OCCIPITO POSTERIOR POSITION;
PREDICTIVE INDICES ON THE OUTCOME OF LABOUR

A thesis submitted to the

University of Lagos

for the degree of

Doctor of Medicine

NIMI DIMKPA BRIGGS

MB, BS (Lagos), MRCOG, FMCOG (Nig)

OCTOBER, 1979

CONTENTS

		Page
Glossary		4
Acknowledgements		5
The Problem		7
CHAPTERS		
1.	Historical Surveys	11
	Importance	12
	Aetiology	14
	Diagnosis	15
	Treatment	18
2.	Maternal care at Ahmadu Bello University Hospital Zaria ..	22
3.	The Study	28
4.	The Results	34
	Preliminary analysis of data	35
	Comparison with caucasians	69
	Comparison with controls	73
5.	Closer examination of labour outcome in study patients ..	83
6.	The predictive Indices	91
	Maternal age	92
	Maternal stature	96
	Parity	103
	Rate of cervical dilation	109
	Pelvis	114
7.	Non Predictive Indices	128
8.	General Discussion	135
	Further discussion on predictive and non predictive indices	136
	Contribution to knowledge and future lines of research	152
	meeting criticisms	155

APPENDICES 158

1. Worksheet I: Personal information 159
2. Worksheet II: History and findings on admission 160
3. Worksheet III: Summary of clinical observations in labour. 162
4. Worksheet IV: Delivery 163
5. Worksheet V: Puerperium .. 165
6. Worksheet VI: Pelvic X-ray .. 166
7. Worksheet VII: The Infant .. 167
8. Data on study patients 168
9. Data on control patients 184
10. Representative partogram 200
11. Radiation harzards 201

REFERENCES 203

GLOSSARY

ABBREVIATIONS: The following were used in this thesis:

O.P.	=	OCCIPITO POSTERIOR
O.A.	=	OCCIPITO ANTERIOR
Fig.	=	FIGURE
S	=	STUDY GROUP PATIENTS
C	=	CONTROL GROUP PATIENTS
A.B.U.	=	AHMADU BELLO UNIVERSITY
V.V.F.	=	VESICO-VAGINAL FISTULA
R.V.F.	=	RECTO-VAGINAL FISTULA

DEFINITION - OBSTRUCTED LABOUR

As used in this thesis, labour is said to be obstructed when, on account of mechanical difficulties, further progress becomes impossible without assistance.

REFERENCES: are numbered consecutively in the order in which they are first mentioned in the text in accordance with the Vancouver document [1] recently approved by the International Sterring Committee of Medical Editors.[2]

ACKNOWLEDGEMENTS

I am sincerely indebted to Professor Kelsey Harrison of the Department of Obstetrics and Gynaecology and Dr. Babayo Musa, Director of the Institute of Health both of Ahmadu Bello University. The former for giving the necessary guidance and supervision and the latter for moral and financial support.

A. B. U. approved a three month Study Leave for me to conclude part of this work in London. For this, I am grateful.

I express profound gratitude to the Institute of Obstetrics and Gynaecology, University of London, Chelsea Hospital for Women/Queen Charlotte Maternity Hospital not only for granting me a three month clinical attachment to the Unit, but also for putting their facilities so generously at my disposal. In this regard, special thanks are due to Professor Sir Jack Dewhurst, Dr. James Smitham and Mr. Geoffree Chamberlain for the very personal attention paid to me during my stay in London.

In addition, I will like to record my appreciation for the valuable assistance and critical comments I received from Mr. John Lawson of Newcastle General Hospital, Dr. Frank Hytten of the Clinical Research Centre, Northwick Park Hospital, and Dr. Brian Newman of the Computer Services Centre, Middlesex Hospital Medical School during my work on this thesis.

This work would not have been possible, but for the co-operation I received at all times from the other Consultant Staff of the A. B. U. Hospital, the Nurses in the Labour Ward and the Radiographers of the Radiology Department.

I pay tribute to the Secretarial Staff of the Department of Obstetrics and Gynaecology, A. B. U. Hospital, Zaria, particularly Mrs. Rhoda Tor-Agbidye and Mr. James Attah, too extremely efficient persons, for their ability to convert my often illegible handwriting into meaningful scripts.

Finally, I thank members of my family for their co-operation, understanding and forebearance during the difficult days of the preparation of this manuscript.

THE PROBLEM

Medical literature is very rich in number of publications and monographs on the O.P. position. But a lot of these are of retrospective nature from information collected in hospitals over a period of time. Very few have been prospective research designed to provide answers to specific pre-determined Obstetric problems. This is hardly surprising when one realises that in those parts of the world, notably Europe and America, from which the vast majority of these publications emanate, the problem of O.P. position in labour no longer appears to be a major one. In accord with this, a lot of patients discovered to have an O.P. position have an easy vaginal delivery in the Caucasians. Management, therefore, is essentially conservative.

This does not appear to be borne out in our clinical practice on Nigerian patients in Zaria. For example, one often finds O.P. positions associated with advanced obstructed labour demanding immediate Caesarean Section, or with difficult vaginal deliveries ending in stillbirths.

In instances where rotational instrumental deliveries had been achieved, this had been with great difficulties, even in the hands of experienced Obstetricians.

There is, therefore, a need for a prospective study on Nigerian patients to confirm the above clinical impressions and the reasons behind them.

Also, just as active treatment once the diagnosis is made would entail a high incidence of operative interference with its attendant increase in morbidity and mortality, purely expectant management in anticipation of easy vaginal delivery may not serve the interest of a large proportion of patients. In view of these considerations, it becomes highly desirable for purposes of rational treatment to find means of differentiating early in labour the cases in which difficulty should be envisaged from those in which the outlook for easy vaginal delivery is good, particularly for the Obstetrician in the tropics, where mechanical difficulty in labour is still widely rampant.

As a result of this work, therefore, we now know that the outcome of labour in O.P. positions in Nigerian patients is less favourable as compared to the Caucasians, and that several factors are responsible for this. Finally, from the knowledge gained through this research, predictive indices on the outcome of labour in O.P. positions have been worked out.

CHAPTER ONE

HISTORICAL SURVEYS

A. IMPORTANCE:

Of the many controversies surrounding the subject of O.P. position in labour none appears to have such sharply divided opinions as what importance should be attached to it.

Up to the 30s, grave consequences appeared to be associated with the O.P. positions. Beard[3] writing on these consequences states that many women may never be the same again after a primiparous O.P. labour. Mention is made of lax bladder sphincter, cystocele, urinary incontinence and haemorrhoids. Rectocele and other degrees of pelvic floor damage up to complete tear of the anal sphincter, sagging of the middle and upper supports, and uterine appendage involvement he mentions are frequent legacy of O.P. labours. Subinvolution and gross infection are also cited as resulting from prolonged labour associated with this condition. Impressed by the frequency and severity of these complications, earlier writers[4-6] have tended to consider the posteriorly placed occiput as posing a major obstetric problem causing considerable maternal and perinatal morbidity and mortality.

On the other hand, around the 50s, most authors held the directly contrary view; stating that labour in O.P. positions was no different from O.A. positions and no special significance should be attached to it[7-9]. Munro Kerr[10] draws attention to this conflicting teaching on the importance of O.P. positions.

However, the majority of writers consider the above two views extreme and take an intermediate attitude, confirming that although labour is usually normal in the vast majority of instances, there is such a thing as dystocia due to the posteriorly placed occiput[11-15].

It is interesting to speculate on the reasons behind the two extreme views regarding the importance of O.P. position. We now know[16] that pelvic size and shape are related to stature (height) and social grouping which are themselves related to the standard of nutrition. Before the 30s poor socio-economic circumstances might have affected nutrition, maternal height, and pelvic size resulting in an increased frequency of dystocia. And so the medical literature at that time reported the existing situation. After the 30s, improvements in the overall socio-economic circumstances of the parturient mothers also meant improvements in their pelvic size and statures with a concomitant fall in dystocia associated with O.P. positions. More recently, as a result of greater acquaintance with the problem, Obstetricians have now evolved the more balanced opinion which probably should be the correct attitude to the problem of O.P. position in labour, in the Caucasians.

B. AETIOLOGY

The maternal pelvis has been held most responsible for causing O.P. positions. Thoms[17] supported by Caldwell et al[18] drew attention to the frequency with which O.P. positions are associated with a pelvis in which the antero-posterior dimension of the brim equals or exceeds the transverse. In further contributions various workers have incriminated other sections of the pelvis, for example, Caldwell et al[19] - narrow interspinous diameter, Moloy[20] - narrow for pelvis, Jacobs[21] - faulty inclination and King[22] - abnormal shortness and convergence of side walls, straight sacrum and prominent ischial spines. However, more recently, Holmberg et al[23] performed x-ray pelvimetry in 68 consecutive cases of O.P. position. They concluded that although in a number of instances the pelvis tended to be narrow transversely or of large dimensions, in many cases, no clear correlation to pelvic dimension was found.

Fetal and maternal soft tissues have also been cited as causing O.P. positions. Taylor[24] makes mention of the shape of the cervix and rigidity of the lower uterine pole, while Donald[25] holds anteriorly placed placentae responsible in some cases.

The position of the fetal back in late pregnancy before the onset of labour has for a long time been looked upon as contributing to the aetiology of O.P. position[10].

If the back of the fetus is to the left, the chances of an O.P. position are relatively remote, on account of the dextro-rotation of the uterus and presence of bowel on the left. If, however, the back of the fetus is to the right, conditions are much more favourable for an O.P. position because of the hollow right pelvic wall.

With the advent of regional blockade in pain relief during parturition, an argument is now raging whether epidural anaesthetic increases the incidence of malpositions. Hoult et al[26] in agreement with Studd[27] suggest a causal relation between epidural analgesia and O.P. positions. They postulated that epidural analgesia decreases tone in the muscles of the pelvic floor and that the occiput is less likely to rotate anteriorly when it is pushed against a relaxed levator ani. Potter[28] and McQueen[29] hold contrary views.

However, it is probably true that in most cases of O.P. malposition, aetiological factors are usually unexplained[25].

C. DIAGNOSIS

1. Inspection:

The whole uterus appears larger than normal because of the partially extended spine. There is a general flattening of the abdomen which is more pronounced below the umbilicus and fetal limbs may be seen to move on both sides of the midline.

2. Palpation:

The fetal back is either felt to one or the other flank or not at all. The breech is felt at the fundus, but on tracing it downwards instead of feeling the back the fingers dip into a hollow, between the breech at the fundus, and the head at the brim, and in the hollow knobs of limbs are felt. Both sinciput and occiput are palpated at about the same level. Beard[3] describes as "Intermediate Posterior" cases in which fetal backs can be palpated stating that in true O.P. position it is impossible to palpate the fetal backs.

3. Auscultation:

Fetal heart is often heard higher up and in greater intensity towards the respective flank. According to Munro Kerr[10] this unusual feature is more commonly noted after labour has started, and expecially after the membranes have ruptured, and it results from deflexion of the trunk throwing the chest of the child more forwards.

4. Radiography:

A lateral view of the abdomen and pelvis taken in late pregnancy or labour, shows the fetal back to the spine of the mother and the occiput adjacent to the sacrum.

5. Vaginal examination

After the onset of labour, abdominal examination is often inconclusive in the diagnosis of O.P. position, particularly in primigravidae on account of tense anterior abdominal wall muscles.

On vaginal examination, the direction of the sagital suture and the site at which it is met by three other suture lines (anterior fontanelle) should be noted. One fetal ear should be palpated as the convexity of the helix corresponds to the occipital pole. With the patient anaesthetised, there is no great difficulty in reaching the ear, but this could be difficult if only a pudendal nerve block is utilised.

If the condition is still unrecognised and forceps delivery is attempted, usually for delay in second stage, the blades do not lock easily. Traction itself is difficult and the forceps may slip on account of incorrect cephalic application. In addition, not only does the fetal head not come down with the traction, but the anal and vulval orifices may be found to gape unusually and the perineum may begin to tear before the head has distended it.

6. <u>After Delivery</u>

If the baby born spontaneously or instrumentally face to pubes is examined, it will be seen in some cases that the caput is situated on the anterior aspect of the parietal bone behind the coronal suture, and it is developed upon the parietal bone opposed to the same side of the pelvic floor, as corresponds to the position of the occiput. In other words, a Right Occipito Posterior has its caput on the anterior part of the left parietal bone, and a Left Occipito Posterior upon the anterior part of the right parietal bone.

Occasionally the diagnosis of fetal position from vaginal examination could be difficult, especially in early labour when cervical dilatation is small and very little moulding of fetal skull bones has occurred and also in late first and second stages. This is more so if labour has been prolonged with gross moulding and caput formation and impaction of the fetal head into the maternal pelvis.

King[22] states that diagnosis of O.P. position should not be made before engagement of the fetal head since rotation can still take place. This is hardly tenable as in many cases of O.P. position where disproportion is present, engagement of the fetal head does not occur.

D. TREATMENT:

1. Postural methods

After Buist[30] in 1921 advocated correcting malpositions with pads and binders, several postural treatments in late pregnancy or early labour designed to displace the fetal back forwards from the maternal spine, thereby enhancing the probability of spontaneous anterior rotation were practiced. For example, patients with malpositions were frequently ambulated[31] in the first stage and this practice probably has something to recommend it as recent evidence[32] suggests that uterine contractions, which could enhance spontaneous rotation, are strongest in the ambulatory patient.

De Lee and Greenhill[6] recommend lying patients on the side towards which the occiput points in a modified Sims position during the later part of the first and second stages while Puddicombe[33] suggests placing patients in the knee chest position from about 4cm cervical dilation.

2. Manual methods

Amongst the most ancient is rotary version in which fetal head and entire body were turned through 180° under deep surgical anaesthesia, followed by spontaneous delivery or forceps extraction. Several workers have written in support of this[34-37]. Bill[4] in 1931 suggested internal podalic version and breech extraction under deep general anaesthesia in second stage of labour. Although manual methods of treatment are still practiced today, neither of these two methods enjoys much patronage. Most Obstetricians now adopt the method of manual rotation originally advocated by Danforth[38] in 1933 in which the fetal head with or without general anaesthesia is manually rotated with simultaneous rotation of the shoulder followed by forceps extraction.

3. Operative methods

(i) Rotational forceps: The credit for first using forceps for rotation of the head in O.P. position seems due to William Smellie himself[39]. The instrument he used were short straight forceps probably covered with leather.

Since then medicine has noticed a plethora of forceps instruments with accompanying descriptions for their uses and varying claims of success. Only a few of these instruments and procedures can be mentioned here: Scanzoni's two stage application[40], Kiellands forceps[41], the two forceps menoeuvre of Seides[42], Bartons forceps[43,44], Luikart's Special forceps[45], Murchan approach[46], Smith's recommendation of Pipers forceps[47] and the Moolgoaker forceps[48]. Of all these, only the Kiellands forceps and to a less extent the Bartons forceps are being utilised to any appreciable extent in present day Obstetric practice.

(ii) Vacuum extractor: This instrument first introduced by Malstrom[49] is really an alternative to the obstetric forceps and is still used in many centres today. Chalmers[50] who has probably done more than anyone else to popularise its use, states its advantages over forceps as being the possibility of application in an incompletely dilated cervix and in circumstances where fetal position is uncertain.

(iii) Caesarean Section and Craniotomy: Caesarean Section is not advocated for the management of persistent occipito posterior position per se. However, if associated with relative disproportion and fetal viability is assured, abdominal delivery may be safer for mother and child[51].

In Europe and America, because of the variety of obstructed labour and safety of Caesarean Section, Craniotomy is hardly ever done nowadays except to deliver hydrocephalics. However, Lawson and Stewart[52] call attention to the fact that in the Tropics obstructed labour is still common, and the immediate risk of fatal sepsis and the later one of ruptured scar in a subsequent delivery limit the use of Caesarean Section when the baby is dead. In such circumstances Craniotomy is often utilized.

(iv) Other almost completely obscure method of operative delivery which has been suggested consists of placing Duhrssen's incisions at 10, 12 and 6 to facilitate cervical dilation before forceps application[14, 53].

CHAPTER TWO

MATERNAL CARE AT THE A.B.U. HOSPITAL, ZARIA

In order to orientate the reader of this thesis who may be completely unfamiliar with the surroundings in which this research was carried out, it is thought that a brief account of maternal care at the A. B. U. Hospital, Zaria will not be out of place.

The Department of Obstetrics and Gynaecology, A. B. U. Hospital, Zaria renders services to a catchment area of about 6,000 sq. k.m. in the Savannah region of Northern Nigeria. The population is mainly illiterate and Islam is the predominant religion. Small scale farming and cattle rearing constitute the occupation of the vast majority of the natives. All medical services are provided free of charge and so the economically disadvantaged patients are not excluded. Encouraged by this policy, the number of mothers having their babies here has more than doubled since 1973 and is now approaching 7,000 per annum. Attendance at the antenatal clinics is also increasing and now stands at about 800 per week, although purdah is widely practised. The immense problem of gross overcrowding resulting from this situation coupled with acute shortages in personnel and materials are the most striking features of our maternity services.

About 30% of the patients arrive in hospital for the first time in labour not having had any antenatal care. Such patients are not infrequently extremely ill and often require desperate measures to save their lives. There is a single all purpose ward with a bed occupancy rate of about 160% and so, after normal delivery, mother and baby are discharged home within 12 hours to make room for other freshly delivered patients.

In 1976, 84% of the deliveries were normal, the Caesarean Section rate was 6.5%, forceps 1.3%, assisted breech deliveries 1.6%, destructive operations 0.6%. The mean fetal birth weights were 2.90 kg., and 3.19 kg. for babies born to primiparous and multiparous women respectively. The stillbirth rate at 54 per 1,000, and the perinatal mortality at 77 per 1,000 are very high. Among the stillbirths, intrauterine death has already occurred in two-thirds of the cases by the time the mothers reported here to have their babies. For cultural reasons, autopsies were hardly ever performed.

Tables 1 and 2 are included to illustrate further aspects of maternal and fetal deaths in this unit.

Table 1

A. B. U. HOSPITAL, ZARIA

Mortality Rates in Obstetric Practice 1976

Condition	No. of Patients	Mortality Rates (%)
Spontaneous Delivery	4,636	0.56
Caesarean Section	355	1.13
Destructive Operation	36	5.5
Severe Anaemia in Pregnancy	104	9.5
Eclampsia	84	10.7
Haemorrhage	484	2.3

Maternal mortality rate = 9.9 per 1,000

Stillbirth rate = 54 per 1,000

Perinatal mortality rate = 77 per 1,000

Table 2

MATERNAL MORTALITY IN A.B.U. HOSPITAL, ZARIA 1973 - 1976

Prevalence of Factors which cause Maternal Deaths in Booked and Unbooked Patients

Condition	% Prevalence	
	Unbooked	Booked
Sepsis	31.4	30.4
Severe Anaemia	14.9	1.8
Obstructed Labour) Caesarean Section) Ruptured Uterus)	11.7	4.6
Medical Conditions	9.6	4.1
Retained Placenta	4.4	0
P.E.T./Hypertension	2.0	0
Haemorrhage	13.5	21.4
Eclampsia	6.7	13.2
Anaesthetic	2.6	9.1
Surgical	1.3	1.8
Sickle Cell Anaemia	0	9.1

Table 2 (continued)

Uncertain	1.7	4.5
	n = 156	n = 22

The situation described above is similar to that reported by Lister[54] as being prevalent at the Adeoyo Hospital in the then Western Nigeria, when it was temporarily occupied by the University College, Ibadan.

CHAPTER THREE

THE STUDY

Before commencement of the study, an estimate had to be made of the size of sample that would yield results of statistical significance. This was carried out in the following manner.

About 80 - 85% of the overall patients in this unit have spontaneous vaginal delivery, interference being necessary in about 15 - 20% of cases. If the study patients are substantially different from the rest of the patients who deliver in this unit, they should require at least 30% (15 x 2) interference rate. At 5% significance level and 80% chance of getting the informations correctly, the number required is 94 patients, as read from the appropriate statistical table.[55] So the figure of 100 was decided upon.

A. The Patients

Between 25th December, 1977 and 20th March, 1979, 101 consecutive women (booked or unbooked) who arrived in labour at the A. B. U. Hospital, Zaria with singleton babies presenting by the head and in an O.P. position were studied and they constituted the study group.

Patients with eclampsia and antepartum haemorrhage were excluded. Multiple pregnancy is associated with increased complication rate and the effect of a second fetus on the course of labour will be difficult to ascertain. In eclampsia and to some extent, antepartum haemorrhage, once diagnosis has been made efforts are directed towards effecting delivery quickly.

From each patient a history was taken and physical examination carried out. A patient admitted in labour directly after the delivery of a study mother that matched her age, height and parity, with a singleton fetus, but in occipito anterior or transverse position, was taken as the control for that particular study patient. In so doing, another set of 100 patients were obtained as controls.

B. Measurements

Measurements were clinical and radiological.

1. Clinical

(a) Fetal heart rates were counted for one minute using the Pinard stethoscope every hour.

(b) Maternal pulse, temperature and blood pressure were recorded hourly.

(c) Uterine contractions were palpated for 10 minutes every hour and the number and intensity of contractions occurring every 10 minutes recorded.

(d) By a combination of abdominal palpation and vaginal examination, the descent and station of the presenting part, together with dilatation of the cervical os were noted every three hours.

(e) The time and mode of delivery were recorded.

(f) The baby weights, their occipito-frontal head circumferences and Apgar scores at birth, 3 minutes and 10 minutes were noted.

All the above informations were recorded on partograms which were made out for each study or control patient and in addition, as soon as possible after delivery maternal heights and weights were measured. The above measurements were all carried out by me. Heights and weights were measured on a combined weighing maching graduated in Kg., with a fixed vertical scale graduated in metres and the patients were all clothed in a light "buba" material. The body weights were read to the nearest one-tenth of a kg. while the heights were to the nearest one-hundredth of a metre.

2. Radiological

As soon as possible after delivery (under 24 hours in normal deliveries and as soon as patients were well enough to walk to the X-Ray Department after instrumental deliveries), an erect lateral and brim pelvimetries were taken.

The outlet view was not taken partly because of the great difficulties associated with positioning patients for that view, especially in the early puerperium and partly because it was felt that a lot of the information it would yield could be obtained from the lateral and brim views. Six patients had intrapartum lateral pelvimetries as part of their clinical management in labour. In the early puerperium, these were not repeated and only inlet views were taken. These films were taken by the radiographers in the x-ray department under the direction of their respective Consultant staff; the method utilized being that described by Colcher - Sussman[56].

C. Statistical Methods

Ordinary statistical methods described by Hill[57] and Swinscow[58] were used to calculate mean, standard deviation and standard error of the mean.

Analysis by "student t" and Chi-squared were employed and their probability determined with the aid of the statistical tables by Fisher and Yates[59]. In addition, analysis of variance was performed on a special computer program which worked from the group means and standard deviations previously computed on the calculator. This was carried out at the Computer Services department, The Middlesex Hospital Medical School, University of London. For the calculations, Casio college fx-80 Scientific calculator (Japan) was used.

D. Significance Levels

$P > 0.05$		Not significant
$P = 0.05$		Probably significant
$P < 0.05$		Significant
$P < 0.01$		Very significant
$P < 0.001$		Highly significant

CHAPTER FOUR

THE RESULTS

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR

POSITIONS OF THE FETAL HEAD

Labour Outcome	STUDY PATIENTS Number %	CONTROL PATIENTS Number %
Spontaneous Vaginal Delivery - Occiput Anterior	43 (42%)	87 (87%)
Low Cavity Forceps - Occiput Anterior	1 (1%)	1 (1%)
Midcavity Forceps - Occiput Anterior	3 (3%)	2 (2%)
Kiellands Forceps Rotation and Extraction	8 (8%)	1 (1%)
Caesarean Section	29 (29%)	9 (9%)

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD (CONTINUED)

Labour Outcome	STUDY PATIENTS Number %	CONTROL PATIENTS Number %
Craniotomy	3 (3%)	0
Spontaneous Face to Pubis Delivery	14 (14%)	0
	101(100%)	100(100%)

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (N = 101)

MATERNAL CHARACTERISTICS

	OUTCOME OF LABOUR			
	Spontaneous vaginal delivery - Occiput anterior + Outlet forceps extraction	Difficult operative vaginal delivery - Mid cavity + Rotational forceps	Caesarean section + Craniotomy	Spontaneous face to pubes
	(a)	(b)	(c)	(d)
Maternal Characteristics	Total No 44(43%)	11(11%)	32(32%)	14(14%)
Age distribution (Yrs)				
Under 16	21(21%) 7(16%)	3(27%)	10(31%)	1(7%)
16 - 19	24(23%) 17(39%)	2(19%)	4(13%)	1(7%)
20 - 24	24(24%) 13(29%)	3(27%)	7(22%)	1(7%)
25 - 29	18(18%) 6(14%)	3(27%)	1(3%)	8(57%)
30 & over	14(14%) 1(2%)	0	10(31%)	3(22%)
	101(100%) 44(100%)	11(100%)	32(100%)	14(100%)

STUDY PATIENTS - MATERNAL CHARACTERISTICS (Contd.)

	Total No	(a)	(b)	(c)	(d)
Order of viable pregnancy					
1	52(51%)	28(64%)	8(73%)	15(47%)	1(7%)
2	12(12%)	5(11%)	2(18%)	3(10%)	2(14%)
3	12(12%)	7(16%)	0	2(6%)	3(22%)
4	4(4%)	1(2%)	0	1(3%)	2(14%)
5 & over	21(21%)	3(7%)	1(9%)	11(34%)	6(43%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Stature					
a.Height (metres)					
Under 1.53	35(35%)	10(23%)	4(37%)	20(63%)	1(7%)
1.53-1.63	55(54%)	30(68%)	5(45%)	11(34%)	9(64%)
Over 1.63	11(11%)	4(9%)	2(18%)	1(3%)	4(29%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
b. Average weight post partum (Kg)		52.2	53.2	45.4	60.7
Had antenatal care	61(60%)	34(77%)	7(64%)	7(64%)	13(93%)
No antenatal care	40(40%)	10(23%)	4(36%)	25(36%)	1(7%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)

STUDY PATIENTS - MATERNAL CHARACTERISTICS (Contd.)

	Total No	(a)	(b)	(c)	(d)
Literate	25(25%)	12(27%)	4(36%)	3(9%)	6(43%)
Illiterate	76(75%)	32(73%)	7(64%)	29(91%)	8(57%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Previous obstetric abnormality	10(10%)	1(2%)	1(9%)	8(25%)	0

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (N = 101)

CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR

	OUTCOME OF LABOUR			
Condition of mother and fetus on admission in labour	Spontaneous Vag. delivery + Occiput Anterior + Low cavity forceps (a)	Difficult operative vag. delivery - Mid cavity + Rotational forceps (b)	Caesarean section + Craniotomy (c)	Spontaneous face to pubes delivery (d)
Total No%	44(43%)	11(11%)	32(32%)	14(14%)
Duration of labour on admission				
Under 12 hours	59(58%)	31(70%)	7(64%)	9(28%)	12(86%)
12 - 24 hours	20(20%)	10(23%)	2(18%)	6(19%)	2(14%)
Over 24 hours	22(22%)	3(7%)	2(18%)	17(53%)	0
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Dehydration on admission				
None	58(57%)	35(79%)	7(64%)	5(16%)	11(79%)
Mild	25(25%)	9(21%)	2(18%)	11(34%)	3(21%)
Moderate	13(13%)	0	2(18%)	11(34%)	0
Severe	5(5%)	0	0	5(16%)	0
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)

STUDY PATIENTS - CONDITION OF MOTHER & FETUS ON ADMISSION IN LABOUR (Contd.)

Fetal head on admission	Total	(a)	(b)	(c)	(d)
Not Engaged	97(96%)	43(98%)	9(82%)	32(100%)	13(93%)
Engaged	4(4%)	1(2%)	2(18%)	0	1(7%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Fetal attitude					
Well flexed	12(12%)	6(14%)	3(27%)	1(3%)	2(14%)
Partly extended	89(88%)	38(86%)	8(73%)	31(97%)	12(86%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Position of the fetal head					
L.O.P.	33(33%)	16(36%)	1(9%)	11(34%)	5(36%)
D.O.P.	8(8%)	1(2%)	0	2(6%)	5(36%)
R.O.P.	60(59%)	27(62%)	10(91%)	19(60%)	4(28%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Fever (Temp> 37°C) on admission					
Present	23(23%)	1(2%)	2(18%)	20(63%)	0
Not present	78(77%)	43(98%)	9(82%)	12(37%)	14(100%)
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)

STUDY PATIENTS - CONDITION OF MOTHER & FETUS ON ADMISSION IN LABOUR (Contd.)

Hypertension (Diastolic 90 mmHg or more)	Total	(a)	(b)	(c)	(d)
Present	22(22%)	8(18%)	5(45%)	8(25%)	1(7%)
Not present	79(78%)	36(82%)	6(55%)	24(75%)	13(93%)
Protein Uria					
Present	30(30%)	9(21%)	3(27%)	18(56%)	0
Not present	71(70%)	35(79%)	8(73%)	14(44%)	14(100%)
Cervical dilation (cm) on admission					
4 and under	40(39%)	20(45%)	5(46%)	9(28%)	6(44%)
5 - 8	34(34%)	18(41%)	3(27%)	9(28%)	4(28%)
9 and over	27(27%)	6(14%)	3(27%)	14(44%)	4(28%)
Obstructed labour on admission					
Present	16(16%)	0	0	16(50%)	0
Not present	85(84%)	44(100%)	11(100%)	16(50%)	14(100%)

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (n = 101)

OBSERVATION AND TREATMENT IN LABOUR

Observation and treatment		OUTCOME OF LABOUR				
		Spontaneous vaginal delivery Occiput anterior + Low cavity forceps. (a)	Difficult operative vaginal delivery - mid cavity + Rotational forceps (b)	Caesarean section + craniotomy (c)	Spontaneous face to pubes (d)
	Total No%	44(43%)	11(11%)	32(32%)	14(14%)
Hypertension (Diastolic 90 & over)					
Present		12(12%)	4(9%)	2(18%)	6(19%)	0
Not present		89(88%)	40(91%)	9(82%)	26(81%)	14(100%)
Fetal heart rate						
Absent on admission		5(5%)	0	0	5(16%)	0
Bradycardia (under 120/min)		3(3%)	0	0	3(9%)	0
Tachycardia (over 160/min)		4(4%)	0	0	3(9%)	1(7%)
Normal (120 - 160/min)		89(88%)	44(100%)	11(100%)	21(66%)	13(93%)

STUDY PATIENTS - OBSERVATION AND TREATMENT IN LABOUR (Continued)

	Total	(a)	(b)	(c)	(d)
Required bladder Catheterization					
Yes	44(44%)	4(9%)	11(100%)	29(91%)	0
No	57(56%)	40(91%)	0	3(9%)	14(100%)
Meconium stained liquor					
Present	34(34%)	7(16%)	3(36%)	21(66%)	2(14%)
Absent	67(66%)	37(84%)	7(64%)	11(34%)	12(86%)
Treatment					
None	30(30%)	16(36%)	1(9%)	0	13(93%)
IV fluids only	41(41%)	3(7%)	7(64%)	31(97%)	0
IV fluids with syntocinon	15(15%)	10(23%)	3(27%)	1(3%)	1(7%)
Sedatives/ Analgesics	41(41%)	25(57%)	9(82%)	6(19%)	1(7%)
Total duration of labour					
Under 12 hours	24(24%)	12(27%)	2(18%)	1(3%)	9(64%)
12 - 24 hours	37(37%)	19(43%)	3(27%)	10(31%)	5(36%)
Over 24 hours	40(39%)	13(30%)	6(55%)	21(66%)	0
	101(100%)	44(100%)	11(100%)	32(100%)	14(100%)
Cervical dilation in cm/HR		0.79	0.51	0.38	1.3

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (n = 101)

MATERNAL INJURIES AND PUERPERAL COMPLICATIONS.

		OUTCOME OF LABOUR			
		Spontaneous vaginal delivery Occiput anterior + Low cavity forceps (a)	Difficult operative vaginal delivery - mid cavity+ Rotational forceps (b)	Caesarean section + craniotomy (c)	Spontaneous face to pubes (d)
Maternal Injuries* and Puerperal Complications	Total No%	44(43%)	11(11%)	32(32%)	14(14%)
Perineal tears					
1st degree	8(8%)	2(5%)	1(9%)	0	5(38%)
2nd degree	6(6%)	3(7%)	1(9%)	2(6%)	0
3rd degree	0	0	0	0	0
Episiotomy	29(29%)	16(36%)	11(100%)	1(3%)	1(7%)
Vaginal tears	5(5%)	2(5%)	2(18%)	1(3%)	0
Cervical tears	0	0	0	0	0
Ruptured uterus	2(2%)	0	0	2(6%)	0
VVF/RVF	3(3%)	0	0	3(9%)	0
'Gishiri cut'	4(4%)	0	0	4(13%)	0
No inuries	58(57%)	25(57%)	0	25(78%)	8(57%)
Estimated mean blood loss (ml)		185	465	813	120

* (Excluding Caesarean Section wounds)

STUDY PATIENTS- MATERNAL INJURIES AND PUERPERAL COMPLICATIONS (Continued)

	Total	(a)	(b)	(c)	(d)
Required blood transfusion	31(31%)	1(2%)	5(45%)	25(78%)	0
Required anaesthetic					
Local	25(25%)	16(36%)	8(73%)	0	1(7%)
General	37(37%)	1(2%)	4(36%)	32(100%)	0
None	40(40%)	27(62%)	0	0	13(93%)
Sepsis present	25(25%)	1(2%)	4(36%)	20(63%)	0
Other complications (see Appendix)					
Present	7(7%)	0	3(27%)	3(9%)	1(7%)
Not present	94(93%)	44(100%)	8(73%)	29(91%)	13(93%)
Delivery - Discharge interval					
Within one day	62(61%)	42(95%)	6(55%)	0	14(100%)
More than one day	39(39%)	2(5%)	5(45%)	32(100%)	0
Maternal death					
Present	2(2%)	0	0	2(6%)	0
Absent	99(98%)	44(100%)	11(100%)	30(94%)	14(100%)

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (n = 101)

THE INFANT

Characteristics		OUTCOME OF LABOUR				
		Spontaneous Vag. Delivery Occiput Ant. + Low Cavity forceps Extraction	Difficult operative vaginal delivery - Mid cavity + Rotational forceps	Caesarean section + Craniotomy	Spontaneous face to pubes
		(a)	(b)	(c)	(d)
	Total No%	44(43%)	11(11%)	32(32%)	14(14%)
Sex					
	Male	49(49%)	21(48%)	5(45%)	19(59%)	4(29%)
	Female	52(51%)	23(52%)	6(55%)	13(41%)	10(71%)
Survival					
	Alive	94(93%)	44(100%)	11(100%)	25(78%)	14(100%)
	Dead (6SBs, 1NND, 5IUDs on admission)	7(7%)	0	0	7(22%)	0
Birth Weight (Kg)					
	Under 2.5	5(5%)	0	0	5(16%)	0
	2.5 - 3.5	75(74%)	34(77%)	8(73%)	24(75%)	9(64%)
	Over 3.5	21(21%)	10(23%)	3(27%)	3(9%)	5(36%)

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS (n = 101)

THE INFANT

	Total	(a)	(b)	(c)	(d)
Mean Head Circumference at birth (cm)		34.6	35.6	35.4	35.0
Birth asphyxia present (Apgar Score 6 & under)	28(28%)	4(9%)	8(73%)	16(50%)	0
External Injuries present	5(5%)	0	1(9%)	4(13%)	0
Congenital Malformation present	0	0	0	0	0

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS

PELVIMETRY MEASUREMENTS (N = 99)

		OUTCOME OF LABOUR			
		Spontaneous Vaginal Delivery - Occiput Anterior + Low cavity Forceps Extraction	Difficult Operative Vaginal Delivery - Midcavity + Rotational Forceps Extraction	Caesarean Section + Craniotomy	Spontaneous Face to Pubis Delivery
		(a)	(b)	(c)	(d)
Measurements	Total No.	44	11	30	14
Inlet View					
Widest transverse Diameter	99	mean 12.4cm range 10.2-15.7	mean 11.5cm range 10.2-12.9	mean 11.1cm range 8.5-12.8	mean 12.6cm range 11.1-13.9
Bi-ischial Spinous diameter	99	mean 11.0cm range 9.1-13.3	mean 10.1cm range 8.7-11.4	mean 9.1cm range 6.4-10.8	mean 11.5cm range 10.2-12.1
Separation of Symphysis	98	mean 0.99cm range 0.5-2.1	mean 0.74cm range 0.5-1.0	mean 0.43cm range 0.3-0.6	mean 1.2cm range 0.8-2
Lateral View					
True Conjugate	99	mean 10.8cm range 8.8-13.7	mean 10.6cm range 8.8-12	mean 9.4cm range 7.6-11.2	mean 11.5cm range 10.4-12.8

STUDY PATIENTS - PELVIMETRY MEASUREMENTS (N = 99) (Continued)

	Total	(a)	(b)	(c)	(d)
AP Diameter at Mid plane	99	mean 12.4cm range 10.0-14.4	mean 12.5 cm range 10.4-14.8	mean 11.2cm range 9.3-12.8	mean 13.2cm range 11.0-14.8
AP Diameter Bony outlet	99	mean 12.3cm range 10.4-13.6	mean 12.1cm range 10-14	mean 11.1cm range 9.2-13.2	13.5cm range 11.1-14.8
Angle of pelvic Inclination to the horizontal	99	mean 54° range 40 - 68	mean 55° range 45 - 66	mean 48° range 28 - 65	mean 55° range 44 - 67
Tilt of sacrum to plane of Symphysis pubis	99	Inwards 1 Outwards 2 Parallel 14	Inwards 0 Outwards 0 Parallel 11	Inwards 1 Outwards 4 Parallel 25	Inwards 0 Outwards 1 Parallel 13
Description of Sacrum	99	Concave 2 Straight 7 Normal Hollow 35	Concave 0 Straight 2 Normal Hollow 9	Concave 2 Straight 8 Normal Hollow 20	Concave 0 Straight 0 Normal Hollow 14

ANALYSIS OF DATA FROM STUDY GROUP PATIENTS - (2)

PELVIMETRY MEASUREMENTS (N = 99)

NOTE:

There were two maternal deaths and both occurred in the Caesarean Section/ Craniotomy group. One patient (Hospital No. 938979) died in the recovery room a few minutes after operation. Although the other patient (Hospital No. 896534) died 27 days after operation, she was never well enough at any time to have had pelvimetry studies at the X-ray department. This accounts for the total number of 99 instead of the usual 101.

The extent of separation of Symphysis was indistinct in one patient (Hospital No. 843264 Spontaneous Vaginal Delivery group) and so could not be measured.

ANALYSIS OF DATA FROM CONTROL GROUP PATIENTS (N = 100)

MATERNAL CHARACTERISTICS

	OUTCOME OF LABOUR			
		Spontaneous Vag. Delivery Occiput Ant. + Low cavity forceps (a)	Difficult Operative vaginal delivery - Mid cavity + Rotational forceps (b)	Caesarean Section + Craniotomy (c)
Characteristics	Total No%	88(88%)	3(3%)	9(9%)
Age distribution (years)				
Under 16	21(21%)	14(16%)	1(33%)	6(67%)
16 - 19	24(24%)	22(25%)	1(33%)	1(11%)
20 -24	23(23%)	22(25%)	1(33%)	0
25 - 29	18(18%)	17(19%)	0	1(11%)
30 & over	14(14%)	13(15%)	0	1(11%)
	100(100%)	88(100%)	3(100%)	9(100%)
Order of viable pregnancy				
1	52(52%)	43(48%)	3(100%)	6(67%)
2	12(12%)	11(12%)	0	1(11%)
3	12(12%)	12(14%)	0	0
4	4(4%)	4(5%)	0	0
5 & over	20(20%)	18(21%)	0	2(22%)

ANALYSIS OF DATA FROM CONTROL GROUP PATIENTS (N = 100)

MATERNAL CHARACTERISTICS (Continued)

Stature	Total	(a)	(b)	(c)
a. Height (metres)				
Under 1.53	34(34%)	27(31%)	1(33%)	6(67%)
1.53 - 1.63	55(55%)	52(59%)	1(33%)	2(22%)
Over 1.63	11(11%)	9(10%)	1(34%)	1(11%)
b. Mean weight				
Postpartum (Kg)		53.7	62.6	39.5
Had antenatal care	80(80%)	73(83%)	3(100%)	4(44%)
Did not have Antenatal care	20(20%)	15(17%)	0	5(56%)
Literate	30(30%)	28(32%)	2(67%)	0
Illiterate	70(70%)	60(68%)	1(33%)	9(100%)
Previous Obstetric abnormality (see appendix)	3(3%)	2(2%)	0	1(11%)

ANALYSIS OF DATA FROM CONTROL GROUP PATIENTS (N = 100)

CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR

		OUTCOME OF LABOUR		
		Spontaneous Vag. Delivery Occiput Ant. + Low Cavity forceps. (a)	Difficult operative vaginal delivery- Mid cavity + Rotational forceps (b)	Caesarean Section + Craniotomy (c)
Condition on admission	Total No%	88(88%)	3(3%)	9(9%)
Duration of labour on admission				
Under 12 hours	81(81%)	75(85%)	2(67%)	4(44%)
12 - 24 hours	17(17%)	13(15%)	1(33%)	3(34%)
Over 24 hours	2(2%)	0	0	2(22%)
Dehydration				
None	85(85%)	78(89%)	3(100%)	4(44%)
Mild	12(12%)	9(10%)	0	3(34%)
Moderate	3(3%)	1(1%)	0	2(22%)
Severe	0	0	0	0
Engagement of fetal head				
Not Engaged	92(92%)	80(91%)	3(100%)	9(100%)
Engaged	8(8%)	8(9%)	0	0

CONTROL PATIENTS - CONDITION OF MOTHER & FETUS ON ADMISSION IN LABOUR (Contd.)

	Total	(a)	(b)	(c)
Fetal attitude				
Well flexed	74(74%)	68(77%)	2(67%)	4(44%)
Partly extended	26(26%)	20(23%)	1(33%)	5(56%)
Position of the fetal head				
R.O.T.	20(20%)	17(19%)	2(27%)	1(12%)
R.O.A.	8(8%)	8(9%)	0	0
L.O.A.	26(26%)	22(25%)	0	4(44%)
L.O.T.	46(46%)	41(47%)	1(33%)	4(44%)
Fever (temp.> 37°C)				
Present	6(6%)	3(3%)	0	3(34%)
Not present	94(94%)	85(97%)	3(100%)	6(66%)
Hypertension (Diastolic 90mm/Hg and over)				
Present	21(21%)	16(18%)	1(33%)	4(44%)
Not present	79(79%)	72(82%)	2(67%)	5(56%)
Protein Uria				
Present	13(13%)	8(9%)	1(33%)	4(44%)
Not present	87(87%)	80(91%)	2(67%)	5(56%)
Cervical Dilation cm				
4 and under	50(50%)	47(53%)	1(33%)	2(22%)
5 - 8	38(38%)	31(35%)	2(67%)	5(56%)
9 & over	12(12%)	10(12%)	0	2(22%)

CONTROL PATIENTS - CONDITION OF MOTHER & FETUS ON ADMISSION IN LABOUR (Contd.)

Obstructed labour on admission	Total	(a)	(b)	(c)
Present	1(1%)	0	0	1(11%)
Not present	99(99%)	88(100%)	3(100%)	8(89%)

ANALYSIS OF DATA FROM CONTROL GROUP PATIENTS (N = 100)

OBSERVATION AND TREATMENT IN LABOUR

	OUTCOME OF LABOUR			
Observation and treatment	Total No%	Spontaneous vaginal delivery - Occiput anterior + Low cavity forceps (a) 88(88%)	Difficult operative vaginal delivery - Mid cavity + Rotational forceps (b) 3(3%)	Caesarean section + Craniotomy (c) 9(9%)
Hypertension (Diastolic 90 mm Hg or more)				
Present	8(8%)	7(8%)	0	1(11%)
Not present	92(92%)	81(92%)	3(100%)	8(89%)
Fetal heart rate Absent on admission	2(2%)	1(1%)	0	1(11%)
Bradycardia (under 120/min)	0	0	0	0
Tachycardia (over 160/min)	1(1%)	0	0	1(11%)
Normal (120 - 160/min)	97(97%)	87(99%)	3(100%)	7(78%)

CONTROL PATIENTS - OBSERVATION AND TREATMENT IN LABOUR (Continued)

	Total	(a)	(b)	(c)
Required bladder Catheterization				
Yes	15(15%)	3(3%)	3(100%)	9(100%)
No	85(85%)	85(97%)	0	0
Meconium stained liquor				
Present	12(12%)	8(9%)	1(33%)	3(33%)
Absent	88(88%)	80(91%)	2(67%)	6(67%)
Treatment				
None	66(66%)	65(74%)	1(33%)	0
IV fluids only	8(8%)	1(1%)	1(33%)	6(67%)
IV Fluids with Syntocinon	11(11%)	7(8%)	1(33%)	3(33%)
Sedatives/ Analgesics	32(32%)	23(26%)	2(67%)	7(78%)
Total duration of labour				
Under 12 hours	48(48%)	46(52%)	0	2(22%)
12 - 24 "	42(42%)	38(43%)	1(33%)	3(33%)
Over 24 hours	10(10%)	4(5%)	2(67%)	4(45%)
Cervical dilation in cm/hr.		1.08	0.41	0.63

ANALYSIS OF DATA FROM CONTROL GROUP PATIENTS (N = 100)

MATERNAL INJURIES AND PUERPERAL COMPLICATIONS

	OUTCOME OF LABOUR			
Injuries and Puerperal complications exc. C.S. wounds		Spontaneous Vaginal delivery - Occiput Anterior + Low cavity forceps extraction (a)	Difficult operative vaginal delivery - Mid cavity + Rotational forceps (b)	Caesarean section + Craniotomy (c)
	Total No%	88(88%)	3(3%)	9(9%)
Perineal tears				
1st degree	8(8%)	8(9%)	0	0
2nd degree	4(4%)	4(5%)	0	0
3rd degree	0	0	0	0
Episiotomy	22(22%)	19(22%)	3(100%)	0
Vaginal tears	2(2%)	2(2%)	0	0
Cervical tears	0	0 0	0	0
Ruptured uterus	1(1%)	0	0	1(11%)
VVF/RVF	0	0	0	0
'Gishiri Cut'	0	0	0	0
No injuries	65(65%)	59(67%)	0	6(67%)

CONTROL PATIENTS - MATERNAL INJURIES AND PUERPERAL COMPLICATIONS (Contd.)

	Total	(a)	(b)	(c)
Mean blood loss (ml)		183	608	733
Required blood transfusion	13(13%)	5(6%)	1(33%)	7(78%)
Anaesthesia				
Local	18(18%)	16(18%)	2(67%)	0
General	10(10%)	0	1(33%)	9(100%)
None	72(72%)	72(82%)	0	0
Sepsis	6(6%)	0	1(33%)	5(56%)
Other maternal complication (see appendix)				
Present	3(3%)	1(1%)	1(33%)	1(11%)
Not present	97(97%)	87(99%)	2(67%)	8(89%)
Delivery - Discharge Interval				
Within a day	82(82%)	81(92%)	1(33%)	0
More than a day	18(18%)	7(8%)	3(67%)	9(100%)
Maternal death				
Present	0	0	0	0
Absent	100(100%)	88(100%)	3(100%)	9(100%)

ANALYSIS OF DATA FROM CONTROL **PATIENTS (N = 100)**

THE INFANT

		OUTCOME OF LABOUR		
		Spontaneous vaginal delivery - Occiput anterior + Low cavity forceps	Difficult operative vaginal delivery - Mid cavity + Rotational forceps	Caesarean section + Craniotomy
		(a)	(b)	(c)
Characteristics	**Total No%**	88(88%)	3(3%)	9(9%)
Sex				
Male	48(48%)	44(50%)	1(33%)	3(33%)
Female	52(52%)	44(50%)	2(67%)	6(67%)
Survival				
Alive	98(98%)	87(99%)	3(100%)	8(89%)
Dead (1 SB, 1 IUD on admission)	2(2%)	1(1%)	0	1(11%)
Birth Weight (Kg)				
Under 2.5	2(2%)	1(1%)	0	1(11%)
2.5-3.5	86(86%)	78(89%)	2	6(67%)
Over 3.5	12(12%)	9(10%)	1(33%)	2(22%)

CONTROL PATIENTS - THE INFANT (Continued)

	Total	(a)	(b)	(c)
Mean head circumference (cm)		34.7	35.3	35.0
Birth Asphyxia (Apgars 6 & under)	7(7%)	2(2%)	1(33%)	4(44%)
External Injuries	1(1%)	0	1(33%)	0
Congenital Malformations	0	0	0	0

ANALYSIS OF DATA FROM CONTROL PATTENTS (N = 98)

PELVIMETRY MEASUREMENTS

		OUTCOME OF LABOUR		
		Spontaneous vaginal delivery- Occiput Anterior + Low cavity forceps extraction	Difficult operative vaginal delivery - Mid cavity + Rotational forceps extraction	Caesarean section + Craniotomy
		(a)	(b)	(c)
Measurements	Total No	87	3	8
INLET VIEW				
Widest transverse Diameter	98	mean 12.3cm range 10.5 - 14.5	mean 11.2cm range 10.5-11.9	mean 10.8cm range 10 - 11.9
Bi-ischial Spinous diameter	98	mean 10.7cm range 9.0-12	mean 9.4 cm range 9.2 - 9.7	mean 9cm range 7.8 - 10.1
Separation of Symphsis	97	mean 1.0cm range 0.6 - 2.5	mean 0.6cm range 0.5 - 0.6	mean 0.5cm range 0.3 - 1.0
LATERAL VIEW				
True Conjugate	98	mean 10.8cm range 9.2 - 12.8	mean 10.3cm range 9.2 - 11.2	mean 8.7cm range 8.2 - 9.4

CONTROL PATIENTS - PELVIMETRY MEASUREMENTS (Continued)

	Total	(a)	(b)	(c)
A.P. Diameter at Mid Plane	98	mean 12.3cm range 10.2 - 15.2	mean 12.1cm range 11.2 - 13.6	mean 10.4cm range 10 - 11
A.P. Diameter Bony Outlet	98	mean 11.8cm range 9.2 - 14.5	mean 12.1cm range 11.2 - 13.6	mean 10.5cm range 10 - 11.5
Angle of pelvic inclination to the horizontal	98	mean 51.8° range 34 - 68	mean 61° range 55 - 68	mean 53° range 40 - 58
Tilt of sacrum to plane of Symphysis Pubis	98	Inwards 0 Outwards 3 Parallel 84	Inwards 0 Outwards 0 Parallel 3	Inwards 0 Outwards 0 Parallel 8
Description of sacrum	98	Concave 0 Straight 4 Normal Hollow 83	Concave 0 Straight 0 Normal Hollow 3	Concave 0 Straight 1 Normal Hollow 7

CONTROL PATIENTS - PELVIMETRY MEASUREMENTS **(Continued)**

NOTE: One patient, Hospital No 97365 (Spontaneous Vaginal Delivery Occiput anterior group) refused puerperal pelvimetry on the grounds that she would not benefit from it, having safely delivered her baby.

Another patient, Hospital No 850503, absconded from the hospital before she was fit enough to have pelvimetry studies. This explains the discrepancy of 2 (100 - 98) in the pelvimetry films that were taken.

It was difficult to ascertain the exact extent of symphysial separation in one patient (Hospital No 823390 - Spontaneous Vaginal Delivery - Occiput Anterior group) so this was not measured.

Diagnosis in this series were all made on inspection, palpation and auscultation and confirmed by vaginal examination - feeling for the fetal occiput and fontanelles. In instances where there were doubts, the patients were not included in the study. On the whole, no fewer than 10 patients were so discarded and to that much extent the study and control patients constitute a "cleaned out population". This probably explains why the odd patient with "O.A. position" did not deliver face to pubes or the odd "O.P. position" come out as a breech as not infrequently happens in clinical practice.

A. <u>The Data</u>

The data obtained from study and control patients are contained in Appendices 8 and 9 while pages 35-65 contain preliminary analysis of these data. During the course of this preliminary analysis it was discovered that informations obtained from patients that had spontaneous vaginal delivery - occiput anterior and low cavity forceps - occiput anterior were very similar; so they were combined under a new outcome of labour: Spontaneous vaginal delivery occiput anterior and low cavity forceps extraction. Also similar were informations obtained from patients delivered by mid cavity forceps - occiput anterior and Kiellands forceps rotation and extraction.

They too were combined under a new outcome of labour: Difficult operative vaginal delivery. Finally, close similarity was also noticed between the informations from patients who had Caesarean Section and those that had craniotomy and so these were also combined to give a new outcome of labour: Caesarean Section/Craniotomy. This last combination was further justified by the fact that had the patients delivered by Craniotomy arrived in hospital before the death of the fetus in utero, Caesarean Section would have been the treatment of choice.

After these minor adjustments, the new outcome of labour with which the rest of the analyses were carried out became as shown in Table 3.

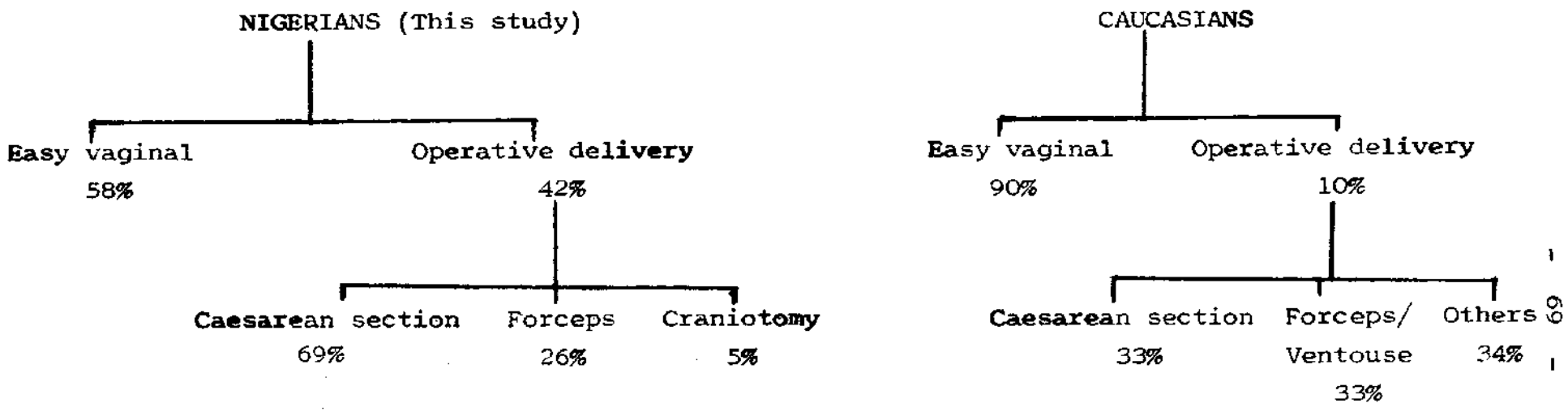
Table 3

OUTCOME OF LABOUR IN O.P. POSITIONS OF THE FETAL HEAD

Labour Outcome	Study Patients Number (%)	Control Patients Number (%)
Spontaneous Vaginal Delivery - Occiput Anterior + Low Cavity Forceps	44 (43)	88 (88)
Difficult Operative Vaginal Delivery - Mid-cavity + Rotational Forceps	11 (11)	3 (3)
Caesarean Section/Craniotomy	32 (32)	9 (9)
Spontaneous Face to Pubis	14 (14)	0 (0)
	101(100%)	100(100%)

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

Outcome in Nigerians compared with outcome in Caucasians



NOTE: Easy vaginal delivery in the above figures includes spontaneous vaginal delivery occiput anterior and spontaneous vaginal delivery face to pubes.
The breakdown of the outcome of labour in the caucasians has been compiled from generally accepted figures[50].

Fig. I

B. Comparison with Caucasians

1. Outcome of labour

Fig. I shows the outcome of labour in the study group compared with the outcome in Caucasians.

In the Nigerian patients there was a more than fourfold increase in the operative delivery rate as compared with the Caucasians. Secondly, Caesarean Section/Craniotomy was the most commonly utilized method of operative delivery in the Nigerians while Caesarean Section, forceps, ventouse and others (mainly rotatory methods) were utilized in the Caucasians in almost equal instances.

2. Major complication rates.

Other than the mention of one V.V.F. by King[22] in several O.P. deliveries, published literature is virtually silent on major complications in association with O.P. deliveries in the Caucasians. It is possible that either these do not occur, or are so infrequent in modern obstetrics as not to arrest attention.

In this series of 101 consecutive patients, the following major complications (Table 4) were recorded in association with O.P. labours in Nigerian mothers.

Table 4

Prevalence of Major Complications in 101 O.P. Deliveries in Nigerian Patients

Complications	Number
Maternal death	2
Obstructed labour present on admission	16
Ruptured uterus	2

It is, therefore, clear that the outcome of labour in O.P. positions in Nigerians is less favourable as compared to the outcome in the Caucasians. However, these differences might not be due to O.P. positions. Indeed, they might be manifestations of differences between Nigerians and Caucasians irrespecitve of fetal positions. To prove that the differences are strictly in association with the malposition, therefore, the outcome of labour and prevalence of complications will be compared in the study group and their Nigerian controls.

C. Comparison with Controls

1. Outcome of labour.

This is shown on Table 3. The differences are highly significant (chi-squared 46.4, Df 3, P<0.001).

The most obvious difference is in the incidence of operative delivery. This was again almost four times as high in the study patients as compared with the controls. However, Caesarean Section/Craniotomy contributed almost equally (75 - 74%) to the operative delivery rate in both study and control patients.

The contribution made by difficult operative vaginal delivery i.e. mid-cavity + rotational forceps extraction to the overall operative interference rate was small for both study and control groups (25 - 26%).

2. Major Complications.

The prevalence of major complication in study and control patients is shown in Table 5.

Table 5

Prevalence of Major Complications in Study and Control Patients

Complications	Number	
	Study (101)	Control (100)
Maternal death	2	0
Obstructed labour present on admission	16	1
Ruptured uterus	2	1
V.V.F./R.V.F.	3	0
"Gishiri Cut"	4	0
Prolonged labour (over 24 hours)	40	10
Sepsis	25	6
Fetus I U D on admission	5	2

(a) Maternal death

There were two deaths and both occurred in the study group. The first patient (A.B.U. Hospital No. 896534) aged 30, Para 5 and 1.50 metres tall, was admitted as an emergency having been in labour at home for 52 hours. She showed a moderate dehydration, pallor, tachycardia and fever, but her blood pressure was normal and her abdomen was generally tender and hard. Although the fetus which was in the right occipito posterior position had died in utero, the head was still unengaged. There was gross overlapping of skull bones with massive caput formation, the cervical os being fully dilated. Brisk vaginal bleeding was coming from the vault and the little liquor such as there were, was foul smelling and blood stained. The diagnoses made were multiple and included ruptured uterus, obstructed labour from cephalopelvic disproportion associated with malposition, genital sepsis and intrauterine fetal death. At laparotomy, an oblique anterior rupture of the uterus involving the upper and lower segments and also the right uterine vessels was noticed.

A macerated male fetus weighing 3.1 kg was delivered and thereafter, a large V.V.F. with ragged and necrotic edges was encountered. The uterine rupture was repaired and bilateral tubal ligation carried out. The estimated blood loss of 2.5 litres was replaced with a transfusion of 3 litres whole blood. Her post-operative condition was very stormy with total incontinence of urine and relentless fever. Despite the use of massive antibiotics in various combinations, she eventually died 27 days after her operation. No autopsy was performed.

The second patient (A.B.U. Hospital No. 938979) aged 14, primigravida and 1.49 metres tall, was also admitted as an emergency having been in labour at home for 48 hours. She was slightly dehydrated and hypertensive. The fetus which was in the right occipito posterior position was alive, but there were signs of gross cephalo-pelvic disproportion and fetal distress as evidenced by severe moulding and caput formation with the head unengaged, fetal tachycardia and meconium formation. The cervical os was fully dilated. An emergency lower uterine segment Caesarean Section was carried out and a male fetus weighing 3.3 kg which unfortunately was a fresh stillbirth, was delivered.

The mother herself initially recovered from the anaesthetic, but was found dead in the Recovery Room about 30 minutes after the Anaesthetist had left her. Again, no autopsy was performed.

The suggestion is not being made that O.P. positions were the causes of death in these two patients. Indeed, in West Africa,[60,61] multiple obstetric causes of death are the rule rather than the exception. However, whatever the causes of death may have been, the malpositions were contributory factors.

(b) Obstructed labour present on admission.

These were all cases of cephalo-pelvic disproportion. The prevalence rate of 16 in the study and 1 in the controls is highly significant. Not only is cephalopelvic disproportion one of the main obstetric causes of death in this unit,[60,62] it is also a fore-runner of other very serious obstetric complications like ruptured uterus and V.V.F.

(c) Ruptured uterus

The ruptured uterus rate of 2 in the study and 1 in the controls is probably under-represented. During the period of this study, there were other cases of ruptured uterus treated in the unit.

But in these cases, the fetal heads had been extruded from the pelvis and uterine cavity and so neither the lie, presentation nor position at the time of rupture could be ascertained. Such patients were not included in the study.

(d) VVF/RVF

Obstetric fistulae from prolonged unrelieved obstructed labour is a major problem in the Northern parts of Nigeria, being second only to incomplete abortion as indication for admission into the gynaecological ward. It is commonest in young illiterate primiparous mothers who have had home confinment. The difference in its prevalence when study and control patients are compared is again relevant.

(e) "Gishiri Cut"

In Hausa, gishiri means 'salt' but among many Hausa women, it refers to a traditional operation in which the vagina or birth canal is cut, usually by old women using razor blade[62]. Although these cuts are occasionally made for some obscure reasons like fever or genital prolapse, they are most commonly inflicted when difficulty in childbearing is encountered. So long as the cut does not go too deep, apart from slight bleeding, no serious harm may result. However, occasionally very deep cuts are made resulting in extensive injuries not just to the birth canal but also to related structures like urinary bladder, urethra, large and small intestines, giving rise to VVF or RVF.

Apart from these effects on micturition and defaecation, the haemorrhage from these cuts can threaten life and in 1977, 3 pregnant women died in this unit from this cause[62]. That there were as many as 4 cases in the study group and none in the controls suggest that labour must have been much more difficult in the study patients.

(e) Prolonged labour

Prolonged labour was taken to be one that lasted beyond 24 hours and the difference in the incidence between the two groups is again highly significant. Prolonged labour is widely accepted as being associated with O.P. positions[25, 51, 63, 64]. Its explanation is due to the fact that on account of the head deflection commonly found with the posteriorly placed occiput, a larger diameter of the fetal head is thrown across the pelvis for engagement and secondly, the curve of the fetal shape is maligned to the curve of the birth canal. Donald[35] states that on the average labour is prolonged about 3½ hours in primigravidae and about 1¾ hours in multipara in O.P. positions.

To shorten this duration of labour, O'Driscoll and Strong[65] suggest active management of labour for cases of O.P. positions. By so doing, they were able to deliver all but 7 of 1,000 consecutive primiparous mothers including those with O.P. positions within 12 hours of the onset of labour vaginally.

(f) Sepsis

The diagnosis of the presence of infection was made only on clinical grounds. The commonest sites of sepsis were the genital tract, chest and blood stream while E. Coli was most commonly isolated from the few patients who had bacteriological confirmation as part of their clinical management. Prolonged labour in particular could explain the high incidence of sepsis in the study as compared to the controls.

(g) Intrauterine fetal death

Several reports[60, 62, 66] have confirmed that intrauterine fetal death present before admission to hospital is responsible for a large proportion of the high perinatal mortality noticed in developing countries. In this series there were five in the study and two in the control group. The most probable explanation for the intrauterine fetal death was obstructed labour.

The above facts should suffice to prove the point that the outcome of labour in O.P. positions in Nigerians is not only different when compared to the outcome in Caucasians but also their fellow Nigerian controls. It calls for a greater operative interference rate, often by Caesarean Section and major complications rates are higher. It becomes obvious, therefore, that in order to avoid the element of delay and uncertainty with their attendant consequences,

the Obstetrician in the tropics needs to be given guidelines that would enable him decide early in labour which patient with O.P. position is likely to do well and which one is likely to fare badly. Apart from the obvious advantages to the patient this policy would have, it should also result in an obstetric unit that is better run. The Obstetrician would be able to re-arrange his scarce available equipments, manpower and time the demands on which are usually enormous. In any case, before these guidelines can be worked out, the individual outcomes of labour into which the O.P. patients differentiated themselves will have to be examined in some details.

CHAPTER FIVE

CLOSER EXAMINATION OF LABOUR OUTCOME IN STUDY PATIENTS

A. Spontaneous Face to Pubes Delivery

14 patients (14%) delivered spontaneous face to pubes. This is in agreement with the figure quoted by Donald[25]. The ages of the patients were often above 24 (79%) and only one was under 16 (7%). One patient was short, the rest (93%) being either of medium or tall stature. Although almost exclusively multiparous (93%), none had a history of any previous obstetric abnormality. About half (43%) of them were literate and all (93%) but one had had antenatal care.

No obstetric abnormality was discovered in any of them on admission in labour and they all achieved spontaneous delivery face to pubes within 24 hours of the onset of labour (64% in under 12 hours); the mean rate of cervical dilatation being 1.3 cm. per hour. The babies were born alive in all instances with excellent apgar scores and none weighed below 2.5 Kg.

Other than one patient (7%) requiring episiotomy and 5 (38%) sustaining first degree perineal tears, there were no other injuries to birth canal. Mothers and babies were all discharged home within 24 hours of delivery. Not only was the outcome of labour best in this group but also as shown on pages 49 and 50, their pelvic measurements were the best.

There are conflicting reports in the literature on how innocuous spontaneous face to pubes deliveries are. King[22] is of the opinion that they are usually more difficult and associated with increased fetal trauma and extensive laceration of maternal soft tissues. Donald[25] states that maternal lacerations are more common in O.P. deliveries face to pubes and the narrower the subpubic angle happens to be the worse will be the damage to the pelvic floor. Munro Kerr[10] although agreeing that labour is remarkably easy, thinks that smallness of the babies sizes is responsible for this ease. Our findings are in support of those of Weekes and Hobbs[67] and Bainbridge et al[63] that not only is labour remarkably easy when spontaneous face to pubes delivery occurs, but that for some multipara the O.P. presentation of the fetal head might be the optimal presentation. Secondly, given an environment such as Nigeria where home confinment is very popular, the ease of spontaneous face to pubes delivery would suggest that it occurs quite frequently at home.

B. Spontaneous Vaginal Delivery - Occiput Anterior

This group includes all patients in whom the posteriorly placed occiput had undergone spontaneous complete internal rotation and they either delivered on their own or required only outlet forceps. There was a total of 44 (43%) such patients and their ages varied mainly between 16 and 35 (84%) with only 7 (16%) being under 16. Ten patients (23%) were short, the rest (77%) being either of medium or tall stature. They were mainly primiparous (64%) and one (2%) had had a previous Caesarean Section. Illiteracy was common amongst them and the majority (77%) had had antenatal care.

Only few patients had minor obstetric abnormalities on admission and spontaneous vaginal delivery or forceps delivery was achieved within 24 hours of onset of labour in 70% of cases; the mean rate of cervical dilatation being 0.79 cm. per hour. All babies were born alive but four (9%) were asphyxiated and needed resuscitation. No baby weighed below 2.5 Kg. and 10 (23%) weighed more than 3.5 Kg. Three patients (7%) sustained second degree perineal tears and mothers and babies were discharged home within 24 hours in all but two cases (5%). Both the outcome of labour and pelvic measurements of patients in this group were good.

C. Difficult Operative Vaginal Delivery.

Delivery here was conducted with forceps starting from the midcavity either after spontaneous rotation had occurred or after it had been effected by means of the Kiellands forceps. There were 11 patients and delivery is described as difficult because in all cases, an appreciable amount of force was required to extract the baby. The ages of the patients were evenly distributed, but 3 (27%) were under 16. Four patients were short (37%) and the rest were of medium or tall stature. They were mainly primiparous and one had had a previous obstetric abnormality. Instrumental vaginal deliveries within 24 hours of onset of labour were achieved in only 45% of cases; the mean rate of cervical dilatation being 0.51 c.m. per hour. Although all babies were born alive, 8 (73%) were asphyxiated and needed resuscitation. No baby weighed below 2.5 kg and three (27%) weighed above 3.5 kg. Over half (55%) of the patients remained in hospital for more than a day, but all eventually went home with their babies. The outcome of labour here was poor and the mean values obtained for their various pelvic measurements were generally less than those of the two preceeding groups.

The forceps delivery rate here is small as compared to that in the European countries. This is so because when spontaneous vaginal delivery is impossible in our patients, careful clinical examination often reveals a degree of cephalo-pelvic disproportion that will render forceps application hazardous. This is more so in cases of O.P. positions and in the series reported by Freeth,[68] O.P. position with unrecognised disproportion was the commonest cause of failed forceps.

Recently, midcavity forceps extraction and in particular the use of Kiellands forceps for rotation, have come under severe criticisms as causing undue damage to maternal and fetal soft tissues.[69-72] The recent award of substantial damages by a Court in a case of failed forceps [73] has further heightened these criticisms. However, as stated by Spinapolice and Magra[74] there probably is still a place for midpelvic forceps extraction if the Obstetrician has adequate knowledge of pelvic architecture, uses good clinical judgement and selects his cases on individual basis. As far back as 1964 Dennen [75] pointed out that it is not the type of forceps used that is important, but the skill, judgement and experience of the physician using the forceps.

D. Caesarean Section/Craniotomy

In these patients vaginal delivery was deemed impossible on account of cephalo-pelvic disproportion and so Caesarean Section if the babies were alive, or craniotomy if the babies were dead was performed. Thirty-two patients (32%) were so treated. Their ages ranged between 14 and 35, but 10 patients (31%) were under 16 while another 10 (31%) were over 35 years. As many as 20 patients (63%) were of short, the rest being of medium or tall stature. Fifteen (47%) were primiparous while 11 (34%) were having their 5th or more child. The vast majority (91%) were illiterates and 25% of them had history of previous obstetric abnormality. Even on admission to hospital 17 (53%) had already been in labour for more than 24 hours and obstructed labour was present in 16 (50%). On the whole, twenty-one (66%) had labours protracted beyond 24 hours and the mean cervical dilatation rate for the group was 0.38 cm per hour. Also, even on admission, 5 (16%) of them were carrying babies that had already died in utero and only 25 (78%) of them went home with live babies.

Their stay in hospital was long because of the mode of delivery and its complications and the two maternal deaths that occurred in this study were from this group. The outcome of labour was worst in this group and the mean values for their various pelvic measurements were also the worst compared to the means of the preceeding groups of patients.

E. Preliminary Discussion

By now it is clear that the outcome of labour in the patients with O.P. position was influenced by certain maternal factors. These are:

1. Age
2. Stature
3. Parity
4. Rate of Cervical Dilatation
5. Pelvis.

With this understanding, it becomes possible to work out predictive indices on the outcome of labour when the fetal occiput is posteriorly placed.

CHAPTER SIX

THE PREDICTIVE INDICES

A. MATERNAL AGE

The age at which women have their babies influence their reproductive efficiency in all societies. The patients in this study show this remarkably.

In order to see what influence age had on the outcome of labour, the patients were divided into three groups according to their age distribution - under 16 years, 16 - 29 years and 30 and over years. For purposes of clarity and simplicity, Labour Outcome was also divided into two major outcomes, easy and difficult delivery. In the study patients, easy delivery consists of spontaneous vaginal delivery, face to pubes and spontaneous vaginal delivery occiput anterior together with outlet forceps delivery, while difficult delivery consists of Caesarean Section and craniotomy and midcavity forceps delivery with or without rotation. In the Control Patients, easy delivery consists of spontaneous vaginal delivery with or without outlet forceps extraction, while difficult delivery consists of Caesarean Section and craniotomy and midcavity forceps delivery with or without rotation.

Tables 6 and 7 show the contribution made by the various age groups to the outcome of labour in the study and controls.

Table 6

Contribution made by various age groups to outcome of labour in study patients

		Contribution by various age groups (years)		
		Under 16	16 - 29	30 & Over
Labour Outcome	Total	No	No	No
Easy Delivery	58	8 (14%)	46 (79%)	4 (7%)
Difficult Delivery	43	13 (30%)	20 (47%)	10 (23%)

Chi Squared = 12.4,
Df = 2, P<0.01.

Table 7

Contribution made by various age groups to outcome of labour in control patients

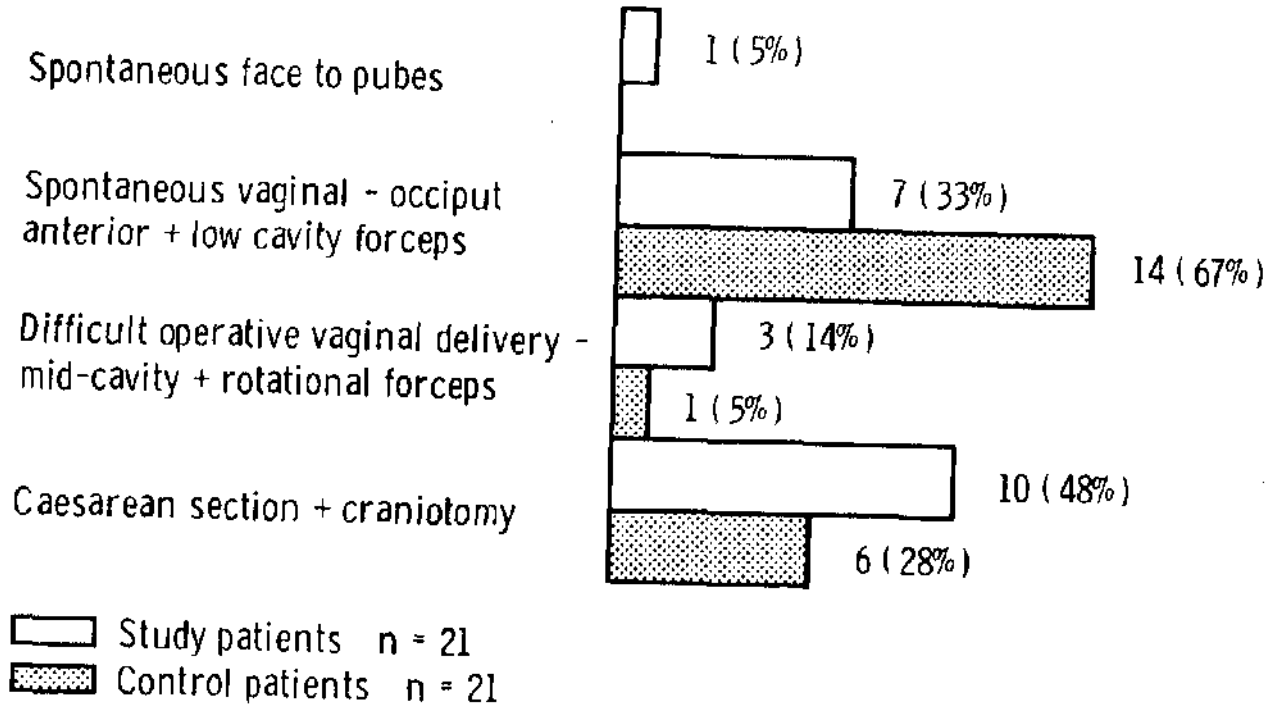
		Contribution made by various age groups (years)		
Labour Outcome	Total	Under 16	16 - 29	30 & Over
Easy Delivery	88	14 (16%)	61 (69%)	13 (15%)
Difficult Delivery	12	7 (58%)	4 (33%)	1 (9%)

Chi Squared = 9.1,

Df = 2, $P < 0.02$.

These two tables show convincingly that age group under 16 and age group 30 and over contribute significantly to difficult delivery. Secondly, it is obvious that even in the study and control patients, the contribution to the incidence of difficult labour by mothers under 16 outweighs that by mothers 30 and over.

Figure 2 shows outcome of labour in patients under 16 years old.



OUTCOME OF LABOUR IN AGE GROUP UNDER 16
FIG. 2

Considering all the above information, tables and figure, one can now conclude that a Nigerian patient, aged under 16, in labour with an O.P. position, has a 62%* chance of having a difficult delivery. On the other hand, if the fetal position is normal, the chances of undergoing a difficult delivery, though still quite high (33%)** are reduced by one half.

* 10 + 3 = 13. $^{13}/_{21} \times 100 = 62\%$

** 6 + 1 = 7. $^{7}/_{21} \times 100 = 33\%$

B. MATERNAL STATURE.

a. Height.

Following the classic work of Baird,[16] we now know that maternal height plays a great part in the reproductive performances of mothers from several races of the world. The negroid race is no exception.

To find out what influence height had on the outcome of labour, the patients were divided into three groups according to their heights, that is less than 1.53 metres, 1.53 - 1.63 metres and over 1.63 metres. Again for purposes of simplicity and clarity, labour outcome was divided as described on page 92.

Tables 8 and 9 show the contribution made by the various height groups to the outcome of labour in the study and control patients.

Table 8

Contribution made by various height groups to outcome of labour in study patients.

		Contribution by various height groups (m)		
		Under 1.53	1.53 - 1.63	Over 1.63
Labour Outcome	**Total**	No (%)	No (%)	No (%)
Easy Delivery	58	11 (19%)	39 (67%)	8 (14%)
Difficult Delivery	43	24 (56%)	16 (37%)	3 (7%)

Chi Squared = 14.6,
Df = 2, $P < 0.001$.

Table 9

Contribution made by various height groups to outcome of labour in control patients

		Contribution by various height groups (m)		
		Under 1.53	1.53-1.63	Over 1.63
Labour Outcome	Total	No(%)	No(%)	No(%)
Easy delivery	88	27(31%)	52(59%)	9(10%)
Difficult delivery	12	7(58%)	3(25%)	2(17%)

Chi squared = 6.3,

Df = 2. $P < 0.05$.

It can be seen from the above that when a mother is of short stature, (< 1.53 metres) difficult delivery is very likely.

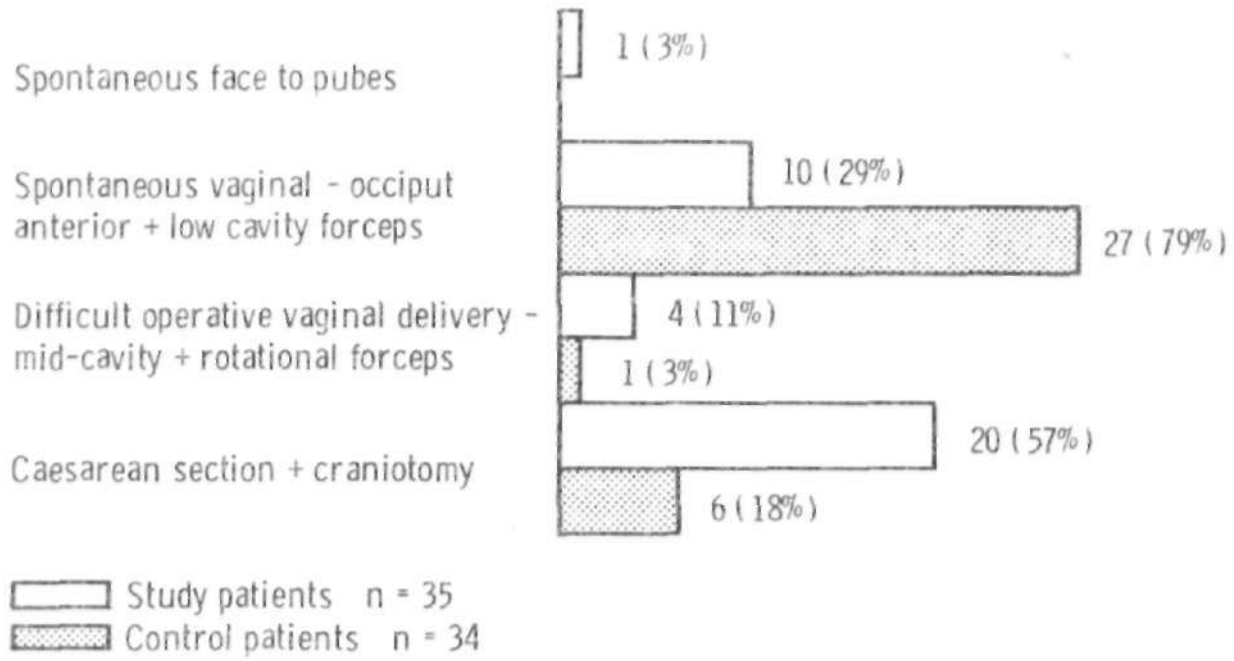
A look at the full compliments of chi - squared for study and control, as shown before, yields further information.

Study: chi squared = 4.1 + 5.4 + 1.5 + 2.1 + 0.7 + 08 = 14.6

Control: chi squared = 0.3 + 2.3 + 0.3 + 2.3 + 0.1 + 1.0 = 6.3

The contribution to chi - squared by the short mothers are 4.1 + 5.4 for the study patients and 0.3 + 2.3 for the control patients. This shows that maternal short stature plays a very dominant role in deciding the outcome of labour where mechanical difficulties are encountered as for example in OP position labours.

Figure 3 shows outcome of labour in short mothers.



OUTCOME OF LABOUR IN MOTHERS OF SHORT STATURE

Fig. 3

Again from the available information, we now conclude that a Nigerian mother of short stature (less than 1.53 m) in labour with an OP position, has a *69% chance of having a difficult labour. On the other hand, if the fetal position is normal, the chances of undergoing a difficult delivery (**21%) are reduced by more than three fold.

Foot note: Calculation

*20 + 4 = 24. 24/35 x 100 = 69%

**6 + 1 = 7 7/34 x 100 = 21%

b. Maternal Weight.

The dystrophia dystocia syndrome described by several authors is regarded as having predictive value on the outcome of labour in cases of OP positions[10, 76, 77]. Classically, such patients are described as small in stature, having broad shoulders and short neck. The fingers are short and with little difference in length of the second, third and fourth digits. When the arm is extended the fingertips reach only a short distance beyond the trochanters. The cervix is small and the vagina rigid and narrow. There is a strong tendency for such an individual to develop pre-eclampsia. Pregnancy almost always continues for more than one or two weeks beyond term. Labour starts normally, but the contractions soon become ineffective and dilation of the cervix is extremely slow.

Engagement of the presenting part tends to be late and occiput posterior positions and deep transverse arrest are common. A high proportion of such women, it is said, fail to make reasonable progress during labour and ultimately come to Caesarean Section.

Measurements of maternal weights in this study could not be done before pregancy for obvious reasons. They were all taken in the immediate puerperium - in some instances as early as 6 hours after delivery. Thomson et al[78] have found that the extra body water which forms the major component of the weight gain in pregnancy might not be completely lost by the time most women are discharged from hospital, about one week after delivery. The postpartum weights in this study are therefore at the best an approximation to antepartum weights.

No publication was found in which maternal weights had been divided into light, average or heavy for a given community. So, in order to do this for the population under study, the mean maternal weight and standard deviation for the 201 patients (study and control) was calculated. The values obtained were 53.1 Kg $\pm$ 10.4 respectively. Mothers whose weights were below one standard deviation less than the mean, i.e. 42.7 Kg, were considered light, while mothers whose weights were one standard deviation or more above the mean, i.e. 63.5 Kg were deemed heavy. On this classification there were 17 heavy patients in the study group (63.5 Kg or more) and 11 in the control group.

But, of these, only one in the study and one in the control was short (under 1.53 m).

It was therefore thought it would be fruitless to analyse figures of short, heavy Nigerians to see if this feature had predictive influence on the outcome of labour.

C. PARITY

Birth order is always mentioned along with maternal age as having great influence on reproductive efficiency. Harrison[62] confirmed that reproductive performance was better in second, third and fourth pregnancies as compared to those of the first and fifth or more. To ascertain the influence of parity on the outcome of labour, the patients were divided into three groups, this time according to birth order. Those who were having their first viable pregnancy formed one group. Another group was having their second to the fourth viable pregnancy while the last group was having their fifth or more viable pregnancy. Labour outcome was divided as before into easy and difficult delivery.

Tables[10] and [11] show the contribution made by the various parity groups to the outcome of labour in the study and control patients.

Table 10

Contribution made by various parity groups to outcome of labour in study patients

		Contribution by various parity groups		
		Parity 1	Parity 2-4	Parity 5 & over
Labour Outcome	Total	No	No	No
Easy delivery	58	29(50%)	20(34%)	9(16%)
Difficult delivery	43	23(53%)	8(19%)	12(28%)

Chi squared = 4.13, Df = 2

$P < 0.10$.

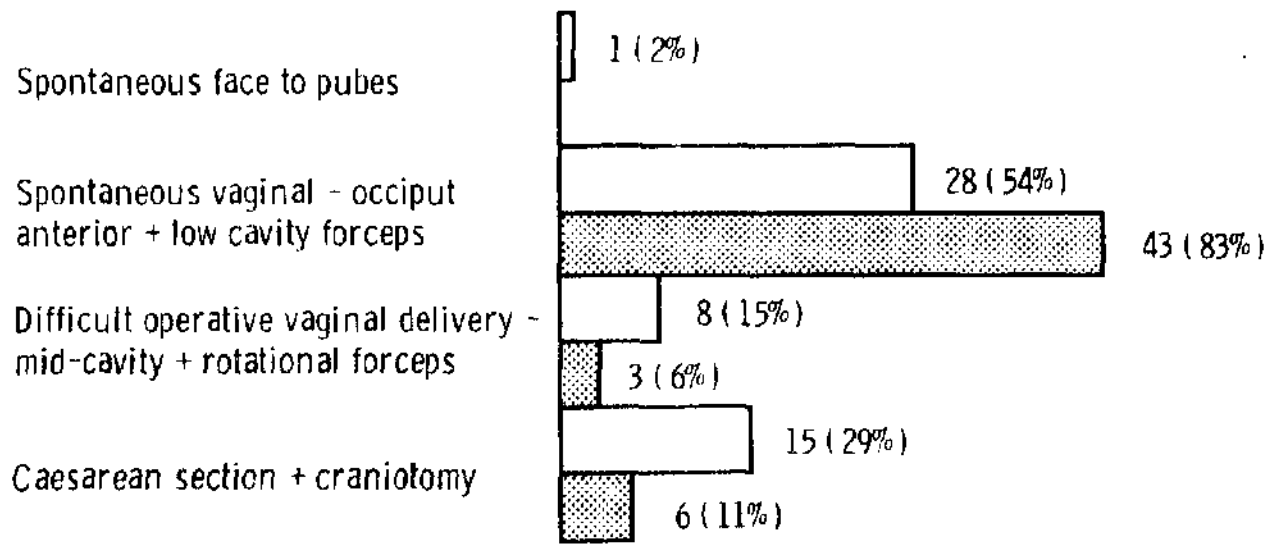
Table 11

Contribution made by various parity groups to outcome of labour in control patients

		Contribution by various parity groups		
Labour outcome	Total	Parity 1 No	Parity 2-4 No	Parity 5 & over No
Easy delivery	88	43(49%)	27(31%)	18(20%)
Difficult delivery	12	9(75%)	1(8%)	2(17%)

Chi squared = 3.16,
Df = 2, P < 0.10.

From the above, and also as confirmed by figure 4 below, the order of viable pregnancy does not appear to affect the outcome of labour.



OUTCOME OF LABOUR IN PRIMIGRAVIDAE

Fig. 4

There are at least two possible explanations for the fact that parity distribution in this study, did not have the generally reported predictive value on the outcome of labour. The first one is that the population sample 101 study and 100 controls is small and that for the effect of parity on labour outcome to be demonstrated, a larger population sample is required.

The second explanation is that the widely reported influence of parity on the outcome of labour might be mediated through some other factor. If this is true, the most likely factor is age. In Northern Nigeria most primigravidae are young and on a global basis, maternal parity tends to rise with maternal age. To test this hypothesis, the outcome of labour in primiparous mothers whose ages were below 16 (the age group already shown to be most vulnerable in OP labours) was ascertained in study and control patients. Table 12 shows the information so obtained.

Table 12

Outcome of labour in Primipara Aged under 16 years

	Group of Patients	
	Study (21)	Control (21)
Labour outcome	No (%)	No (%)
Easy delivery	8(38%)	15(71%)
Difficult delivery	13(62%)	6(29%)

Chi - squared = 4.55,
Df = 1, P< 0.05.

It seems, therefore, that as far as parity is concerned, it is the immature (under 16 years) primiparous mother that is very likely to have a difficult labour.

C. RATE OF CERVICAL DILATION

Philpott's partogram for graphic charting of labour has now been employed extensively in several parts of the world.[79-84] In this study partograms were kept for each patient and from them not only were graphic records of each patient's labour obtained, but also the total durations of labour and so the rates of cervical dilation. Rate of cervical dilation has been found to correlate accurately with the outcome of labour for a whole population. Thus, the higher the cervical dilation rate, the higher the probability of spontaneous delivery while the lower the rate, the higher the probability of assisted delivery or Caesarean Section.[85,86] Davidson et al [87] suggest that if the cervix took longer than two hours to dilate from 7 - 10 cm, delivery was likely to be difficult. This is supported by James and Chiswick[88] who went further to construct partograms to be used as standards against which the speed of cervical dilation may be assessed in individual labours when the fetal head is not in the occiput anterior position.

Table 13 shows average duration of labour for each labour outcome in the study.

Table 13

Average duration of labour in various labour outcome

	Labour Outcome			
	Spont. face to pubes	Easy vaginal delivery	Difficult op. vag. del.	Caesarean Sec./ Craniotomy
Groups of patients	Average duration in hours (±) SD			
Study	10.5(±5.6)	17.2(±8.6)	26(±11.7)	32.4(±19.1)
Control	-	12.3(±6.0)	27.7(±9.5)	22.6(±13.3)

On the whole, labour was more prolonged in the study as compared to the controls. The average duration of labour in the Caesarean Section/Craniotomy patients was shorter than that in the difficult operative vaginal delivery patients in the control group. This is because a lot of patients in the control series, unlike the study patients, came to hospital fairly early when difficulties arose in labour. Cephalo-pelvic disproportion was therefore diagnosed in time and correct treatment instituted.

Also from the duration of labour for each patient, the rate of cervical dilation in cm per hour was calculated. It was then easy to compute the average rate of cervical dilation for each mode of delivery as shown below in Table 14.

Table 14

Rates of cervical dilation with different modes of delivery

Mode of delivery	Rates of cervical dilation in cm/hour Groups of patients Study	 Control
Spontaneous face to pubes	1.3	-
Spontaneous vaginal delivery - occiput anterior and low cavity forceps	0.79	1.08
Difficult operative vaginal delivery - mid cavity & rotational forceps	0.51	0.41
Caesarean Section/Craniotomy	0.38	0.63

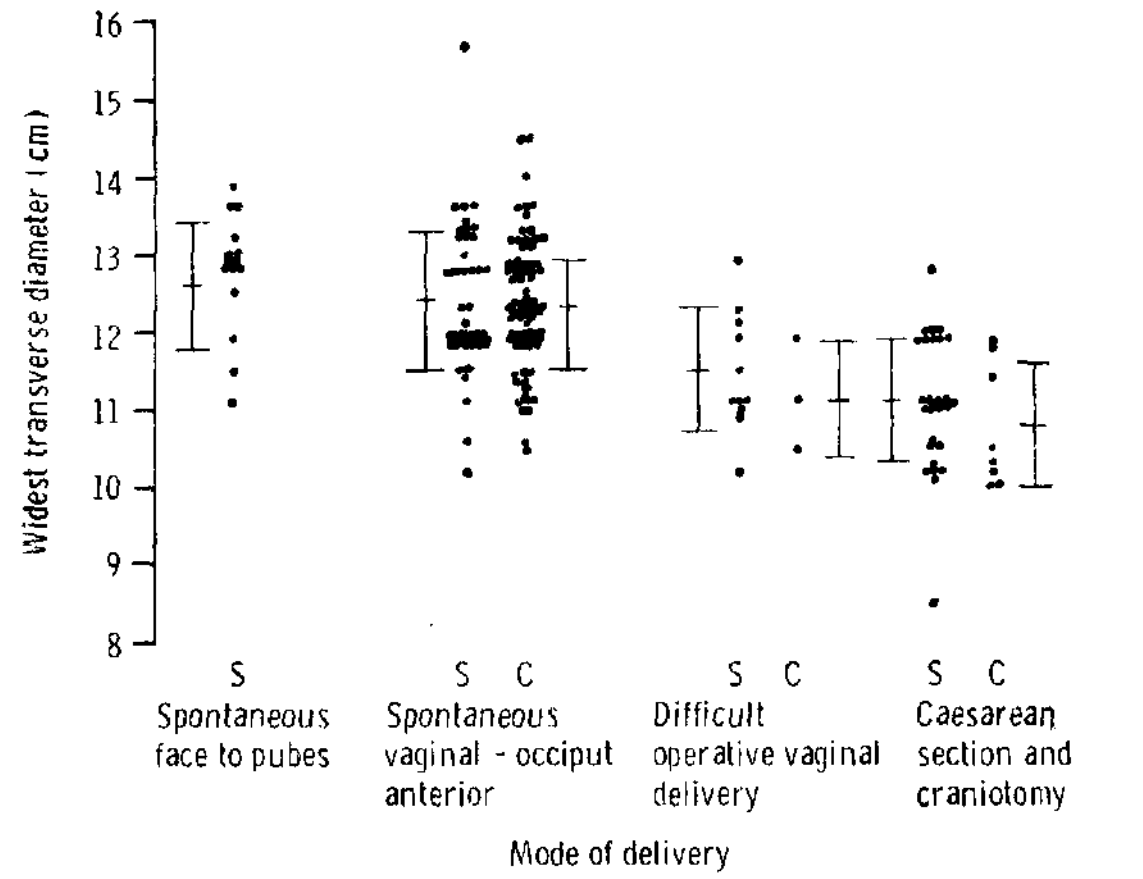
By the standards of modern obstetrics, the above durations of labour are too long, and the rates of cervical dilation too slow. Several reasons may be responsible for this. Cephalopelvic disproportion is common in our patients and this is often associated with prolonged labour. Lister[54] has stated that prolonged labour in Nigerians of over 24 hours is almost invariably due to disproportion. Active management of labour is not practised in our unit as a result of heavy workload and gross shortages in equipment, nursing and medical personnel. By this method, O'Driscol and Strong were able to reduce duration of labour to under 12 hours in 1,000 consecutive primigravidae[65]. In the belief that rotation of the fetal head would accelerate dilation of the cervix when the first stage is prolonged, Arthure and Holmes have even advocated rotation with Kiellands forceps in the first stage of labour[89].

However, using our present data as predictive indices, we find that for a Nigerian mother in labour with an OP position, if cervical dilation measured in the active phase of labour is proceeding at a rate of more than 0.8 cm per hour, the outlook for an easy vaginal delivery is good. If the rate is between 0.8 and 0.4 cm, vaginal delivery could still occur, but this might require a difficult instrumental extraction. On the other hand, if the dilation rate is below 0.4 cm per hour, the outlook for a vaginal delivery is poor.

D. THE PELVIS

The pelvis of all patients were studied clinically and radiologically but because clinical measurements are very imprecise, only radiological measurements were recorded. The study of the human pelvis by means of X-ray pelvimetry is a very old method of investigation indeed. In the course of these studies, mainly for simplicity, various pelvic classifications have been suggested. Among these are, those by Turner[90], Thoms[91], Allen[92], Nicholson[93] but that by Caldwell and Moloy[94] into gynaecoid, anthropoid, android and platypelloid has achieved world-wide acceptance. But the description of the composition of these pelvic groups is very subjective and have been challenged by Nicholson and Sandman[95]. These pelvic classifications were therefore not used in this study, interest being restricted to critical pelvic measurements below which vaginal delivery was unlikely. As for using radiography in predicting the course of labour, this has been recommended by several authors[96-101]. Inlet and lateral pelvimetries were therefore carried out on all patients as previously described. From the results obtained, the following figures and tables were constructed.

a. Widest transverse diameter at the pelvic inlet - Fig. 5



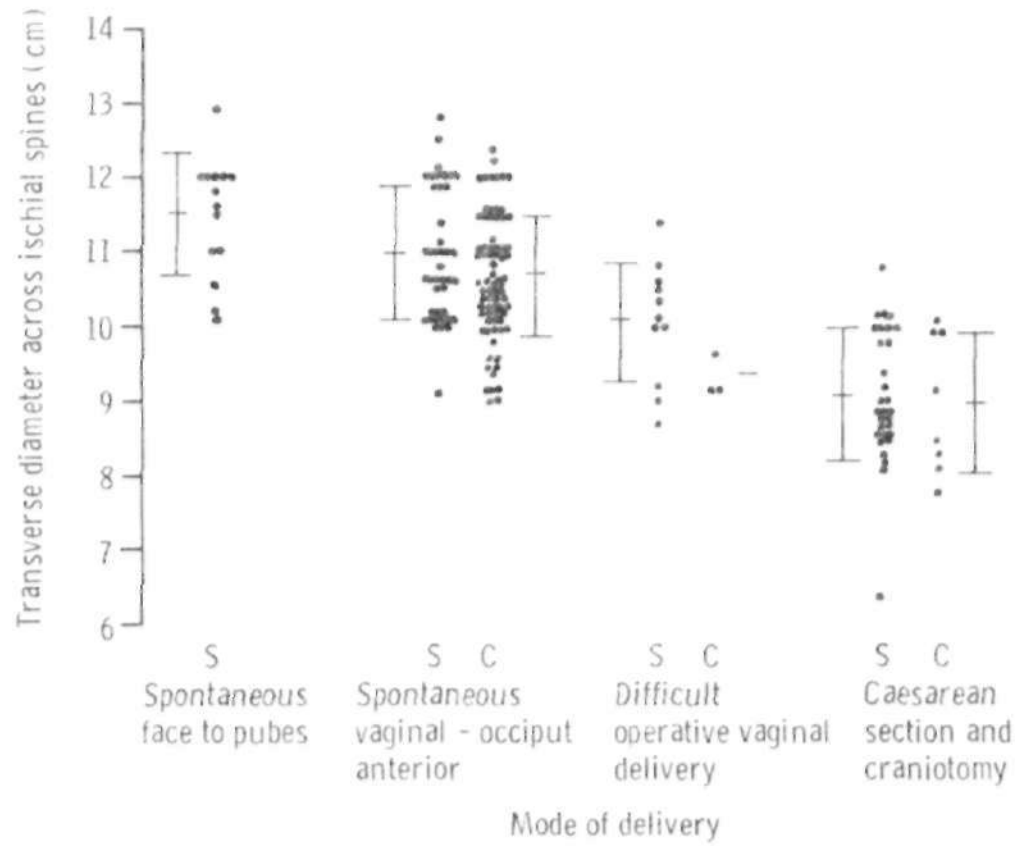
Bars = Mean ± standard deviation

WIDEST TRANSVERSE DIAMETER WITH VARIOUS MODES OF DELIVERY

Fig. 5

It can be seen that except in two instances, no patient with a widest transverse diameter at the pelvic brim of less than 10.5 cm achieved vaginal delivery in the study patients.

b. Bi-Ischial spinous diameter - Fig. 6.



Bars = Mean ± standard deviation

BI-ISCHIAL SPINOUS DIAMETER WITH VARIOUS MODES OF DELIVERY

Fig. 6

Here 8.7 cm seems to be the value below which vaginal delivery was not achieved.

c. Separation of the Symphysis.

One of the most exhaustive reports so far on the separation of the symphysis in pregnancy and parturition is that of Heyman and Lundqvist[102] who investigated 74 pregnant and 8 parturient mothers. They concluded that separation occurred only in pregnancy, it started early and had ceased by the second or third month to the end of the pregnancy. No separation occurred in labour and the actual widening was small - no more than 1.2 mm. Separation was wider in multips as compared with controls and that after delivery the symphysis appears to reassume its original width. They rejected mechanical pressure being responsible for this separation and put it down to be due to an active biological process probably hormonal. Putschar [103] confirmed from his studies of pelvic joints of 198 patients (87 males and 111 females) that the human symphysis pubis undergoes a variety of changes under the influence of age and function. In addition to all this that is now known, occasionally after spontaneous delivery, especially if precipitate, a painful wide separation of the symphysis occurs limiting ambulation.

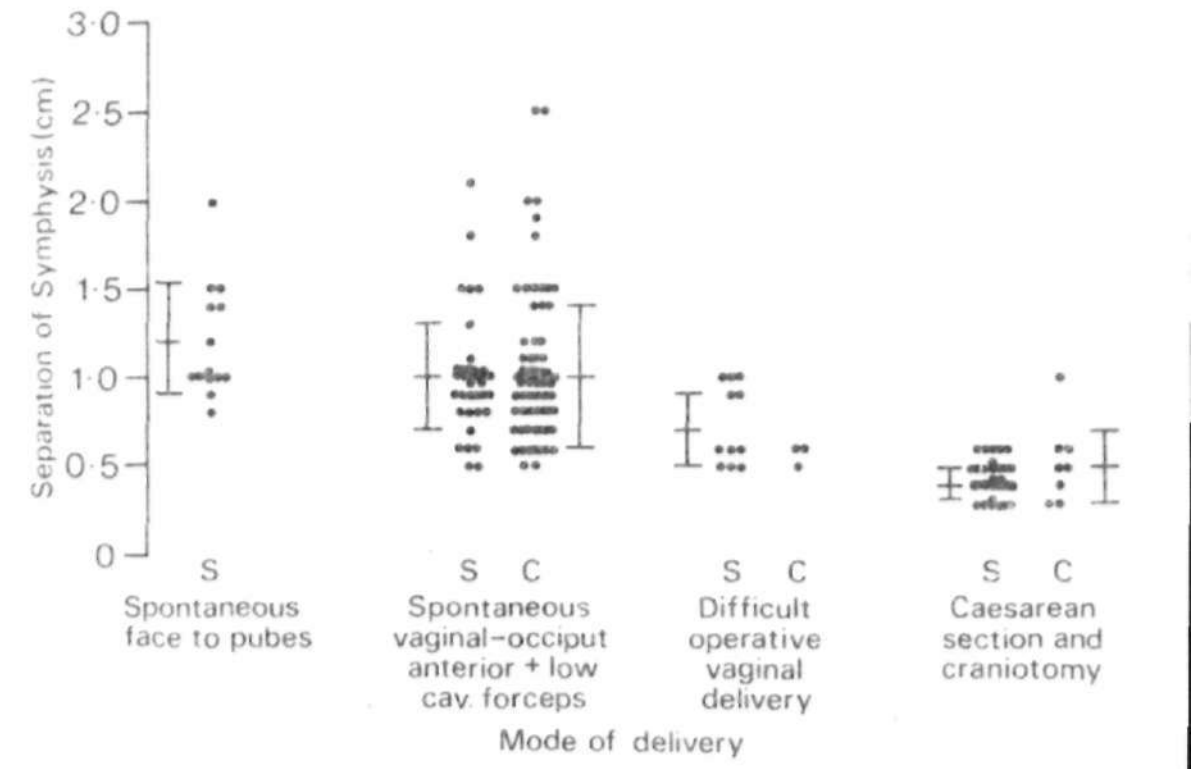
This is the condition of acute separation of the symphysis or pelvic arthropathy.

Long before all those, the theory of 'Disjunction Pelvica' accredited to Hippocrates by Ingerslev[104] had been postulated. This stated that an appreiciable degree of separation occurred at the symphysis in labour to make room for passage of the baby. The theory was rejected. It was, therefore, surprising to discover that not only was an appreciable degree of symphisial separation noted on the postpartum pelvimetry films of our patients (Fig. 7) but as shown



SEPARATION OF THE SYMPHYSIS
Fig. 7

On fig. 8, the measurements of these separations correlated with the outcome of labour.



Bars = Mean ± standard deviation

SEPARATION OF SYMPHYSIS WITH VARIOUS MODES OF DELIVERY

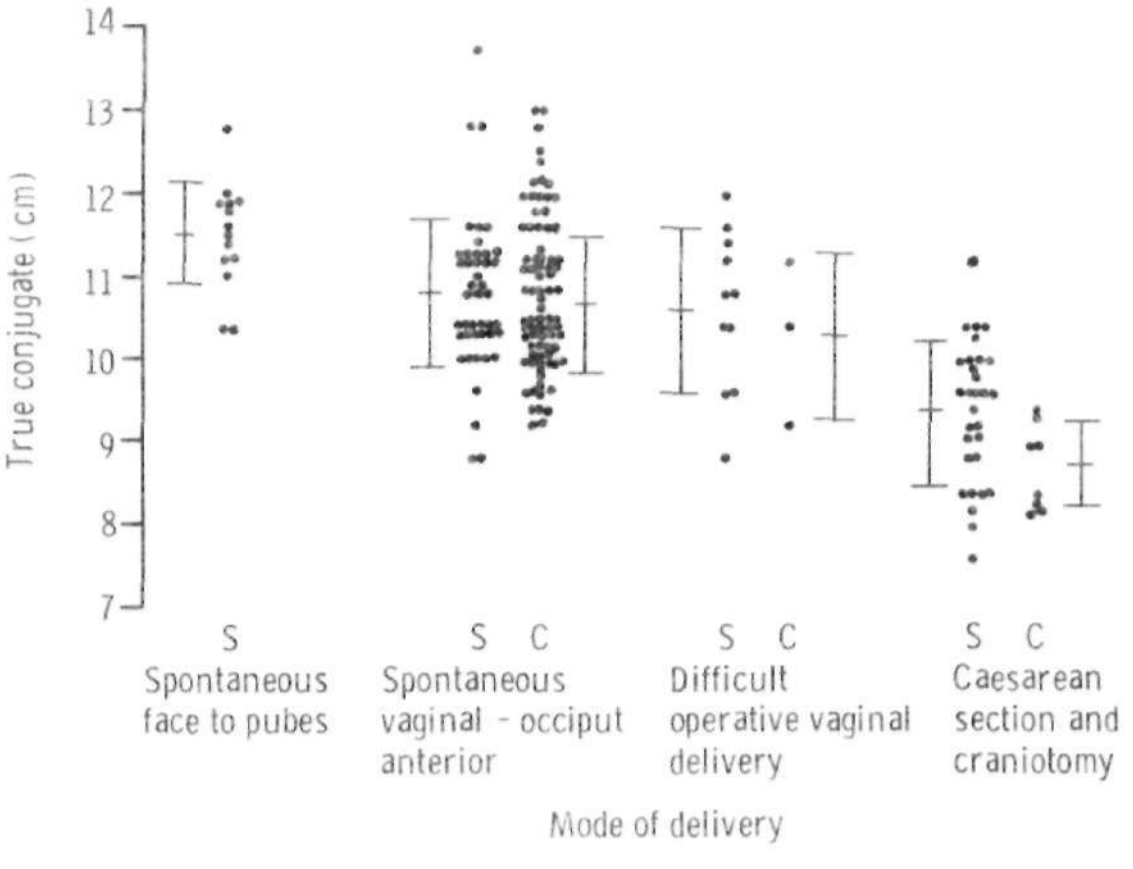
Fig 8

These patients were all completely symptom free contrary to the report by Callaghan[105] that separation of 1 cm or more in labour should produce symptoms.

It is not being suggested that separation of the symphysis noticed in this series all occurred in labour, but their close correlation with the outcome of labour suggests that at least, in part, they had something to do with the process of labour. The final amount by which separation would occur can only be judged postpartum and this precludes its use as a predictive factor on the outcome of labour.

d. True Conjugate - Fig. 9.

Once again 8.8 cm seems to be the value below which vaginal delivery was not achieved.

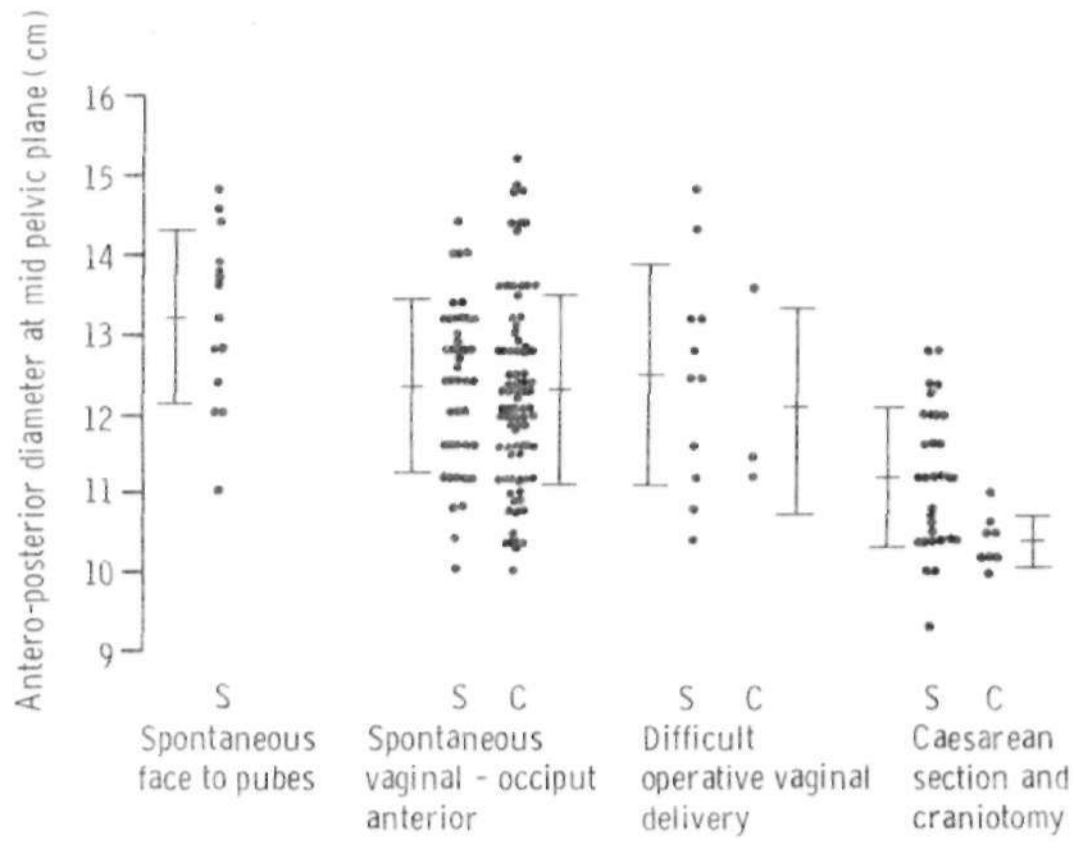


Bars = Mean ± standard deviation

TRUE CONJUGATE VALUES WITH VARIOUS MODES OF DELIVERY.

Fig. 9

e. Antero - posterior diameter of mid-pelvic plane - Fig. 10.



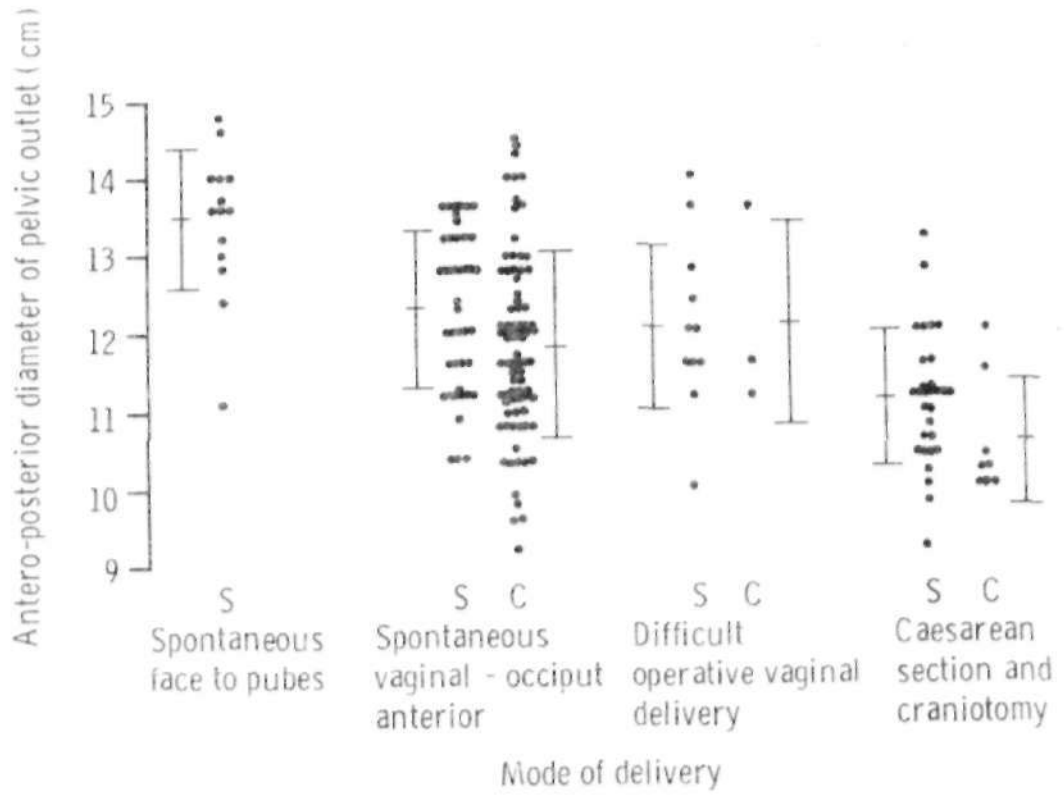
Bars = Mean ± standard deviation

VALUES OF A-P DIAMETER AT MID PELVIC PLANE WITH VARIOUS MODES OF DELIVERY

Fig. 10

Vaginal delivery did not occur when the A-P diameter of the mid pelvic plane was less than 10 cm.

f. Antero - posterior diameter of bony pelvic outlet - Fig. 11



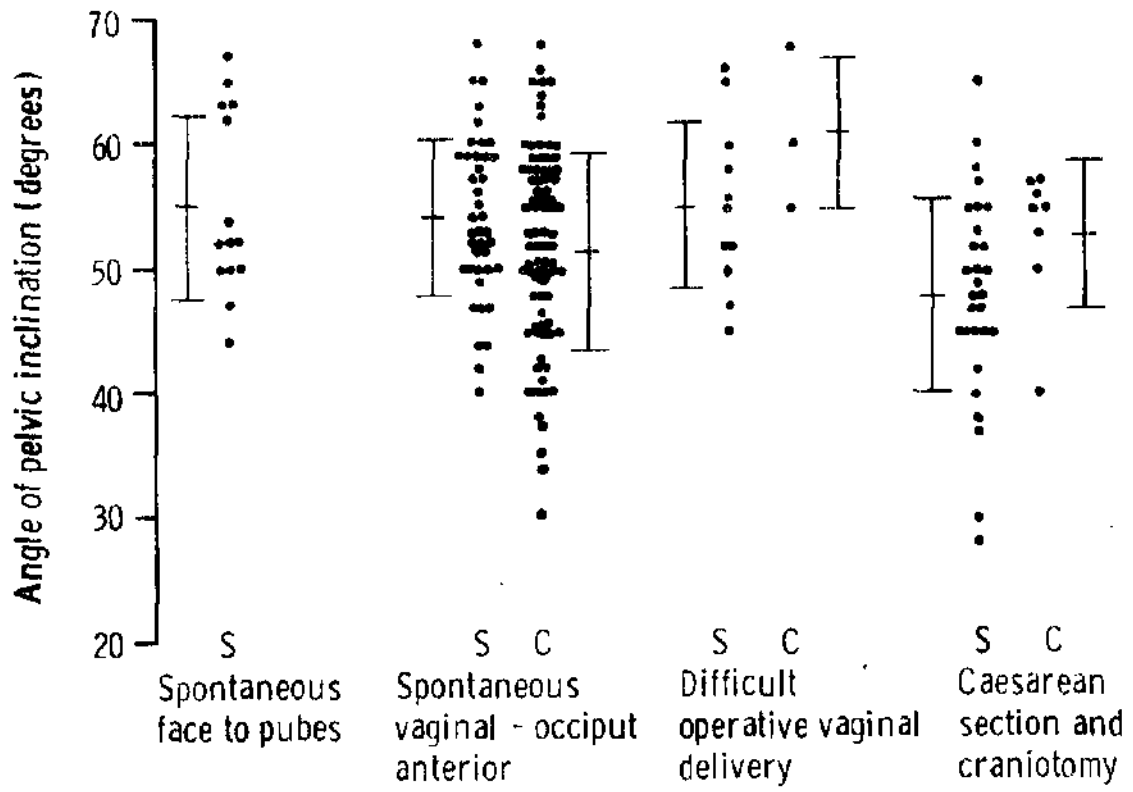
Bars = Mean ± standard deviation

VALUES OF A-P DIAMETER AT BONY PELVIC OUTLET WITH VARIOUS MODES OF DELIVERY

Fig. 11

For the study patient, except in one instance, vaginal delivery did not occur when AP diameter of bony pelvic outlet was less than 10.4 cm.

g. Angle of pelvic inclination to the horizontal - Fig. 12.



Bars = Mean ± standard deviation

ANGLE OF PELVIC INCLINATION WITH VARIOUS MODES OF DELIVERY

Fig. 12

The correlation here was so poor that pelvic inclination to the horizontal could not be regarded as having predictive value on the outcome of labour. The same was true pf the tilt of the sacrum.

h. Sacral abnormality

The prevalence of sacral abnormality - flat or concave sacrum is shown in Table 15.

Table 15

Prevalence of Sacral Abnormality in Study Patients

Labour Outcome	Sacral Abnormality Present No of Patients	Sacral Abnormality Absent No of Patients
Easy Delivery	9	49
Difficult Delivery	12	29

Chi squared = 2.43, Df = 1, P>0.10.

The lack of statistical significance here might be due to inadequate population sample.

It would be seen that other than the true conjugate, the measurements derived from the lateral pelvimetry correlated poorly with labour outcome. On the other hand, measurements derived from the inlet view, that is, widest transverse diameter, bi-spinous diameter (and symphysial separation) correlated well with labour outcome.

From the above informations, Table 16 showing values of pelvic measurements below which vaginal delivery was unlikely in the Nigerian mother with an O.P. position was constructed.

Table 16

PELVIC MEASUREMENTS

* CRITICAL VALUE FOR STUDY GROUP PATIENTS

Diameter	Value in cm
Inlet View	
** Widest transverse	10.5
** Bi-Ischial Spinous	8.7
Lateral View	
** True Conjugate	8.8
A-P Mid plane	10.0
A-P Bony Outlet	10.4

* Values below which vaginal delivery was unlikely.

** Diameters that correlated well with outcome of labour.

Hawksworth and Allen[106] point out that prediction of the course of labour based upon the knowledge of radiology is reliable to a degree largely dependent upon the experience and interest of the radiologist. In good hands, it has probably an overall accuracy of about 85%, and to this extent can reasonably be relied upon to separate cases into those which will deliver normally, those in which Caesarean Section will be required, and a residudal borderline group. The division of cases into each group is ultimately the responsibility of the obstetrician with the knowledge of all factors involved.

CHAPTER SEVEN

NON PREDICTIVE INDICES

In this chapter will be discussed various factors which have been thought at one time or the other to have an influence on the outcome of labour, particularly in O.P. positions but which were not found by this study to play a very significant role.

A. FETAL SIZE

We have seen that cephalopelvic disproportion is common in the tropics particularly with O.P. labours. This is presumably due to the fact that O.P. position and its associated deflection cause impaction of the head before it reaches the curve of the birth canal. Two factors make up the ratio of disproportion; maternal pelvis and fetal size. Maternal pelvis has been discussed and found to play a dominant role in deciding the various outcomes of labour in the study group patients. This section will now investigate the contribution of fetal size to the ratio of disproportion. Fetal birth weights and fetal occipito-frontal head circumferences will be used as measures of fetal size as these are very easily obtained at birth without any further calculations.

1. Fetal birth weight.

Table 17 shows mean fetal birth weight distributions for each outcome of labour in the study patients.

Table 17 **Mean** Fetal Birthweights with Various Outc**omes** of Labour in Study Groups Patients

Spontaneous Face to pubes	Spontaneous Vaginal - Occiput Anterior	Difficult Operative Vaginal Delivery	Caesarean Section/ Craniotomy
$\bar{x}$ 3.296Kg	$\bar{x}$ 3.21 Kg	$\bar{x}$ 3.336 Kg	$\bar{x}$ 2.957
SD ± 0.424	SD ± 0.37	SD ± 0.590	SD ± 0.535
n 14	n 44	n 11	n 32

$\bar{x}$ = mean, SD = standard deviation, n = number of patients.

Analysis of variance shows that the differences are not significant. The figures reveal more informations. The Caesarean Section/craniotomy group, the patients with the greatest mechanical difficulty, had the least mean fetal birth weight and as many as 16% of babies born to mothers in that group weighed less than 2.5 Kg. (page 47). No patient in any other group delivered a baby that weighed less than 2.5 Kg. There are at least two possible explanations for the above findings. One is that within the range of 2.0 - 4.5 Kg. (range of fetal birth weights for study group patients), fetal birth weight does not play an appreciable role in deciding the mode of delivery. This is partly supported by Walss and Keefer[107] who in a retrospective review found mean fetal birth weights of babies born by Caesarean Section lower than babies delivered vaginally. On the other hand, the maternal pelves of the Caesarean Section/Craniotomy patients may have been so grossly contracted that even babies who weighed 2.5 Kg or less had difficulty in being born vaginally.

2. Occipito-Frontal Head Circumference.

Table 18 shows mean occipito-frontal head circumferences of babies born to mothers in the different sub-groups of the study patients according to outcome of labour.

Table 18 Mean Occipito-Frontal Head Circumferences of Babies Born to Mothers in Study Group with Different Modes of Delivery

Spontaneous Face to Pubes Delivery	Spontaneous Vaginal - Occiput Anterior	Difficult Operative Vaginal Delivery	Caesarean Section/ Craniotomy
$\bar{x}$ 35.285 cm	$\bar{x}$ 34.613 cm	$\bar{x}$ 34.818 cm	$\bar{x}$ 32.943 cm
SD ± 2.643	SD ± 1.93	SD ± 1.940	SD ± 8.25
n 14	n 44	n 11	n 30

$\bar{x}$ = mean, SD = standard deviation, n = number of patients.

Analysis of variance shows that the differences are not significant.

We therefore can conclude that in the absence of gross maternal or fetal complications, neither fetal birth weight nor head circumference markedly offsets the outcome of labour in O.P. positions. This finding is supported by the report of James and Chiswick[88].

B. TYPE OF MALPOSITION

In addition to being commoner than the left occipito posterior position[108], right occipito posterior position is considered more likely to be associated with difficult labour, the direct occipito posterior position being on the whole rare[51]. Page 41 shows that out of the 101 study patients in 60 the posteriorly placed occiput was on the right while it was on the left in 33 patients (ratio approximately 2:1). The differences on the outcome of labour also shown on the same page are not significant (Chi squared = 5.97, Df = 3, $P > 0.50$).

C. EARLY ENGAGEMENT OF THE FETAL HEAD

In general, if the fetal head is engaged in late pregnancy or before attainment of 4 cm. cervical dilation, prospects for vaginal delivery are good especially for primigravidae. In this study, patients with engaged fetal head in early labour were very few and so no statistical inferences could be made using this factor in predicting labour outcome.

This lack of engagement of the fetal head in early labour is common amongst negroid patients [54, 109, 110], unlike what obtains in their Caucasian counterparts.

D. MECONIUM STAINED LIQUOR

Meconium staining of the liquor is accepted as one of the manifestations of fetal distress. Although the majority of meconium staining of liquor occured in the patients that needed operative delivery, they appeared late long after the positive predictive indices that had been discussed.

E. PRESENCE OF PREVIOUS OBSTETRIC ABNORMALITY

Here again, the number of patients who had had a previous obstetric abnormality of a mechanical nature were very few. This could therefore not be used as a predictive index.

CHAPTER EIGHT

GENERAL DISCUSSION

In this chapter the various predictive indices will be discussed further. The contribution this thesis has made to medical knowledge will be stated and further lines of research in this field suggested. Finally, critical comments will be made on some aspects of the study.

1. Maternal Age and Parity

This study has shown that maternal age and to a lesser extent parity, greatly influence labour outcome especially in instances where mechanical difficulties are encountered. The very young mothers having their first babies have an increased risk of undergoing a difficult labour, not only in negroids but also in the Caucasians [111, 112]. It follows therefore that in a community such as ours, where an early start to childbearing is practised and encouraged,[113] O.P. positions will pose greater problems than necessary.

Thomson and Baird [114] reporting on childbearing in the African villages of Keneba and Imesi found that 15% of pregnant women were expecting their first babies and over 40% had had 4 or more previous babies.

This is in marked contrast to the situation in Aberdeen in the United Kingdom where nearly 40% of pregnant women were primigravidae [115]. At the moment, about 10% of patients who have their babies at the A. B. U. Hospital, Zaria are below 16 years old and expecting their first babies. The corresponding figure for Caucasians at the Queen Charlotte Maternity Hospital, London is well below 1%.

Influences of maternal age and parity are of course mediated by economic circumstances, cultural practices, beliefs, genetic predisposition, health, nutritional status, environmental conditions and medical care; but even under the best conditions, differential risks by age and parity persist[116,117].

2. Maternal Height

Maternal height was another factor found to have had great predictive influence on the outcome of labour. In this respect the short mothers (height below 153 cm) taken as a group were found to be very significantly different from the medium or tall mothers. Labour in the short mothers was often difficult and was terminated frequently by a difficult forceps, Caesarean Section or Craniotomy. Effiong and Banjoko[110] found that 40% of Southern Nigerian primigravidae were of short stature. In Lister's[54] series of 320 cases of obstructed labour in Southern Nigeria, about 25% of the mothers were short.

Knutzen and Davey comparing maternal heights in white and black mothers in South Africa found that black women were significantly shorter [118]. In the Zaria community about ⅓ of the childbearing population is stunted [113]. It seems therefore that the prevalence of short stature among parturient mothers is higher in Africans as compared to whites. This will lead to an increase in mechanical difficulties when labour is complicated by O.P. positions.

Height is to a large extent genetically determined but it is generally agreed that the full potential for growth may not be attained unless the environment in childhood is favourable. In the tropics therefore where intercurrent infections and malnutrition are common in infancy [119 - 121], full growth potentials will probably not be obtained in a lot of instances. In addition, there is the practice of early start to childbearing which brings to motherhood girls that are still growing and are yet to attain maturity.

3. Fetal Size

It is interesting to note that fetal size did not contribute significantly to the outcome of labour. The fetal birth weights and head circumference recorded in this study are good even by Caucasian standards.

Heyns [122] studied the weights and dimensions of the skull of the children in South Africa and found that the differences between the Bantu and European fetal heads at term is insignificant. It is probable therefore that the greater difficulty encountered by African mothers with O.P. positions is not exclusively due to larger babies.

4. The Maternal Pelvis

Fetal size, powers of uterine contractions and maternal pelvic architecture should all contribute to the course of labour. Fetal size in Africans, as has been seen, may not be very different from the Caucasians. Although there has been no known proper studies on uterine contractility in Africans, this is generally held to be good [54, 122, 123]. Differences on the outcome of labour in African mothers should therefore relate substantially to differences in pelvic architecture. This study confirms that contracted pelvis is more commonly found in patients that had difficult delivery, both in study and control patients.

It has been suggested that pelvic contracture might be a major cause of O.P. position [11, 124-128]. This study does not confirm that impression.

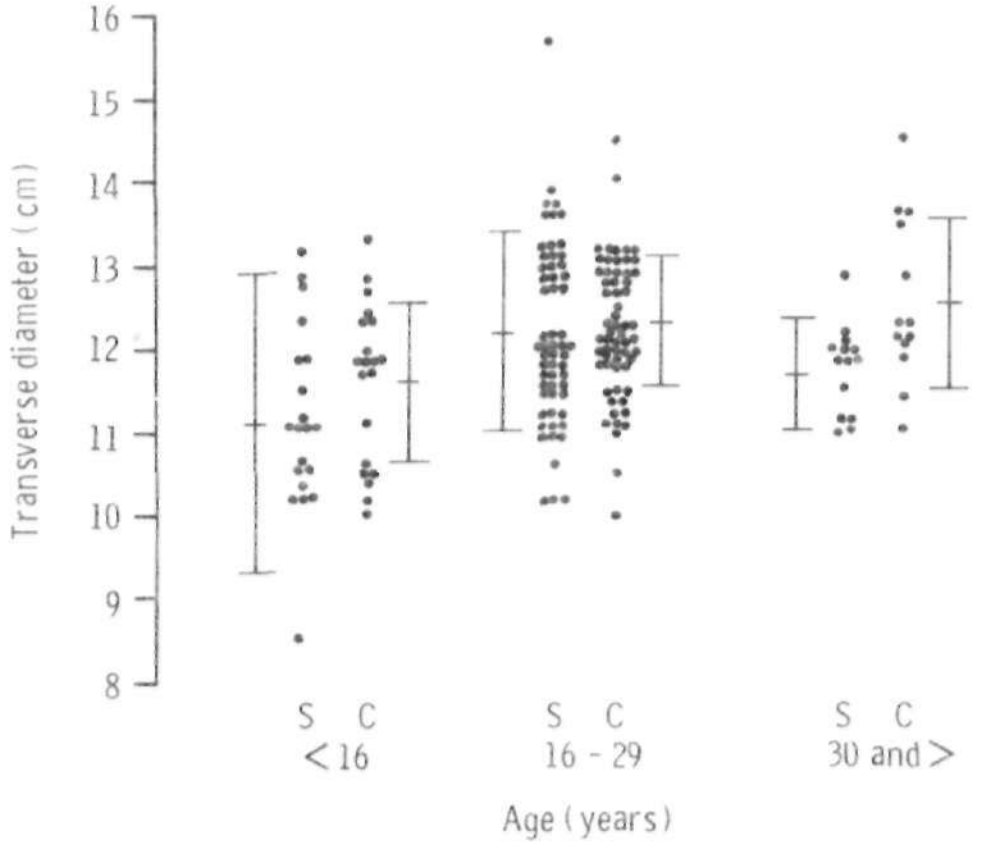
Figures 5, 6, 9, 10 and 11, where comparisons are made using various pelvic measurements between study and control patients, show that in several instances, the mean value for the pelvic measurement is better in the study patient for a particular mode of delivery. But even with this, mechanical difficulty was commoner with the study patients which confirms the findings of Aurthur and Holmes [89] that although a pelvis is adequate for normal delivery with O A, prolonged labour ending in difficult forceps or Caesarean Section may be encountered if the head is O.P. When published figures of pelvic measurements are compared in different races, Table [19], it becomes clear that the female negroid pelvis is on the average smaller than that of white races. Kaltreides[129] in the United States found contracted pelvis to be present in 10.7% of negros he investigated as compared with 1.08% in Caucasians. Even more recently Heyns[130] and Stewart[131] have found that the African pelvis is small in all dimensions. The negroid pelvis may therefore in many instances just be adequate for easy deliveries uncomplicated by malpositions, but inadequate when the extra demands of an O.P. labour are brought into play.

Table 19

Comparison of Pelvic Measurements of Different Races

Origin	Pelvic Measurements (cm.)					
	Widest Transverse diameter at pelvic inlet			True conjugate		
	Mean	Range	± SD	Mean	Range	± SD
Ugandan Ganda[123]	-	-	-	9.97	8.1-11.8	0.85
South African Bantu[132]	-	-	-	10.59	8.2-12.5	0.81
Nigerians (this research)						
Study patients	11.93	8.5-15.7	1.08	10.43	7.6-13.7	1.14
Control patients	12.18	10.0-14.5	0.90	10.63	8.2-12.8	1.07
English[133]	-	-	-	11.83	8.7-15.0	1.0
Welsh[134]	-	-	-	12.15	9.5-14.5	1.02
American Whites[135]	13.5	-	-	12.0	-	-
Unspecified[136] (but probably Caucasian)	13.1	-	-	11.2	-	-
Scottish[137]	-	-	-	11.5	-	-

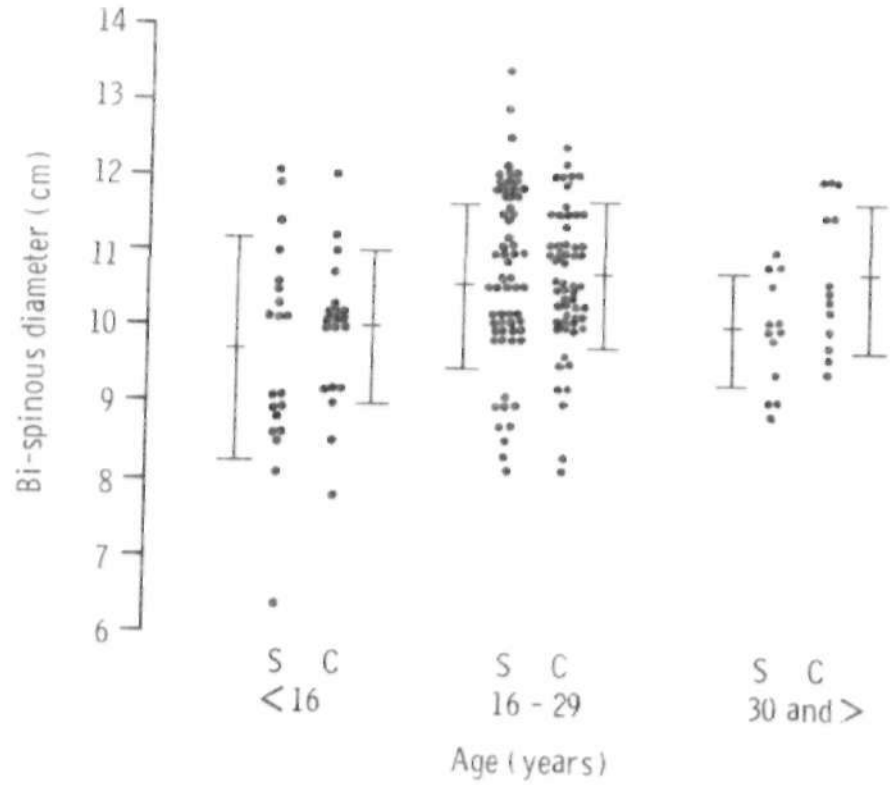
If the maternal pelvis plays such a crucial role in influencing labour outcome, then it should relate to the other equally important factors of age and height. In the following three illustrations, scatter diagrams of the pelvic measurements previously found to correlate with outcome of labour, namely widest transverse diameter at pelvic inlet, bi-ischial spinous diameter and true conjugate are drawn for different age groups in study as well as control patients. - Fig. 13, 14, 15.



Bars = Mean ± Standard deviation

WIDEST TRANSVERSE DIAMETER WITH VARIOUS AGE GROUPS

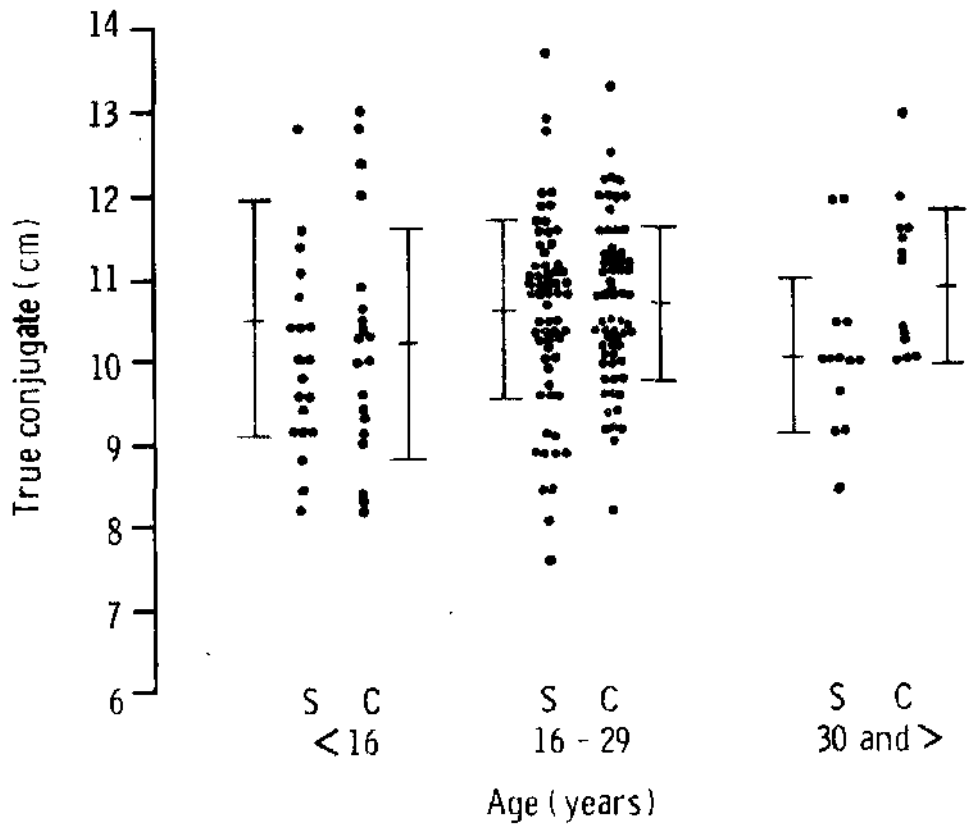
Fig. 13



Bars = Mean ± Standard deviation

BI-ISCHIAL SPINOUS DIAMETER WITH VARIOUS AGE GROUPS

Fig. 14



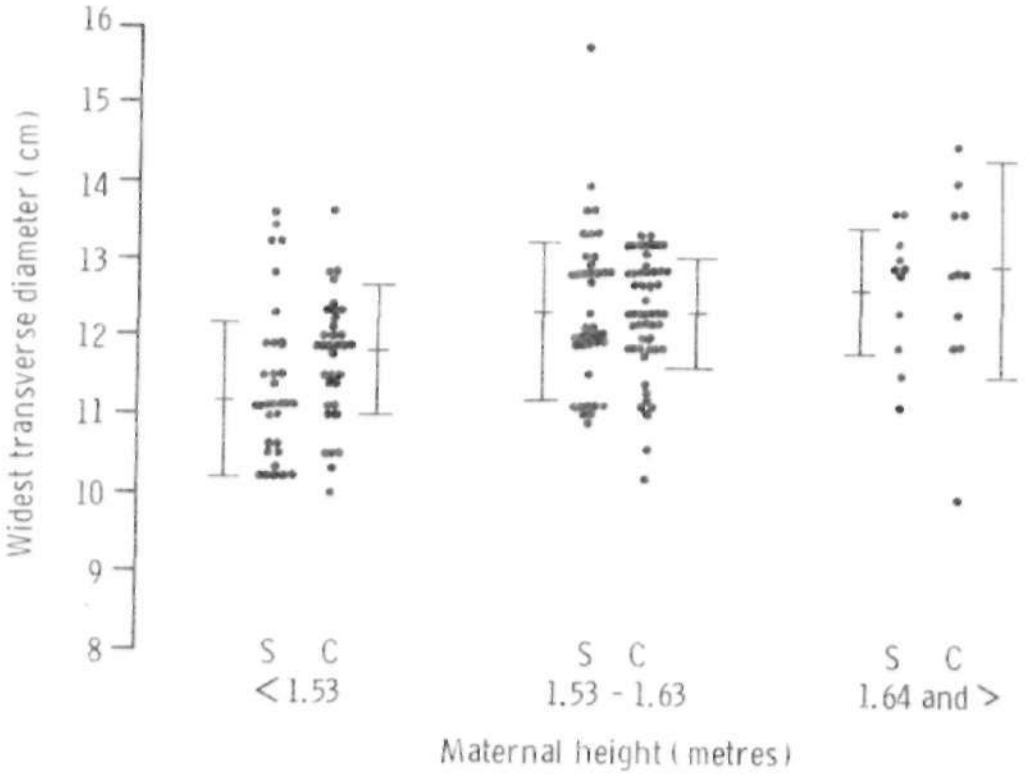
Bars = Mean ± standard deviation

TRUE CONJUGATE VALUES WITH VARIOUS AGE GROUPS

Fig. 15

The respective values for P are <0.05, >0.1 and >0.1 showing that statistically significant difference was obtained only with measurements of widest transverse diameter at pelvic inlet.

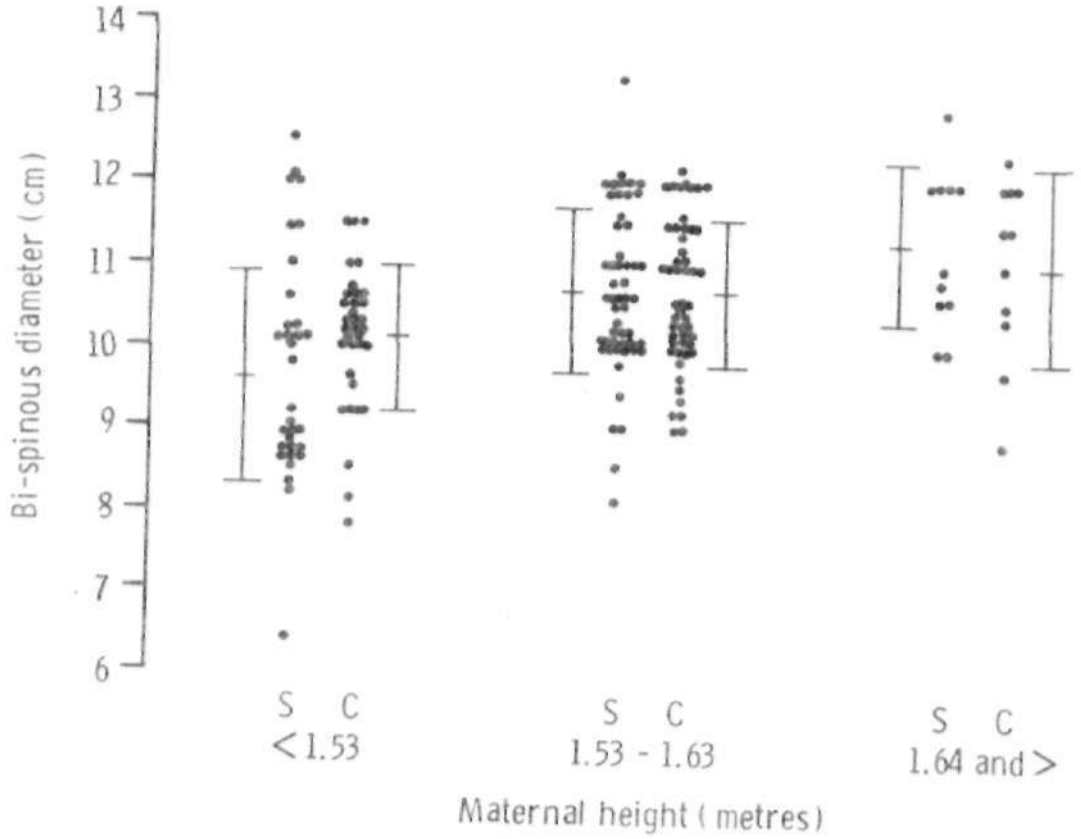
Using the same method of illustration, scatter diagrams (fig. 16, 17 and 18) were plotted for various height groups: <1.53 metres, 1.53 - 1.63 metres and >1.63 metres.



Bars = Mean ± Standard deviation

WIDEST TRANSVERSE DIAMETER AT VARIOUS MATERNAL HEIGHTS

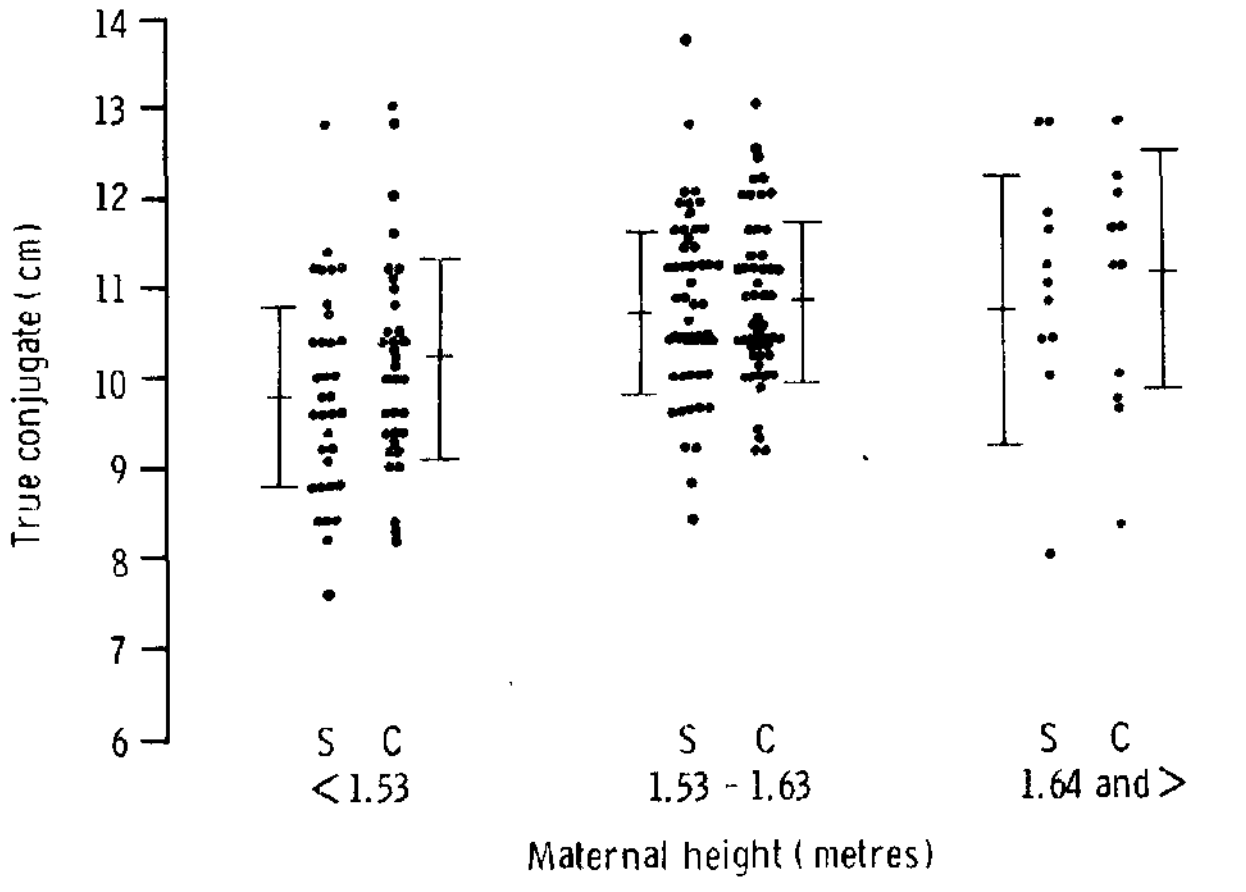
Fig. 16



Bars = Mean ± Standard deviation

BI-ISCHIAL SPINOUS DIAMETER AT VARIOUS MATERNAL HEIGHTS

Fig. 17



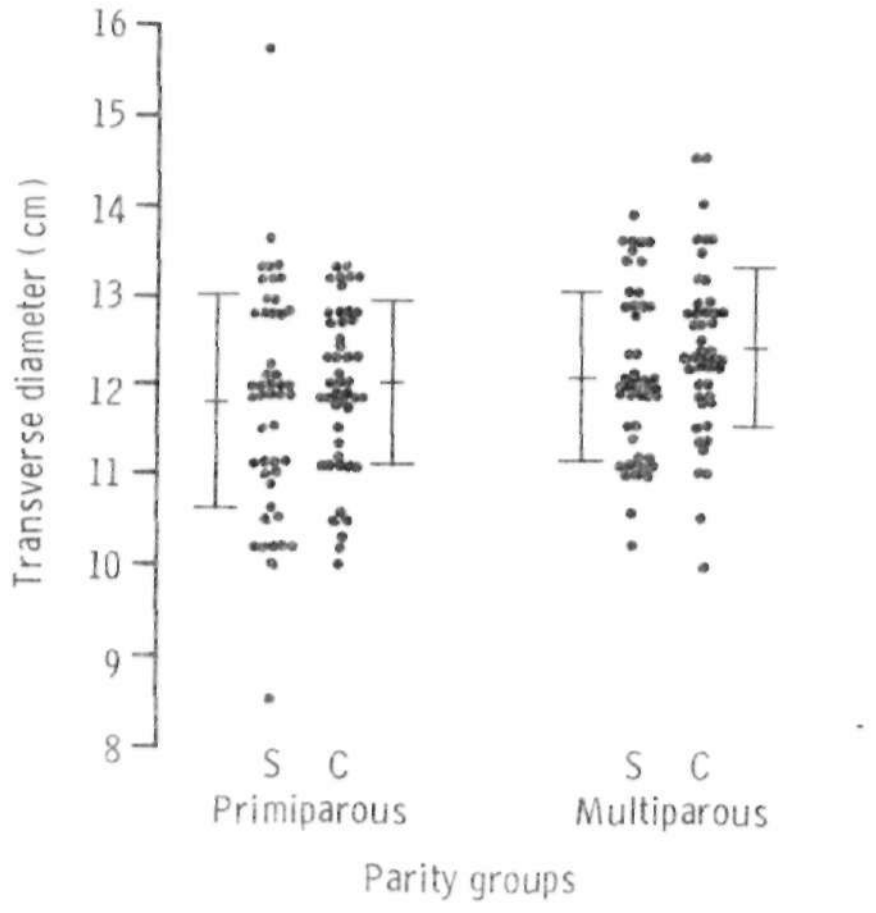
Bars = Mean ± standard deviation

TRUE CONJUGATE VALUES AT VARIOUS MATERNAL HEIGHTS

Fig. 18

Here, the respective values for P are <0.05, >0.1 and <0.05; widest transverse diameter at inlet and true conjugate showing statistically significant difference.

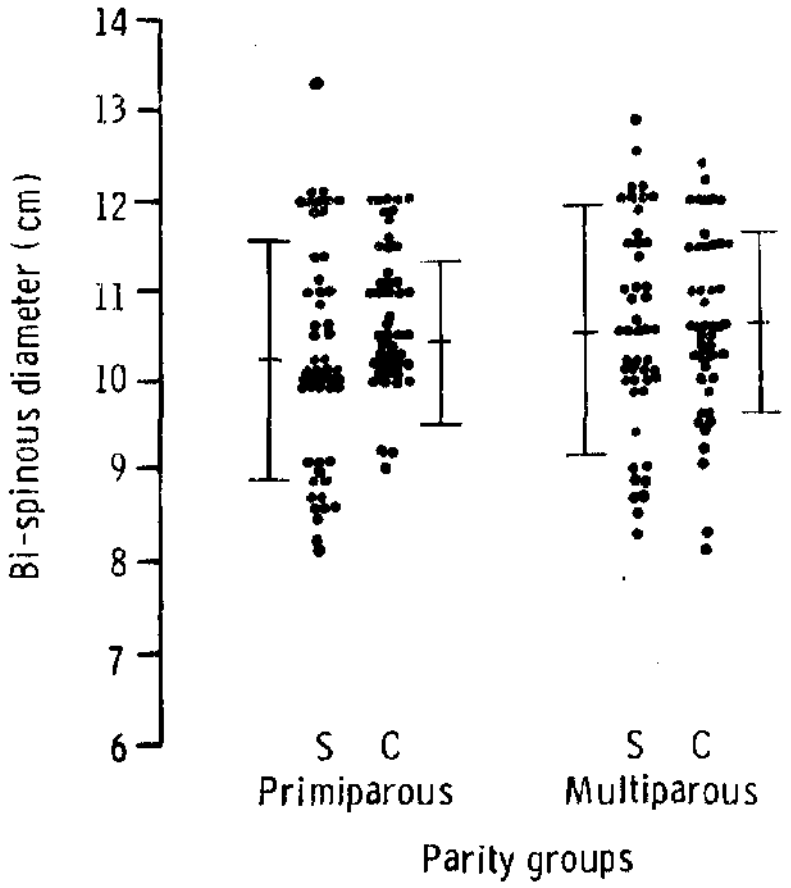
Finally, the same method was applied using parity distribution - fig. 19, 20 and 21. Here, for purposes of simplicity, parity was divided into just two groups:



Bars = Mean ± Standard deviation

WIDEST TRANSVERSE DIAMETER AT VARIOUS PARITY GROUPS

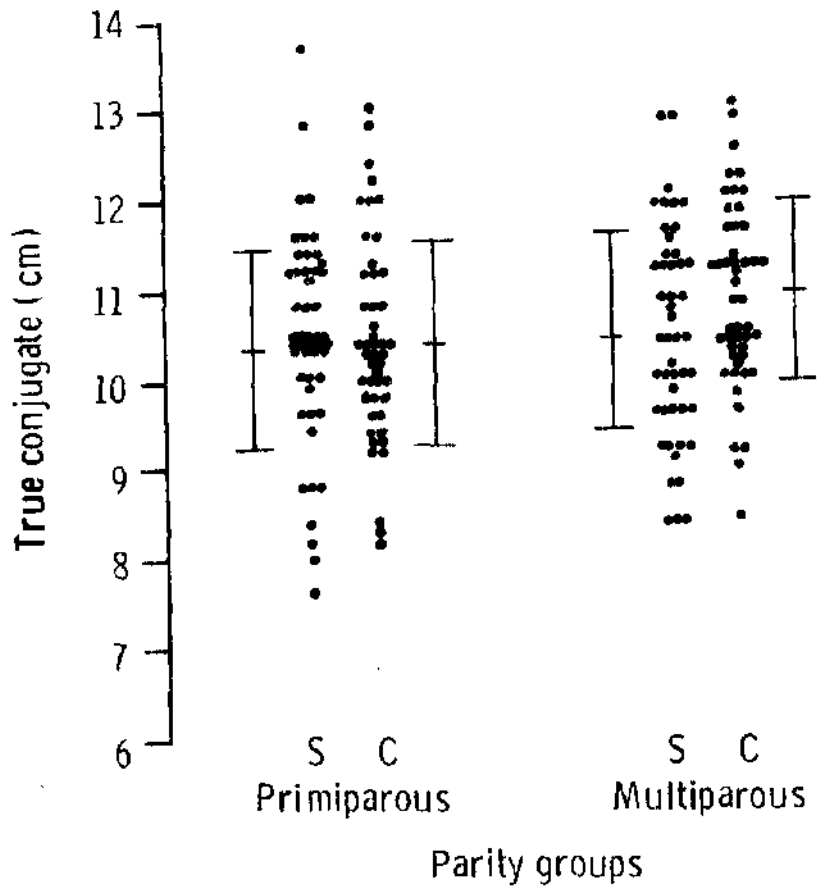
Fig. 19



Bars = Mean ± standard deviation

BI-ISCHIAL SPINOUS DIAMETER AT VARIOUS PARITY GROUPS

Fig. 20



Bars = Mean ± standard deviation

TRUE CONJUGATE VALUES AT VARIOUS PARITY GROUPS

Fig. 21

primiparous and multiparous patients and the respective values for P are <0.05, <0.05 and >0.1; the differences obtained from the widest transverse and bi-ischial spinous diameter being statistically significant.

It now becomes clear that the maternal pelvic size has a very dominant effect on the outcome of labour in O.P. positions and that to some extent even the other predictive indices of age, height and birth order, appear to be outward manifestations of maternal pelvic architecture. A young, short mother having her first baby is more likely to have a small pelvis compared to an older, taller patient having her second or more delivery. It has been argued, probably correctly, that the ability to measure diameters of the bony pelvis and to recognise those in which alterations in pelvic size and shape may interfere with normal delivery is one of the important factors responsible for the reduction in maternal and fetal morbidity.[76]

Contributions to Medical Knowledge and Suggested Lines of Further Research

1. As a result of this work, predictive indices on the outcome of labour for the Nigerian patient with O.P. position have been worked out. The Obstetrician is now aware that the very young primigravida who is short is particularly liable to serious mechanical difficulties when her labour is complicated by O.P. position.

In this respect, the fact that fetal size did not significantly affect the outcome of labour was interesting. In an environment such as Nigeria where cephalopelvic disproportion is common, a more extensive study on fetal birth weights with various modes of delivery is needed. This will ascertain more correctly the contribution made by the fetus to the ratio of cephalo-pelvic disproportion.

2. Maternal pelvis has been shown to play a dominant role on the course of labour in O.P. positions. In the process of the studies on maternal pelvis base line values for the various pelvic diameters for Nigerians have been obtained. This is the most detailed pelvimetric study so far carried out on the Nigerian female pelvis.

The vesico-vaginal fistula is one of the most disturbing complications of obstructed labour encountered in Zaria. The cause of the obstructed labour is glibly put down to cephalo-pelvic disproportion from con$tracted pelvis. A prospective study of the pelvis of these patients with V.V.F. is, therefore, required in order to ascertain the degree of pelvic abnormality.

3. In clinical practice, the true conjugate read from a lateral pelvimetry is often utilised in deciding pelvic adequacy in preference to other pelvic measurements. This study has shown that the true conjugate failed to correlate with the outcome of labour in some instances. On the other hand, the widest transverse diameter, read from an inlet view, correlated with labour outcome in all instances. It is, therefore, being suggested that measurement of the transverse diameter on an inlet view should in conjuction with the true conjugate, be utilized in deciding pelvic adequacy.

4. According to previous reports, the pubic symphysis separates very little in pregnancy and not at all in labour. But this study has shown that an appreciable degree of spontaneous symptomless symphisial separation occurs - some of it most probably in labour. In this respect, a possible line of further research will be to find out if this phenomenon is racial and also the effects of age, height and parity on the degree of symphisial separation.

In clinical practice, a primigravida who had Caesarean Section for cephalo-pelvic disproportion occasionally delivers a bigger baby spontaneously in her second or third confinement. This could be due to an initial wrong diagnosis of disproportion or that the maternal pelvic capacity had increased in between pregnancies. Separation of the symphysis in the previous pregnancy and labour may play a part in widening pelvic capacity. A repeat pelvimetry of the inlet view at the end of the puerperium may have thrown some light on this.

Meeting Criticisms

A reader of this thesis might be critical about some aspects of this study. These aspects are discussed in the following paragraphs.

1. Sepsis.

Since sepsis is one of the major causes of maternal morbidity and mortality in the tropics, the lack of bacteriology reports on at least the patients with prolonged labour is unsatisfactory. In addition to a heavy clinical work load, the bacteriology department at the Ahmadu Bello University Hospital was very short staffed at the commencement of this study.

It was, therefore, not in a position to undertake the extra work load involved in a prospective research.

2. Intrapartum monitoring.

Prolonged labour was a feature of O.P. labour in this study and occasionally resulted in intrapartum fetal death. Under ideal circumstances, therefore, as stated by Sokol et al,[138,139] O.P. labour should constitute an indication for very close feto-maternal monitoring during labour. Unfortunately, fetal monitoring is not carried out at the A.B.U. hospital, Zaria on account of shortages in equipment and personnel.

3. The Ventouse.

The vacuum extractor as used in modern obstetrics probably has its greatest application in instances where malpositions are present. It was not used in this study because maintenance of the component parts had been difficult in the tropical heat of northern Nigeria resulting in frequent breakdown of the instrument.

4. Follow up.

Most of the babies in this research were discharged home after hospitalization for very short periods in several instances. However, some long term sequele attributable to the mode of delivery may become evident with time. A proper follow up would have revealled this. But unfortunately, the average mother in Zaria is very reluctant to attend a Postnatal follow up clinic once she and her baby have been discharged home.

APPENDICES

APPENDIX I

LABOUR IN OCCIPITO POSTERIOR POSITION

OF THE FETAL HEAD

WORK SHEET I

PERSONAL INFORMATIONS

1. SURNAME: HASSAN OTHER NAMES: YELWA

2. HOSPITAL NO: 752980

3. SERIAL NO: 026

4. AGE 18 YEARS

5. ADDRESS: TUDUN WADA, ZARIA

6. ETHNIC GROUP: HAUSA

7. (STUDY)/CONTROL FOR: 026

8. DATE OF ADMISSION: 25/02/1978

9. DATE OF DISCHARGE/DEATH: 26/02/1978

10. (BOOKED)/UNBOOKED: BOOKED

11. NO. OF YEARS OF MARRIAGE: 2

12. EDUCATION: (NIL) PRIMARY SECONDARY

SECONDARY +

APPENDIX II

LABOUR IN OCCIPITO POSTERIOR POSITION

OF THE FETAL HEAD

WORK SHEET II

HISTORY AND FINDINGS ON ADMISSION

Name: Yelwa HASSAN Hosp. No. 752980

Serial No: 026

13. Order of Viable Pregnancy: 1

14. Number of children alive: 0

15. L.M.P.: APRIL 1977

16. E.D.D.: JANUARY 1978

17. Past obstetric history: Operative (NO)/YES

18. Previous Forceps/Ventouse/Face to Pubis/ Caesarean Section/Destructive Operation.

History of Labour

19. Duration of labour before admission 11 Hrs

20. Duration of ruptured membranes before admission 7 hrs.

21. General Condition on Admission

21 Dehydration: 0

22. Temperature: $37.5^{0}C$

23. Pulse 84 /min.

24. Respiratory rate 27 /min.

25. B.P. 110/70 /mmHg

WORK SHEET II (continued)

26. Fundal height: TERM SIZE

27. Fetal head: 3/5

Well flexed / (Partly extended) / Fully extended.

28. Position: LOA, DOA, ROA, (ROP), ROT, DOP, LOP, LOT.

29. Pelvis: Inlet: Promontory reached/~~not reached at~~: 9.5 CM .....

Cavity: Sacrum Straight/(Normal)
Side walls Convergent/(Normal)
Ischial spines Prominent/(Normal)

Outlet: Sub pubic angle (Narrow)/Normal
Cocyx Fixed/(Normal)

30. Cervix: (Thin)/Oedematous. Effacement: 0

31. Head station: - 1 cm

32. Moulding: 0

33. Caput: 0

34. Diagnosis on admission: Normal 1st stage ROP Position.

APPENDIX III

LABOUR IN OCCIPITO POSTERIOR POSITION

OF THE FETAL HEAD

WORK SHEET III

SUMMARY OF CLINICAL OBSERVATIONS IN LABOUR

Name: Yelwa HASSAN Hosp. No.: 752980

Serial No. 026

35. Average maternal pulse rate/min = 82

36. Average maternal temperature in ^{O}C = 37.0

37. Catheterization: (No)/Yes = times

38. Protein uria: (No) / Trace / Over Trace.

39. Average fetal heart rate: 1st stage) 143
2nd stage)

40. Meconium: (No)/Yes

41. Cervical dilatation:. 0.38 cm/hr

42. I.V. Fluids - (Nil)/Dextrose/Oxytocin -

Volume...../ Strength

43. Drugs: Nil/(Yes) - state Analgesics

APPENDIX IV

LABOUR IN OCCIPITO POSTERIOR POSITION

OF THE FETAL HEAD

WORK SHEET IV

DELIVERY

Name: Yelwa HASSAN ..... Hosp. No. 752980 .....

Serial No.: 026 .....

44. Duration of 1st stage: 25 HRS. 50 MINS.

45. Duration of 2nd stage: 30 Minutes

46. Duration of 3rd stage: 5 Minutes

47. Total duration of labour: 26 HRS. 25 MIN.

48. Method of delivery: (SVD)/Face to pubis/ Ventouse/Keillands forceps/Ordinary forceps/Caesarean Section/Destructive operation.

49. Anaesthetic No/(Yes) - (Local)/G.A.

50. Placenta: Spontaneous /(CCT)/ Manual Removal /Laparotomy.

Method: ..... Weight: 0.5 kg .....

Abnormality: (No)/Yes - state

51. Estimated blood loss: 120 mls.

52. Other maternal complication in labour (State)

WORK SHEET IV (continued)

53. Perineal tears - (No)/1st degree/2nd degree/ 3rd degree

54. Episiotomy - No/(Yes) - extended (No)/Yes

55. Vaginal Tears - (No)/Yes

56. Cervical Tears - (No)/Yes

57. Others -

APPENDIX V

LABOUR IN OCCIPITO POSTERIOR POSITION

OF THE FETAL HEAD

WORK SHEET V

PUERPERIUM

Name: Yelwa HASSAN Hosp. No. 752980

Serial No. 026

59. Complications: (No)/Yes

60. Delivery/Discharge Interval 26 hrs.

61. Height in metres 1.57

62. Weight in kg: 51.5

63. Fever: (No)/Yes Day of onset

64. Chemotherapy/Antibiotics/Blood transfusion
Day of Onset

65. Anaemia

66. PPH

67. V.V.F.

68. Eclampsia

69. Others (state)

70. Maternal Mortality: (No)/Yes - cause

APPENDIX VI

LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

WORK SHEET V1

PELVIC X-RAY

Name: Yelwa HASSAN Hosp. No. 752980

Serial No. 026

71. If taken (Yes)/No

72. Inlet View

Feature	Measurement in cm
Widest transverse diameter	12.1
Bi-Ischial Spinous diameter	11.0
Separation of Symphysis	1.5

73. Lateral View

Feature	Measurement in cm
True Conjugate	11.2
A.P. Midplane	13.2
A.P. Bony Outlet	13.6

74. Others:

Angle of pelvic inclination 49^{O}

Sacral Tilt - Inwards/Outwards/(Parallel)

Description of Sacrum - Concave/Straight/(Normal Hollow)

APPENDIX VII

LABOUR IN OCCIPITO POSTERIOR POSITIONS

OF THE FETAL HEAD

WORK SHEET VII

THE INFANT

Name: Yelwa HASSAN Hosp. No: 752980

Serial No: 026

79. (Alive)/Fresh SB / Macerated SB

Immediate NND /Death 1 day to 6/52

80. Sex: (Male)/Female

81. Birthweight: ♂ 2.95 KG

82. Head circumference at birth: 33 cm

83. Apgar Scores at birth: 9, 3 minutes 10,

10 minutes 10

84. Resuscitation (No)/Yes - state

85. Injuries (No)/Yes - state

86. Congenital Malformations (None)/Yes

87. Delivery/Discharge Interval: if over

6 hrs. State cause

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

STUDY PATIENTS (N = 101)

		MATERNAL CHARACTERISTICS							CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR																	
A. B. U. HOSPITAL REG. NUMBER	RESEARCH NUMBER	AGE IN YEARS	ORDER OF VIABLE PREGNANCY	STATURE HEIGHT IN METRES	WEIGHT POST-PARTUM IN KG	ANAEMIA	EDUCATIONAL STATUS	PREVIOUS OBSTETRIC ABNORMALITY	NO. OF YEARS MARRIED	DURATION OF LABOUR ON ADMISSION (HOURS) UNDER 12	BETWEEN 12-24	OVER 24	DEHYDRATION	FETAL HEAD PALPABLE PER ABDOMEN	ATTITUDE	POSITION	SECTION	MOULDING	CAPUT FORMATION	FEVER (TEMPERATURE PER MORE THAN 37°C)	MATERNAL PULSE RATE PER MINUTE	MATERNAL BLOODPRESSURE (mmHg)	PROTEIN IN CM	CERVICAL DILATATION IN CM	OBSTRUCTED LABOUR PRESENT
781653	001	19	1	1.59	48.9	B	NIL	0	6	5	–	–	0	3/5	PE	LOP	–10M	0	0	0	74	120/90	0	4	●
752958	002	18	1	1.47	48.4	B	NIL	0	5	–	13	–	0	4/5	PE	ROP	0	0	0	0	78	120/70	0	4	0
819055	003	18	1	1.53	37.8	E	NIL	0	3	–	–	36	++	3/5	PE	ROP	0	+	+	+	110	140/90	+	8	0
751575	004	27	5	1.51	49.0	B	NIL	0	7	–	12	–	0	3/5	PE	ROP	0	0	0	0	82	110/70	●	7	0
751359	005	24	1	1.51	45.4	B	SEC +	0	1	6	–	–	0	5/5	PE	LOP	–20M	0	0	●	90	130/80	+	2	●
752969	006	27	1	1.61	65.0	B	SEC +	0	2	5	–	–	0	3/5	WP	ROP	–10M	0	0	0	80	120/80	0	2	●
823350	007	20	3	1.52	43.5	E	NIL	0	7	–	–	106	+++	4/5	PE	LOP	–10M	+++	+++	+	106	130/80	+	10	+
825113	008	15	1	1.50	39.0	E	NIL	0	2	–	–	50	+++	4/5	PE	ROP	–10M	+++	+++	+	90	110/70	+	10	+
825842	009	40	9	1.60	60.0	E	NIL	0	30	–	14	–	++	3/5	PE	ROP	0	+	+	0	90	140/100	+	9	0
751899	010	19	1	1.53	50.6	B	NIL	0	2	5	–	–	0	3/5	PE	LOP	–10M	0	0	0	90	120/80	0	3	0
817230	011	23	1	1.64	56.0	B	SEC	0	1	–	12	–	0	4/5	PE	ROP	–10M	0	0	0	80	120/80	0	4	0
752656	012	18	1	1.37	41.6	BD	NIL	0	3	–	–	36	+4	4/5	PE	ROP	–20M	+++	+++	4	88	150/100	+	10	+
827079	013	35	9	1.60	55.0	E	NIL	PSB	20	–	–	27	+	4/5	PE	ROP	–20M	+	+	0	80	120/70	0	8	0
751814	014	18	1	1.57	51.8	B	PRI	0	1	35	–	–	0	3/5	PE	ROP	–10M	0	0	0	80	110/70	0	3	0
510453	015	25	2	1.67	68	B	SEC +	PCS	3	2	–	–	0	4/5	PE	ROP	–10M	0	0	0	78	150/90	0	4	0
820497	016	14	1	1.43	47.5	B	NIL	0	1	–	13	–	+	3/5	PE	ROP	–10M	+	+	0	80	110/80	0	8	0

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION CONTINUED

809893	017	30	7	1.53	42.2	E	NIL	0	10	–	–	48	+	4/5	PE	BOP	-10M	++	++	+	100	130/80	+	10	+
833060	018	19	3	1.42	55.8	E	NIL	0	4	6	–	–	++	3/5	PE	LOP	0	+	+	0	100	120/70	+	4	0
36324	019	28	6	1.71	84	B	PRI	0	13	5.5	–	–	0	4/5	PE	LOP	-20M	+	0	0	82	140/90	0	10	0
820397	020	22	3	1.51	52	B	NIL	0	5	6	–	–	0	3/5	PE	LOP	0	+	0	0	84	140/90	0	10	0
820703	021	16	1	1.54	52.8	B	NIL	0	1	8	–	–	0	4/5	PE	LOP	-10M	+	0	0	90	120/80	0	3	0
843221	022	28	2	1.47	40	E	NIL	0	5	–	–	28	0	4/5	PE	LOP	-20M	+	0	0	92	130/90	0	4	0
843264	023	26	3	1.51	53	E	NIL	0	3	4.5	–	–	+	3/5	PE	BOP	0	+	+	0	100	130/90	0	9	0
752506	024	25	3	1.59	50.2	B	NIL	POS	4	6	–	–	C	5/5	PE	BOP	-20M	+	0	0	82	120/80	0	4	0
508515	025	18	2	1.57	47.2	B	NIL	0	4	–	–	26	++	4/5	PE	BOP	-20M	+	0	0	72	120/80	+	6	0
752960	026	18	1	1.57	51.5	B	NIL	0	2	11	–	–	0	3/5	PE	BOP	-10M	0	0	0	84	130/70	0	4	0
848014	027	20	2	1.60	63.2	E	NIL	0	3	5.5	–	–	0	4/5	PE	BOP	-10M	+	0	0	82	140/90	0	5	0
752902	028	21	1	1.45	44.5	B	NIL	0	9	2	–	–	0	4/5	PE	BOP	-10M	0	0	0	80	140/90	+	4	0
849824	029	30	9	1.57	58.8	E	NIL	0	15	–	–	48	++	3/5	PE	BOP	0	+++	+++	+	82	120/70	+	10	+
850509	030	35	8	1.48	54.6	E	NIL	0	12	–	–	25	++	4/5	PE	LOP	-10M	++	++	+	120	120/70	+	8	0
850826	031	15	1	1.49	40.4	E	NIL	0	2	–	–	48	+++	4/5	PE	LOP	-20M	+++	+++	+	120	120/60	+	10	+
821017	032	15	1	1.52	40.5	B	NIL	0	1	–	19	–	0	4/5	PE	BOPB	-10M	0	0	0	88	120/70	0	1	0
751666	033	18	1	1.66	85	B	NIL	0	5	3	–	–	0	4/5	WP	BOP	-20M	0	0	0	82	120/70	0	3	0
820049	034	25	3	1.53	49.5	B	NIL	0	4	–	13	–	+	4/5	WP	BOP	-10M	+	+	0	91	120/80	0	5	0
540089	035	40	9	1.64	67	B	NIL	Prev. Forceps.	15	–	14	–	+	5/5	PE	LOP	-10M	+	+	0	100	130/90	0	5	0
821387	036	15	1	1.51	45.1	B	NIL	0	2	10	–	–	0	4/5	WP	BOP	-20M	+	+	0	91	130/90	0	5	0
822691	037	38	8	1.60	72	B	SBO +	0	10	3	–	–	0	4/5	PE	LOP	-20M	0	0	0	100	130/90	0	4	0
825244	038	38	2	1.55	47.4	B	PRI	0	2	6	–	–	0	4/5	PE	LOP	-10M	0	0	0	78	110/70	0	4	0
46666	039	29	4	1.58	55.2	B	SBO +	Prev. Ventr-	8	2	–	–	0	5/5	PE	BOP	-20M	0	0	0	79	120/80	0	3	0
752901	040	22	1	1.59	72.5	B	NIL	0	2	2	–	–	+	4/5	PE	BOP	-10M	0	0	0	80	120/70	0	4	0
852559	041	20	1	1.52	41.6	E	NIL	0	2	–	–	28	+++	4/5	PE	BOP	-20M	+++	+++	+	104	120/80	+	10	+
874417	042	35	9	1.55	44.1	B	NIL	0	20	–	–	26	+++	4/5	PE	BOP	-20M	++	++	+	102	120/70	+	10	+
822018	043	14	1	1.60	41.8	E	NIL	0	1	5	+ –	–	0	4/5	PE	BOP	-20M	0	0	0	80	120/70	0	4	0
874512	044	18	1	1.63	54.5	E	NIL	0	2	–	14.5	–	+	1/5	PE	BOP	0	+	+	0	110	120/70	0	5	0
877298	045	13	1	1.55	52.2	E	NIL	0	1	–	–	48	+	2/5	PE	BOP	+20M	++	++	+	98	120/70	0	10	0
853138	046	24	4	1.54	40.7	B	PRI	0	3	8	–	–	0	4/5	PE	LOP	-10M	0	0	0	84	100/70	0	4	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION CONTINUED

877298	045	13	1	1.55	52.2	E	NIL	0	1	–	–	48	+	2/5	PE	ROP	+2CM	++	++	+	98	120/70	0	10	0
853138	046	24	4	1.54	40.7	B	PRI	0	3	8	–	–	0	4/5	PE	LOP	−1CM	0	0	0	84	100/70	0	4	0
878476	047	14	1	1.47	42.0	E	NIL	0	1	–	–	28	+	4/5	PE	ROP	−2CM	++	++	+	110	130/80	+	10	+
879026	048	25	5	1.67	42.5	E	NIL	0	10	–	24	–	+	4/5	WF	LOP	−2CM	+	+	0	100	120/80	0	6	0
880029	049	15	1	1.45	44.6	E	NIL	0	1	–	–	48	++	5/5	PE	ROP	−2CM	+++	+++	+	140	120/70	+	10	+
512511	050	25	4	1.61	64.0	B	NIL	POS	6	25	–	–	0	4/5	PE	DOP	−2CM	+	+	0	100	140/90	0	9	0
821979	051	20	1	1.69	64.2	B	SBC +	0	1	7	–	+	+	5/5	PE	LOP	−2CM	0	0	0	82	120/80	0	4	0
821078	052	17	2	1.54	42.8	B	NIL	0	3	4	–	–	0	5/5	PE	LOP	−2CM	0	0	0	85	120/80	0	4	0
896534	053	30	6	1.50	42.1	E	NIL	0	10	–	–	52	++	4/5	PE	ROP	−1CM	+++	+++	+	125	90/60	+	10	+
842519	054	15	1	1.44	41.8	B	NIL	0	1	7	–	–	0	4/5	PE	ROP	−1CM	0	0	0	82	130/80	0	6	0
869332	055	23	1	1.59	61.4	B	NIL	0	3	4	–	–	0	4/5	PE	ROP	−2CM	0	0	0	74	150/100	+	3	0
921528	056	15	1	1.58	52.2	E	NIL	0	1	5	–	–	0	5/5	PE	LOP	−1CM	0	0	0	100	120/70	0	5	0
822251	057	14	1	1.54	41.4	B	NIL	0	2	10	–	–	0	4/5	PE	LOP	−1CM	0	0	0	75	120/80	0	5	0
659727	058	18	1	1.58	46	B	NIL	0	2	2	–	–	0	4/5	PE	ROP	−2CM	0	0	0	78	120/80	0	3	0
913739	059	15	1	1.50	51.0	E	NIL	0	2	–	16	–	0	4/5	WF	ROP	−1CM	0	0	0	100	120/70	0	5	0
919609	060	18	1	1.52	50.2	E	NIL	0	2	–	12	–	+	4/5	PE	ROP	−1CM	0	0	0	78	120/80	0	4	0
624584	061	19	3	1.54	45	B	PRI	0	6	5	–	–	0	4/5	PE	ROP	−2CM	0	0	0	82	120/70	+	3	0
375247	062	24	5	1.59	50.2	BE	NIL	POS	10	8	–	–	+	4/5	PE	ROP	−1CM	++	++	+	84	120/70	+	10	0
822396	063	20	2	1.54	42	B	NIL	POS	4	3	–	–	0	4/5	PE	DOP	+1CM	+	+	0	84	110/70	0	7	0
868040	064	19	1	1.60	50	B	NIL	0	1	–	24	–	+	3/5	PE	LOP	−1CM	+	+	0	82	120/80	0	7	0
869802	065	25	2	1.59	68.2	E	PRI	0	3	–	12	–	0	4/5	PE	LOP	−2CM	0	0	0	90	120/70	0	4	0
934610	066	18	2	1.46	43.8	E	NIL	0	3	–	–	37	++	3/5	PE	LOP	−1CM	+++	+++	+	92	130/80	+	10	+
822681	067	23	1	1.61	56.4	B	NIL	0	6	4	–	–	0	3/5	PE	LOP	−2CM	0	0	0	80	120/70	0	3	0
936266	068	15	1	1.31	32.2	E	NIL	0	2	–	–	42	++	4/5	PE	ROP	−2CM	++	++	+	78	130/80	+	10	+
377030	069	19	3	1.57	43.6	B	NIL	0	4	3	–	–	0	4/5	PE	ROP	−2CM	0	0	0	85	110/70	0	3	0
936972	070	20	2	1.52	50.2	E	NIL	0	4	9	–	–	+	2/5	PE	ROP	+2CM	+	+	0	84	120/70	+	10	0
868090	071	22	2	1.57	73.6	B	PRI	0	4	3	–	–	0	3/5	WF	ROP	−1CM	+	+	0	82	150/110	0	3	0
869462	072	22	2	1.50	35.0	B	PRI	0	3	2	–	–	0	4/5	PE	DOP	+2CM	+	+	0	90	140/90	0	5	0
938979	073	14	1	1.49	43.6	E	NIL	0	2	–	–	48	+	3/5	PE	ROP	−1CM	+++	+++	+	101	150/100	+	10	+
740100	074	15	1	1.52	39.6	E	NIL	0	2	7	–	–	++	4/5	WF	ROP	−2CM	0	0	0	160	130/80	+	3	0
941645	075	35	7	1.52	58.2	E	NIL	POS	10	10	–	–	+	4/5	PE	ROP	−1CM	+	+	0	82	130/90	0	6	0
858117											13		0	3/5	PE	ROP	+1CM	0	0	0	80	130/90	0	9	0

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION CONTINUED

740106	074	15	1	1.52	39.6	K	NIL	0	2	7	~	-	++	4/5	WF	ROP	-2CM	0	0	0	160	130/80	+	3	0
941645	075	35	T	1.52	58.0	K	NIL*	PCS	10	10	~	-	+	4/5	PE	ROP	-1CM	+	+	0	82	140/90	0	6	0
858117	076	18	3	1.56	50.4	B	NIL	0	3	-	13	-	0	3/5	PE	ROP	+1CM	0	0	0	80	120/80	0	9	0
870013	077	18	1	1.7	56.4	B	PRI	0	1	-	14	-	0	4/5	WF	ROP	-2CM	0	0	0	85	130/80	0	5	0
416201	078	24	1	1.55	60.5	B	SEC	0	4	10	~	-	0	4/5	PE	ROP	-1CM	+	+	0	87	120/70	0	5	0
599368	079	26	1	1.61	65	B	SEC +	0	1	6	~	-	0	4/5	PE	ROP	-2CM	0	0	0	78	130/90	0	4	0
947166	080	29	9	1.48	38.8	K	NIL	0	15	-	24	-	+	4/5	PE	LOP	-2CM	+	+	+	92	160/80	+	9	0
788836	081	25	5	1.65	68.0	B	NIL	0	5	2	~	-	0	4/5	PE	ROP	-2CM	0	0	0	74	130/70	0	2	0
930133	082	15	1	1.46	52.6	K	NIL	0	2	7	~	-	+	4/5	PE	LOP	-2CM	+	+	0	78	140/70	0	6	0
78589	083	31	8	1.58	54.6	K	NIL	Preterm birth:	15	5	~	-	+	4/5	PE	ROP	-1CM	+	+	0	78	140/70	0	6	0
28880	084	25	8	1.61	52.6	B	NIL	0	7	5	~	-	0	4/5	PE	DOP	-1CM	+	+	0	80	120/80	0	6	0
869687	085	25	5	1.66	59.4	B	NIL	0	13	5	~	-	0	3/5	WF	LOP	-1CM	0	0	0	84	140/70	0	5	0
949680	086	15	1	1.45	47	K	NIL	0	1	11	~	-	+	3/5	PE	LOP	-1CM	0	0	79	79	140/90	0	5	0
870329	087	22	1	1.60	63.0	B	SEC +	0	0	2	11	-	-	4/5	PE	LOP	0	+	+	0	89	120/80	0	6	0
190569	088	26	3	1.60	52.0	K	PRI	0	5	4	~	-	0	4/5	PE	ROP	-1CM	+	+	0	78	120/80	0	8	0
868628	089	14	1	1.61	43.8	B	NIL	0	1	11	~	-	0	4/5	PE	ROP	-1CM	+	+	0	78	140/100	0	7	0
870817	090	17	1	1.57	46.6	B	PRI	0	2	-	17	-	0	3/5	WF	ROP	0	+	+	0	82	130/90	+	7	0
960082	091	24	1	1.62	52.2	K	NIL	0	4	-	14	-	+	3/5	PE	DOP	-1CM	+	+	+	78	120/70	0	7	0
868500	092	19	1	1.56	52.8	B	PRI	0	2	-	19	-	0	4/5	PE	ROP	-2CM	+	+	0	82	130/70	0	5	0
930705	093	30	5	1.73	56.8	K	NIL	0	10	10	~	-	0	4/5	PE	ROP	-2CM	0	0	0	95	120/80	0	3	0
870936	094	24	3	1.66	66.0	B	NIL	0	5	5	~	-	0	4/5	PE	LOP	-1CM	+	+	0	80	140/90	0	6	0
963243	095	14	1	1.55	40.9	K	NIL	0	1	-	23	-	0	4/5	PE	ROP	-1CM	++	++	+	92	120/70	+	9	0
870414	096	22	1	1.60	69.8	B	PRI	0	3	3	-	-	0	5/5	PE5	LOP	-2CM	+	+	0	82	110/70	0	3	0
750118	097	23	3	1.59	71.0	B	PRI	0	5	8	~	-	0	5/5	WF	LOP	-2CM	+	+	0	82	120/70	0	3	0
967199	098	40	6	1.55	63.0	K	NIL	0	20	10	~	-	+	4/5	PE	LOP	-1CM	+++	+++	+	120	130/70	+	10	+
869792	099	16	1	1.59	47	B	NIL	0	2	9	~	-	+	4/5	PE	LOP	-2CM	+	+	0	79	120/80	0	8	0
18075	100	26	4	1.67	58	B	PRI	0	5	6.5	~	-	0	2/5	PE	DOP	+1CM	+	+	0	100	110/70	0	10	+
967221	101	15	1	1.49	40.4	K	NIL	0	2	-	~	48	++	4/5	PE	LOP	-2CM	+++	+++	+	12	120/70	+	10	+

LEGEND: Antenatal Care: B = Booked Patient. K = No Antenatal Care. BD = Booked, But Defaulted. Position: ROP, LOP, DOP = Right, Left or Direct Occipito Posterior respectively

Previous Obstetric Abnormality: PSB = Previous Stillbirth. PSC = Previous Caesarean Section

Attitude: PE = Partly Extended. WF = Well Flexed.

APPENDIX 8

CURSIVE OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FOETAL HEAD

STUDY PATIENTS (N = 101)

OBSERVATIONS IN LABOUR AND MODE OF DELIVERY

Research Number	LABOUR: CLINICAL OBSERVATIONS IN LABOUR: maternal pulse rate per min.	maternal blood pressure in mmHg	maternal respiratory rate per min.	foetal heart rate per min.	patient required bladder Catheterization	meconium stained liquor present	LABOUR: TREATMENT IN LABOUR: I.V fluids only	Syntocinon drip	required sedative or anaesthetics	LABOUR: DURATION OF LABOUR: first stage in hrs.	second stage in mins.	third stage in mins.	total duration to the nearest Hour	cervical dilatation cm per hour	DELIVERY: MODE OF DELIVERY: spontaneous vaginal delivery occiput anterior	low cavity forceps del. occiput anterior	mid cavity forceps delivery occiput anterior	Kellan forceps rotation and del.	caesarean section	craniotomy	Spontaneous face to pubes del.	Required Anaesthesia	Estimated blood loss in ml.	Other maternal complications
001	80	120/90	20	160	0	0	+	0	0	10.5	30	5	11	1.0	+	0	0	0	0	0	0	L	300	0
002	78	120/70	22	135	0	0	0	0	0	18	30	6	19	0.56	+	0	0	+	0	0	0	0	500	0
003	110	140/80	24	160	+	0	+	0	+	31	40	40	32	0.32	0	0	0	+	0	0	0	LAG	500	Retained Placenta
004	80	110/70	20	145	+	0	0	0	0	12	45	5	13	0.83	0	0	0	+	0	0	0	L	400	0
005	90	130/90	24	145	+	0	+	0	+	31.5	30	3	32	0.37	+	0	0	0	0	0	0	L	500	0
006	80	130/80	20	145	+	0	+	0	+	10	60	5	11	1.0	0	0	0	+	0	0	0	L	700	0
007	106	130/80	28	0	+	+	+	0	0	96	120	2	98	0.10	0	0	0	0	0	+	0	G	6000	0
008	94	110/70	24	135	+	+	+	0	0	48	180	0	51	0.20	0	0	0	0	+	0	0	G	500	0
009	90	140/100	26	135	+	0	+	0	0	14	0	0	14	0.71	0	0	0	0	+	0	0	G	500	0
010	90	130/80	26	145	+	0	0	0	0	19	60	5	20	0.53	0	+	0	0	0	0	0	L	200	0
011	82	120/80	24	140	+	0	0	+	+	30	120	0	33	0.33	0	0	0	0	+	0	0	G	600	0
012	100	110/100	24	165	+	0	+	0	+	48	180	0	51	0.31	0	0	0	0	+	0	0	G	1,000	Intra-Eclampsia
013	78	120/70	20	154	+	0	+	0	+	27	0	0	27	0.37	0	0	0	0	+	0	0	G	500	0
014	78	110/70	24	145	0	0	0	0	+	11	30	4	12	0.9	+	0	0	0	0	0	0	L	100	0
		130/								19												L	250	0

APPENDIX 8
DATA ON STUDY PATIENTS
OBSERVATIONS IN LABOUR AND MODE OF DELIVERY CONTINUED

013	78	120/70	20	154	+	0	+	0	+	27	0	0	27	0.37	0	0	0	0	+	0	0	G	500	0					
014	78	110/70	24	145	0	0	0	0	+	11	30	4	12	0.9	+	0	0	0	0	0	0	L	100	0					
015	90	120/70	26	145	+	0	0	+	+	19	60	5	20	0.53	0	0	0	+	0	0	0	L	250	0					
016	82	110/70	20	143	+	0	0	+	+	17	40	3	18	0.59	+	0	0	0	0	0	0	L	150	0					
017	100	140/90	24	110	+	+	+	0	0	48	30	0	48	0.21	0	0	0	0	+	0	0	G	1,500	0					
018	82	120/70	20	140	+	0	+	0	0	19	0	0	19	0.53	0	0	0	0	+	0	0	G	520	0					
019	80	120/70	24	140	0	0	0	0	0	5.5	15	3	6	1.8	0	0	0	0	0	0	+	0	100	0					
020	82	120/70	20	142	0	0	0	0	0	5	40	5	6	2	0	0	0	0	0	0	+	0	60	0					
021	80	120/70	24	140	0	0	0	0	0	6[13]	33	6	14	0.77	+	0	0	0	0	0	0	L	100	0					
022	84	130/70	28	130	0	0	0	+	+	32	20	3	32	0.31	+	0	0	0	0	0	0	0	30	0					
023	100	130/80	27	135	0	0	0	0	0	6.5	30	1	7	1.54	+	0	0	0	0	0	0	0	90	0					
024	96	130/70	20	143	0	0	0	0	0	9	30	6	10	1.1	+	0	0	0	0	0	0	0	100	0					
025	78	120/70	24	148	0	0	+	0	0	12	60	0	13	0.8	0	0	0	0	+	0	0	G	500	0					
026	82	110/70	18	140	0	0	0	0	0	126	30	5	27	0.38	+	0	0	0	0	0	0	L	120	0					
027	80	140/90	22	140	0	0	0	0	0	10	23	3	10	1.0	+	0	0	0	0	0	0	0	50	0					
028	80	110/70	20	135	0	0	0	0	0	7.5	20	3	8	1.3	+	0	0	0	0	0	0	0	60	0					
029	80	120/70	26	0	+	+	+	0	0	48	60	0	49	0.21	0	0	0	0	0	+	0	G	500	Prolapsed Cord					
030	120	120/70	28	156	+	+	+	0	0	48	0	0	48	0.21	0	0	0	0	+	0	0	G	4,000	0					
031	120	120/60	30	0	+	+	+	0	0	48	0	0	48	0.21	0	0	0	0	+	0	0	G	1,500	0					
032	80	120/70	20	140	0	0	0	+	+	40	30	3	41	0.25	+	0	0	0	0	0	0	L	120	0					
033	80	120/70	20	140	0	0	0	+	0	14.5	40	3	15	0.69	+	0	0	0	0	0	0	0	100	0					
034	90	120/70	20	142	0	+	0	0	0	15.75	35	3	16	0.63	0	0	0	0	0	0	+	0	60	0					
035	100	120/70	22	155	0	0	0	0	0	13	29	4	14	0.77	0	0	0	0	0	0	+	0	90	0					
036	90	130/70	20	145	+	0	0	0	+	16	70	0	17	0.63	0	0	0	0	+	0	0	G	800	0					
037	100	120/70	20	152	0	0	+	0	+	11.5	10	0	12	0.87	0	0	0	0	0	0	+	0	500	Abruptio Placenta					
038	80	110/70	24	150	0	0	0	0	+	21	32	4	32	0.48	0	0	0	0	0	0	+	0	52	0					
039	80	120/70	24	165	0	0	0	+	+	19	30	2	20	0.53	0	0	0	0	0	0	+	0	100	0					
040	85	120/70	20	140	0	0	0	0	0	19	35	4	20	0.53	+	0	0	0	0	0	0	0	300	0					
041	100	140/70	29	110	+	+	0	0	0	28	35	0	29	0.36	0	0	0	0	+	0	0	G	700	0					
042	102	120/70	28	145	+	+	-	0	0	26	60	0	27	0.38	0	0	0	0	+	0	0	G	1,500	0					
043	80	120/70	22	148	0	+	0	0	0	11	10	3	11	0.91	0	0	0	0	0	0	+	L	300	0					
044	100	120/70/120	20	144	0	0	0	0	0	10	30	10	19	0.56	+	0	0	0	0	0	0	-	-	-					

APPENDIX 8

DATA ON STUDY PATIENTS
OBSERVATIONS IN LABOUR AND MODE OF DELIVERY CONTINUED

		120/70	22	140	0	+	0	0	0	11	10	3	11	0.91	0	0	0	0	0	0	+	L	300	0	
044	100	120/70	20	144	0	0	0	0	0	18	30	10	19	0.56	+	0	0	0	0	0	0	0	90	0	
045	100	120/70	24	140	+	+	+	0	0	48	0	4	48	0.21	0	0	+	0	0	0	0	L	350	0	
046	85	130/70	20	140	0	0	0	0	0	26	0	0	28	0.38	0	0	0	0	+	0	0	G	1,000	0	
047	100	130/70	24	125	+	-	+	0	0	28	1	0	29	0.36	0	0	0	0	+	0	0	G	500	0	
048	100	120/70	24	125	+	+	+	0	0	26	33	4	27	0.38	+	0	0	0	0	0	0	G	250	0	
049	140	130/70	25	190	+	++	+	0	0	48	2	0	50	0.21	0	0	0	0	+	0	0	G	500	0	
050	100	140/80	20	140	0	0	0	0	0	3	10	3	3	3.3	0	0	0	0	0	0	-	0	50	0	
051	82	130/70	22	130	+	0	0	+	+	32	45	15	33	0.31	0	0	+	0	0	0	0	L	600	0	
052	80	140/70	22	140	0	0	0	0	0	8	20	3	8	1.3	0	0	0	0	0	0	0+	0	80	0	
053	120	80/70	30	0	++	++	+	0	0	53	120	0	56	0.19	0	0	0	0	+	0	0	G	2,500	0	
054	80	110/70	20	140	+	+	+	0	+	20	90	4	22	0.5	0	0	0	+	0	0	0	L	600	0	
055	90	150/100	19	140	+	0	0	+	+	29.5	75	3	31	0.34	0	0	0	+	0	0	0	G	600	0	(Primary Eclampsia)
056	78	120/70	21	135	0	0	0	+	+	13	35	5	14	0.77	+	0	0	0	0	0	0	L	150	0	
057	80	120/80	22	130	0	0	0	0	0	12	35	10	13	0.83	+	0	0	0	0	0	0	0	100	0	
058	78	130/80	20	130	0	0	0	+	+	16	45	10	17	0.63	+	0	0	0	0	0	0	L	80	0	
059	95	120/70	30	140	0	0	+	+	+	24	35	10	25	0.42	+	0	0	0	0	0	0	L	100	0	
060	80	120/80	24	130	0	0	0	0	+	19	35	10	20	0.53	+	0	0	0	0	0	0	L	200	0	
061	78	120/80	24	140	0	0	0	0	0	10	35	5	11	1.0	+	0	0	0	0	0	0	0	350	0	
062	84	120/70	24	145	+	+	+	0	0	10	0	0	10	1.0	0	0	0	0	+	0	0	G	600	0	
063	82	110/70	24	154	0	0	0	0	0	4	20	4	4	2.5	+	0	0	0	0	0	0	0	110	0	
064	80	120/70	22	135	0	+	0	0	+	31	40	5	32	0.32	+	0	0	0	0	0	0	L	140	0	
065	90	120/70	24	130	0	+	0	0	+	16	15	5	16	0.63	+	0	0	0	0	0	0	0	120	0	
066	80	120/70	29	125	+	+	+	0	0	24	2	0	26	0.42	0	0	0	0	+	0	0	G	600	0	
067	82	150/90	20	140	0	0	0	0	+	25	35	5	26	0.40	-	0	0	0	0	0	0	0	120	0	
068	90	130/80	25	150	+	+	+	0	0	24	60	0	25	0.42	0	0	0	0	+	0	0	G	300	0	
069	85	120/80	20	140	+	0	+	0	+	13	40	6	14	0.77	+	0	0	0	0	0	0	0	75	0	
070	84	120/70	22	134	+	+	+	0	0	10	60	2	11	1.0	0	0	0	+	0	0	0	G	600	0	
071	82	130/80	20	143	0	0	0	0	+	10	30	5	11	1.0	+	0	0	0	0	0	0	L	500	0	
072	85	140/90	25	135	+	+	+	0	+	12	25	0	12	0.83	0	0	0	0	+	0	0	G	450	0	
073	100	150/100	34	190	+	++	+	0	+	48	120	0	50	0.21	0	0	0	0	0	0	0	G	1,000	0	
074	89	130/80	24	145	0	+	+	0	+	34	25	7	35	0.29	0	0	-	0	-	-	-	-	-	-	
075	100	130/80	-	-																					

APPENDIX 8

DATA ON STUDY PATIENTS
OBSERVATIONS IN LABOUR AND MODE OF DELIVERY CONTINUED

075	100	130/80	24	145	+	0	+	0	0	13	0	0	13 ·	0.27	0	0	0	0	+	0	0	G	500	0	
076	82	130/70	24	143	0	0	0	0	0	13.5	20	5	14 ·	0.75	+	0	0	0	0	0	0	0	104	0	
077	85	140/90	30	145	+	0	0	+	+	29	45	1	30	0.33	0	0	0	0	+	0	0	0	300	0	
078	85	120/70	28	145	0	0	0	+	+	13	30	7	14 ·	0.77	+	0	0	0	0	0	0	0	80	0	
079	85	130/70	22	145	0	0	+	0	+	11	33	6	12 ·	0.90	+	0	0	0	0	0	0	0	89	0	
080	92	140/90	24	155	+	+	+	0	0	26	0	0	26	0.38	0	0	0	0	+	0	0	G	350	0	
081	85	120/70	24	140	0	0	0	0	0	7	20	4	7	1.47	+	0	0	0	0	0	0	0	100	0	
082	75	120/70	28	142	+	+	+	0	0	26	0	0	26	0.38	0	0	0	0	+	0	0	G	550	0	
083	80	130/70	22	135	+	+	+	0	0	26	0	0	26	0.38	0	0	0	0	+	0	0	G	650	0	
084	80	120/70	20	130	0	0	0	0	+	7	20	5	7	1.43	0	0	0	0	0	0	+	0	100	0	
085	92	140/70	21	135	0	0	0	0	0	7	10	½	7	1.43	0	0	0	0	0	0	+	0	58	0	
086	98	130/70	29	143	+	0	+	0	0	30	0	0	30	0.33	0	0	0	0	+	0	0	0	650	0	
087	85	120/70	20	143	0	0	0	0	0	19	25	6	20 ·	0.53	+	0	0	0	0	0	0	0	150	0	
088	75	120/70	18	132	0	0	0	0	0	7	20	7	8	1.43	0	0	0	0	0	0	+	0	82	0	
089	90	120/70	20	142	0	0	0	0	+	13	27	6	13 ·	0.77	+	0	0	0	0	0	0	0	110	0	
090	85	130/70	20	135	0	0	0	0	+	20	30	4	21 ·	0.5	+	0	0	0	0	0	0	9	80	0	
091	79	120/90	24	135	+	0	+	0	0	23	0	0	23 ·	0.43	0	0	0	0	+	0	0	G	550	0	
092	84	120/80	20	135	0	+	0	+	+	30	25	5	31	0.33	+	0	0	0	0	0	0	0	120	0	
093	94	120/70	22	135	0	0	0	0	0	11.5	20	4	12 ·	0.87	+	0	0	0	0	0	0	0	80	0	
094	85	140/80	24	140	0	0	0	0	0	7	10	3	7	1.43	+	0	0	0	0	0	0	L	120	0	
095	90	120/70	24	132	0	+	0	+	+	30	35	5	31	0.33	+	0	0	0	0	0	0	L	200	0	
096	82	120/80	20	134	0	0	0	0	+	5	20	3	5	2.0	+	0	0	0	0	0	0	0	80	0	
097	60	120/70	22	150	0	+	0	0	0	11	10	½	11	0.9	+	0	0	0	0	0	0	0	60	0	
098	120	90/70	26	110	+	+	+	0	0	14	0	0	14 ·	0.7	0	0	0	0	+	0	0	G	1,000	0	Severe Anaemia
099	79	110/70	20	140	0	+	0	0	0	12	7	4	12 ·	0.83	+	0	0	0	0	0	0	G	1,500	0	
100	100	110/70	20	145	0	0	0	0	0	7	4	½	7	1.43	0	0	0	0	0	0	+	0	60	0	
101	120	120/80	30	0	+	+	+	0	0	48	0	0	48	0.21	0	0	0	0	0	+	0	G	1,500	0	

LEGEND: Catheterization: + = bladder was Catheterized. O= bladder was not catheterized. Meconium : + = Meconium was present. C = Meconium was abs

Treatment in labour: + = Patient had the particular treatment described. O= Patient did not have the particular treatment described.

Mode of delivery: + = Patient was delivered by the mode described. O or - = patient was not delivered by the mode described.

APPENDIX 8

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

STUDY PATIENTS (N. = 101)

Research Number	INJURIES: Perineal Tears: First degree	Second degree	Third degree	Episiotomy	Vaginal Tears	Cervical Tears	Ruptured uterus	VVF	RVF	Vaginal Cut*	None	Require Blood Transfusion	Sepsis	Delivery Discharge Interval: Within one day (hrs)	more than one day (days)	Maternal death	SEX: Male	Female	FETUS INFANT: Survival: Alive	Dead	Birth Weight in Kg.	Head Circumference in Cm.	Asphyxia	External Injuries	Obvious Congenital malformation.
001	0	0	0	0	0	0	0	0	0	+	0	0	6	–	0	–	+	+	+	3.3	33	0	0	0
002	0	0	0	0	0	0	0	0	0	+	0	0	10	–	0	–	+	+	–	3.3	33	0	0	0
003	0	0	0	+	0	0	0	0	0	0	0	+	24	–	0	–	+	+	–	2.5	31	+	+	0
004	+	0	0	+	+	0	0	0	0	0	0	0	8	–	0	–	+	+	–	3.0	35	+	0	0
005	0	0	0	+	0	0	0	0	0	0	0	0	17	–	0	+	–	+	–	3.3	34	+	0	0
006	0	+	0	+	0	0	0	0	0	0	+	0	24	–	0	–	+	+	–	4.5	37	+	0	0
007	0	+	0	+	+	0	0	+	0	0	+	+	–	9	0	+	–	–	+	3.5	34	IUD	0	0
008	0	0	0	0	0	0	0	0	0	+	0	+	–	16	0	+	–	+	–	2.75	32	+	+	0
009	0	0	0	0	0	0	0	0	0	+	0	0	–	9	0	–	+	–	+	2.75	34	+	0	0
010	0	0	0	+	0	0	0	0	0	0	0	0	23	–	0	–	+	+	–	2.50	29	0	0	0
011	0	0	0	0	0	0	0	0	0	+	+	0	–	8	0	+	–	+	–	3.5	36	0	0	0
012	0	0	0	0	0	0	0	0	0	+	+	0	–	9	0	–	+	+	–	2.0	29	+	0	0
013	0	0	0	0	0	0	0	0	0	+	0	0	–	10	0	–	+	+	–	3.1	37	0	0	0
014	0	0	0	+	0	0	0	0	0	0	0	0	6	–	0	+	–	+	–	2.8	35	0	0	0
015	0	0	0	+	0	0	0	0	0	0	0	0	–	3	0	–	+	+	–	3.45	38	0	0	0
016	0	0	0	+	0	0	0	0	0	0	+	0	6	–	0	–	+	+	–	3.4	35	0	0	0
017	0	0	0	0	0	0	0	0	0	+	0	+	–	9	0	+	–	+	–	3.0	39	+	0	0
018	0	0	0	0	0	0	0	0	0	+	0	0	–	10	0	–	+	+	–	3.0	38	0	0	0
019	0	0	0	0	0	0	0	0	0	+	0	0	12	–	0	–	+	+	–	3.9	39	0	0	0
020	0	0	0	0	0	0	0	0	0	+	0	0	7	–	0	+	–	+	–	2.9	38	0	0	0
021	0	0	0	+	0	0	0	0	0	0	0	0	8	–	0	–	+	+	–	3.2	32	0	0	0
022	0	0	0	0	0	0	0	0	0	+	0	0	15	–	0	+	–	+	–	2.7	35	0	0	0
023	0	0	0	0	0	0	0	0	0	+	0	0	18	–	0	+	–	+	–	2.9	35	0	0	0
024	0	0	0	0	0	0	0	0	0	+	0	0	8	–	0									

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED

022	0	0	0	0	0	0	0	0	0	+	0	0	15	–	0	+	–	+	–	2.7	35	0	0	0
023	0	0	0	0	0	0	0	0	0	+	0	0	18	–	0	+	–	+	–	2.9	35	0	0	0
024	0	0	0	0	0	0	0	0	0	+	0	0	8	–	0	–	+	+	–	3.3	35	0	0	0
025	0	0	0	0	0	0	0	0	0	+	0	0	–	8	0	–	+	+	–	2.5	32	0	0	0
026	0	0	0	+	0	0	0	0	0	0	0	0	–	26	0	+	–	+	–	2.55	33	0	0	0
027	0	0	0	0	0	0	0	0	0	+	0	0	6	–	0	+	–	+	–	2.55	34	0	0	0
028	0	0	0	0	0	0	0	0	0	+	0	0	7	–	0	+	–	+	–	2.95	34	0	0	0
029	0	0	0	0	0	0	0	0	0	+	0	+	–	10	0	+	–	–	+	3.2	–	IUD	0	0
030	0	0	0	0	0	0	0	0	+	0	+	+	–	9	0	–	+	+	–	3.1	38	+	0	0
031	0	+	0	0	0	0	0	+	0	0	0	+	+	–	6	0	–	+	–	+	2.5	–	IUD	0	0
032	0	0	0	+	0	0	0	0	0	0	0	0	0	–	2	0	–	+	+	–	3.2	38	0	0	0
033	0	0	0	0	0	0	0	0	0	0	+	0	0	7	–	0	–	+	+	–	3.3	34	0	0	0
034	+	0	0	0	0	0	0	0	0	0	0	0	0	6	–	0	+	–	+	–	3.2	33	0	0	0
035	+	0	0	0	0	0	0	0	0	0	0	0	0	8	–	0	–	+	+	–	3.6	35	0	0	0
036	0	0	0	0	0	0	0	0	0	+	+	0	–	9	0	–	+	+	–	3.0	34	0	0	0
037	0	0	0	0	0	0	0	0	0	+	0	0	7	–	0	–	+	+	–	3.6	33	0	0	0
038	0	0	0	0	0	0	0	0	0	+	0	0	9	–	0	–	+	+	–	3.0	32	0	0	0
039	0	0	0	0	0	0	0	0	0	+	0	0	6	–	0	+	–	+	–	3.95	40	0	0	0
040	0	0	0	0	0	0	0	0	0	+	0	0	24	–	0	–	+	+	–	3.75	36	0	0	0
041	0	0	0	0	0	0	0	0	0	+	+	+	–	9	0	+	–	+	–	2.2	38	+	0	0
042	0	0	0	0	0	0	0	0	0	+	+	+	–	8	0	+	–	+	–	3.4	34	+	0	0
043	0	0	0	+	0	0	0	0	0	0	0	0	8	–	0	–	+	+	–	2.65	33	0	0	0
044	0	0	0	+	0	0	0	0	0	0	0	0	7	–	0	–	+	+	–	2.9	34	0	0	0
045	0	0	0	+	0	0	0	0	0	0	0	+	–	4	0	+	–	+	–	3.8	34	+	0	0
046	0	0	0	0	0	0	0	0	0	+	+	+	–	9	0	+	–	+	–	4.2	37	0	0	0
047	0	0	0	0	0	0	0	0	0	+	+	+	–	11	0	+	–	+	–	2.45	36	+	0	0
048	0	0	0	0	0	0	0	0	0	+	0	0	13	–	0	+	–	+	–	3.2	34	0	0	0
049	0	0	0	0	0	0	0	+	+	0	+	+	–	12	0	+	–	+	–	2.50	36	+	+	0
050	+	0	0	0	0	0	0	0	0	0	0	0	8	–	0	–	+	+	–	3.2	34	0	0	0
051	0	0	0	+	0	0	0	0	0	0	+	+	18	–	0	–	+	+	–	3.4	36	0	0	0
052	0	0	0	0	0	0	0	0	0	+	0	0	13	–	0	–	+	+	–	2.7	33	0	0	0

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED

APPENDIX 8

DATA ON STUDY PATIENTS

MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED

080	0	0	0	0	0	0	0	0	0	+	+	0	-	8	0	-	+	+	-	2.9	34	+	0	0
081	0	0	0	0	0	0	0	0	0	+	0	0	18	~	0	-	+	+	-	3.25	33	0	0	0
082	0	0	0	0	0	0	0	0	0	+	+	0	-	8	0	-	+	+	-	2.9	35	0	0	0
083	0	0	0	0	0	0	0	0	0	+	+	+	-	9	0	+	-	+	-	3.3	37	0	0	0
084	0	0	0	0	0	0	0	0	0	+	0	0	8	~	0	-	+	+	-	3.35	34	0	0	0
085	+	0	0	0	0	0	0	0	0	0	0	0	6	~	0	-	+	+	-	3.2	34	0	0	0
086	0	0	0	0	0	0	0	0	0	+	+	+	-	9	0	+	-	+	-	2.3	34	+	0	0
087	0	0	0	0	0	0	0	0	0	+	0	0	8	~	0	+	-	+	-	3.7	37	0	0	0
088	+	0	0	0	0	0	0	0	0	0	0	0	6	~	0	+	-	+	-	3.9	32	0	0	0
089	0	0	0	0	0	0	0	0	0	+	0	0	7	~	0	-	+	+	-	2.85	31	0	0	0
090	0	0	0	0	0	0	0	0	0	+	0	0	6	~	0	+	-	+	-	3.0	35	0	0	0
091	0	0	0	0	0	0	0	0	0	+	+	0	-	9	0	+	-	+	-	2.85	34	+	0	0
092	0	0	0	0	0	0	0	0	0	+	0	0	7	~	0	+	-	+	-	4.1	37	0	0	0
093	0	0	0	0	0	0	0	0	0	+	0	0	6	~	0	+	-	+	-	2.9	36	0	0	0
[illegible]		+	0	0	0	0	0	0	0	0	0	0	24	~	0	-	+	+	-	3.8	35	0	0	0
095	0	0	0	0	0	0	0	0	0	+	0	0	24	~	0	+	-	+	-	3.[illegible]	39	0	0	0
096	0	0	0	+	0	0	0	0	0	0	0	0	12	~	0	-	+	+	-	3.25	35	0	0	0
097	0	0	0	0	0	0	0	0	0	+	0	0	8	~	0	-	+	+	-	3.4	36	0	0	0
098	0	0	0	0	0	0	0	0	+	0	+	+	-	9	0	+	-	+	-	3.1	37	+	+	0
099	0	+	0	0	+	0	0	0	0	0	+	0	-	3	0	+	-	+	-	3.55	34	0	0	0
100	0	0	0	0	0	0	0	0	0	+	0	0	6	~	0	?	+	+	-	3.05	32	0	0	0
101	0	0	0	0	0	0	0	0	0	+	+	+	-	6	0	-	+	-	+	2.8	30	IUD	0	0

LEGEND: INJURIES: + = present. 0 = absent. with respect to the particular type being described.

BLOOD TRANSFUSION: + Indicates patients that were transfused with blood. 0 = patients that were not.

SEPSIS: + Indicates presence of Sepsis. 0 = no sepsis.

SEX: + Indicates particular sex of baby.

SURVIVAL: + Under alive indicates babies that were born alive; while + under dead indicates babies that did not leave hospital alive.

ASPHYXIA: + Indicates Asphyxia was present. 0 = Asphyxia was absent. The same legend for external injuries and Congenital Malformations.

APPENDIX 8

PELVIC MEASUREMENTS - SPIRIT PREGNANTS

PATIENT NUMBER	BIPARIETAL DIAMETER AT THE WIDEST (Cm)	OCCIPITO-FRONTAL DIAMETER (Cm)	OCCIPITO-MENTAL DIAMETER OF THE SUTURES (Cm)	TRANS-VERSE DIAMETER (Cm)	IF ENGAGED AT THE BRIM (Cm)	AT STATION 0 (Cm)	ANGLE OF INCLINATION TO HORIZONTAL (DEGREES)	TYPE OF PUBIC ARCH	CONFIGURATION OF SACRUM
781653	11.9	12.0	0.9	11.2	11.6	11.6	44	Parallel	Hollow
752958	12.8	11.4	0.8	11.5	12.7	12.8	52	Parallel	Hollow
751359	11.2	12.0	0.8	10.4	13.2	13.2	57	Parallel	Hollow
751899	12.8	11.2	0.8	10.4	13.4	13.5	60	Parallel	Hollow
751814	11.3	12.0	0.9	11.0	11.4	11.6	50	Parallel	Hollow
820407	13.2	13.7	1.1	10.8	13.3	11.2	60	Parallel	Concave
820703	12.8	12.0	0.9	10.4	13.2	12.4	58	Parallel	Hollow
843221	11.6	10.6	1.0	9.2	11.6	11.6	43	Outwards	Concave
843264	12.9	10.2	Not Obvious	9.6	11.2	10.4	53	Parallel	Hollow
752506	13.0	11.5	1.3	11.2	12.8	11.6	58	Parallel	Hollow
752980	12.1	11.0	1.5	11.2	13.2	13.6	49	Parallel	Hollow
848014	11.9	10.6	1.0	10.8	12.0	12.0	50	Parallel	Hollow
752902	11.5	11.0	1.0	10.8	10.0	10.8	47	Outwards	Hollow
821017	13.2	12.1	0.9	12.8	12.8	13.2	47	Parallel	Hollow
751666	13.2	12.0	0.5	10.4	13.2	13.2	57	Parallel	Hollow
752901	13.3	12.0	0.5	10.6	14.0	11.6	47	Parallel	Hollow
874512	11.3	12.0	0.7	11.2	12.3	13.2	50	Parallel	Hollow
879026	13.5	12.5	1.0	10.7	13.2	13.5	59	Parallel	Hollow
911528	11.9	10.6	1.0	10.4	12.4	12.8	50	Parallel	Hollow
822251	11.5	10.1	1.0	10.4	11.2	11.2	54	Parallel	Straight
659727	11.9	10.1	1.0	10.6	12.0	12.0	62	Parallel	Hollow
913739	13.5	13.1	0.9	10.0	11.6	12.0	50	Parallel	Straight
919409	11.1	10.1	1.0	10.4	11.2	12.0	60	Parallel	Straight

947166	10.6	8.9	0.4	8.4	10.6	10.9	30	Mollow
220133	11.1	9.7	0.6	9.4	10.0	9.8	55	Mollow
78589	12.0	10.1	0.3	9.6	11.6	11.2	50	Mollow
949680	11.1	8.9	0.3	9.6	10.4	10.0	50	Tenaight
960082	11.0	8.1	0.5	10.4	11.2	11.9	55	Mollow
967199	12.0	10.8	0.5	10.0	11.2	10.4	15	Mollow
967221	10.2	7.0	0.3	9.1	10.4	10.6	45	Mollow
36324	13.6	12.9	1.0	12.8	14.8	14.0	63	Mollow
820197	11.1	10.2	1.0	11.2	13.6	13.6	50	Mollow
670049	12.7	11.5	1.0	10.4	12.8	13.2	65	Mollow
540089	12.3	10.6	1.0	10.4	13.2	14.8	62	Mollow
822691	12.0	10.1	1.0	11.5	12.9	13.7	67	Mollow
825944	11.9	11.0	1.4	11.9	17.0	12.8	63	Mollow
46666	13.9	11.6	0.9	11.5	13.7	14.0	50	Mollow
822019	13.8	12.0	0.8	11.4	12.8	13.6	54	Mollow
512911	13.6	11.0	1.4	12.0	11.4	14.0	44	Mollow
821078	13.0	12.1	1.5	11.9	12.0	10.1	59	Mollow
28880	12.8	12.0	1.2	11.6	12.4	13.0	50	Mollow
869687	13.0	12.0	1.5	11.0	13.8	13.6	52	Mollow
190569	12.9	11.8	2.0	11.2	11.0	11.1	52	Mollow
18075	12.9	12.0	1.0	11.8	14.6	14.6	47	Mollow

APPENDIX 8
STUDY PATIENTS
PELVIC MEASUREMENTS CONTINUED

APPENDIX 8

STUDY PATIENTS
PELVIC MEASUREMENTS CONTINUED

877298	11.1	10.5	0.6	10.4	11.6	12.0	52	Parallel	Hollow
881979	12.9	10.6	0.6	10.8	12.8	12.4	66	Parallel	Hollow
842519	10.7	9.2	0.5	8.8	10.4	10.0	58	Parallel	Hollow
859332	11.3	10.0	1.0	9.6	10.8	11.6	55	Parallel	Hollow
936377	11.5	10.1	0.9	9.6	11.2	11.6	56	Parallel	Hollow
940100	12.3	11.4	1.0	10.4	12.4	11.2	45	Parallel	Hollow
870013	11.1	10.8	0.5	12.0	13.2	12.8	60	Parallel	Hollow
823350	11.9	9.8	0.4	9.2	10.4	11.6	57	Outwards	Hollow
825113	11.0	8.5	0.6	8.4	10.4	11.0	28	Inwards	Concave
825242	12.8	10.0	0.5	8.4	10.4	11.0	60	Parallel	Straight
817030	11.9	10.0	0.4	8.0	10.8	11.2	48	Parallel	Hollow
752056	10.2	8.7	0.3	8.8	10.4	10.4	62	Parallel	Straight
877079	11.9	9.0	0.5	10.4	12.8	13.2	49	Outwards	Straight
809893	11.1	9.4	0.6	10.0	12.0	11.6	60	Parallel	Concave
833060	11.9	10.0	0.3	8.4	11.2	12.0	45	Parallel	Hollow
508545	11.1	10.2	0.5	9.6	12.8	12.8	47	Outwards	Hollow
849824	11.1	10.0	0.3	9.2	12.0	12.0	58	Parallel	Hollow
850509	11.0	8.8	0.3	10.0	11.6	10.4	45	Parallel	Hollow
850826	10.5	8.6	0.3	9.8	10.5	10.6	45	Parallel	Hollow
822387	11.1	8.9	0.6	11.2	12.8	11.6	55	Parallel	Hollow
852559	10.2	8.6	0.4	7.6	10.0	11.2	38	Parallel	Straight
874417	11.0	9.8	0.4	9.2	11.2	11.2	55	Parallel	Hollow
853138	12.0	10.2	0.5	10.8	12.4	12.0	47	Parallel	Hollow
878476	10.1	8.7	0.4	9.6	10.7	10.4	52	Parallel	Straight
880029	10.3	8.9	0.3	10.4	11.2	11.3	53	Parallel	Hollow
375247	11.1	8.5	0.4	9.6	11.2	10.8	42	Parallel	Hollow
934610	10.2	8.3	0.5	8.8	12.0	12.0	37	Backwards	Straight
936266	8.5	6.6	0.4	8.2	9.3	9.2	48	Parallel	Straight
869462	11.1	8.7	0.4	9.6	11.2	11.2	50	Parallel	Hollow
941645	11.9	9.0	0.5	10.0	11.6	11.2	50	Parallel	Hollow
947166	10.6	8.9	0.4	8.4	10.6	10.2	30	Parallel	Hollow

APPENDIX 8

STUDY PATIENTS
PELVIC MEASUREMENTS CONTINUED

659727	11.9	10.1	1.0	10.4	12.0	12.0	62	Parallel	Hollow
913739	10.6	10.1	0.9	10.0	11.6	12.0	50	Parallel	Straight
919409	11.1	10.1	1.0	10.4	11.2	12.0	60	Parallel	Straight
624584	11.9	10.6	1.0	10.0	11.6	12.4	53	Parallel	Hollow
822396	11.9	10.1	1.0	10.4	10.4	11.2	53	Parallel	Hollow
868040	11.9	10.1	1.0	11.2	12.8	12.8	42	Parallel	Hollow
869802	11.9	10.6	0.8	10.8	12.4	12.8	63	Parallel	Hollow
822681	11.9	10.0	1.0	10.4	12.0	11.2	58	Parallel	Hollow
377030	11.9	10.6	0.6	9.9	13.9	13.1	57	Parallel	Straight
868090	13.6	12.0	0.9	11.2	14.0	13.2	65	Parallel	Hollow
858117	12.4	11.9	1.0	11.2	12.8	11.2	56	Parallel	Hollow
416201	11.9	10.0	0.6	11.6	12.4	11.2	58	Parallel	Hollow
599368	15.7	13.3	1.0	11.6	14.0	12.8	50	Parallel	Hollow
788836	12.8	11.0	1.0	11.2	12.4	12.0	62	Parallel	Hollow
870329	13.6	9.1	0.9	13.7	14.4	13.6	68	Parallel	Straight
868688	11.9	10.5	1.0	11.6	13.0	12.8	53	Parallel	Hollow
870817	11.9	10.2	1.0	10.4	11.2	11.2	55	Parallel	Straight
868500	12.8	11.0	1.5	10.0	12.8	12.8	52	Parallel	Hollow
930705	12.4	10.9	1.5	10.0	12.8	12.8	52	Parallel	Straight
870936	13.6	12.0	1.0	12.8	13.2	13.6	58	Parallel	Hollow
963243	12.8	11.0	1.8	10.0	11.6	11.2	40	Parallel	Hollow
870414	11.9	10.0	0.6	11.2	12.4	10.4	58	Inward	Hollow
750118	12.8	11.0	2.1	10.6	11.2	11.6	65	Parallel	Hollow
869792	11.9	10.0	1.0	11.2	12.6	13.6	52	Parallel	Hollow
819055	12.1	10.5	0.9	10.8	11.2	12.0	55	Parallel	Straight
751575	11.1	8.7	0.6	11.2	12.4	11.6	50	Parallel	Hollow
752969	10.9	9.0	1.0	11.4	14.3	14.0	52	Parallel	Hollow
510453	11.1	10.0	0.5	11.6	14.8	13.6	47	Parallel	Straight
877298	11.1	10.3	0.6	10.4	11.6	13.0	52	Parallel	Hollow
891979	12.9	10.6	0.6	10.8	12.8	12.4	66	Parallel	Hollow
842519	10.2	9.2	0.5	8.8	10.4	10.0	58	Parallel	Hollow
913132	11.3	11.1	1.0	9.6	10.9	11.6	65	Parallel	Hollow

APPENDIX 9

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD
CONTROL PATIENTS (N = 100)
MATERNAL CHARACTERISTICS AND STATE OF MOTHER AND FETUS ON ADMISSION IN LABOUR

	MATERNAL CHARACTERISTICS									CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR														
														FETAL HEAD										
A. B. U. HOSPITAL REGISTRATION NUMBER	RESEARCH NUMBER	AGE IN YEARS	ORDER OF VIABLE PREGNANCY	STATURE HEIGHT IN METRES	STATURE WEIGHT POST PARTUM (KG)	ANTENATAL CARE	NO. OF YEARS MARRIED	EDUCATION	PREVIOUS OBSTETRIC ABNORMALITY	DURATION OF LABOUR ON ADMISSION (HRS) LESS THAN 12	DURATION OF LABOUR ON ADMISSION (HRS) 12 TO 24	DURATION OF LABOUR ON ADMISSION (HRS) MORE THAN 24	DEBYDRATION	PALPABLE PER ABDOMEN	ATTITUDE	POSITION	STATION IN CM	MOULDING	CAPUT	FEVER (TEMPERATURE MORE THAN 37°C)	MATERNAL PULSE RATE PER MINUTE	BLOOD PRESSURE (mmHg)	PROTEINURIA	CERVICAL DILATATION IN CM	OBSTRUCTED LABOUR PRESENT
751323	0010	19	1	1.59	47.2	B	1	NIL	0	4	–	–	0	4/5	WP	LOA	0	0	0	0	90	120/80	0	4	0
820424	0020	18	1	1.47	45.5	B	4	NIL	0	5	–	–	0	3/5	WP	LOT	+1	0	0	0	80	150/90	0	5	0
684571	0030	18	1	1.53	60.75	B	5	SEC	0	5	–	–	0	3/5	WP	LOA	−1	0	0	0	82	150/90	+	2	0
820219	0040	27	5	1.50	47.0	B	12	NIL	0	6	–	–	0	1/5	WP	ROA	+1	+	+	0	80	130/70	0	10	0
803861	0050	24	1	1.51	57.3	B	7	NIL	0	–	14	–	0	3/5	WP	LOA	0	0	0	0	86	150/80	0	8	0
97365	0060	27	1	1.62	55.3	B	7	NIL	0	–	12.5	–	0	2/5	WP	LOA	+1	0	0	0	88	110/70	0	10	0
820399	0070	20	3	1.52	55.2	B	8	PRI	0	5.5	–	–	0	5/5	WP	ROT	−1	0	0	0	74	110/70	0	5	0
820735	0080	15	1	1.50	53.4	B	1	NIL	0	4.5	–	–	0	3/5	WP	LOT	0	+	0	0	80	120/70	0	4	0
825582	0090	40	9	1.60	66.0	E	9	NIL	0	9.5	–	–	+	3/5	WP	ROA	−1	+	+	0	90	130/80	+	8	0
798627	0100	19	1	1.53	45.6	B	SINGLE	NIL	0	–	16	–	0	1/5	WP	ROA	+1	+	0	0	82	120/70	0	8	0
751353	0110	23	1	1.64	56.8	B	1	PRI	0	–	13	–	0	4/5	PE	ROT	−2	0	0	0	90	130/90	+	4	0
825600	0120	18	1	1.37	51.0	E	2	NIL	0	10	–	–	+	3/5	WP	LOA	−1	0	0	0	78	120/70	0	3	0
750497	0130	36	9	1.60	84.5	B	12	NIL	0	3	–	–	0	4/5	WP	LOA	0	0	0	0	82	110/70	0	4	0
751852	0140	18	1	1.56	56.3	B	1	PRI	0	2	–	–	0	4/5	WP	ROT	−2	0	0	0	74	130/70	0	2	0
820240	0150	25	2	1.67	61.5	B	4	NIL	0	6	–	–	0	4/5	WP	ROT	−1	0	0	0	80	140/90	0	4	0
778550	0160	14	1	1.43	48.5	B	1	NIL	0	10	–	–	0	3/5	WP	LOT	0	+	0	0	78	140/90	+	8	0
832596	0170	30	7	1.53	61.2	E	9	NIL	0	9	–	–	0	3/5	WP	LOT	0	+	0	0	92	110/80	0	8	0

APPENDIX 9

CONTROL PATIENTS

MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR CONTINUED

[redacted]																									
832596	017C	30	7	1.53	61.2	E	9	NIL	0	9	–	–	0	3/5	WF	LOT	0	+	0	0	92	110/80	0	8	0
830143	018C	19	3	1.42	42.8	E	4	NIL	0	9	–	–	++	5/5	PE	LOA	−2	+	+	+	90	120/70	+	5	0
457579	019C	27	6	1.71	58.5	B	13	NIL	0	4	–	–	0	3/5	WF	LOT	−2	0	0	0	90	120/80	0	3	0
378035	020C	22	3	1.51	57.0	B	14	PRI	0	3	–	–	0	5/5	PE	LOT	−2	0	0	0	82	120/80	0	5	0
752041	021C	16	1	1.54	80.0	B	3	PRI	0	5	–	–	0	3/5	WF	LOT	0	+	0	0	92	130/80	0	5	0
820339	022C	20	2	1.47	49.5	B	4	NIL	0	8	–	–	0	4/5	WF	BOT	−1	+	0	0	82	130/80	0	4	0
821407	023C	26	3	1.51	53.1	B	6	NIL	0	9	–	–	0	4/5	WF	BOA	−1	0	0	0	90	120/80	0	5	0
820058	024C	25	3	1.59	49.4	B	5	NIL	0	5	–	–	0	3/5	WF	BOA	−1	+	0	0	92	110/70	0	6	0
456795	025C	18	2	1.57	49.0	B	3	NIL	0	5	–	–	0	3/5	PE	LOT	0	+	0	0	80	130/80	0	8	0
751642	026C	18	1	1.57	53	B	1	NIL	0	10	–	–	0	2/5	WF	BOA	+2	+	0	0	83	110/70	0	10	0
375533	027C	20	2	1.60	60.0	B	2	NIL	0	3	–	–	0	5/5	PE	LOA	−2	0	0	0	90	120/70	0	2	0
820408	028C	21	1	1.45	57.2	B	6	NIL	0	3	–	–	0	5/5	WF	BOT	−1	0	0	0	80	120/80	0	5	0
850503	029C	30	9	1.57	53.7	E	15	NIL	0	–	–	–	48 +	3/5	PE	LOA	−2	+	+	+	120	140/90	+	10	+
752397	030C	35	8	1.48	59.5	B	15	NIL	0	11	–	–	0	2/5	WF	LOT	+1	+	+	0	80	120/70	0	10	0
752859	031C	15	1	1.49	46.5	B	2	PRI	0	12	–	–	0	4/5	WF	LOA	−1	+	0	0	81	130/80	0	7	0
752734	032	15	1	1.52	51.5	B	2	NIL	0	4	–	–	0	4/5	WF	LOA	−1	0	0	0	80	110/70	0	3	0
854053	033C	18	1	1.66	48.7	E	2	NIL	0	10	–	–	0	4/5	WF	LOA	−1	0	0	0	92	130/80	0	5	0
18937	034C	25	3	1.53	52.0	B	6	NIL	0	3	–	–	0	2/5	WF	LOA	+1	+	0	0	82	110/80	0	10	0
845471	035C	40	9	1.64	55.5	E	20	NIL	0	–	16	–	0	4/5	WF	LOA	−1	0	0	0	78	110/70	0	7	0
807160	036C	15	1	1.50	40.1	B	2	NIL	0	4	–	–	0	5/5	WF	BOT	−1	+	0	+	82	120/70	0	4	0
21644	037C	38	8	1.60	57.2	B	24	PRI	0	2	–	–	0	5/5	WF	LOA	−2	0	0	0	80	130/80	0	4	0
624968	038C	38	2	1.55	43.4	B	20	SBO+	Prev. A-n-OL	1	–	–	0	4/5	WF	LOA	−2	0	0	0	80	120/60	0	4	0
874252	039C	29	4	1.58	42.3	E	6	NIL	0	2	–	–	0	3/5	WF	LOT	−1	0	0	0	74	120/70	0	4	0
789328	040C	22	1	1.59	55.8	B	2	NIL	0	2	–	–	0	4/5	WF	LOA	−2	0	0	0	85	120/70	+	4	0
874515	041C	20	1	1.52	41.4	E	3	NIL	0	4	–	–	0	3/5	PE	BOT	−2	0	0	0	100	120/80	0	3	0
19033	042C	35	9	1.55	68.5	B	12	NIL	Prev. Forcp.	–	22	–	0	5/5	PE	LOT	−2	+	+	0	100	140/90	0	6	0
830003	043C	14	1	1.60	52.2	B	1	NIL	0	4	–	–	0	4/5	WF	LOA	−2	0	0	0	84	130/80	0	4	0
822096	044C	18	1	1.63	45.3	B	2	PRI	0	4.5	–	–	+	4/5	WF	BOT	−1	0	0	0	82	130/80	0	4	0
752356	045C	13	1	1.55	44.5	B	1	NIL	0	2.5	–	–	0	4/5	WF	LOA	−2	0	0	0	92	120/80	0	3	0
111222	046C	24	4	1.54	51.5	B	6	PRI	0	5.5	–	–	0	4/5	WF	LOA	−2	0	0	0	82	120/80	0	4	0

MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR CONTINUED

111222	0460	24	4	1.54	51.5	B	6	PRI	0	5.5	-	-	0	4/5	WF	LOA	-2	0	0	0	82	120/80	0	4	2
821148	0470	14	1	1.47	48.1	B	1	NIL	0	-	12	-	0	4/5	WF	LOT	-2	0	0	0	84	120/70	0	3	0
821222	0480	25	5	1.47	54.0	B	5	PRI	0	3	-	-	0	4/5	WF	ROT	-2	0	0	0	94	130/80	0	4	0
882792	0490	15	1	1.45	40.6	E	1	NIL	0	-	24	-	+	4/5	PE	LOT	-1	+	+	0	82	140/80	+	6	0
822390	0500	20	1	1.69	52.1	B	5	NIL	0	7	-	-	0	4/5	WF	LOA	-1	0	0	0	90	120/70	0	2	0
821242	0510	25	4	1.61	63	B	1	PRI	0	3	-	-	0	4/5	WF	ROT	-2	0	0	0	78	120/80	0	3	0
868251	0520	17	2	1.54	50.3	B	3	NIL	0	3	-	-	0	4/5	WF	LOA	-2	0	0	0	78	150/100	0	3	0
851359	0530	30	6	1.50	47.8	B	12	NIL	0	6	-	-	0	4/5	WF	LOA	-1	0	0	0	82	140/80	0	7	0
936742	0540	15	1	1.44	36.4	E	2	NIL	0	-	15	-	0	3/5	PE	ROT	-1	+	+	0	92	120/80	+	8	0
822838	0550	23	1	1.69	52.8	B	1	SBC	0	5	-	-	0	4/5	WF	LOA	-1	0	0	0	88	130/80	0	3	0
869507	0560	15	1	1.68	52.1	B	1	NIL	0	4	-	-	0	4/5	PE	LOA	-1	0	0	0	92	160/100	0	4	0
822975	0570	14	1	1.54	54	B	1	NIL	0	1	-	-	0	4/5	WF	ROT	-2	0	0	0	80	140/90	0	3	0
869077	0580	18	1	1.58	38.6	B	1	SBC+	0	-	12	-	0	4/5	WF	LOA	-1	0	0	0	90	120/80	0	5	0
919927	0590	15	1	1.50	42.2	E	2	NIL	0	-	-	32	++	4/5	PE	LOT	-2	++	++	0	80	140/90	0	8	0
868897	0600	18	1	1.52	55.6	B	2	PRI	0	4	-	-	+	4/5	WF	ROT	-1	+	+	0	84	140/85	0	4	0
828081	0610	19	3	1.54	43.4	B	3	NIL	0	8	-	-	0	4/5	WF	LOA	-1	0	0	0	88	110/80	0	5	0
145755	0620	24	5	1.59	58.6	B	5	PRI	0	4	-	-	0	4/5	PE	LOA	-2	0	0	0	85	120/70	0	3	0
822396	0630	20	2	1.54	42.0	B	2	NIL	0	6	-	-	+	2/5	WF	LOA	0	+	+	0	87	130/80	+	10	0
821610	0640	19	1	1.60	45	B	2	NIL	0	6	-	-	0	4/5	PE	ROT	-1	0	0	0	82	110/70	0	4	0
858079	0650	25	2	1.59	57.0	B	3	PRI	0	2	-	-	0	2/5	WF	LOT	+2	0	0	0	78	130/80	0	8	0
822526	0660	18	2	1.46	42.2	B	3	NIL	C/S for C.P.D.	-	13	-	+	4/5	PE	LOT	-2	+	+	0	84	140/80	+	10	0
870610	0670	23	1	1.61	67.8	B	7	PRI	0	8	-	-	0	3/5	WF	LOT	-1	+	+	0	78	140/80	0	4	0
939033	0680	15	1	1.31	45.6	E	1	NIL	0	8	-	-	+	5/5	PE	LOT	-2	+	+	+	120	150/110	0	5	0
894745	0690	19	3	1.57	59.5	B	14	NIL	0	7	-	-	0	2/5	WF	L/A	0	+	+	0	78	110/70	0	10	0
869767	0700	20	2	1.52	46.6	B	5	NIL	0	-	14	-	0	3/5	WF	LOA	-1	+	+	0	75	110/70	0	8	0
822964	0710	22	2	1.57	55.6	B	3	NIL	0	8	-	-	0	4/5	WF	ROT	-2	+	+	0	85	130/90	0	4	0
824901	0720	22	2	1.50	63	B	3	PRI	0	6	-	-	0	5/5	PE	LOA	-1	+	+	0	78	130/90	0	9	0
940680	0730	14	1	1.49	43.4	E	1	NIL	0	10	-	-	0	3/5	WF	LOT	+1	+	+	0	78	140/70	0	9	0
868085	0740	15	1	1.52	43.2	E	2	NIL	0	6	-	-	0	4/5	WF	LOA	-1	0	0	0	78	130/90	0	4	0
36947	0750	35	7	1.52	57.6	B	14	NIL	0	7	-	-	0	4/5	WF	ROA	-1	+	+	0	87	130/70	0	6	0
36478	0760	18	1	1.56	55.6	B	1	NIL	0	4	-	-	0	3/5	WF	LOA	-2	0	0	0	80	140/70	0	7	0

APPENDIX 9
CONTROL PATIENTS
MATERNAL CHARACTERISTICS AND CONDITION OF MOTHER AND FETUS ON ADMISSION IN LABOUR CONTINUED

868085	0740	15	1	1.52	43.2	B	2	NIL	0	6	–	–	0	4/5	WF	LOA	−1	0	0	0	78	130/90	0	4	0
36942	0750	35	7	1.52	57.6	B	14	NIL	0	7	–	–	0	4/5	WF	ROA	−1	+	+	0	87	130/70	0	6	0
36178	0760	18	3	1.56	55.6	B	3	NIL	0	6	–	–	0	3/5	WF	ROT	0	+	+	0	80	110/70	0	7	0
870190	0770	19	1	1.56	44.4	B	1	NIL	0	10	–	–	0	3/5	WF	TOT	−1	+	+	0	80	120/80	0	5	0
536252	0780	74	1	1.65	51.3	B	2	NIL	0	5	–	–	0	3/5	WF	LOA	0	+	+	0	82	120/70	0	8	0
822881	0790	26	1	1.61	57.0	B	3	PRI	0	8	–	–	0	4/5	PE	LOT	−2	0	0	0	78	140/90	0	4	0
510611	0800	29	9	1.48	67.2	B	13	NIL	0	4	–	–	0	5/5	PE	ROA	−2	+	+	0	28	120/70	+	2	0
870960	0810	25	5	1.65	80.4	B	10	GBD+	0	4	–	–	+	4/5	PE	LOT	−2	0	0	0	78	110/80	0	4	0
949299	0820	15	1	1.46	47	B	1	NIL	0	–	16	–	+	3/5	WF	LOA	0	+	+	0	80	160/130	+	5	0
624227	0830	31	8	1.58	65	B	12	NIL	0	8	–	–	0	5/5	PE	LOA	−2	0	0	0	79	150/100	0	5	0
282854	0840	25	8	1.61	56	B	7	PRI	0	–	14.5	–	0	4/5	WF	LOT	−1	+	+	0	78	120/70	0	10	0
558236	0850	25	5	1.66	61	B	10	NIL	0	2	–	–	0	4/5	WF	LOA	0	+	+	0	80	130/70	0	5	0
967254	0860	15	1	1.45	48.2	E	1	NIL	0	–	24	–	+	4/5	PE	LOA	−1	+	+	+	82	120/70	+	8	0
869147	0870	22	1	1.60	65.0	B	2	SBO	0	8	–	–	0	4/5	WF	ROT	−2	+	+	0	80	140/90	0	5	0
19502	0880	26	3	1.60	65	B	6	NIL	0	5	–	–	0	4/5	WF	LOA	−2	+	+	0	82	120/70	0	4	0
870378	0890	14	1	1.61	48.4	B	1	NIL	0	9	–	–	0	4/5	PE	ROT	−2	0	0	0	80	120/80	0	4	0
961704	0900	17	1	1.57	46	E	2	NIL	0	6	–	–	0	4/5	WF	LOT	−2	0	0	0	84	120/80	0	3	0
869692	0910	24	1	1.62	35.6	B	2	PRI	0	3	–	–	0	3/5	WF	LOT	−1	0	0	0	78	110/70	0	4	0
869859	0920	19	1	1.56	47.4	B	2	NIL	0	–	14	–	0	3/5	WF	LOA	−1	+	+	0	84	130/70	0	3	0
930030	0930	30	5	1.73	65.4	B	10	PRI	0	1	–	–	0	3/5	WF	LOA	−1	+	+	0	80	110/70	0	6	0
626243	0940	24	3	1.66	55.0	B	10	PRI	0	4	–	–	0	4/5	WF	LOT	−2	+	+	0	79	120/70	0	4	0
870990	0950	14	1	1.55	52.5	B	2	NIL	0	–	16	–	0	3/5	PE	LOA	−1	+	+	0	95	130/80	+	8	0
869191	0960	22	1	1.60	55.2	B	2	PRI	0	6.5	–	–	0	4/5	WF	ROT	−2	0	0	+	80	140/90	0	4	0
751848	0970	23	3	1.59	43.4	B	5	NIL	0	3	–	–	10	4/5	PE	LOA	−2	+	+	0	80	110/70	0	4	0
229411	0980	40	6	1.55	57	B	15	NIL	0	2	–	–	0	4/5	WF	LOA	−2	+	+	0	78	120/70	0	4	0
975951	0990	16	1	1.59	56.2	E	2	NIL	0	3	–	–	0	3/5	PE	LOT	−1	+	+	0	80	140/90	0	4	0
976419	1000	26	4	1.67	63.2	E	6	NIL	0	2	–	–	0	3/5	PE	LOT	−1	+	+	0	78	120/80	0	4	0

LEGEND:

Antenatal care : B = Booked. E = Emergency
Education : PRI = Primary. Sec = Secondary
Attitude : WF = Well flexed. PE = Partly extended.

APPENDIX 9

OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

CONTROL PATIENTS (N = 100)

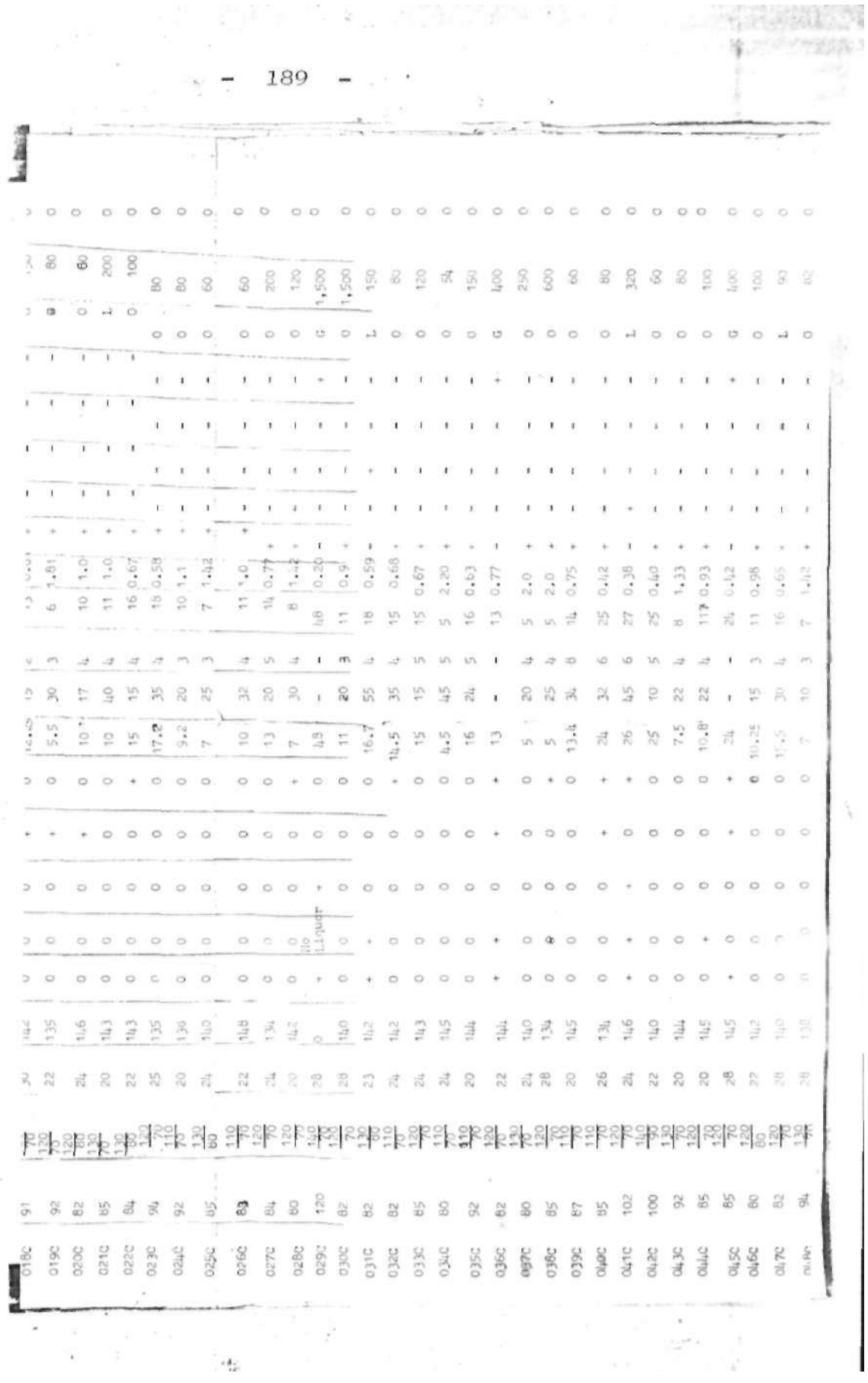
OBSERVATIONS IN LABOUR AND MODE OF DELIVERY

	LABOUR													DELIVERY									
	CLINICAL OBSERVATION IN LABOUR					TREATMENT IN LABOUR				DURATION OF LABOUR				MODE OF DELIVERY									
Research Number	maternal pulse rate per minute	maternal blood pressure in mmHg	Maternal respiratory rate per minute	Foetal heart rate per minute	patient required bladder Catheterization.	meconium stained liquor present	I.V. fluids only	Syntocinon drip	required sedatives or Analgesics.	first stage in Hours	second stage in mins.	Third stage in minutes	Total to the nearest Hour	cervical dilatation in cms	Spontaneous Vag. del.	low forceps	mid cavity forceps	Wellands Rotation and del.	Caesarean section	Required Anaesthesia.	Estimated blood loss in ml.	Other Mat. Complicated
000C	90	120/70	22	135	0	0	0	0	0	8	30	5	9	1.25	+	-	-	-	-	0	250	0
002C	80	150/90	22	140	0	0	0	0	+	8.5	10	5	9	1.20	+	-	-	-	-	0	100	0
003C	90	150/90	21	145	0	0	0	0	+	15	30	10	16	0.67	+	-	-	-	-	L	300	0
004C	80	130/70	16	140	0	+	0	0	0	15.5	10	4	16	0.65	+	-	-	-	-	0	150	0
005C	84	120/70	18	140	+	0	0	0	0	15.2	25	8	16	0.66	+	-	-	-	-	0	300	0
006C	88	110/70	19	146	0	0	0	0	0	12.5	10	5	13	0.8	+	-	-	-	-	0	100	0
007C	80	110/70	20	135	0	+	0	0	0	8.5	30	5	9	1.2	+	-	-	-	-	0	80	0
008C	80	120/70	24	140	0	0	0	0	0	9	30	5	10	1.1	+	-	-	-	-	0	80	0
009C	90	140/70	22	140	0	0	0	0	0	10.5	10	2	11	0.96	+	-	-	-	-	0	200	0
010C	82	120/70	18	135	0	0	0	0	0	17	30	4	18	0.59	+	-	-	-	-	0	400	0
011C	80	120/70	22	120	+	0	+	0	0	26	90	3	28	0.38	-	-	-	+	-	G	1,500	Hydramnios
012C	82	120/70	22	144	0	0	0	0	0	20.5	30	5	21	0.49	+	-	-	-	-	0	200	0
013C	82	110/70	22	140	0	0	0	0	0	10	15	5	10	1.0	+	-	-	-	-	0	380	0
014C	80	120/70	24	152	+	0	0	+	+	36	60	3	37	0.28	-	-	+	-	0	L	500	0
015C	80	140/80	20	140	0	0	0	0	+	10.5	20	3	11	0.96	+	-	-	-	-	0	90	0
016C	80	130/90	24	135	0	+	0	0	0	11.5	25	4	12	0.87	+	-	-	-	-	L	200	0
017C	90	110/70	28	142	0	0	0	0	0	13	45	5	14	0.77	+	-	-	-	-	L	150	0
018C	91	120/70	30	142	0	0	0	+	0	12.25	15	2	13	0.81	+	-	-	-	-	0	150	0
019C	92	120/70	22	135	0	0	0	+	0	5.5	30	3	6	9.0								

APPENDIX 9

CONTROL PATIENTS

OBSERVATION IN LABOUR AND MODE OF DELIVERY CONTINUED



APPENDIX 9

CONTROL PATIENTS

OBSERVATION IN LABOUR AND MODE OF DELIVERY CONTINUED

046C	80	80	22	142	0	0	0	0	0	10.2	15	3	11	0.98	+	-	-	-	-	0	100	0	
047C	82	120/70	28	140	0	0	0	0	0	15.5	30	4	16	0.65	+	-	-	-	-	L	90	0	
048C	94	130/70	28	138	0	0	0	0	0	7	10	3	7	1.42	+	-	-	-	-	0	82	0	
049C	82	140/80	24	144	+	+	0	+	+	29	-	-	29	0.34	-	-	-	-	+	G	500	0	
050C	90	120/70	20	138	0	0	0	0	0	11	22	3	12	0.89	+	-	-	-	-	0	90	0	
051C	80	120/70	20	142	0	0	0	0	0	6	35	3	7	1.7	+	-	-	-	-	0	80	0	
052C	78	130/70	21	143	0	0	0	0	+	8	20	3	8	1.25	+	-	-	-	-	0	62	0	
053C	82	120/70	22	145	0	+	0	0	0	7.5	20	5	8	1.33	+	-	-	-	-	0	300	0	
054C	92	120/70	22	0	0	0	0	+	+	19	30	5	20	0.52	+	-	-	-	-	L	120	Prolapsed Cord	
055C	85	120/80	20	140	0	0	0	0	+	11	40	6	12	0.88	+	-	-	-	-	0	100	0	
056C	80	120/70	22	140	0	0	0	0	0	6	40	5	7	1.67	+	-	-	-	-	L	120	0	
057C	90	140/80	24	145	0	0	0	0	+	7	20	10	8	1.42	+	-	-	-	-	0	400	0	
058C	85	110/70	24	140	0	0	0	0	+	16	40	5	17	0.63	+	-	-	-	-	0	80	0	
059C	84	120/70	24	140	+	0	+	0	0	32	-	-	32	0.31	-	-	-	-	+	G	500	0	
060C	84	120/70	22	144	0	0	0	0	0	22	30	5	23	0.45	+	-	-	-	-	0	80	0	
061C	85	110/70	24	135	0	0	0	0	0	12	40	5	13	0.83	+	-	-	-	-	L	250	0	
062C	78	120/70	22	140	0	0	0	0	0	16	20	5	16	0.63	+	-	-	-	-	0	300	0	
063C	83	120/80	20	138	0	0	0	0	0	6	20	4	6	1.67	+	-	-	-	-	0	250	0	
064C	82	110/70	24	140	0	0	0	0	+	12	25	4	12	0.83	+	-	-	-	-	0	250	0	
065C	80	120/80	20	145	0	0	0	0	0	3.5	20	5	4	2.85	+	-	-	-	-	0	100	0	
066C	82	120/70	28	144	+	+	+	0	+	3	-	-	13	0.77	-	-	-	-	+	G	450	0	
067C	85	120/70	20	145	0	0	0	0	+	1.7	29	4	18	0.59	+	-	-	-	-	0	1,500	0	
068C	117	150/100	30	120	+	0	+	0	+	8	-	-	8	1.25	-	-	-	-	+	G	350	0	
069C	80	130/70	24	140	0	0	0	0	0	7	20	3	7	1.25	+	-	-	-	-	0	100	0	
070C	75	120/70	22	148	0	0	0	0	0	15	25	4	15	0.67	+	-	-	-	-	0	70	0	
071C	84	130/90	20	135	0	0	0	0	0	9	15	5	9	1.1	+	-	-	-	-	0	70	0	
072C	100	130/90	22	150	0	0	0	0	+	7.30	20	4	8	1.37	+	-	-	-	-	0	120	0	
073C	84	140/70	30	135	0	0	0	0	0	10	30	5	11	1.0	+	-	-	-	-	L	600	0	
074C	80	120/70	20	130	0	0	0	0	+	11.4	25	4	12	0.88	+	-	-	-	-	0	30	0	
075C	80	110/70	26	135	0	0	0	0	0	12	19	5	12	0.83	+	-	-	-	-	0	60	0	
		120																					

APPENDIX 9
CONTROL PATIENTS
OBSERVATION IN LABOUR AND MODE OF DELIVERY CONTINUED

074C	80	150/70	20	130	0	0	0	0	+	11.4	25	4	12	0.88	+	-	-	-	-	0	30	0	
075C	80	110/70	26	135	0	0	0	0	0	12	10	5	12	0.83	+	-	-	-	-	0	60	0	
076C	80	120/80	20	135	0	0	0	0	0	10	10	5	10	1.0	+	-	-	-	-	0	50	0	
077C	80	120/80	20	145	0	0	0	0	0	12	10	5	12	0.83	+	-	-	-	-	0	50	0	
078C	78	130/80	22	140	0	0	0	0	0	5.5	20	5	6	1.81	+	-	-	-	-	0	100	0	
079C	75	120/80	23	145	0	0	0	+	+	21.5	32	5	23	0.44	+	-	-	-	-	0	60	0	
080C	78	120/80	20	135	0	0	0	0	0	10	20	5	10	1.0	+	-	-	-	-	0	80	0	
081C	80	120/80	16	135	0	0	0	0	0	5.5	20	3	6	1.87	+	-	-	-	-	0	100	0	
082C	82	150/90	27	140	0	0	0	0	+	21	32	4	22	0.48	+	-	-	-	-	L	164	0	
083C	80	140/90	19	182	+	0	+	0	+	8	-	-	8	1.25	-	-	-	-	+	G	1,500	Prolapsed Cord	
084C	82	110/70	24	144	0	0	0	0	0	14.5	10	4	15	0.69	+	-	-	-	-	0	70	0	
085C	80	120/70	22	135	0	0	0	0	0	3.5	20	4	4	2.85	+	-	-	-	-	L	120	0	
086C	84	120/80	24	134	+	0	+	0	+	28	-	-	28	0.36	-	-	-	-	+	G	1,000	0	
087C	82	120/80	22	135	0	0	0	0	+	17.5	22	4	18	0.57	+	-	-	-	-	L	200	0	
088C	84	130/70	24	145	0	0	0	0	0	5	10	3	5	2.0	+	-	-	-	-	0	50	0	
089C	82	120/70	20	140	+	+	0	+	+	30	25	6	31	0.33	+	-	-	-	-	L	90	0	
090C	80	110/70	22	140	0	0	0	0	0	21	30	6	22	0.48	+	-	-	-	-	0	160	0	
091C	75	120/70	23	144	0	0	0	0	+	13.5	20	4	14	0.56	+	-	-	-	-	L	120	0	
092C	78	130/70	22	143	0	0	0	0	+	18	32	6	19	0.62	+	-	-	-	-	0	110	0	
093C	82	130/70	18	144	0	0	0	0	0	4.5	20	6	5	2.2	+	-	-	-	-	0	250	0	
094C	80	130/80	22	134	0	0	0	0	0	5	10	5	5	2.0	+	-	-	-	-	0	70	0	
095C	95	120/70	20	134	0	0	0	0	0	16	20	5	16	0.63	+	-	-	-	-	0	100	0	
096C	82	130/80	22	145	0	0	0	0	0	8.5	25	5	9	1.2	+	-	-	-	-	L	100	0	
097C	80	110/70	20	140	0	0	0	0	0	5	10	5	5	2.0	+	-	-	-	-	0	100	0	
098C	82	120/70	18	135	0	0	0	0	0	12	20	10	13	0.83	+	-	-	-	-	0	100	0	
099C	78	130/90	24	136	0	+	0	+	0	11	30	6	12	0.90	+	-	-	-	-	L	120	0	
100C	80	130/80	20	130	0	0	0	0	0	5.5	15	4	5	1.92	+	-	-	-	-	0	450	0	

LEGEND: Catheterization: + = bladder was catheterized. 0 = bladder was not catheterized. Meconium + = meconium was present. 0 = meconium absent.
Treatment in labour + = patient had the particular treatment described. 0 = patient did not have the particular treatment described.
Mode of delivery: + = patient was delivered by the mode described. 0 or - = patient was not delivered by the mode described.
Anaesthesia: L = local, G= General, 0 = None.

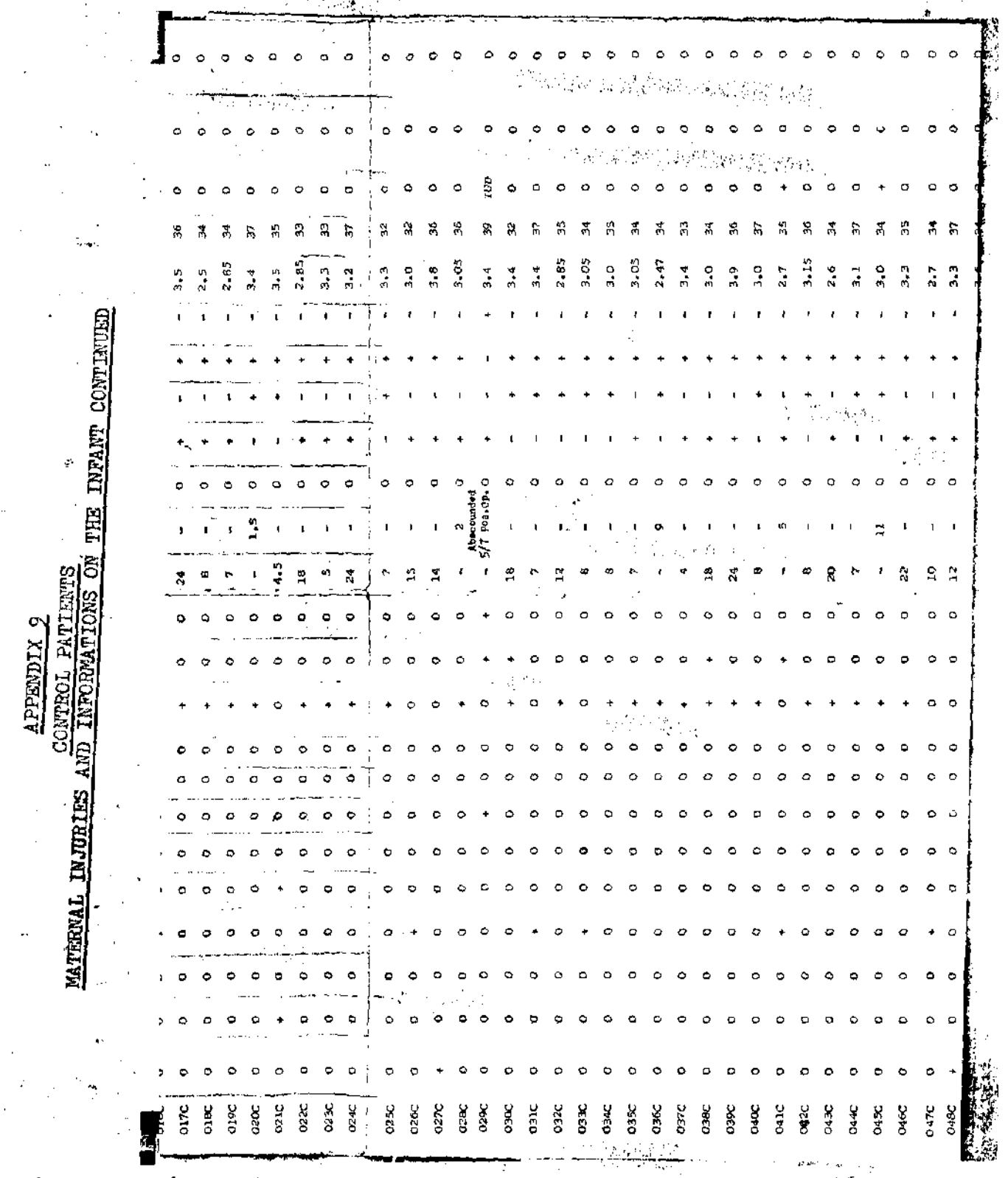
OUTCOME OF LABOUR IN OCCIPITO POSTERIOR POSITIONS OF THE FETAL HEAD

	INJURIES									CONTROL		CASES (N. = 100)												
	PERINEAL TEARS			Episiotomy.	Vaginal tears	Cervical tears	Ruptured uterus	VVF	Gishiri cuts*	none	Required blood transfusion	Sepsis	Delivery Discharge Interval		Maternal death.	THE INFANT								
	First degree	Second degree	Third degree										Within 1 day (hours)	more than 1 day (days)		SEX MALS	SEX FEMALE	SURVIVAL Alive	SURVIVAL Dead	Birth weight in Kg.	Head Circumference in Cm.	Asphyxia	External Injuries.	Obvious Congenital malformation.
001C	0	0	0	0	0	0	0	0	0	+	0	0	5	-	0	+	-	+	-	2.75	33	0	0	0
002C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	-	+	+	-	2.60	31	0	0	0
003C	0	0	0	0	+	0	0	0	0	0	0	0	6	-	0	+	-	+	-	2.50	30	0	0	0
004C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	-	+	+	-	3.1	33	0	0	0
005C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	-	+	+	-	3.0	34	0	0	0
006C	0	0	0	0	0	0	0	0	0	+	0	0	8	-	0	-	+	+	-	3.4	33	0	0	0
007C	0	0	0	0	0	0	0	0	0	+	0	0	10	-	0	-	+	+	-	2.8	32	0	0	0
008C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	+	-	+	-	3.0	31	0	0	0
009C	0	0	0	0	0	0	0	0	0	+	0	0	4	-	0	-	+	+	-	3.25	34	0	0	0
010C	+	0	0	0	0	0	0	0	0	0	0	0	7	-	0	-	+	+	-	3.0	34	0	0	0
011C	0	0	0	+	0	+	0	0	0	0	+	+	-	2	0	+	-	+	-	3.6	36	+	+	0
012C	0	0	0	0	0	0	0	0	0	+	0	0	11	-	0	-	+	+	-	3.75	36	0	0	0
013C	0	0	0	0	0	0	0	0	0	+	0	0	9	-	0	-	+	+	-	3.5	34	0	0	0
014C	0	0	0	+	0	0	0	0	0	0	0	0	-	3	0	-	+	+	-	3.1	35	0	0	0
015C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	-	+	+	-	2.9	32	0	0	0
016C	0	0	0	+	0	0	0	0	0	0	0	0	-	2	0	+	-	+	-	3.3	32	0	0	0
017C	0	0	0	0	0	0	0	0	0	+	0	0	24	-	0	+	-	+	-	3.5	36	0	0	0
									0	+	0	0	8	-	0	+	-	+	-	2.5	34	0	0	0

APPENDIX 9

CONTROL PATIENTS

MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED



APPENDIX 9
CONTROL PATIENTS
MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED

048C	+	0	0	0	0	0	0	0	0	0	0	0	12	-	0	+	-	+	-	3.3	37	0	0	0
049C	0	0	0	0	0	0	0	0	0	+	+	+	12	-	0	+	-	+	-	2.6	34	0	0	0
050C	0	0	0	0	0	0	0	0	0	+	0	0	18	-	0	-	+	+	-	3.2	34	0	0	0
051C	+	0	0	0	0	0	0	0	0	0	0	0	6	-	0	+	-	+	-	3.5	33	0	0	0
052C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	-	+	+	-	3.5	33	0	0	0
053C	0	0	0	0	0	0	0	0	0	+	0	0	8	-	0	-	+	+	-	3.4	36	0	0	0
054C	0	0	0	+	0	0	0	0	0	0	0	0	24	-	0	+	-	-	+	3.4	35	IUD	0	0
055C	0	0	0	0	0	0	0	0	0	+	0	0	8	-	0	+	-	+	-	2.8	33	0	0	0
056C	0	+	0	0	0	0	0	0	0	0	0	0	-	2	0	-	+	+	-	2.9	33	0	0	0
057C	0	0	0	0	0	0	0	0	0	+	0	0	10	-	0	-	+	+	-	2.8	32	0	0	0
058C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	+	-	+	-	2.8	32	0	0	0
059C	0	0	0	0	0	0	0	0	0	+	+	+	-	9	0	-	+	+	-	2.35	35	+	0	0
060C	0	0	0	0	0	0	0	0	0	+	0	0	20	-	0	+	-	+	-	2.35	34	0	0	0
061C	0	0	0	+	0	0	0	0	0	0	0	0	10	-	0	+	-	+	-	3.2	35	0	0	0
062C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	+	-	+	-	3.5	35.4	0	0	0
063C	0	0	0	+	0	0	0	0	0	0	0	0	6	-	0	-	+	+	-	3.3	35	0	0	0
064C	0	0	0	+	0	0	0	0	0	0	0	0	13	-	0	-	+	+	-	2.9	35	0	0	0
065C	0	0	0	0	0	0	0	0	0	+	0	0	12	-	0	+	-	+	-	3.25	35	0	0	0
066C	0	0	0	0	0	0	0	0	0	+	+	+	-	10	0	+	-	+	-	3.55	34	+	0	0
067C	0	0	0	+	0	0	0	0	0	0	+	0	0	36	0	-	+	+	-	2.5	33	0	0	0
068C	0	0	0	0	0	0	0	0	0	+	+	0	12	-	0	-	+	+	-	2.9	35	0	0	0
069C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	+	-	+	-	3.6	35	0	0	0
070C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	+	-	+	-	3.2	34	0	0	0
071C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	-	+	+	-	3.0	34	0	0	0
072C	0	0	0	+	0	0	0	0	0	0	0	0	8	-	0	-	+	+	-	3.4	35	0	0	0
073C	0	+	0	0	0	0	0	0	0	0	+	0	24	-	0	+	-	+	-	2.85	33	0	0	0
074C	0	0	0	0	0	0	0	0	0	+	0	0	12	-	0	+	-	+	-	2.65	32	0	0	0
075C	0	0	0	0	0	0	0	0	0	+	0	0	12	-	0	+	-	+	-	3.85	36	0	0	0
076C	+	0	0	0	0	0	0	0	0	0	0	0	8	-	0	-	+	+	-	3.2	36	0	0	0
077C	0	0	0	0	0	0	0	0	0	+	0	0	12	-	0	-	+	+	-	3.2	33	0	0	0
078C	0	0	0	0	0	0	0	0	0	+	0	0	9	-	0	-	+	+	-	3.2	34	0	0	0
079C	0	0	0	0	0	0	0	0	0	+	0	0	15	-	0	-	+	+	-	2.9	32.5	0	0	0
080C	0	0	0	0	0	0	0	0	0	+	0	0	5	-	0	+	-	+	-	2.9	35	0	0	0
081C	0	0	0	0	0	0	0	0	0	+	0	0	18	-	0	+	-	+	-	4.0	37	0	0	0

APPENDIX 9
CONTROL PATIENTS
MATERNAL INJURIES AND INFORMATIONS ON THE INFANT CONTINUED

078C	0	0	0	0	0	0	0	0	0	+	0	0	9	-	0	-	+	+	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
079C	0	0	0	0	0	0	0	0	0	+	0	0	15	-	0	-	+	+	-	2.9	32.5	0	0	0		
080C	0	0	0	0	0	0	0	0	0	+	0	0	5	-	0	+	-	+	-	2.9	35	0	0	0		
081C	0	0	0	0	0	0	0	0	0	+	0	0	18	-	0	+	-	+	-	4.0	37	0	0	0		
082C	0	0	0	+	0	0	0	0	0	0	0	0	-	1.5	0	-	+	+	-	2.6	33	0	0	0		
083C	0	0	0	0	0	0	0	0	0	+	+	0	-	8	0	-	+	+	-	3.55	37	+	0	0		
084C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	-	+	+	-	2.8	32	0	0	0		
085C	0	+	0	0	0	0	0	0	0	0	0	0	4	-	0	-	+	+	-	3.3	33	0	0	0		
086C	0	0	0	0	0	0	0	0	0	+	+	+	-	9	0	-	+	+	-	2.65	34	0	0	0		
087C	0	0	0	+	0	0	0	0	0	0	0	0	6	-	0	-	+	+	-	3.55	36	0	0	0		
088C	+	0	0	0	0	0	0	0	0	0	0	0	10	-	0	+	-	+	-	3.2	34	0	0	0		
089C	0	0	0	+	0	0	0	0	0	0	0	0	12	-	0	-	+	+	-	3.0	34	0	0	0		
090C	0	0	0	0	0	0	0	0	0	+	0	0	12	-	0	+	-	+	-	3.05	35	0	0	0		
091C	0	0	0	+	0	0	0	0	0	0	0	0	8	-	0	-	+	+	-	3.2	34	0	0	0		
092C	+	0	0	0	0	0	0	0	0	0	0	0	20	-	0	-	+	+	-	2.75	34	0	0	0		
093C	0	0	0	0	0	0	0	0	0	+	0	0	8	-	0	+	-	+	-	3.2	39	+	0	0		
094C	0	0	0	0	0	0	0	0	0	+	0	0	6	-	0	-	+	+	-	3.55	35	0	0	0		
095C	0	0	0	0	0	0	0	0	0	+	0	0	8	-	0	-	+	+	-	3.7	36	0	0	0		
096C	0	0	0	+	0	0	0	0	0	0	0	0	9	-	0	+	-	+	-	3.0	32	0	0	0		
097C	0	0	0	0	0	0	0	0	0	+	0	0	7	-	0	-	+	+	-	2.8	34	0	0	0		
098C	0	0	0	0	0	0	0	0	0	0	0	0	8	-	0	+	-	+	-	3.9	33	0	0	0		
099C	0	0	0	+	0	0	0	0	0	0	0	0	14	-	0	-	+	+	-	2.85	33	0	0	0		
100C	+	0	0	0	0	0	0	0	0	0	0	0	8	-	0	+	-	+	-	3.1	34	0	0	0		

LEGEND: INJURIES: + = present, 0 = absent with respect to the particular type being described.

BLOOD TRANSFUSION: + Indicates patients that were transfused with blood. 0 patients that were not.

SEPSIS: + indicates presence of sepsis. 0 no sepsis.

SEX: + indicates particular sex of baby.

SURVIVAL: + Under alive Indicates babies that were born alive; while + under dead indicates babies that did not leave hospital alive.

ASPHYSIA: + indicates Asphyxia was present, 0 = Asphyxia was absent. The same legend for external injuries and Congenital malformations.

APPENDIX 9

PELVIC MEASUREMENTS OF CONTROL PATIENTS

HOSPITAL NUMBER	WIDEST TRANSVERSE DIAMETER AT THE BRIM (Cm)	BI-ISCHIADIC DIAMETER (Cm)	SEPARATION OF THE SYMPHYSIS (Cm)	TRUE CONJUGATE (Cm)	AP DIAMETER AT MID PLANE (Cm)
LATERAL VIEW					
751323	13.1	11.6	1.1	11.1	11.5
800424	12.0	10.4	1.0	9.4	10.3
684771	11.8	10.0	0.9	9.8	10.1
820219	12.0	10.0	0.8	11.1	11.0
801961	12.1	11.0	1.0	10.2	12.8
87165				REFUSED EXAMINATION	
800399	11.5	10.5	1.0	10.4	12.0
810735	12.0	10.2	1.0	10.0	11.0
805582	13.5	12.0	0.9	10.5	11.5
798627	11.7	10.3	1.0	10.0	10.5
825600	11.4	10.0	1.0	9.8	12.0
750497	12.1	10.3	0.9	10.2	12.0
830240	14.5	12.0	0.6	11.2	12.8
778550	12.1	10.1	1.0	9.6	10.8
812596	12.0	9.8	1.0	10.0	11.9
814343	11.5	10.1	1.4	9.6	12.0
457579	11.6	11.5	0.8	12.0	12.8
378035	12.2	10.3	1.9	10.5	14.8
752041	12.7	12.0	1.0	11.6	14.3
800339	10.5	9.2	0.6	10.1	12.1
821407	12.4	9.5	1.0	10.8	12.0
820658	11.1	9.5	1.0	10.4	11.6
456795	11.9	10.1	1.0	9.2	12.2
751642	11.0	11.0	1.7	11.7	13.6

HOSPITAL NUMBER	AP DIAMETER AT OUTLET (Cm)	ANGLE OF PUBIC INCLINATION TO THE HORIZONTAL (Degrees)	TILT OF SACRUM TO PUBIC SYMPHYSIS	DESCRIPTION OF SACRUM
LATERAL VIEW				
751323	12.6	50	Parallel	Hollow
800424	9.8	50	Parallel	Hollow
684771	12.0	58	Parallel	Hollow
820219	11.2	45	Parallel	Hollow
801961	12.0	50	Parallel	Hollow
87165				
800399	11.0	45	Parallel	Hollow
810735	11.4	53	Parallel	Hollow
805582	11.4	54	Parallel	Hollow
798627	9.8	37	Parallel	Hollow
825600	12.0	57	Parallel	Hollow
750497	11.5	42	Parallel	Hollow
830240	12.8	46	Parallel	Hollow
778550	11.6	53	Parallel	Hollow
812596	11.5	56	Parallel	Hollow
814343	10.8	45	Parallel	Hollow
457579	13.7	50	Parallel	Straight
378035	14.0	45	Outwards	Hollow
752041	14.1	59	Parallel	Hollow
800339	10.8	45	Parallel	Hollow
821407	11.2	40	Parallel	Hollow
820658	11.2	50	Parallel	Hollow
456795	11.2	42	Parallel	Hollow
751642	12.0	59	Parallel	Hollow

APPENDIX 9
CONTROL PATIENTS
PELVIC MEASUREMENTS CONTINUED

626658	11.1	9.5	1.0	10.4	11.0	11.2	46	Parallel	Hollow
616795	11.8	10.1	1.0	9.8	11.2	11.2	42	Parallel	Hollow
751667	12.2	11.0	1.0	11.2	13.6	12.8	52	Parallel	Hollow
775533	12.1	11.0	1.8	10.4	12.6	12.0	56	Parallel	Hollow
800498	11.6	10.5	1.0	9.6	10.8	10.4	58	Parallel	Hollow
752397	11.6	11.2	2.8	10.3	12.6	12.0	50	Parallel	Hollow
752734	11.1	9.2	0.9	10.0	11.6	11.6	48	Parallel	Hollow
854053	11.1	10.4	0.6	9.4	11.6	11.2	55	Parallel	Hollow
19437	11.6	9.6	0.6	9.8	10.4	11.7	50	Parallel	Hollow
855471	11.6	10.6	0.8	10.2	11.0	11.6	40	Parallel	Hollow
21668	12.1	9.6	0.9	12.0	12.5	12.3	48	Parallel	Hollow
624908	12.6	10.0	0.7	13.0	12.1	12.0	49	Parallel	Hollow
736752	11.7	11.3	0.6	11.1	13.6	12.7	35	Parallel	Hollow
979328	13.5	10.1	1.0	12.0	12.8	11.6	50	Parallel	Hollow
736515	11.1	10.7	1.0	9.2	10.0	9.6	37	Parallel	Hollow
19033	12.2	10.1	0.9	10.1	12.0	11.6	45	Parallel	Hollow
830003	10.6	9.0	1.2	10.3	12.5	11.7	28	Parallel	Hollow
822096	11.8	9.7	1.4	10.4	11.8	10.5	50	Parallel	Hollow
111772	12.3	10.6	0.8	10.2	11.5	9.6	50	Parallel	Hollow
821148	11.4	10.2	0.6	10.5	10.4	10.4	45	Parallel	Straight
821272	11.9	9.6	0.8	11.0	10.9	11.0	45	Parallel	Hollow
821242	12.8	11.5	0.7	12.2	14.4	12.8	52	Parallel	Hollow
823390	12.8	10.6	Indistinct	12.2	13.0	12.5	41	Parallel	Hollow
868251	12.8	12.2	0.7	9.2	10.4	9.9	56	Parallel	Straight
851359	11.6	10.6	1.0	11.2	12.0	12.0	50	Parallel	Hollow
936742	11.6	10.5	1.0	10.4	11.2	10.4	50	Parallel	Hollow
872848	12.8	11.0	0.6	10.3	10.8	11.6	55	Parallel	Hollow
869507	13.3	12.0	0.9	12.4	13.6	12.7	50	Parallel	Hollow
820475	12.3	11.2	0.7	10.6	12.4	12.0	58	Parallel	Hollow
869077	12.3	11.1	1.0	10.8	12.4	12.4	40	Parallel	Hollow
868097	11.5	10.0	1.0	9.4	12.0	12.0	48	Parallel	Hollow
828081	11.9	9.6							

APPENDIX 9
CONTROL PATIENTS
PELVIC MEASUREMENTS CONTINUED

361704	12.7	11.0	1.9	10.4	12.1	11.7	51	Parallel	Hollow
870178	11.9	12.0	1.1	10.4	10.4	10.4	45	Parallel	Hollow
19502	12.7	12.0	0.8	11.6	12.8	12.4	58	Parallel	Hollow
869447	12.3	12.0	0.6	11.6	13.6	12.0	57	Parallel	Hollow
967254	12.8	10.6	1.6	12.8	14.8	12.8	59	Parallel	Hollow
262854	11.9	10.6	0.6	11.2	13.2	13.2	60	Parallel	Hollow
624227	11.0	9.4	1.0	10.0	11.2	10.4	50	Parallel	Hollow
870980	14.0	12.4	2.0	12.8	14.4	14.4	60	Parallel	Hollow
510611	12.8	11.5	1.0	10.0	10.8	10.8	55	Parallel	Hollow
822881	12.8	12.0	0.6	10.1	12.0	11.2	50	Parallel	Hollow
536252	12.0	11.0	1.0	10.2	12.8	12.0	50	Parallel	Hollow
870190	12.1	11.0	1.5	10.0	11.2	11.2	55	Parallel	Hollow
3617B	12.4	11.5	1.5	12.2	13.6	11.6	55	Parallel	Hollow
36942	12.1	11.5	0.6	11.6	12.0	12.0	57	Parallel	Hollow
864085	12.7	11.0	1.0	13.0	14.8	14.5	59	Parallel	Hollow
940660	12.4	10.3	2.1	12.0	13.1	13.0	52	Parallel	Hollow
624901	12.1	10.6	1.0	10.4	12.0	12.0	55	Parallel	Hollow
870964	10.7	10.4	0.9	11.8	12.4	13.0	60	Parallel	Hollow
869767	11.0	10.6	1.0	11.2	12.8	12.0	55	Parallel	Hollow
934725	12.9	11.0	0.6	10.4	12.0	10.8	66	Quadrant	Hollow
870610	11.7	11.5	0.8	12.0	13.2	12.0	63	Parallel	Hollow
859079	12.5	10.9	0.8	10.3	11.8	12.0	63	Parallel	Hollow
821610	11.3	12.0	2.0	10.8	12.9	11.0	60	Parallel	Hollow
822137	12.1	10.6	1.0	12.0	12.8	10.8	45	Parallel	Hollow
1457355	12.8	10.2	1.0	11.2	11.6	12.8	68	Quadrant	Hollow
828081	11.2	11.0	0.7	10.8	11.6	10.8	58	Parallel	Hollow
868447	11.5	10.0	1.0	9.4	12.0	12.0	56	Parallel	Hollow
869077	12.1	11.1	1.0	10.8	12.4	12.4	40	Parallel	Hollow

APPENDIX 9
CONTROL PATIENTS
PELVIC MEASUREMENTS CONTINUED

751353	11.9	9.7	0.6	11.0	11.6	13.6	55	Parallel	Hollow
751852	11.1	9.2	0.5	10.4	11.9	11.6	66	Parallel	Hollow
752859	10.5	9.4	0.6	9.2	11.2	11.2	60	Parallel	Hollow
859503			Absconded from hospital						
807160	10.0	7.8	0.3	9.0	10.2	10.2	57	Parallel	Hollow
942929	10.3	8.5	0.5	8.4	10.6	10.0	50	Parallel	Hollow
558236	10.0	8.3	0.4	8.2	10.2	10.0	53	Parallel	Hollow
752156	10.2	10.0	0.3	9.4	10.9	10.4	40	Parallel	Hollow
668792	11.8	10.1	1.0	9.3	11.0	12.0	58	Parallel	Straight
919927	11.9	10.0	0.6	8.8	10.2	10.0	55	Parallel	Hollow
822526	11.4	8.1	0.6	9.0	10.0	11.2	58	Parallel	Hollow
939033	10.5	9.2	0.5	8.3	10.3	10.2	55	Parallel	Hollow
976419	12.8	11.5	1.5	11.6	13.2	14.0	55	Parallel	Hollow
979952	12.8	11.0	1.4	12.5	14.4	13.4	65	Parallel	Hollow
725411	11.4	10.5	1.0	11.3	12.3	12.0	41	Parallel	Hollow
751848	12.2	10.3	0.8	11.2	12.8	11.2	65	Parallel	Hollow
869191	11.1	10.2	1.0	10.4	11.9	11.2	64	Parallel	Straight
870990	11.8	10.2	1.5	10.8	12.0	11.6	55	Parallel	Hollow
626241	12.1	11.0	1.0	11.2	11.6	13.0	50	Parallel	Hollow
790010	14.5	12.0	2.5	11.6	12.0	12.0	60	Parallel	Hollow
869859	11.2	11.5	0.5	10.8	12.3	12.0	62	Parallel	Hollow
869692	11.9	10.1	0.5	11.2	12.0	9.2	53	Parallel	Hollow
961704	12.7	11.0	1.5	10.4	12.1	11.2	53	Parallel	Hollow
810178	11.9	10.0	1.1	10.4	10.4	10.4	45	Parallel	Hollow
19502	12.7	12.0	0.8	11.6	12.9	12.4	58	Parallel	Hollow
669447	12.3	12.0	0.6	12.6	13.6	12.0	57	Parallel	Hollow
967254	12.8	10.6	1.6	12.8	14.8	12.8	59	Parallel	Hollow
288854	11.9	10.6	0.6	11.2	13.2	13.2	60	Parallel	Hollow

Appendix 10

A.B.U. Zaria **PARTOGRAM**

Name No.

No. 190369

Surname AKINBEDE

First Name Olabusola

PARITY (P) 1+0 2

No. of living children 2

Age 26 Date 22/11/78

L.M.P. Jan } 1978

E.D.D. Oct }

PELVIS Normal

Duration of Labour 4hrs.

Duration of Ruptured Membranes 2 / before admission

SPECIAL POINTS

PAST OBSTETRIC HISTORY

B / E

Para 2+0. ALL SVD at home

ANTE-NATAL HISTORY

Normal

TIME 2.30 3.30 4.30 5.30 6.30 7.30

FETAL HEART RATE 190 180 170 160 150 140 130 120 110 100 90 80 70

LIQUOR

Duration

Contractions per 10 minutes 5 4 3 2 1

Oxytocin

CERVICAL DILATION 10 9 8 7 6 5 4

DESCENT 3 2 1

MOULDING

CAPUT

ALB.

- 200 -

Appendix II

Radiation Hazards

This short note on radiation hazards is necessary since x-ray pelvimetry was the main investigative tool utilized in this work.

It is now established that x-rays have a damaging effect on all living tissues, and that the damage varies with the amount of radiation as determined by the intensity and duration of the exposure.[140, 141] In the nonpregnant female radiation to the ovaries is of paramount importance while in the pregnant mother the radiation received by the fetus is also of serious importance.

X-ray pelvimetry in labour to confirm or exclude disproportion in doubtful cases is an accepted obstetric practice. Only six patients in the work had intrapartum lateral pelvimetries, all other films being taken in the puerperium. In no instance, therefore, was a fetus exposed to x-rays in early intrauterine life - the time at which damage to developing organs is most likely.

In this regard, it must be noted that the fetus lies protected in a sac filled with amniotic fluid and that maternal skin, subcutaneous tissue, fat, muscle, fascia, peritoneum and uterine wall are interposed between the x-ray tube and the fetus itself. It is, therefore, not surprising to note that recent evidence[142] and [143] indicate that the fetal risks hiterto accepted as being associated with diagnostic radiography during pregnancy are probably less to a considerable degree.

Countless numbers of women have been x-rayed for many conditions other than pelvimetry studies, including pyelography and gastro intestinal series, the dosage of which exceeds that of x-ray pelvimetry. No demonstrable harmful effect has been reported in these patients. It is estimated that the effective dosage in the depth of the pelvis in the region of the ovaries is perhaps five to seven per cent of the dose measured in air at the skin surface, so that there is a wide margin of safety in utilizing x-ray pelvimetry as an investigative tool in the early puerperium.[135]

REFERENCES

1. Manuscripts submitted to Biomedical Journals. International Sterring Committee of Medical Editors. British Medical Journal, 1978, 1, 1334.

2. Manuscripts Submitted to Biomedical Journals. International Sterring Committee of Medical Editors. British Medical Journal, 1979, 1, 532.

3. BEARD, R, The Occipito-Posterior Position. Its mechanism and Treatment. F.W. Preece and Sons, Adelaide, 1937, P 1.

4. BILL, A H, The Treatment of the Vertex Occipito Posterior Position. American Journal of Obstetrics and Gynecology 1931, 26, 615.

5. MELHADO, G C, The Occipito Posterior Position - A method of management, with an analysis of 976 cases. American Journal of Obstetrics and Gynecology, 1933, 26, 696.

6. DELEE, J B, AND GREENHILL, J P, Principles and Practice of Obstetrics. Saunders Philadelphia. 1938.

7. STANDER, H J, Textbook of Obstetrics. Appleton. New York and London. 1945.

8. CALKINS, L A, Occipito Posterior Presentation. Obstetrics and Gynecology. 1953, 1, 466.

9. HAYNES, D M, Occipito Posterior Position. Journal of American Medical Association. 1954, 156, 494.

10. MUNRO KERR Operative Obstetrics Ninth Edition. Edited by P R, Myerscough. 1976, p.62 Bailliere Tindall.

11. PLASS, E D, A statistical study of 635 labors with the Occiput Posterior. Johns Hopkins Hospital Bulletin, 1916, 27, 164.

12. GREENE, G G, SMITH, A E M, KY, L, Bills' maneuver in relation to persistent Occiput Posterior positions. American Journal of Obstetrics and Gynecology. 1953, 65, 611

13. REIS, A R, Contributing to a discussion on forceps Rotation in Persistent Occiput Posterior. American Journal of Obstetrics and Gynecology 1953, 65, 125.

14. TWEEDY, E H, WRENCH, G T, AND SOLOMONS, B Practical Obstetrics. Oxford University Press. London 1937, P. 336.

15. PHILLIPS, R D, AND FREEMAN, M, The Management of Persistent Occiput Posterior Position. A Review of 552 Consecutive Cases. Obstetrics and Gynecology 1974, 43, 171.

16. BAIRD, D, Social factors in Obstetrics. The Lancet. 1949, 1, 1079.

17. THOMS, H, A type of pelvis intimately associated with occipito posterior position. American Journal of Obstetrics and Gynecology, 1932, 24, 5.

18. CALDWELL, W E, MOLOY, H C, AND D'Esopo, D A, Studies on Pelvic Arrest. Transactions of American Gynecological Society. 1938, 63, 243.

19. CALDWELL W E, MOLOY, H C, AND D'Esopo D A, A Roentgenologic Study of the mechanism of engagement of the fetal head. Transactions of American Gynecological Society 1934, 63, 243.

20. MOLOY, H C, Clinical and Roentgenologic Evaluation of the pelvis in Obstetrics. 1951 Saunders. Philadelphia.

21. JACOBS, J B, Persistent Occipito Posterior - A simple and safe method of treatment with the use of new forceps. Southern Medical Journal, 1936, 29, 891.

22. KING, E L, Occipito Posterior Positions. A monograph in American lectures in Gynecology and Obstetrics. Charles C Thomas. 1957. Springfield. Illinois. U.S.A.

23. HOLMBERG, N G, LILIEQVIST, B, MAGNUSSON, S, AND SEGERBRAND, E, The Influence of the Bony Pelvis in Persistent Occipito Posterior Position. Acta Obstetrica et Gynecologica Scandinavica 1977, Supplement 66, 49.

24. TAYLOR, W A, A revised conception of the Occipito Posterior Position, with which is in-coporated a plea for the adoption of the conservative attitude in force at the Rotunda Hospital. The Journal of obstetrics and Gynaecology of the British Empire, 1931, 38, 85.

25. DONALD, I, Practical Obstetric Problems. Fifth Edition 1979 Chapter 18. Lloyd - Luke.

26. HOULT, I J, MacLENNAN, A H, and CARRIE, L E S, Lumber Epidural Analgesia in Labour: Relation to fetal malposition and instrumental delivery. British Medical Journal 1977, 1, 14.

27. STUDD, J, Management of Labour 1975 Edited by R W Beard et al p. 179, London. Royal College of Obstetricians and Gynaecologists.

28. POTTER, N and MacDONALD, R D, Obstetric Consequences of Epidural Analgesia in Nulliparous patients. The Lancet, 1971, 1, 7708.

29. McQUEEN, J and MYLERA, L, Lumbar Epidural analgesia in Labour. British Medical Journal, 1977, 1, 640.

30. BUIST, R, A note on the early recognition and Corrective treatment of Occipito Posterior Presentations. British Medical Journal, 1921, 2, 782.

31. D'ESOPO, D A, The occipito posterior position - Its mechanism and treatment. American Journal of Obstetrics and Gynecology 1941, 42, 937.

32. Posture in labour. Editorial. South African Medical Journal 1977, 52, 467.

33. PUDDICOMBE, J F, Posture for correction of posterior fetal position. Journal of International College of Surgeons, 1955, 23, 73.

34. HAMBLEN, R N, The management of Occipito posterior Positions. Northwest Medical Journal 1927, 26, 511.

35. COCHRAN, G J, The Pomeroy maneuver (rotary Version). An evaluation of results in 200 cases. Brooklyn Hospital Journal. 1940, 2, 155.

36. WALLACE, J T, Management of dystocia caused by Occipito Posterior Positions. Medical Times 1940, 68, 7.

37. ROSENFIELD, S S, Treatment of persistent occipito posterior positions by 180 degree manual rotation of the occiput. American Journal of Surgery 1941, 51, 340.

38. DANFORTH, W C, The treatment of occipito posterior positions with especial reference to manual rotation. American Journal of Obstetrics and Gynecology 1933, 23, 360.

39. SMELLIE, W, Theory and practice of midwifery. Mclintock's edition. New Sydenham Society, London, 1877. Vol. 2 Reprints with notes, of Smellie's works, published in 1752 - 54.

40. SCANZONI, F W, Lehrbuch der Geburtshilfe, 3rd. Auf., Vienna, Siedel. 1855.

41. KIELLAND'S FORCEPS (1952) Edited by E. Parry Jones. Butterworths. London.

42. SEIDES, S A, A "two-forceps maneuver" for persistant occipito posterior presentation. Surgery, Gynecology and Obstetrics. 1923, 36, 421.

43. PARRY-JONES, E, Barton's forceps. Its use in transverse position of the fetal head. Journal of obstetrics and gynaecology of the British Commonwealth 1968, 75, 892.

44. BARTON, L G, CALDWELL, W E, And STUDDIFORD, W E, A new obstetric forceps. American Journal of Obstetrics and Gynecology 1928, 15, 16.

45. LUIKART, R, A new forceps possessing a sliding lock, modified fenestra, with improved handle and axis-traction attachment. American Journal of Obstetrics and Gynecology. 1940, 40, 1058.

46. MURCHAN R R, New Obstetric maneuver for dystocia. News letter (Columbia) Journal of American Medical Association. 1955, 155, 1442.

47. SMITH, E C, A procedure to correct persistent occiput posterior and Transverse Arrest positions and facililate delivery of the fetal head using a single forceps application. American Journal of Obstetrics and Gynecology 1957, 73, 947.

48. MOOLGAOKER, A, A new design of obstetric forceps. Journal of obstetrics and Gynaecology of the British Empire. 1962, 69, 450.

49. MALSTROM, T, The vacuum Extractor. An obstetric instrument. Acta obstetricia et gynecologica Scandinavica 1957, 36, Supplement 3.

50. CHALMERS, J A, The management of malposition of the occiput. The Journal of obstetrics and Gynaecology of the British Commonwealth 1968, 75, No. 9, 889.

51. KUTCIPAL, R A, Persistent Occipito Posterior position. A review of 498 cases. Obstetrics and Gynecology 1959, 14, 3. P 296.

52. LAWSON, J B and STEWART, D B, Obstetrics and Gynaecology in the Tropics and Developing Countries 1967 Edward Arnold. London. p 193.

53. EVANS, N T, STANDER, W R, Cervical Incisions in obstetrics. American Journal of obstetrics and Gynecology 1954, 67, 322.

54. LISTER, U G, Obstructed labour. A series of 320 cases occuring in 4 years in a Hospital in Southern Nigeria. Journal of Obstetrics and Gynaecology of the British Empire, 1960, 67, 188.

55. BURDETTE, W J, and GEHAN, E A, Planning and Analysis of clinical Studies 1970 First edition page 92. Charles Thomas Publisher. Springfield, Illinois, USA.

56. COLCHER, A E, and SUSSMAN, W, Practical technic for roentgen pelvimetry with new positioning. American Journal of Roentgenology 1944, 51, 207.

57. HILL, A B, A short textbook of medical Statistics. First edition 1977, Hodder and Stoughton, London.

58. SWINSCOW, T D V, Statistics at Square one. Third edition 1978, The Macmillan Press, London.

59. FISHER, R A, and YATES, F, Statistical Tables for Biological, Agricultural and Medical research tables 111 and 1v. Longman Group Ltd. London.

60. HARRISON, K A, Maternal mortality in Zaria Nigeria. Paper read at the First International Congress of the Society of Gynaecology and Obstetrics of Nigeria at Ibadan Nigeria October 1977.

61. LAWSON, J B, Maternal Mortality in West Africa. Ghana Medical Journal 1962, 31, 1.

62. HARRISON, K A, Childbearing in Zaria. A public lecture delivered at the Ahmadu Bello University Zaria on 20th March 1978.

63. BAINBRIDGE, M A, NIXON, W C N, and SMYTH, C N, Fetal weight, presentation and the progress of labour. II Breech and occipito posterior presentation related to the baby's weight and the length of the first stage of labour. Journal of obstetrics and gynaecology of the British Commonwealth 1961, 68, 748.

64. CALKINS, L A Occiput Posterior - A normal presentation. American Journal of Obstetrics and Gynecology 1942, 43, 277.

65. O'DRISCOLL, K and STRONG, J, Active management of labour and Occipito-Posterior Position. The Australian and New Zealand Journal of Obstetrics and Gynaecology. 1975, 15, 1

66. NAEYE, R L, TAFARI, N, MARBOE, C C, and JUDGE, D M Causes of Perinatal mortality in an African City. W H O Bulletin 1977, 55, 63.

67. WEEKES, L R, and HOBBS, K G, Dystocia and Occipito Posterior. American Journal of Obstetrics and Gynecology 1958, 76, 1314.

68. FREETH, H D, The cause and management of failed forceps cases. British Medical Journal 1950, 2, 18.

69. WEXLER, C A and BURNHILL, M S, A method for eliminating difficult midforceps rotations. A reappraisal of the Leff forceps. American Journal of Obstetrics and Gynecology 1970, 106, 3.

70. FRIEDMAN, E A and SACHLEBEN, M R, High Risklabor. Journal of Reproductive Medicine, 1971, 7, 52.

71. COHEN, W R, Influence of the Duration of Second Stage Labor on Perinatal Outcome and Puerperal Morbidity. Obstetrics and Gynecology, 1977, 49, 266.

72. KIELLAND'S FORCEPS, Leading Article, British Medical Journal, 1979, 1, 362.

73. From Legal Correspondent. Negligence and Forceps Delivery. British Medical Journal, 1979, 1, 763.

74. SPINAPOLICE, R Y and LA MAGRA, R J, Midforceps Delivery. Journal of American Osteopathic Association, 1977, 77, 298.

75. ENNEN, E H, Forceps Deliveries. Second Edition, 1964. F. A. Davies and Co. Philadelphia.

76. WILSON, J R, Management of Obstetric Difficulties. St. Louis, Mosby Company. Sixth Edition, 1976, p 318.

77. WILLIAMS, B, The Dystocia Dystrophia Syndrome. The Journal of Obstetrics and Gynaecology of the British Empire. 1942, 49, 412.

78. THOMSON, A M, HYTTEN, F E and BILLEWICZ, W Z, The Epidemiology of Oedema During Pregnancy. The Journal of Obstetrics and Gynaecology of the British Commonwealth. 1967, 74, 1.

79. BEAZLY, J M, Use of Partograms in Labour. Proceedings of the Royal Society of Medicine, 1972, 65, 700.

80. PHILPOTT, R H and CASTLE W M, Cervicographs in the Management of Labour in Primigravidae: the alert line for detecting abnormal labour. Journal of Obstetrics and Gynaecology of the British Commonwealth, 1972, 79, 592.

81. PHILPOTT, R H, Graphic Records in Labour. British Medical Journal 1972, 4, 163.

82. PHILPOTT, R H, and CASTLE W M, Cervicographs in the Management of Labour in Primigravidae: The action line and treatment of abnormal labour. Journal of Obstetrics and Gynaecology of the British Commonwealth, 1972, 79 599.

83. STUDD, J and PHILPOTT, R H, Partograms and Action Line of Cervical Dilation. Proceedings of the Royal Society of Medicine, 1972, 65, 700.

84. STUDD, J, Partograms and Normograms of Cervical Dilation in the Management of Primigravid Labour. British Medical Journal. 1973, 4, 451.

85. MELMED, H and EVANS, M I, The Predictive Value of Cervical Dilation Rates: I. Primigravida labor. Obstetrics and Gynecology, 1976, 47, 511.

86. EVANS, M I, LACHMAN, E, KRAL, S and MELMED, H, Predictive Value of Cervical Dilation Rates in Labour in Multiparous Women. Israel Journal of Medical Sciences, 1976, 12, 1399.

87. DAVIDSON, A C, WEAVER, J B, DAVIES, P and PEARSON, J F. The Relation between Ease of Forceps delivery and Speed of Cervical Dilation, British Journal of Obstetrics and Gynaecology, 1976, 83, 279.

88. JAMES, D K, and CHISWICK, M L, Kielland's Forceps: role of antenatal factors in prediction of use. British Medical Journal, 1979, 1, 10.

89. ARTHURE, H and HOLMES, J M, Kielland's Forceps Rotation in the First Stage of Labour. Journal of Obstetrics and Gynaecology of the British Empire, 1961, 68, 82.

90. TURNER, W, The Index of the Pelvic Brim as a Basis for Classification, Journal of Anatomy and Physiology, 1885-6, 20, 125.

91. THOMS. H, The Clinical Application of Roentgen Pelvimetry and a Study of the Results in 1,000 White Women. American Journal of Obstetrics and Gynecology, 1941, 42, 957.

92. ALLEN, E P, Radiologic Pelvimetry, New Zealand Medical Journal, 1944, 43, 116.

93. NICOLSON, C, The Interpretation of Radiological Pelvimetry, Journal of Obstetrics and Gynaecology of the British Empire, 1938, 45, 980.

94. CALDWELL, W E and MOLOY, H C, Anatomical Variations in the Female Pelvis and their Effect on Labour with a Suggested Classification. American Journal of Obstetrics and Gynecology, 1933, 26, 479.

95. NICHOLSON, C and SANDMAN, A H, Variation in the Female Pelvis. The Lancet, 1946, 2, 192.

96. WEINBEEG, A and SCADRON, S J, The Value and Limitations of Pelvioradiography in the Management of Dystocia, with Special Reference to Midpelvic Capacity. American Journal of Obstetrics and Gynecology, 1946, 52, 255.

97. WILLIAMS E R and ARTHURE, H G E, Further Radiological Studies in the Investigation of Obstetric Disproportion with Especial Reference to the Contracted Pelvic Outlet. The Journal of Obstetrics and Gynaecology of the British Empire, 1949, 56, 553.

98. HAWKSWORTH, W and ALLEN, E P, Radiological Pelvimetry and the General Practitioner. Journal of Obstetrics and Gynaecology of the British Empire, 1951, 58, 203.

99. KALTREIDER, D F, Criteria of Inlet Contraction. What is their Value ? American Journal of Obstetrics and Gynecology, 1951, 62, 600.

100. ERSKINE, J P, KELHAM, G and WIUM, P P, An Assessment of the Value of the Chassar Moir Graphs in the Radiological Investigation of Cephalo-pelvic Disproportion. The Journal of Obstetrics and Gynecology of the British Empire, 1953, 60, 312.

101. PIMBLETT, G W and WHITE, T G E, An Assessment of the Value of Antenatal Radiological Pelvimetry Based on 500 Successive Pelvimetric Examinations. Journal of Obstetrics and Gynaecology of the British Empire, 1955, 62, 17.

102. HEYMAN, J and LUNDQVIST, A, The Symphysis Pubis in Pregnancy and parturition. Acta Obstricia et Gynecologica, Scandinavica 1932, 191.

103. PUTSCHAR, W G J, The Structure of the Human Symphysis Pubis with Special Consideration of Parturition and its Sequelae. American Journal of Physical Anthropology, 1976, 45, 589.

104. INGERSLEV. Fragmenter av Foedelsehjaelpens, Historie, 1906.

105. CALLAGHAN, J T, Separation of the Symphysis Pubis. American Journal of Obstetrics and Gynecology, 1953, 66, 281.

106. HAWKSWORTH, W and ALLEN, E P, Radiological Pelvimetry and the Specialist Obstetrician Journal of Obstetrics and Gynaecology of the British Empire, 1951, 58, 59.

107. WALSS - RODRIGUEZ, R J and KEEFER, F J, Assessment of X-ray Pelvimetry in the Management of Labor. West Virginia Medical Journal, 1978, 74, 267.

108. WALKOIAK, R G, Manual Rotation of the Transverse Posterior Occiput. Obstetrics and Gynecology, 1971, 37, 3, 464.

109. SCHER, J and UTIAN, W H, Teenage Pregnancy - An Inter-Racial Study. Journal of Obstetrics and Gynaecology of the British Commonwealth, 1970, 77, 259.

110. EFFIONG, E I, and BANJOKO, M O, The Obstetric Performance of Nigerian Primigravidae Aged 16 and Under. British Journal of Obstetrics and Gynaecology, 1975, 82, 228.

111. MENKEN, J, The Health and Social Consequences of Teenage Childbearing. Family Planning Perspectives, 1972, 4, 45.

112. DUENHOELTER, J H, JIMENEZ, J M and BAUMANN, G, Pregnancy Performance of Patients Under Fifteen Years of Age. Obstetrics and Gynecology, 1975, 46, 49.

113. HARRISON, K A, Approaches to Reducing Maternal and Perinatal Mortality in Africa. Paper presented to the study group on "Maternal Services in the Developing World - what the community needs" at the Royal College of Obstetricians and Gynaecologists, London on 9th September 1979.

114. THOMPSON, Barbara and BAIRD, D, Some Impressions of Childbearing in Tropical Areas. Part I. Journal of Obstetrics and Gynaecology of the British Commonwealth, 1967, 74, 329.

115. BUTLER, N R and BONHAM, D G, Perinatal Mortality. 1963, P 19, Livingstone, London.

116. NORTHMAN, D, Parental Age as a Factor in Pregnancy Outcome and Child Development. Reports on Population/Family Planning, 1974, 16.

117. BERRY, L G, Age and Parity Influences on Maternal Mortality: United States, 1919 - 1969, Demography, 1977, 14, 297.

118. KNUTZEN, V K, DAVEY, D A, The Relationship Between Maternal Height and Weight at Booking and Perinatal Mortality, South African Journal, 1977, 51, 672.

119. CHASE, H C, Parinatal Mortality: Overview and Current Trends. Clinics in Perinatology, 1974, 1, 3.

120. BAIRD, D, The Perinatal Mortality Rates as a Measure of the Efficiency of the Maternal Services. Health Bulletin. 1977, 35, 234.

121. NAEYE, R L, DOZOR, A, TAFARI, N and ROSS, S M, Epidemiological Features of Perinatal Death Due to Obstructed Labour in Addis Ababa. British Journal of Obstetrics and Gynaecology, 1977, 84, 747.

122. HEYNS, O S, The Superiority of the South African Negro or Bantu as a Parturient. The Journal of Obstetrics and Gynaecology of the British Empire, 1946, 53, 405.

123. SIBTHORPE, E M and ALLBROOK, D B, A Radiological Survey of the Female Pelvis in Uganda with Addendum on the Measurements of Specimens of the Female Bony Pelvis. Journal of Obstetrics and Gynaecology of the British Empire, 1958, 65, 600.

124. EASTMAN, N J, Pelvic Measurement: A Study in the Perpetuation of Error. Obstetrical Gynecological Survey, 1948, 3, 301.

125. HANSON, S, The Narrow Bispinous Diameter and the Persistent Occipito Posterior Position. Surgery, Gynecology and Obstetrics, 1934, 59, 102.

126. POSNER, A C, BLOCH, N R and POSNER, N S, The Flat Sacrum: its importance in Obstetrics. American Journal of Obstetrics and Gynecology, 1955, 70, 1021.

127. CRAGIN, E B, Obstetrics 1961, p 27-274. Philadelphia and New York: Lea and Febiger.

128. MALPAS, P, Pelvic Inclination in Dystocia. Reports of Societies. The British Medical Journal, 1936, 2, 1218.

129. KALTREDER, D, Criteria of Midplane Contraction. What is their Value ? American Journal of Obstetrics and Gynecology, 1952, 63, 392.

130. HEYNS, O S, A Critical Analysis of the Bantu Pelvis with Special Reference to the Female. D.Sc. Thesis submitted to the University of Witwatersrand, 1945.

131. STEWART, K S, Cephalo-Pelvic Disproportion in the African Primigravida. Thesis submitted to the University of Edinburgh for the M.D. Degree 1976.

132. HEYNS, O S, Classification of Human Pelvis *with Preliminary note on Evolution of* Anthropoid or Ultradolichopellic type of Pelvis. Journal of Obstetrics and Gynaecology of the British Empire, 1946, 53, 242.

133. INCE, J G H, and YOUNG, M, The Bony Pelvis and its Influence on Labour: a radiological and clinical study of 500 women. Journal of Obstetrics and Gynaecology of the British Empire, 1940, 47, 130.

134. KOLAWOLE, T M, ADAMU, S P and EVANS, K T, Comparative Pelvimetric Measurements in Nigerian and Welsh Women. Clinical Radiology, 1978, 29, 85.

135. BERMAN, R, Obstetrical Roentgenology, 1955, p. 328, F.A. Davies Company, Philadelphia.

136. GRAY'S ANATOMY, 35th Edition, 1973, p. 354, Warwick, R and Williams P L, Longman, London.

137. TRAIN, T S R, X-ray Pelvimetry, Journal of Obstetrics and Gynaecology of the British Commonwealth, 1961, 68, 94.

138. SOKOL, R J J, ROUX, J F, McCARTHY, S, Computer Diagnosis of Labor Progression VI Fetal Stress and Labour in Occipito Posterior Position. American Journal of Obstetrics and Gynecology, 1975, 122, 253.

139. SOKOL, R J, STOJKOV, J, LAWRENCE CHIK, B S, and ROSEN, M G, Normal and Abnormal Labour Progress: I. A Quantitative Assessment and Survey of the Literature. Journal of Reproductive Medicine, 1977, 18, 47.

140. The Hazards to man of Nuclear and Allied Radiations. A second report to the Medical Research Council. Her Majesty's Stationery Office, London. December 1960.

141. RUSSEL, J G B, Radiology in Obstetrics and Antenatal Paediatrics. 1973. Butterworths p. 16.

142. Radiation and the Embryo. British Medical Journal. Leading Article, 1979, 1, 1380.

143. MOLE, R H, Radiation Effects on Pre-natal Development and their Radiological Significance. British Journal of Radiology 1979, 52, 89.