2
Government Officer	142	9.5	128	9.1	14	18.2
Private Business	86	5.8	80	5.7	6	7.8
Housewife	285	19.2	277	19.6	8	10.4
State Enterprise	12	0.8	11	0.8	1	1.3
Staff Officer	31	2.1	30	2.1	1	1.3
Physician	12	0.8	2	0.1	10	13.0
Phamacist	17	1.1	10	0.7	7	9.1
Others	31	2.1	29	2.1	2	2.6
Total	1488	100.0	1411	100.0	77	100.0

FIGURE 4 Pie : Distribution (percentage) of patient's occupations

OCCUPATIONS OF TOTAL PATIENTS



OCCUPATIONS OF THE GENERAL PATIENTS



OCCUPATIONS OF THE PRIVATE PATIENTS

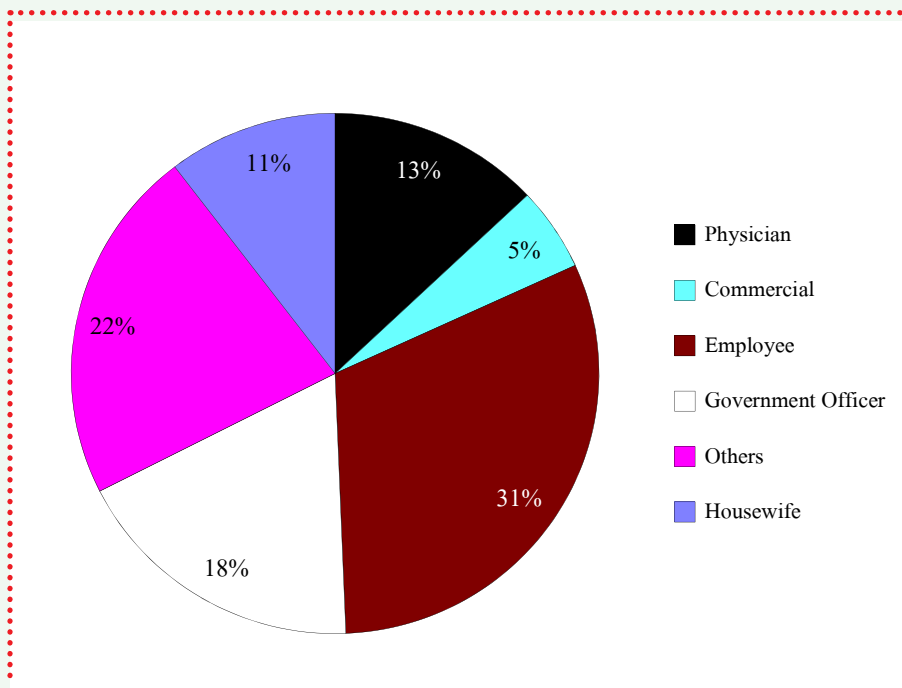
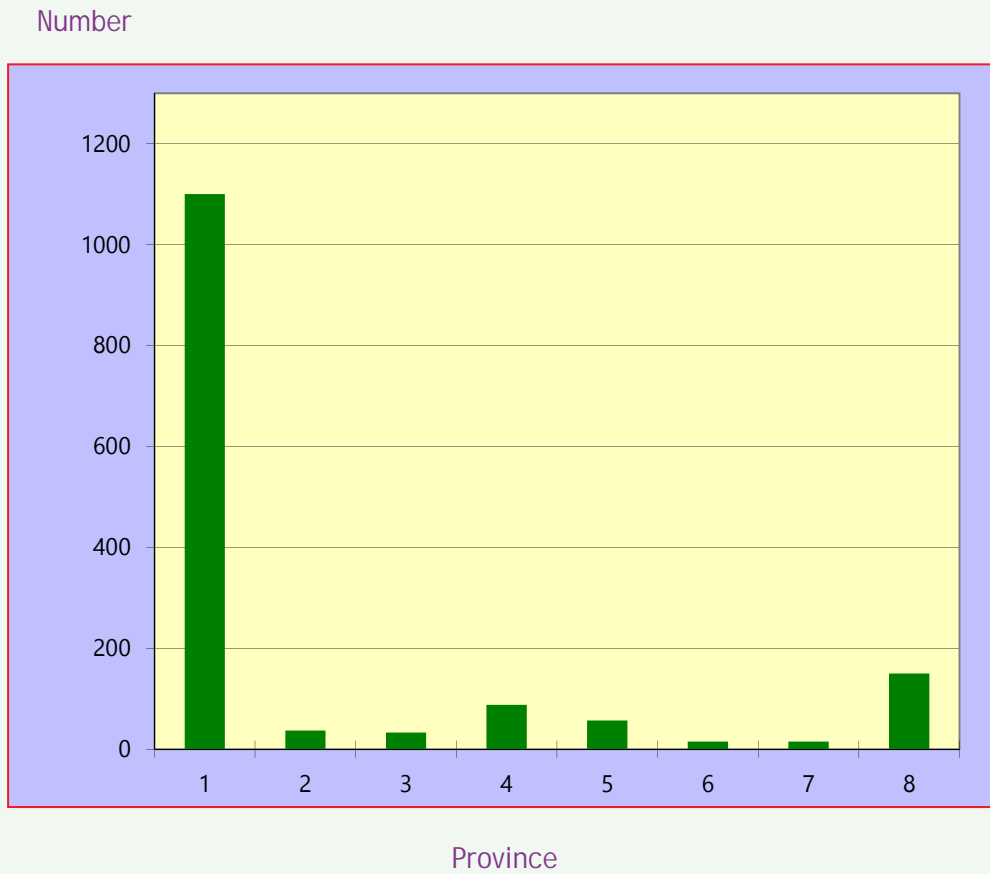


TABLE 9 Distributions of the residence (province)
of the parturients

Province	Number	Percent
Chiang Mai (เชียงใหม่)	1100	73.6
Chiang Rai (เชียงราย)	37	2.5
Lampang (ลำปาง)	33	2.2
Lamphun (ลำพูน)	88	5.9
Maehongson (แม่ฮ่องสอน)	57	3.8
Payao (พะเยา)	15	1.0
Prae (แพร่)	15	1.0
Others (อื่นๆ)	150	10.0
Total	1495	100.0

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

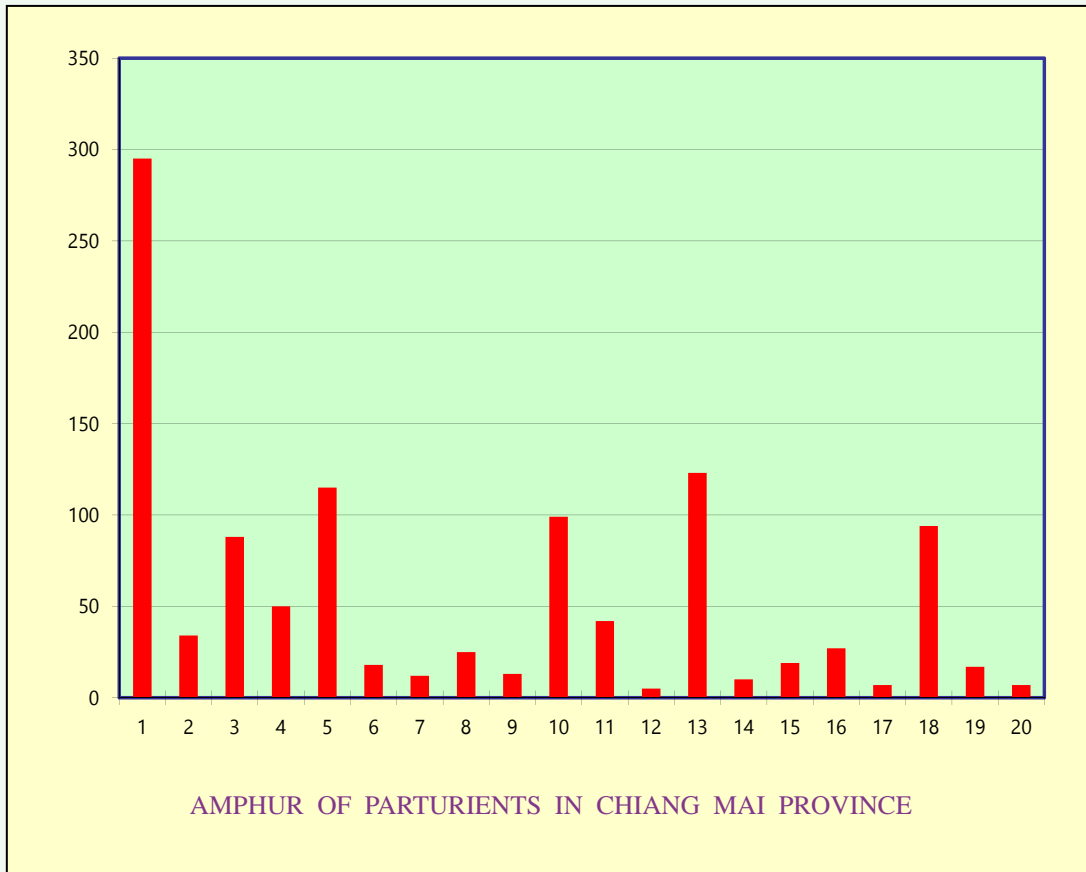


- | | |
|-----------------------------|--------------------------|
| 1. Chiang Mai (เชียงใหม่) | 2. Chiang Rai (เชียงราย) |
| 3. Lampang (ลำปาง) | 4. Lamphun (ลำพูน) |
| 5. Maehongsorn (แม่ฮ่องสอน) | 6. Payao (พะเยา) |
| 7. Phrae (แพร่) | 8. Others (อื่นๆ) |

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

	Amphur	Number	Percent
1.	Meung (เมือง)	295	26.8
2.	Maerim (แมร์ิม)	34	3.1
3.	Doisaked (ดอยสะเก็ด)	88	8.0
4.	Sanpatong (สันป่าตอง)	50	4.5
5.	Hangdong (หางดง)	115	10.5
6.	Jomtong (จอมทอง)	18	1.6
7.	Mae-ai (แม่อาย)	12	1.1
8.	Prao (พร้าว)	25	2.3
9.	Hod (ฮอด)	13	1.2
10.	Sarapee (สารภี)	99	9.0
11.	Maetang (แม่แตง)	42	3.8
12.	Omkoii (อมก๋อย)	5	.5
13.	Sankampang (สันกำแพง)	123	11.2
14.	Samoeng (สะเมิง)	10	.9
15.	Chiangdao (เชียงดาว)	19	1.7
16.	Phang (ฝาง)	27	2.5
17.	Doitao (ดอยเต่า)	7	.6
18.	Santrai (สันทราย)	94	8.5
19.	Maejam (แม่แจ่ม)	17	1.5
20.	Chaiprakarn (ไชยปราการ)	7	.6
	Total	1100	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 |

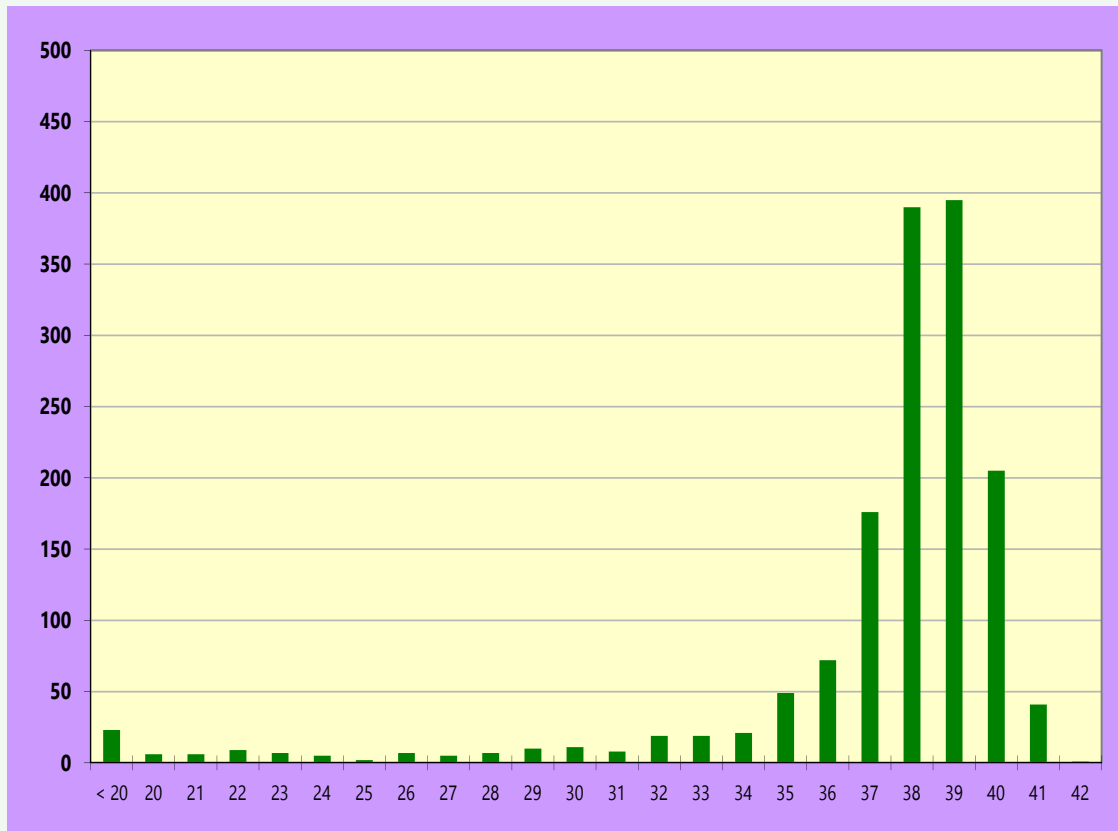
TABLE 11 Number and percentage of parturients by gestational age in singleton pregnancies

GA (Weeks)	Number	Percent	GA (Weeks)	Number	Percent
< 20	23	1.5	31	8	0.5
20	6	0.4	32	19	1.3
21	6	0.4	33	19	1.3
22	9	0.6	34	21	1.4
23	7	0.5	35	49	3.3
24	5	0.3	36	72	4.8
25	2	0.1	37	176	11.8
26	7	0.5	38	390	26.1
27	5	0.3	39	395	26.4
28	7	0.5	40	205	13.7
29	10	0.7	41	41	2.7
30	11	0.7	42	1	0.1
Total				1494	100.0

Average of Gestational Age 37.12 ± 4.2 (13-42) 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)	23	1.5
Immature (20-27 weeks)	47	3.1
Premature (28-36 weeks)	216	14.5
Term (37-41 weeks)	1207	80.8
Postterm (42 weeks or more)	1	0.1
Total	1494	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
19	1	2.5
21	1	2.5
22	1	2.5
23	1	2.5
29	2	5.0
30	2	5.0
31	1	2.5
32	3	7.5
33	2	5.0
34	4	10.0
35	6	15.0
36	8	20.0
37	2	5.0
38	6	15.0
Total	40	100.0

Average of Gestational Age 33.30 ± 4.8 Weeks

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

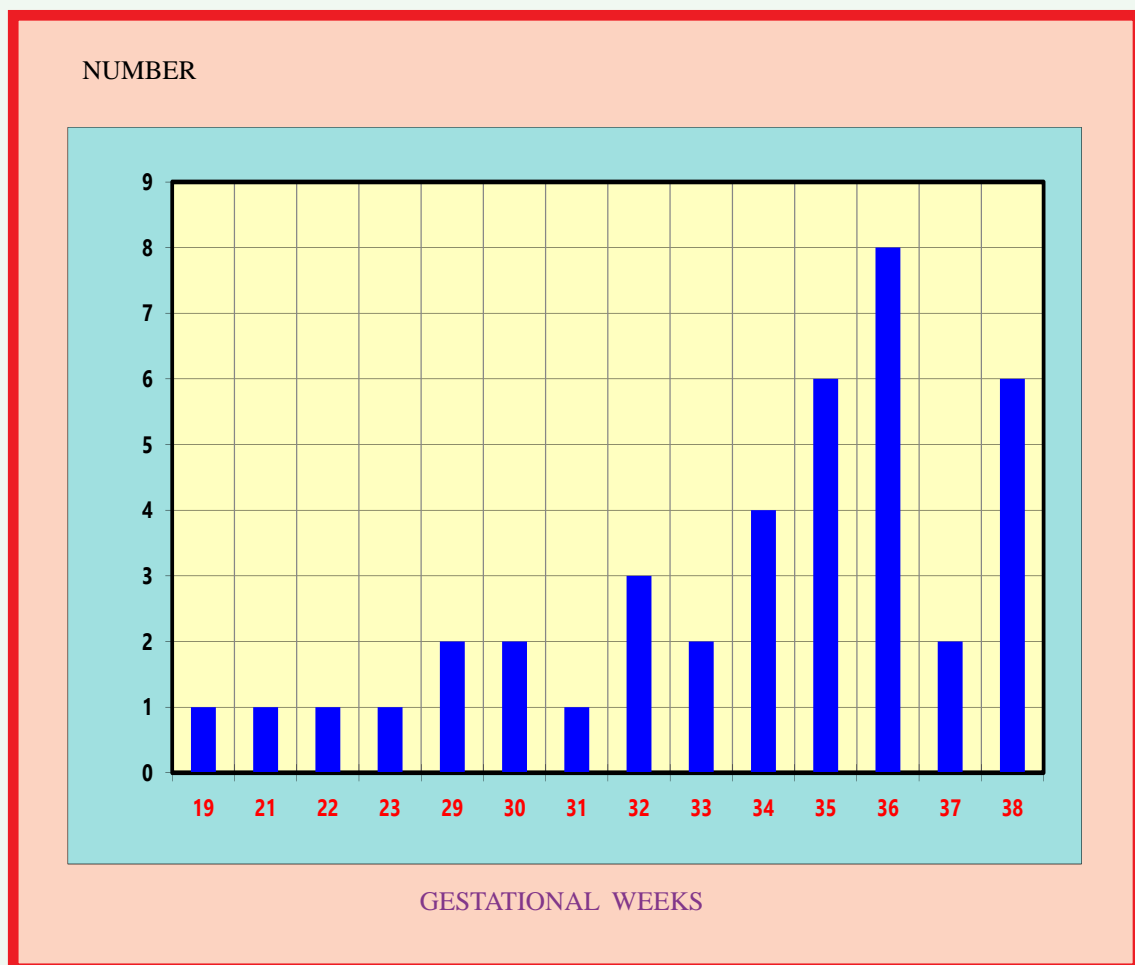


TABLE 14 Number and percentage of parturients by gestational age group in twin pregnancies.

Gestational Age Group	Number	Percent
Abortion (< 20 week)	1	2.5
Immature (20-27 weeks)	3	7.5
Preterm (28-36 weeks)	28	70.0
Term (37-41 weeks)	8	20.0
Total	40	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	50	3.3
1	39	2.6
2	49	3.3
3	66	4.4
4	73	4.9
5	69	4.6
6	67	4.5
7	82	5.5
8	104	7.0
9	110	7.4
10	169	11.3
11	156	10.4
12	174	11.6
13	122	8.2
14	68	4.5
15	49	3.3
16	21	1.4
17	22	1.5
18	1	0.1
19	3	0.2
20	1	0.1
Total	1495	100.0

Attending ANC at other hospitals 12.1% of total parturients

FIGURE 9 Histogram : Number of ANC attendances of general patients

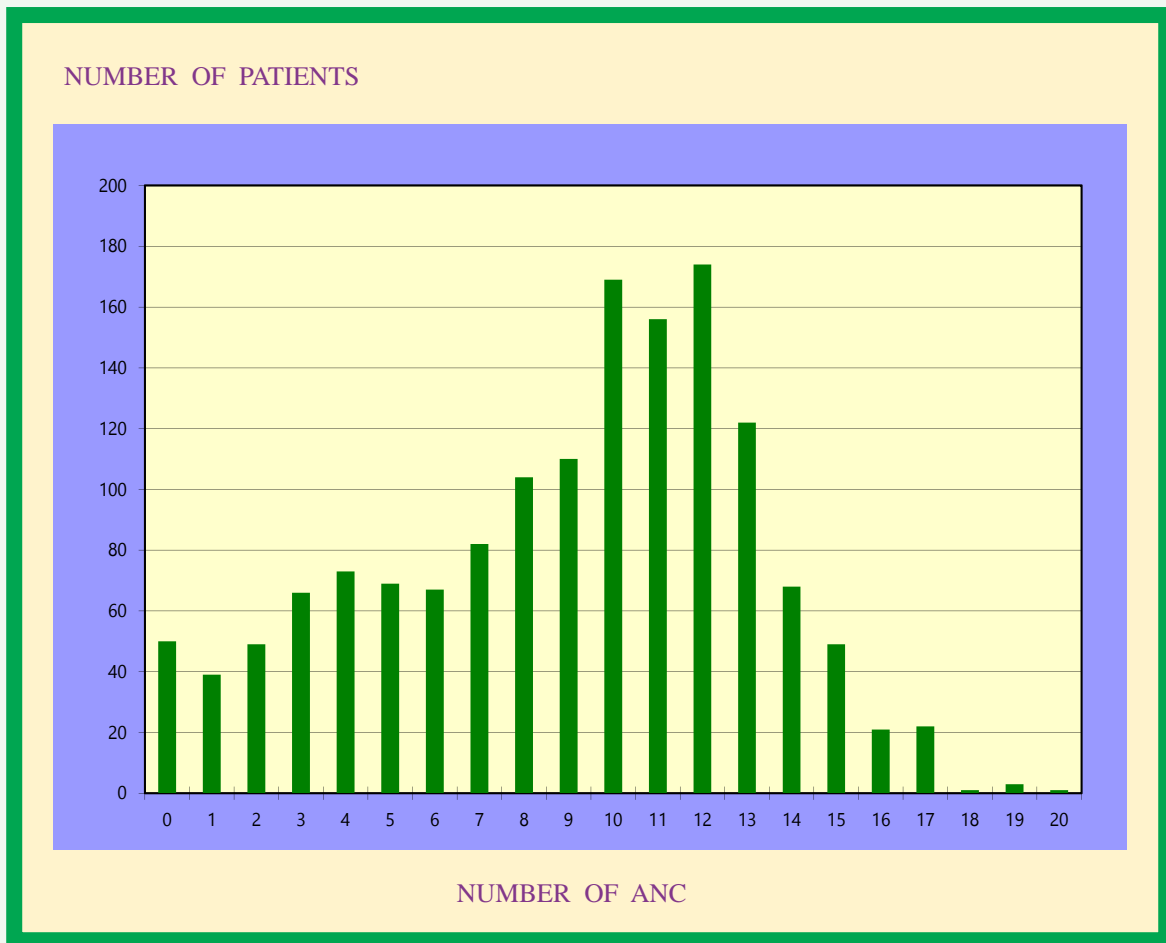


TABLE 16 Number of antenatal care attendance : General patients
(not include the patients attending ANC at other hospitals)

Number of ANC	Number of Parturients	Percent
4 or more	1291	86.4
1-3	154	10.3
No ANC	50	3.3
Total	1495	100.0

Note ANC less than 4 is considered to be inadequate

Inadequate ANC 13.3 %

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

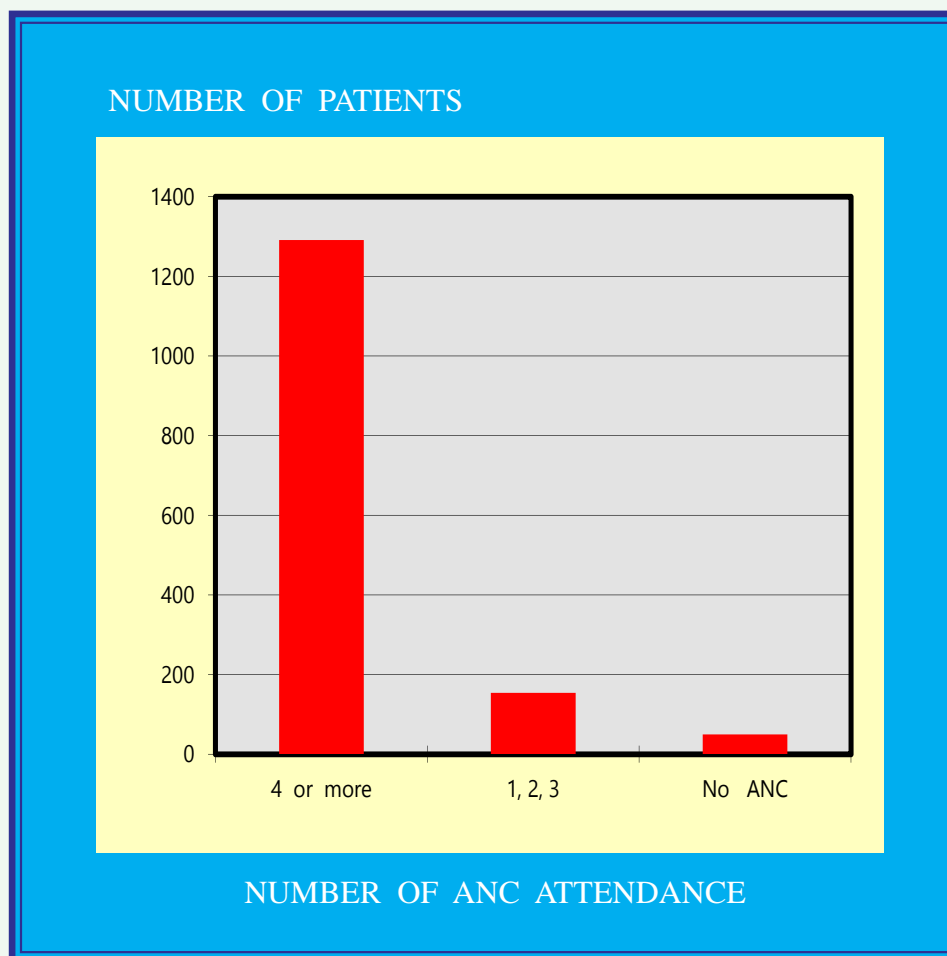
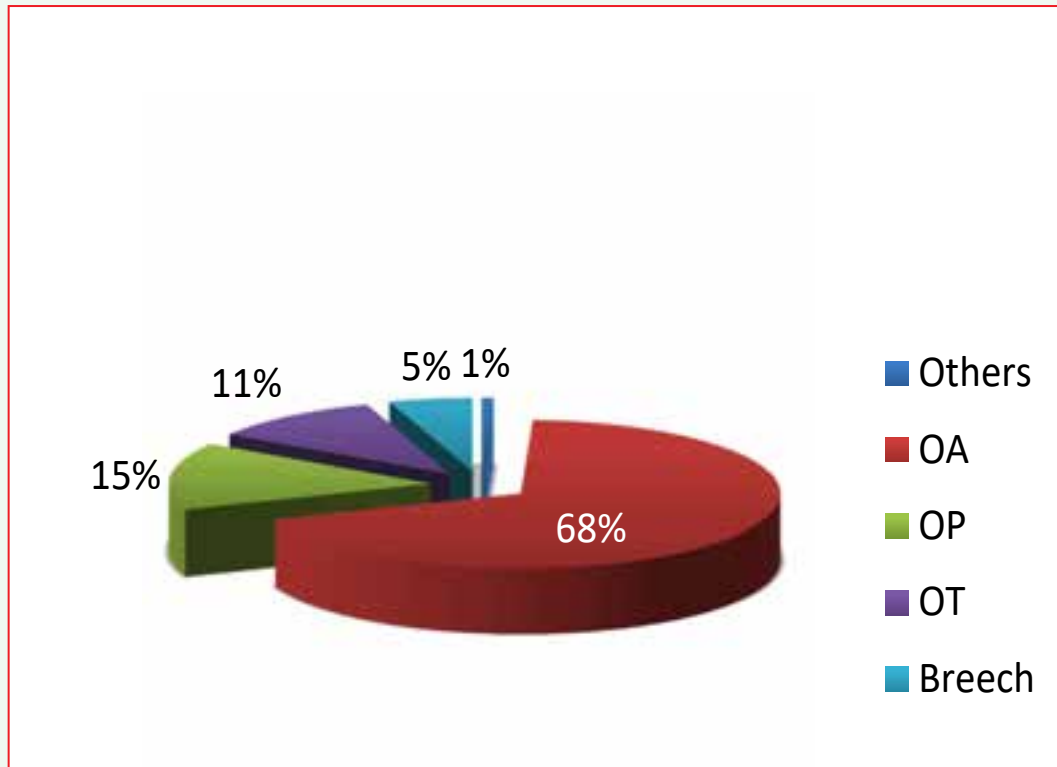


TABLE 17 Distribution of fetal presentations in labor (Singleton)

Fetal Presentation	Percent
Vertex	94.3
Breech	5.1
Transverse lie	0.2
Compound	0.1
Face	0.1
Others	0.2

Breech Presentation was 5.1% of Total Birth

FIGURE 11 Proportion of fetal presentations (singleton) 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	935	64.4	894	64.7	41	57.7
Forceps Delivery	19	1.3	19	1.4	-	-
Vacuum Delivery	39	2.7	36	2.6	3	4.2
Cesarean Section	445	30.6	418	30.3	27	38.0
Vaginal Breech Delivery	8	0.6	8	0.6	-	-
Other*	6	0.4	6	0.4	-	-
Total	1452	100.0	1381	100.0	71	100.0

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

Twins

Mode of Delivery	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Vaginal Delivery	11	27.5	7	22.9	3	60.0
Cesarean Section	29	72.5	27	77.1	2	40.0
Total	40	100.0	35	100.0	5	100.0

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

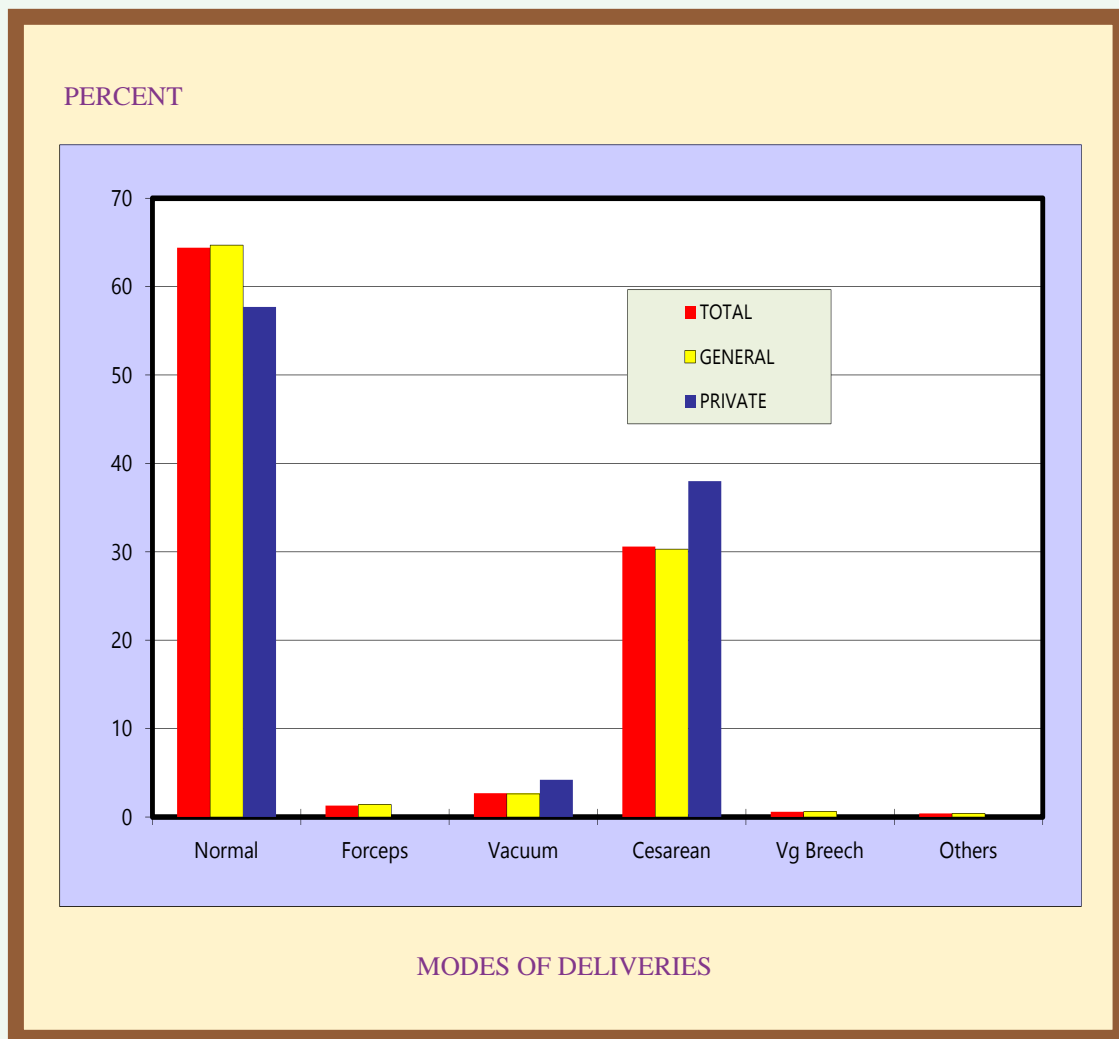


TABLE 19 Modes of deliveries in breech presentation : general and private patients (Singleton)

Mode of Deliveries	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Cesarean Section	66	89.2	64	88.9	2	100.0
Assisting Mauriceau-Smelliveit	7	9.5	7	9.7	-	-
Total Extraction Mauriceau-Smelliveit	1	1.4	1	1.4	-	-
Spontaneous Breech	-	-	-	-	-	-
Total	74	100.0	72	100.0	2	100.0

Total Cesarean Section Rate in Breech presentation 89.2 %

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

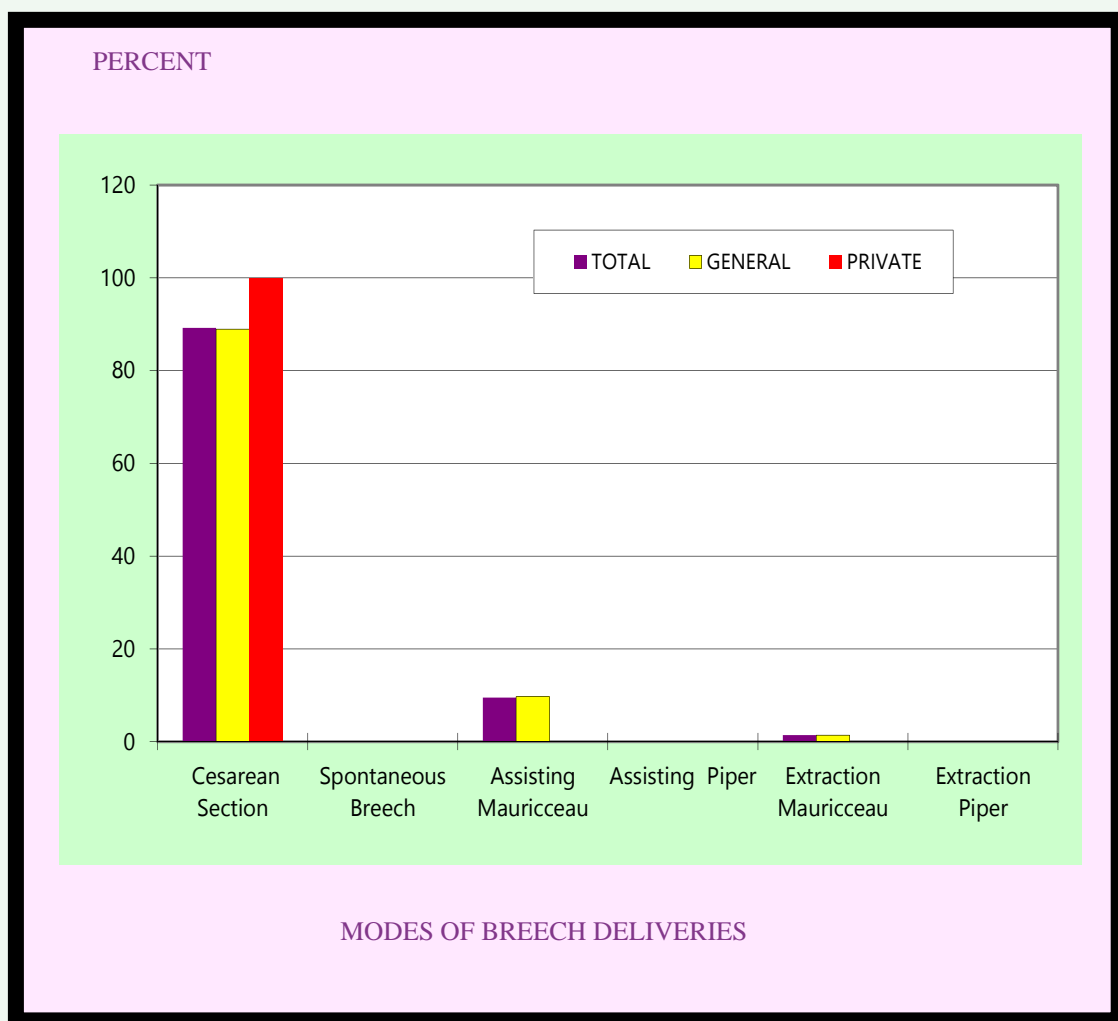


TABLE 20 Frequency of cesarean deliveries according to diagnostic indication (Singleton)

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
CPD	135	30.3	124	29.7	11	40.7
Previous C/S	159	35.7	153	36.6	6	22.2
Breech presentation	66	14.8	64	15.3	2	7.4
Fetal distress	28	6.3	26	6.2	2	7.4
Placenta previa	18	4.0	17	4.1	1	3.7
PIH	10	2.2	10	2.4	-	-
Abruptio placentae	2	0.4	2	0.5	-	-
Malpresentation	3	0.7	3	0.7	3	11.1
Others	7	1.6	4	1.0	-	-
Not recorded	17	3.8	15	3.6	2	7.4
Total	445	100.0	418	100.0	27	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	3	15.8	3	15.8	-	-
Poor expulsive force	1	5.3	1	5.3	-	-
Prophylactic, training	11	57.9	11	57.9	-	-
Shortened second stage of labour	4	21.1	4	21.1	-	-
Total	19	100.0	19	100.0	-	-

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

Indications	Total		General		Private	
	Number	Percent	Number	Percent	Number	Percent
Fetal distress	11	28.9	10	28.6	1	33.3
Poor expulsive force	18	47.4	16	45.7	2	66.7
Prophylactic, training	2	5.3	2	5.7	-	-
Shortened second stage of labour	7	18.4	7	20.0	-	-
Total	38	100.0	35	100.0	3	100.0

TABLE 23 Sex of Fetuses (Including Multiple Pregnancies)

Sex	Number	Percent
Male	798	51.9
Female	724	47.1
Unspecified	15	1.0
Total	1537	100.0

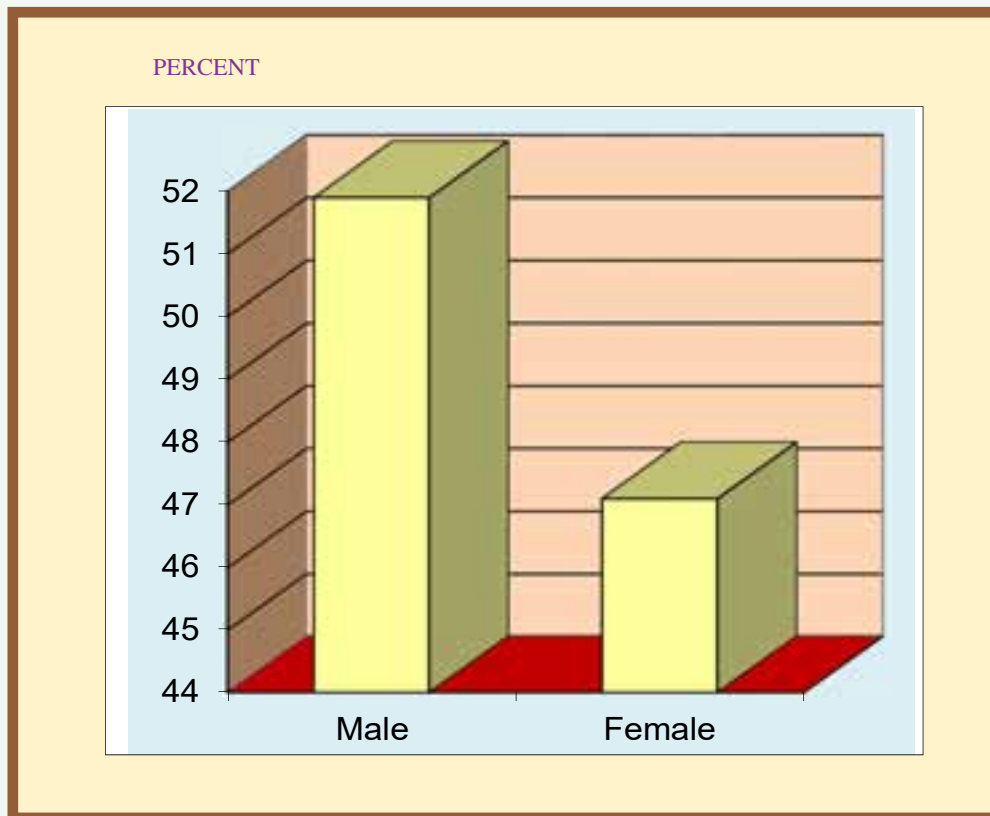
FIGURE 14 Histogram : Distribution of fetal sex (including twins)

TABLE 24 Apgar score at 1 minute of total neonates

Apgar Scores	Number	Percent
0-3 (severe depression)	93	6.0
4-6 (mild depression)	73	4.7
7-10 (no depression)	1375	89.2
Total	1541	100.0

TABLE 25 Apgar score at 5 minutes of total neonates

Apgar Score	Number	Percent
0-3 (severe depression)	75	4.9
4-6 (mild depression)	21	1.4
7-10 (no depression)	1445	93.8
Total	1541	100.0

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

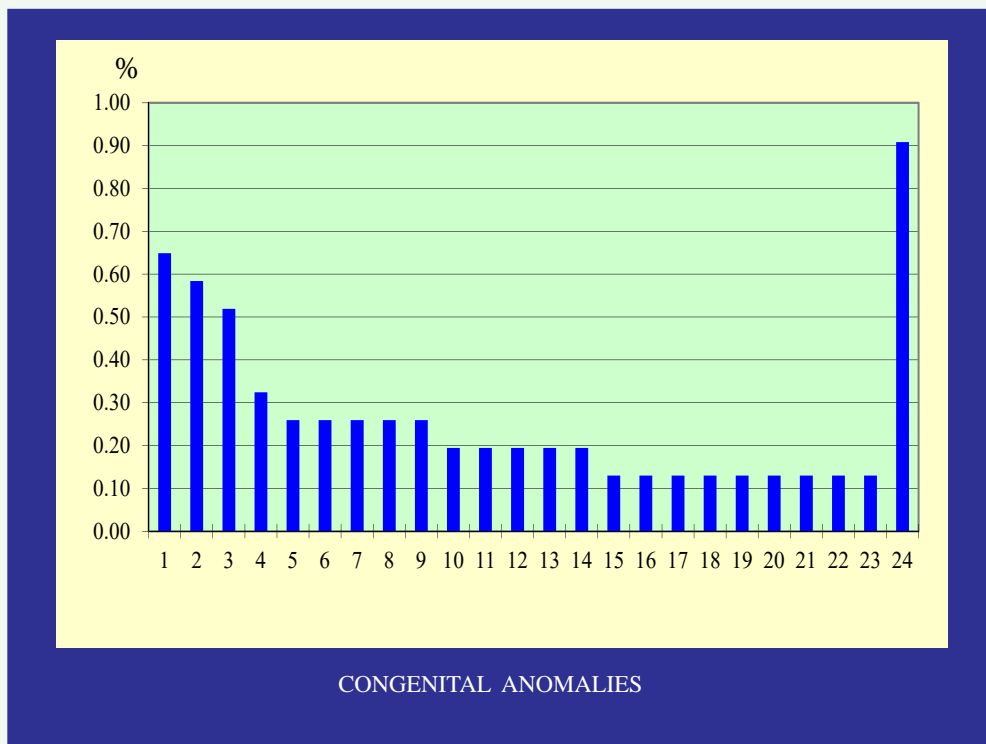
Apgar Score	1-Minute		5-Minute	
	Number	Percent	Number	Percent
0	66	4.3	66	4.3
1	11	0.7	3	0.2
2	10	0.6	1	0.1
3	7	0.5	5	0.3
4	9	0.6	1	0.1
5	17	1.1	8	0.5
6	48	3.1	11	0.7
7	105	6.8	38	2.5
8	348	22.6	109	7.1
9	834	54.1	527	34.2
10	86	5.6	772	50.1
Total	1541	100.0	1541	100.0

TABLE 27 Prenatal sonographic diagnosis of structural anomalies*

	Congenital Anomalies	Number	Percent
1	Trisomy 21	10	0.65
2	Cardiac defect	9	0.58
3	Thal.Hb Bart's	8	0.52
4	Cleft lips	5	0.32
5	Gastroschisis	4	0.26
6	Multiple anomalies	4	0.26
7	Thal.Beta major	4	0.26
8	Hydrops fetalis	4	0.26
9	Cystic hygroma	4	0.26
10	Diaphragmatic hernia	3	0.19
11	Omphalocele	3	0.19
12	Trisomy 18	3	0.19
13	Skeletal dysplasia	3	0.19
14	Hydrocephalus	3	0.19
15	Cleft palates	2	0.13
16	CCAM	2	0.13
17	Anen-/exencephaly	2	0.13
18	Duodenal atresia	2	0.13
19	Holoprocencephaly	2	0.13
20	Acardiac Twins	2	0.13
21	Ambiguous genitalia	2	0.13
22	Hydranencephaly	2	0.13
23	Hydronephrosis	2	0.13
24	Others	14	0.91
	Total	99	6.42

* 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 | Trisomy 21 | 13 | Skeletal dysplasia |
| 2 | Cardiac defect | 14 | Hydrocephalus |
| 3 | Thal.Hb Bart's | 15 | Cleft palates |
| 4 | Cleft lips | 16 | CCAM |
| 5 | Gastroschisis | 17 | Anen-/exencephaly |
| 6 | Multiple anomalies | 18 | Duodenal atresia |
| 7 | Thal.Beta major | 19 | Holoprocencephaly |
| 8 | Hydrops fetalis | 20 | Acardiac Twins |
| 9 | Cystic hygroma | 21 | Ambiguous genitalia |
| 10 | Diaphragmatic hernia | 22 | Hydranencephaly |
| 11 | Omphalocele | 23 | Hydronephrosis |
| 12 | Trisomy 18 | 24 | Others |

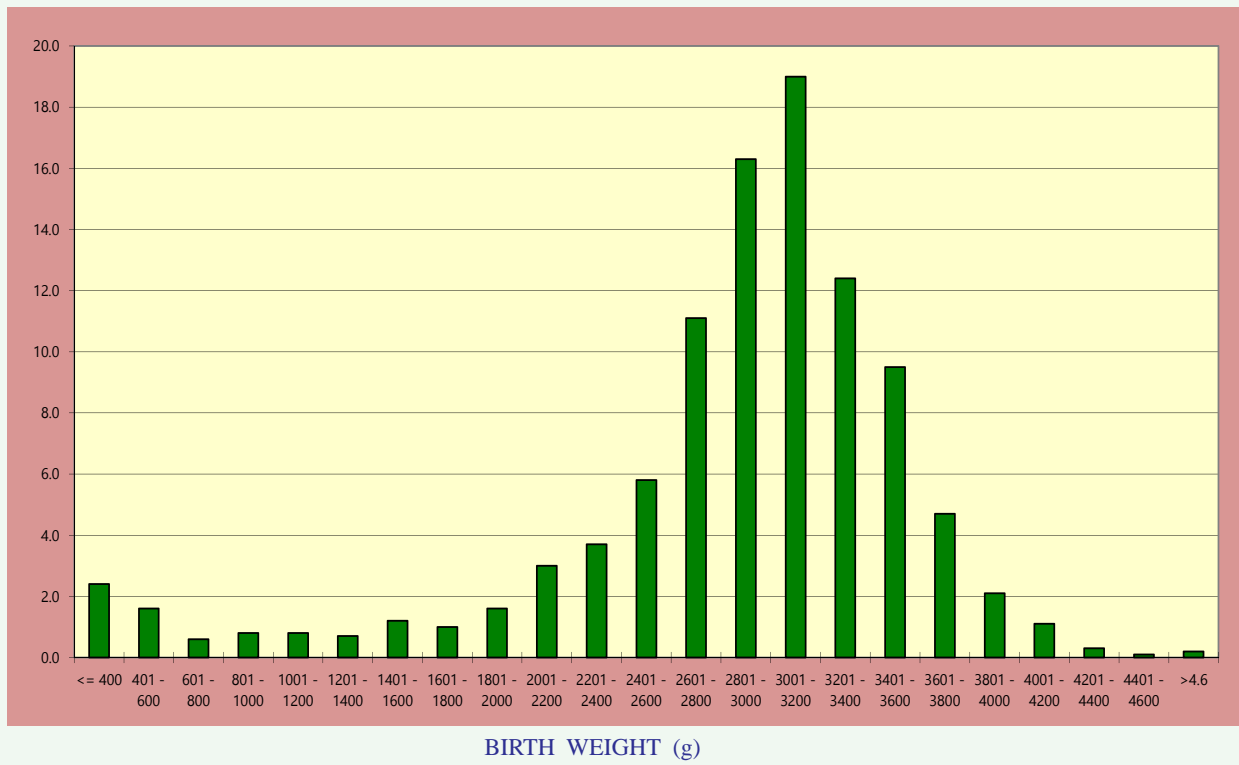
TABLE 28 Number and percentage of neonates by birth weight*

Birth Weight (grams)	Number	Percent
≤ 400	37	2.4
401-600	24	1.6
601-800	9	0.6
801-1000	13	0.8
1001-1200	12	0.8
1201-1400	11	0.7
1401-1600	19	1.2
1601-1800	16	1.0
1801-2000	25	1.6
2001-2200	46	3.0
2201-2400	57	3.7
2401-2600	89	5.8
2601-2800	171	11.1
2801-3000	251	16.3
3001-3200	292	19.0
3201-3400	191	12.4
3401-3600	146	9.5
3601-3800	72	4.7
3801-4000	33	2.1
4001-4200	17	1.1
4201-4400	5	0.3
4401-4600	1	0.1
4601-4800	3	0.2
Total	1540	100.0

* Including therapeutic termination of pregnancy

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

PERCENT



** 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)	32	2.1
Very low birth weight (1000-1499)	31	2.1
Low birth weight (1500-2499)	204	13.7
Average birth weight (2500-3999)	1194	80.2
Macrosomia (> 4000)	28	1.9
Total	1489	100.0

** Including therapeutic termination of pregnancy and weight > 200 gm*

Average Birth Weight of Total Infants 2861 ± 786 grams
range 240-4970 grams

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

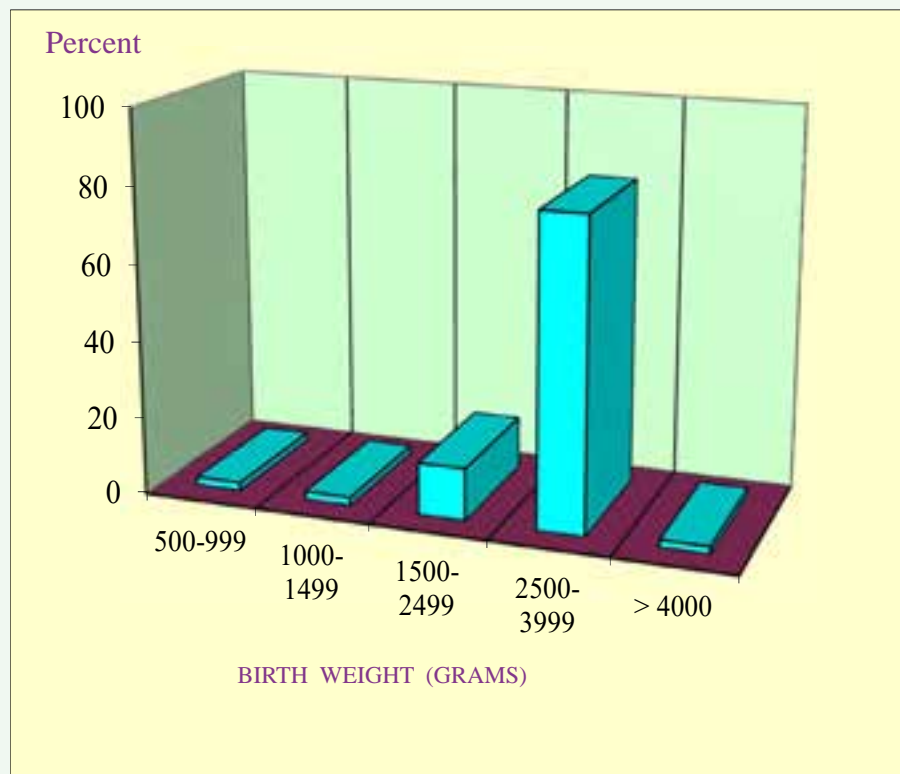


TABLE 30 Fetal weight (grams): the 10th, 50th, 90th percentile at various gestational age (singleton)

Gestational Age (weeks)	Weight (grams) 10th Percentile	Weight (grams) 50th Percentile	Weight (grams) 90th Percentile
20	300.00	300.00	.
21	360.00	420.00	.
22	340.00	455.00	.
23	310.00	460.00	.
24	360.00	570.00	.
25	720.00	795.00	.
26	450.00	815.00	.
27	550.00	790.00	.
28	740.00	940.00	.
29	570.00	1005.00	.
30	850.00	1330.00	.
31	1390.00	1555.00	.
32	1329.70	1820.00	2987.00
33	1388.50	2105.00	2522.50
34	1609.00	2220.00	2571.00
35	1840.00	2440.00	2990.00
36	2080.00	2595.00	3147.50
37	2450.00	2905.00	3410.00
38	2632.50	3060.00	3587.50
39	2782.60	3140.00	3604.00
40	2822.00	3270.00	3790.00
41	2899.00	3440.00	3999.00

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

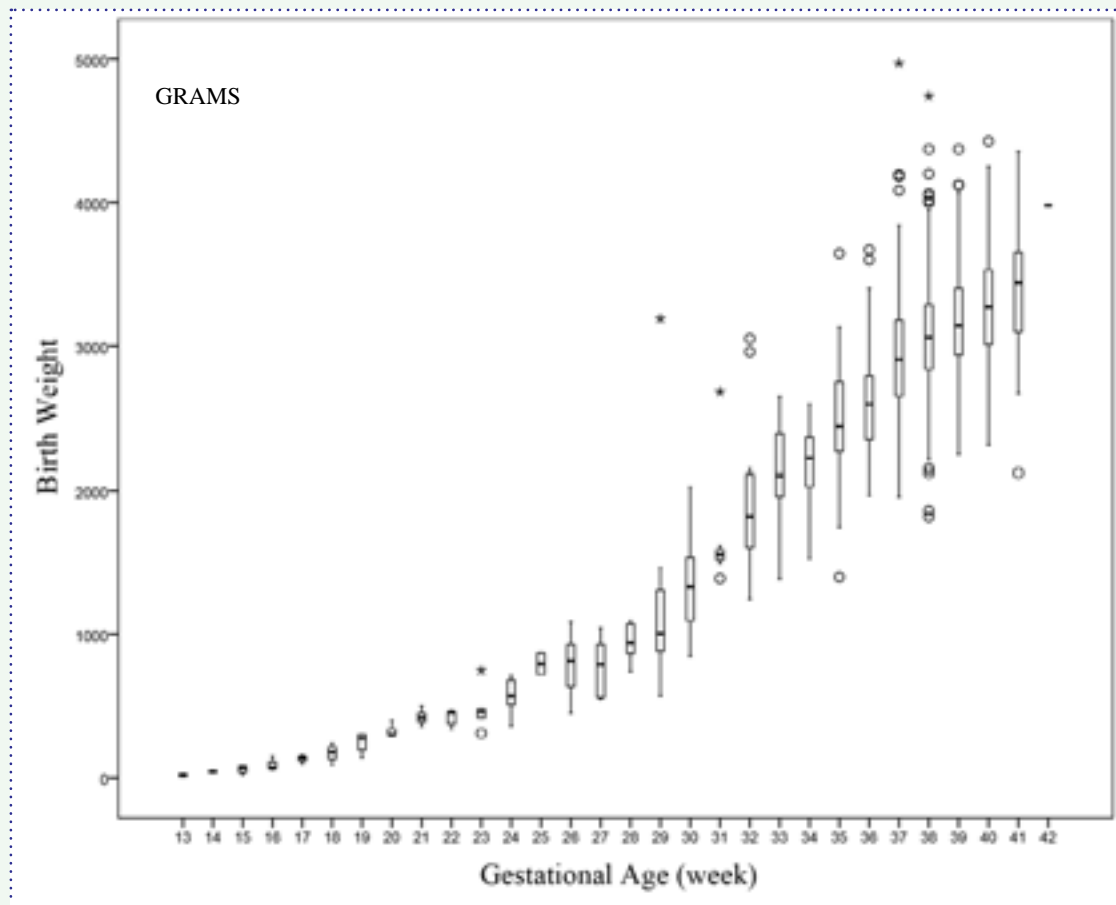


TABLE 31 Means and standard deviation of birth weight
at various gestational age (singleton)

Gestational Age (weeks)	Number of Neonates	Means (grams)	Standard Deviation
20	6	323.33	40.825
21	5	424.00	54.129
22	8	425.00	54.248
23	6	480.00	145.877
24	5	565.80	140.564
25	2	795.00	106.066
26	7	782.86	226.124
27	5	775.00	220.227
28	7	950.71	138.427
29	8	1268.75	818.731
30	8	1350.00	365.738
31	7	1690.71	441.847
32	16	1911.62	495.540
33	16	2082.19	371.986
34	15	2172.00	301.732
35	43	2481.16	420.610
36	64	2604.22	376.139
37	174	2931.78	423.946
38	384	3072.16	382.181
39	395	3171.10	344.934
40	205	3406.02	1898.139
41	41	3407.56	441.230
42	1	3980.00	.
Total	1450	2910.67	1034.770

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
19	2	140.00	42.426
21	2	445.00	7.071
22	2	530.00	0.000
23	2	555.00	21.213
29	4	1116.25	224.773
30	4	1273.75	318.155
31	2	1327.50	137.886
32	6	1600.00	125.340
33	4	1951.25	259.242
34	8	1986.25	191.456
35	12	2118.33	428.991
36	16	2271.00	295.322
37	4	2560.00	302.186
38	12	2535.83	276.979
Total	80	1890.95	692.800

TABLE 33 Comparison of birth weight (singleton & twins)

Type	Means Birth Weight	Standard Deviation	Range
Singleton	2,890	754	120-4,970
Twins	1,890	693	110-2,965

TABLE 34 Comparison of gestational age (singleton & twins)

Type	Means Gestational Age	Standard Deviation	Range
Singleton	37.23	4.2	13-42
Twins	33.30	4.8	19-38

TABLE 35 Early postpartum morbidity

Cause	Number	Percent
Uterine Atony	16	1.07
Lacerations	3	0.20
Retained Pieces of Placenta	6	0.40
Placenta Adherens	4	0.27
Wound / Uterine infection	11	0.74
Total	40	2.68

Section III

HIGH RISK PREGNANCIES

TABLE 36 Major complications during pregnancy

Complications	Numbers	Prevalence (%)
Diabetes Mellitus	380	25.42
Previous cesarian section	194	12.98
Intrauterine growth restriction	97	6.49
Pregnancy-induced hypertension	93	6.22
Breech presentation	88	5.89
Chronic hypertension	60	4.01
Prolonged PROM	55	3.68
HBsAg positive	53	3.55
Myoma uteri	48	3.21
Iron deficiency	45	3.01
Asthma	20	1.34
Placenta previa	20	1.34
Systemic Lupus Erythematosus	15	1.00
Thyrotoxicosis	14	0.94
HIV infection	13	0.87
Upper urinary tract infection	13	0.87
Oligohydramnios	11	0.74
Thalassemia	10	0.67
Incompetent cervix	8	0.54
Chorioamnionitis	7	0.47
Heart disease	7	0.47
Polyhydramnios	7	0.47
Transverse lie	5	0.33
Condyloma accuminata	4	0.27
VDRL positive	4	0.27

Pregnancy with Heart Disease

Total 7 cases (0.47 percent of total parturients)

Singleton: 6 ; Twin: 1

Age range 17-40 years

average 26.0 ± 8.3 years

age of 35 years or more 2 cases (28.6 %)

Functional Class (At delivery 7 cases)

Class I 4 cases

Class II 2 cases

Class III 1 cases

Class IV - case

Gestational Age at Birth

range 15-40 weeks (not included therapeutic abortion)

average 34.0 ± 8.9 weeks

premature delivery (before completed 37 weeks)

3 cases (42.9 %)

Birth Weight

range 80-3720 grams

average 2106 ± 1145 grams

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

5 cases (71.4 %)

Apgar Scores at 1 minute (less than 7) 2 case (28.6%)

Apgar Scores at 5 minutes (less than 7) 1 case (14.3%)

Small-for-gestational-age (less than 10th percentile) 3 case (42.9%)

Perinatal death 0 (0.0%)

Congenital Anomalies -**Other complications (No maternal death)**

<i>Breech presentation</i>	<i>1</i>
<i>Prolonged PROM</i>	<i>1</i>
<i>Diabetes mellitus</i>	<i>1</i>
<i>Asthma</i>	<i>1</i>

Pregnancy with Diabetes Mellitus

Total 380 cases (25.42 percent of total parturients)

(Singleton: 367, Twins: 12, Triplet: 1)

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

Age range 19-44 years

average 32.1±5.0 years

age of 35 years or more 127 cases (33.4%)

Gestational Age at Birth

range 13-41 weeks

average 37.8±2.6 weeks

premature delivery (before completed 37 weeks)

50 cases (13.2%)

Birth Weight

range 30-4740 grams

average 3007±585 grams

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

54 cases (14.2 %)

Apgar Scores at 1 minute (less than 7) 27 cases (7.1 %)

Apgar Scores at 5 minutes (less than 7) 9 cases (2.4 %)

Small-for-gestational-age (less than 10th percentile) 20 cases (5.3 %)

Perinatal Death 3 cases (0.8%) (anomaly 1)

Congenital Anomalies 2 cases (0.6 %) (duodenal atresia, exencephaly)

Other complications

<i>Previous cesarean section</i>	57	15.00	%
<i>Chronic hypertension</i>	33	8.68	%
<i>Breech presentation</i>	25	6.58	%
<i>Preeclampsia</i>	25	6.58	%
<i>HBsAg positive</i>	19	5.00	%
<i>Myoma uteri</i>	17	4.47	%
<i>Iron deficiency</i>	16	4.21	%
<i>Prolonged PROM</i>	15	3.95	%
<i>Marked Obesity</i>	13	3.42	%
<i>Asthma</i>	4	1.05	%
<i>Thyrotoxicosis</i>	4	1.05	%
<i>Urinary tract infection</i>	4	1.05	%
<i>Chorioamnionitis</i>	3	0.79	%
<i>Placenta previa / APH</i>	3	0.79	%
<i>Incompetent cervix</i>	2	0.53	%
<i>Polyhydramnios</i>	2	0.53	%
<i>SLE</i>	2	0.53	%
<i>Condyloma</i>	1	0.26	%
<i>Epilepsy</i>	1	0.26	%
<i>Heart disease</i>	1	0.26	%
<i>Herpes genitalis</i>	1	0.26	%
<i>Ovarian tumor</i>	1	0.26	%
<i>Placenta accreta</i>	1	0.26	%
<i>Short stature</i>	1	0.26	%
<i>Transverse lie</i>	1	0.26	%
<i>VDRL +ve</i>	1	0.26	%

Classifications

Pregestational DM (diagnosed before pregnancy) 57 cases (15.0 %)

Poorly controlled before pregnancy 18 cases

Overt DM with renal involvement 5 cases

Gestational DM (diagnosed during pregnancy)	323 cases (85.0 %)
<i>GDM (Class A1)</i>	273 cases
<i>Overt DM (Class A2)</i>	50 cases
Method of Glucose Control	
Insulin	69 cases
Diet Control only	311 cases

Pregnancy with Systemic Lupus Erythomatosus

Total 15 cases (1.00 percent of total parturients)
(Singleton : 15)

Activity of the disease

Remission before pregnancies	10 cases
Active disease during pregnancies	5 cases
Hypertension	5 cases
Lupus nephritis	6 cases

Age range 22-37 years
average 29.9±4.3 years
age of 35 years or more 3 cases (20.0 %)

Gestational Age at Birth

range 17-39 weeks
average 32.8±7.1 weeks
premature delivery (before completed 37 weeks)
8 cases (53.3 %)

Birth Weight

range 100-3670 grams
average 2016±1195 grams
number of low birth weight fetus (less than 2,500 grams)
8 cases (53.3 %)

Apgar Scores at 1 minute (less than 7)	5 cases (33.3 %)
Apgar Scores at 5 minutes (less than 7)	3 cases (20.0 %)
Small-for-gestational-age (less than 10th percentile)	3 cases (20.0 %)
Perinatal death	3 cases (20.0 %)
Congenital Anomalies	3 cases (heart block, multiple anomaly, duodenal atresia)
Other complications	
<i>Breech presentation</i>	3
<i>Chronic hypertension</i>	2
<i>Diabetes mellitus</i>	2
<i>Chorioamnionitis</i>	1
<i>Oligohydramnios</i>	1
<i>pre-eclampsia</i>	1
<i>Previous cesarean section</i>	1
<i>Prolonged PROM</i>	1
<i>Urinary tract infection</i>	1

Pregnancy with Thyrotoxicosis

Total 14 cases (0.94 percent of total parturients)

All were singleton

Diagnosed before pregnancy 9 cases

Diagnosed during pregnancy 5 cases

Age range 19-37 years

average 29.29 ± 6.0 years

age of 35 years or more 4 cases (28.6 %)

Gestational Age at Birth

range 21-40 weeks

average 36.6 ± 4.7 weeks

premature delivery (before completed 37 weeks)

5 cases (35.7 %)

Birth Weight

range 450-3420 grams

average 2853 ± 753 grams

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

2 cases (14.3 %)

Apgar Scores at 1 minute (less than 7) 1 case (7.1 %)**Apgar Scores at 5 minutes (less than 7)** 1 case (7.1 %)**Small-for-gestational-age (less than 10th percentile)** 1 cases (7.1 %)**Perinatal death** 1 cases (7.1 %)**Congenital Anomalies** 1 case (Hb Bart's hydrops)**Other complications***Diabetes mellitus* 4 cases*Asthma* 1 case*Breech presentation* 1 case*Chronic hypertension* 1 case*Myoma uteri* 1 case**Pregnancy with Hepatitis B Antigen Positive****Total** 53 cases (3.55 percent of total parturients)

Singleton: 50 (94.3 %); twins: 3 (5.7 %)

Age range 20-44 years
 average 32.8±4.8 years
 age of 35 years or more 18 cases (34.0 %)

Gestational Age at Birth
 range 14-40 weeks
 average 36.8±4.7 weeks
 premature delivery (before completed 37 weeks)
 11 cases (20.8 %)

Birth Weight
 range 40-3960 grams
 average 2867±769 grams
 number of low birth weight fetus (less than 2,500 grams)
 11 cases (20.8 %)

Apgar Scores at 1 minute (less than 7) 4 cases (7.5 %)

Apgar Scores at 5 minutes (less than 7) 2 cases (3.8 %)

Small-for-gestational-age (less than 10th percentile) 3 cases (5.7 %)

Perinatal Death 2 cases (3.8 %) (renal agenesis 1; *hydrops fetalis* 1)

Congenital Anomalies 2 cases (multiple anomaly, beta-thalassemia/HbE)

Other complications

<i>Diabetes mellitus</i>	19 cases
<i>Previous cesarean section</i>	12 cases
<i>Breech presentation</i>	4 cases
<i>Placenta previa</i>	3 cases
<i>Preeclampsia</i>	2 cases
<i>HIV positive</i>	1 case
<i>Incompetent cervix</i>	1 case
<i>Iron deficiency</i>	1 case
<i>Myoma uteri</i>	1 case
<i>Prolonged PROM</i>	1 case

Pregnancy with Asthma

Total 20 cases (1.34 percent of total parturients)
(Singleton : 20)

Activity of Disease

Well-controlled	17 cases
Poorly-controlled	3 cases

Age range 21-39 years
average 27.7 ± 5.5 years
age of 35 years or more 5 cases (25.0 %)

Gestational Age at Birth

range 35-40 weeks
average 38.4 ± 1.6 weeks
premature delivery (before completed 37 weeks)
4 cases (20.0 %)

Birth Weight (not included abortion)

range 1980-3830 grams
average 3026 ± 440 grams
number of low birth weight fetus (less than 2,500 grams)
1 cases (5.0 %)

Apgar Scores at 1 minute (less than 7) 2 cases (10.0 %)

Apgar Scores at 5 minutes (less than 7) 0 case (00.0 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (10.0 %)

Perinatal death 0 (0.0 %)

Congenital Anomalies - case**Other complications**

<i>Diabetes mellitus</i>	4
<i>Myoma uteri</i>	2
<i>Prolonged PROM</i>	2
<i>Breech presentation</i>	1
<i>Heart disease</i>	1
<i>Marked Obesity</i>	1
<i>Preeclampsia</i>	1
<i>Previous cesarean section</i>	1
<i>Thyrotoxicosis</i>	1

Pregnancy with Chronic Hypertension

Total 60 cases (4.01 percent of total parturients)
(Singleton : 60)

Severity of Hypertension

Severe (start treatment during pregnancy)	13	cases
Severe (controlled prior to pregnancy)	17	cases
Mild (no medication BP less than 160/90)	12	cases
Mild (BP less than 160/90 but treated with antihypertensive drug)	18	cases

Age range 20-42 years

average 33.5 ± 5.7 years

age of 35 years or more 33 cases (55.0 %)

Gestational Age at Birth

range 14-40 weeks

average 36.1±5.0 weeks
 premature delivery (before completed 37 weeks)
 14 cases (23.3 %)

Birth Weight

range 40-4970 grams
 average 2743±1033 grams
 number of low birth weight fetus (less than 2,500 grams)
 21 cases (35.0 %)

Apgar Scores at 1 minute (less than 7) 11 cases (18.3 %)

Apgar Scores at 5 minutes (less than 7) 8 cases (13.3 %)

Small-for-gestational-age (less than 10th percentile) 8 cases (13.3 %)

Perinatal death 2 cases (3.3 %)

Congenital Anomalies 2 cases (cleft lip/palate, beta-thalassemia / HbE)

Other complications

<i>Diabetes mellitus</i>	33 cases
<i>Preeclampsia</i>	15 cases
<i>Marked Obesity</i>	8 cases
<i>Previous cesarean section</i>	7 cases
<i>Breech presentation</i>	6 cases
<i>Iron deficiency</i>	4 cases
<i>Premature contraction</i>	3 cases
<i>HBsAg positive</i>	2 cases
<i>Myoma uteri</i>	2 cases
<i>Prolonged PROM</i>	2 cases
<i>SLE</i>	2 cases
<i>Placenta accreta</i>	1 case
<i>Short stature</i>	1 case
<i>Thyrotoxicosis</i>	1 case
<i>Urinary tract infection</i>	1 case

Pregnancy-induced Hypertension

Total 93 (6.22 percent of total parturients)

Singleton: 84; Twins: 7; Triplet: 2

Age range 19-45 years

average 31.4 ± 6.0 years

age of 35 years or more 32 cases (34.4 %)

Gestational Age at Birth

range 24-41 weeks

average 36.0 ± 3.8 weeks

premature delivery (before completed 37 weeks)

32 cases (34.4 %)

Classification of PIH

Gestational hypertension 15 cases (16.1 %)

(without proteinuria)

Mild Preeclampsia 43 cases (46.2 %)

Severe Preeclampsia 20 cases (21.5 %)

Pregnancy-aggravated hypertension 15 cases (16.1 %)

Eclampsia - cases (0.0 %)

First eclamptic attack before admission 0 case

First eclamptic attack after admission 0 case

No ANC at Maharaj Nakorn Chiang Mai 0 case

ANC at Maharaj Nakorn Chiang Mai 0 case

Birth Weight range 360-4970 grams

average 2497 ± 922 grams

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

39 cases (41.9 %)

Apgar Scores at 1 minute (less than 7)	16 cases (17.2 %)
Apgar Scores at 5 minutes (less than 7)	8 cases (8.6 %)
Small-for-gestational-age (less than 10th percentile)	13 cases (16.9 %)
Perinatal death	3 cases (3.3 %; immaturity)
Congenital Anomalies	- case

Other complications

<i>Diabetes mellitus</i>	25 cases
<i>Chronic hypertension</i>	15 cases
<i>Previous cesarean section</i>	10 cases
<i>Breech presentation</i>	6 cases
<i>Prolonged PROM</i>	4 cases
<i>Iron deficiency</i>	3 cases
<i>Urinary tract infection</i>	3 cases
<i>HBsAg positive</i>	2 cases
<i>Marked Obesity</i>	2 cases
<i>Oligohydramnios</i>	2 cases
<i>Antepartum hemorrhage</i>	1 case
<i>Asthma</i>	1 case
<i>Myoma uteri</i>	1 case
<i>SLE</i>	1 case
<i>Thalassemia</i>	1 case

Pregnancy with Thalassemia

Total 10 cases (0.67 percent of total parturients)

Singleton: 10; Twins: -

Type of thalassemia

beta-thalassemia / HbE disease 3 cases

alpha-thalassemia (Hb H/variant disease) 7 cases

Age range 18-39 years

average 26.2±5.8 years

age of 35 years or more 1 cases (10.0 %)

Gestational Age at Birth

range 26-41 weeks

average 37.7±4.2 weeks

premature delivery (before completed 37 weeks)

1 cases (10.0 %)

Birth Weight

range 620-3450 grams

average 2797±821 grams

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

1 cases (10.0 %)

Apgar Scores at 1 minute (less than 7) 1 case (10.0 %)

Apgar Scores at 5 minutes (less than 7) 1 case (10.0 %)

Small-for-gestational-age (less than 10th percentile) 2 cases (20.0 %)

Perinatal death 1 case (10.0 %)

Congenital Anomalies - case**Other complications**

<i>VDRL +ve</i>	<i>2 cases</i>
<i>Breech presentation</i>	<i>1 case</i>
<i>Gestational hypertension</i>	<i>1 case</i>
<i>Previous cesarean section</i>	<i>1 case</i>

Placenta Previa

Total 20 cases (1.34 percent of total parturients)

Singleton : 20; Twins : -

Age range 19-42 years

average 31.5 ± 6.2 years

age of 35 years or more 7 cases (35.0 %)

Gestational Age at Birth

range 21-40 weeks

average 33.7 ± 5.1 weeks

premature delivery (before completed 37 weeks)

13 cases (65.0 %)

Birth Weight

range 360-3200 grams

average 2218 ± 898 grams

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

11 cases (55.5 %)

Apgar Scores at 1 minute (less than 7)	6 cases (30.0 %)
Apgar Scores at 5 minutes (less than 7)	2 cases (10.0 %)
Small-for-gestational-age (less than 10th percentile)	2 cases (10.0 %)
Perinatal death	2 cases (10.0 %)
Congenital Anomalies	2 cases (beta-thalassemia major, Trisomy 21)
Other complications	
<i>Previous cesarean section</i>	4 cases
<i>HBsAg positive</i>	3 cases
<i>Diabetes mellitus</i>	2 cases
<i>Myoma uteri</i>	2 cases
<i>Placenta accreta</i>	1 case
<i>Polyhydramnios</i>	1 case
<i>Transverse lie</i>	1 case

Pregnancy with Acute Pyelonephritis

Total 13 cases (0.87 percent of total parturients)
(All were singleton; 13)

Age range 22-41 years
average 29.5±5.3 years
age of more than 35 years 1 cases (7.7 %)

Gestational Age at Birth

range 24-40 weeks

average 34.5±5.5 weeks

premature delivery (before completed 37 weeks)

5 cases (38.5 %)

Onset

First trimester	2	case
Second trimester	5	cases
Third trimester	4	cases
Postpartum	2	cases

Number of Episodes

1	10	cases
2	2	cases
3	1	case

Birth Weight

range 709-3600 grams

average 2376±963 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)** 1 case (7.7 %)**Small-for-gestational-age (less than 10th percentile)** 1 cases (7.7%)**Perinatal death** 1 case (7.7 %)**Congenital Anomalies** 1 case (sacrococegeous teratoma)

Other complications

<i>Diabetes mellitus</i>	<i>4 cases</i>
<i>Preeclampsia</i>	<i>3 cases</i>
<i>Breech presentation</i>	<i>1 case</i>
<i>Chronic hypertension</i>	<i>1 case</i>
<i>Incompetent cervix</i>	<i>1 case</i>
<i>Myoma uteri</i>	<i>1 case</i>
<i>Polyhydramnios</i>	<i>1 case</i>
<i>Prolonged PROM</i>	<i>1 case</i>
<i>Short stature</i>	<i>1 case</i>
<i>SLE</i>	<i>1 case</i>

Small-for-Gestational-Age Fetuses

Birthweight less than 10th percentile

Total 97 (6.49 percent)

Singleton: 80 cases, Twins: 14 cases; Triplet: 3 cases

Age range 18-44 years

average 30.5±6.6 years

age of 35 years or more 31 cases (32.0 %)

Gestational Age at Birth

range 22-41 weeks

average 35.3±4.8 weeks

premature delivery (before completed 37 weeks)

47 cases (48.5 %)

Birth Weight

range 310-2670 grams

average 1871±672 grams

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

86 cases (88.7 %)

Apgar Scores at 1 minute (less than 7) 27 cases (27.8 %)

Apgar Scores at 5 minutes (less than 7) 15 cases (15.5 %)

Perinatal Death 10 cases (10.3 %)

Congenital Anomalies 3 cases (3.1 %)

<i>Gastroschisis</i>	2 cases
<i>Omphalocele</i>	1 case
<i>Multiple anomalies</i>	1 case
<i>Trisomy 18</i>	1 case

Other complications

<i>Poor maternal weight gain</i>	24 cases
<i>Medical diseases</i>	12 cases
<i>Pregnancy-induced hypertension</i>	13 cases
<i>Fetal anomalies</i>	5 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, having delivery at Maharaj Nakorn Chiang Mai (2007-2019)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
No. of Deliveries	2222	2089	1900	2059	1847	1686	1572	1431	1545	1518	1522
No. of women with positive HIV	24	41	36	42	46	37	43	16	20	18	9
Deliveries	27	37	35	38	36	30	33	24*	14	12	13
Therapeutic abortion	1	4	-	-	-	-	2	1	1	-	-
Spontaneous abortion	1	-	1	2	1	2	1	-	-	1	1
Illegal abortion	-	-	-	-	-	-	-	-	-	-	-

* Many cases giving birth at Maharaj Nakorn Chiang Mai hospital, but attending antenatal care at other hospitals

FIGURE 19 Pregnant women with positive HIV antibody at Maharaj Nakorn Chiang Mai (1989-2019) (no screening program during 1989 -1996)

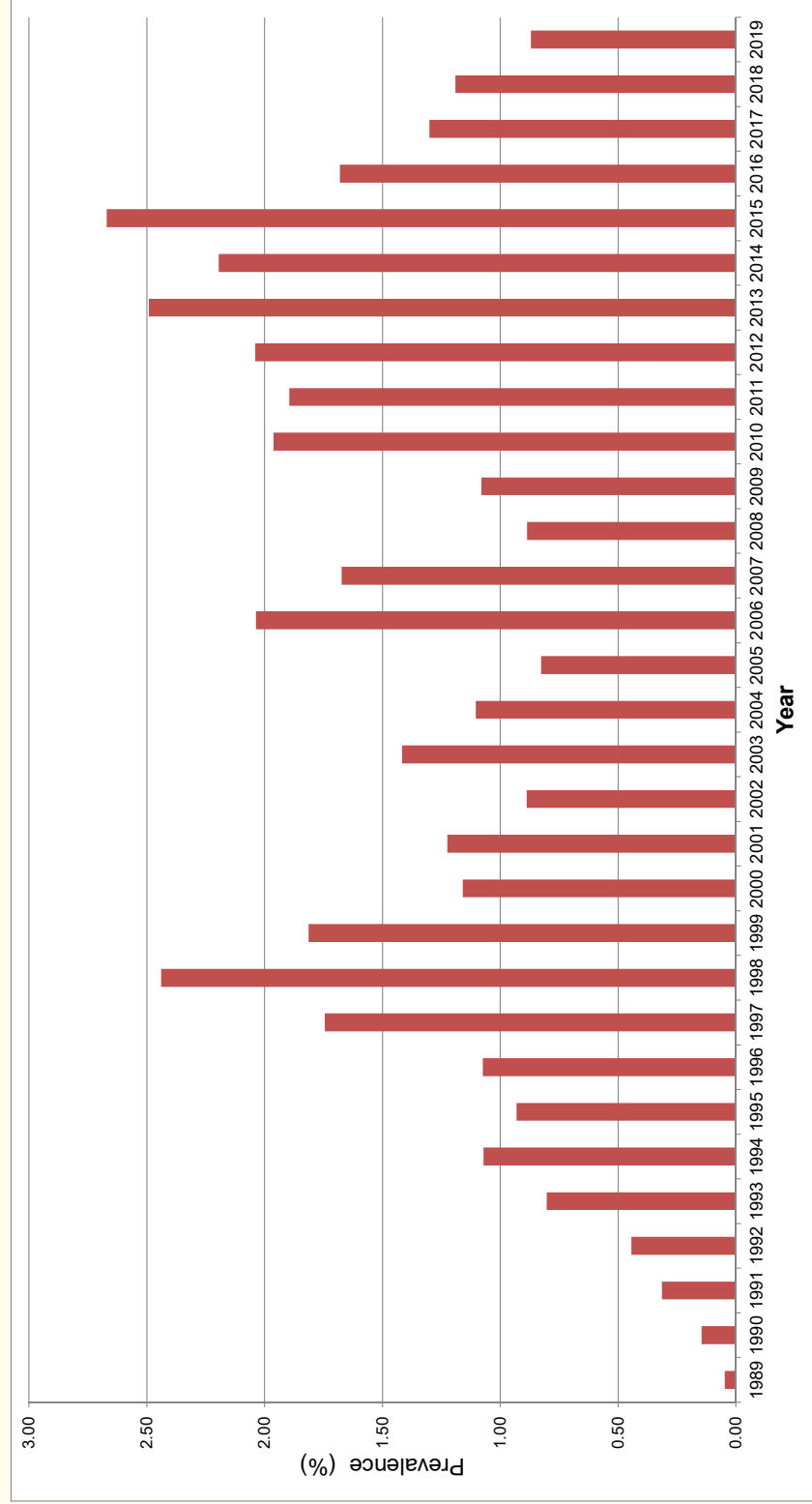


TABLE 38 Voluntary screening (2019) among pregnant women for anti-HIV antibody

Pregnant women (Counselling)	1568	cases
Voluntary screening	1568	cases
+ve anti-HIV antibody	9	cases
% positive case	0.57	%

TABLE 39 Age of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

Age (years)	No. of cases	Percent
15-19	-	-
20-24	2	15.4
25-29	4	30.8
30-34	5	38.4
35-39	1	7.7
40-44	1	7.7
45-49	-	-
Total	13	100

Mean age (years) 30.31

Standard deviation 5.603

Range 23-40 years

TABLE 42 Number of marriages of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

Number	No. of cases	Percent
1	3	23.1
2	7	53.8
3	2	15.4
4	-	-
Unknown	1	7.7
Total	13	100

TABLE 43 Occupations of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

Occupations	No. of cases	Percent
Employee	8	61.5
Housewife	3	23.1
Commercial	1	7.7
Government officer	1	7.7
Total	13	100

TABLE 44 Residence (province) of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

Province	Number	Percent
Chiang Mai (เชียงใหม่)	10	76.9
Lamphun (ลำพูน)	2	15.4
Chiang Rai (เชียงราย)	-	-
Lampang (ลำปาง)	-	-
Maehongson (แม่ฮ่องสอน)	1	15.4
Total	13	100

TABLE 45 Complications of the pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

	Cases	Percent
Without complicaiton	5	38.4
With complication	8	61.6
● Antepartum	7	
● Intrapartum	1	
● Postpartum	-	
Total	13	100

TABLE 46 Birth weight in the pregnant women with posi-tive HIV at Maharaj Nakorn Chiang Mai (2019)

Birth weight (grams)	Number	Percent
1,000 - 1,499	1	7.7
2,000 - 2,499	-	-
2,500 - 2,999	3	23.1
3,000 - 3,499	7	53.8
3,500 - 3,999	2	15.4
Total	13	100

Mean birthweight (grams) **3,018**
Standard deviation (grams) **674**
Range (grams) **1,110-3,960**

TABLE 47 Postpartum contraception of pregnant women with positive HIV at Maharaj Nakorn Chiang Mai (2019)

Method	No. of cases	Percent
Female sterilization	8	61.5
Male sterilization	-	-
DMPA	1	7.7
Oral contraception	1	7.7
Norplant	2	15.4
Unknown	1	7.7
Total	13	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** 2772 tests

(OPD4 = 2074; LR= 512; OB = 186)

Secondary Surveillance

Contraction stress test

or **Nipple stimulation test** 4 tests

Biophysical profile/ultrasonography 130 tests

Doppler velocimetry 300 tests

Prenatal Diagnosis

1. **Ultrasonography** 8,555 examinations
(~ 20 % for gynecologic and infertile examinations)
2. **Amniocentesis** 695 cases
3. **Cordocentesis** 200 cases
4. **Chorionic villous sampling** 97 cases

OBSTETRIC ULTRASOUND SERVICE

Number of Patients undergoing sonographic examinations (OB&GYN) in 2019

8,555 cases

Several examinations involved in the researches without specific indications

Indications for sonographic examination	
■ Obstetric ultrasound	77.1 %
■ Perinatal research	16.4 %
■ Down screening research	41.1%
■ Obstetric ultrasound (others)	42.5 %
■ Gestational age estimation	
■ Obstetric hemorrhage	
■ Follow-up fetal anomalies	
■ Fetal growth surveillance	
■ etc.	
■ Gynecologic ultrasound	22.9 %
■ General gynecology	70.9 %
■ Gynecologic oncology	19.6 %
■ Reproductive medicine	9.5 %

Cordocentesis (2019)

Total 200 cases

Indications	No.	%
1. Previous child with Hb bart's	1	0.5
2. Previous child with β thal / Hb.E	4	2.0
3. Previous child with β thal major	1	0.5
4. Pregnancy at risk for Hb Bart' hydrops fetalis	20	10
5. Pregnancy at risk for β thal major	38	19
6. Pregnancy at risk for β thal / HbE	68	34
7. Chromosome analysis	20	10
8. Combined chromosome and risk for Hb bart's	3	1.5
9. Combined chromosome and risk for β thal major	11	5.5
10. Combined chromosome and risk for β thal Hb/E	27	13.5
11. Combined chromosome and previous child β thal/ Hb E	2	1.0
12. Fetal anemia , Sign hydropfetalis	2	1.0
13. Fetal multiple anomaly	3	1.5
Total	200	100

Amniocentesis (2019)

Total 695 cases

Indications for amniocentesis	
Elderly gravida (age of more than 35 years)	457
■ <i>with no other obvious risk</i>	300
■ <i>with R/O chromosome abnormality</i>	1
■ <i>with high risk for Down syndrome screening</i>	150
■ <i>with High risk Trisomy 18</i>	1
■ <i>with Multiple anomaly by sonogram</i>	4
■ <i>with Heart anomaly</i>	1
Pregnancy with high risk for Down syndrome screening	200
■ <i>Pregnancy with high risk for Trisomy 18</i>	2
■ <i>Pregnancy with fetal anomaly and sonomarkers</i>	25
■ <i>Pregnancy with Previous child Multiple anomaly</i>	1
■ <i>Pregnancy with Previous child abnormal chromosome</i>	2
■ <i>Maternal request</i>	5
■ <i>Confirm CVS results (abnormal chromosomes)</i>	2
■ <i>IUGR with abnormal Doppler</i>	1
Amniocentesis for diagnosis of thalassemia	17
■ <i>Pregnancy at risk for Hb Bart's</i>	1
■ <i>Pregnancy at risk for β thal major</i>	2
■ <i>Combined chromosome and risk for Hb bart's</i>	3
■ <i>Combined chromosome and previous Hb Bart's</i>	1
■ <i>Fetal risk of β thal / Hb-E</i>	7
■ <i>Combined chromosome and risk for β thal Hb-E</i>	3

Chorionic Villous Sampling (2019)

Total 97 procedures

Indications	Number
1. Fetal chromosome study	12
■ Elderly gravida	1
■ Thickening nuchal translucency	7
■ Previous child with trisomy 13 and elderly gravida	1
■ Previous child CAH and ambiguous genitalia	1
■ Elderly gravida and thickening translucency	2
2. Risk for fetal severe thalassemia	67
■ Risk for Hb Bart' s hydrops fetalis	9
■ Risk for Homozygous beta thalassemia	17
■ Risk for Beta thalassemia/Hb E disease	40
■ Previous child with severe Hb H	1
3. Fetal chromosome study and thalassemia diagnosis	18
■ Elderly gravida with fetal risk for Hb Bart's disease	5
■ Elderly gravida with fetal risk for homozygous beta thalassemia	2
■ Elderly gravida with fetal risk for beta thalassemia/Hb E	11

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 MCV or 2 min OF is negative)
 - Diagnostic test (if both of the couple are positive screening test)
 - HbA₂ level & PCR for α -thal1 if MCV (2 min OF) is positive
 - HbA₂ level (negative MCV (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 2019

	Number
Total number of pregnant screened	1,202
Positive MCV or Hb E	182
Number of couple at risk for thalassemia	22
■ Risk for Hb Bart's	8
■ Risk for Beta-thalassemia major	5
■ Risk for Beta thalassemia/Hb E	9
The choice which selected by couples	
■ Cordocentesis	11
■ Chorionic villus samplings	4
■ Amniocentesis	1
■ Ultrasonography	3
■ Waiting for PND	2
■ No PND [risk for minor thalassemia]	1
■ Late ANC	1
■ Early fetal death	1
Result of PND	
■ Hb bart's	3
■ Beta thalassemia major	2
■ Beta thalassemia/Hb E	2

Down Syndrome Screening (2019)

Total 10,938 cases (NHSO)

Trimester	Risk			Total
	Low	Intermediate	High	
Second	10,256 (93.76%)	-	682 (6.24 %)	10,938

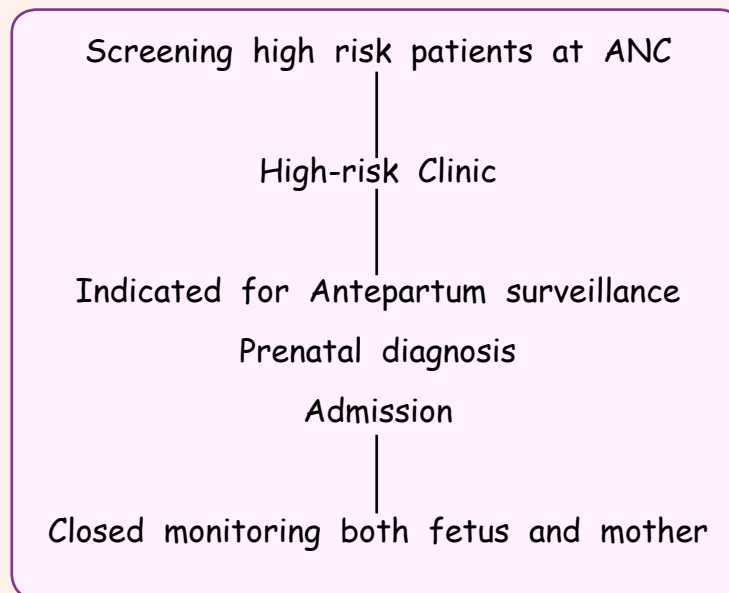
Total 588 cases (Service cases)

Trimester	Risk		Total
	Low	High	
First	420 (97.22%)	12 (2.78%)	432
Second	143 (91.67%)	13 (8.33%)	156
Summary	563	25	588

High Risk Pregnancy

Number of patients approximately 400 cases

Management Guideline



High-risk patients at Maharaj Nakorn Chiang Mai Hospital in 2019

- | | |
|---|--------|
| 1. Elderly Gravida (age of 35 years or more) | 25.3 % |
| 2. Teenage Pregnancy (age of less than 20 years) | 2.3 % |
| <i>Early adolescence (age of less than 17 years)</i> | 0.8 % |
| <i>Late adolescence (age of 17-19 years)</i> | 1.8 % |
| 3. Pregnancy complicated with medical or obstetrical diseases | 11.4 % |

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.