THE OUTCOME OF BABIES BORN FROM PRE-ECLAMPTIC AND ECLAMPTIC PREGNANCIES AT KENYATTA NATIONAL HOSPITAL FROM 1st JANUARY 1980-31st DECEMBER 1981.

A DISSERTATION SUBMITTED IN PART-FULFILLMENT FOR THE DEGREE OF MASTER OF MEDICINE (PAEDIATRICS) OF THE UNIVERSITY OF NAIROBI, KENYA.

BY

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D E C L A R A T I O N

This dissertation is my original work and has not been presented for a degree in any other University.

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This dissertation has been submitted for examination with my approval as University Supervisor.

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S U M M A R Y

This dissertation presents results of a retrospective study of 156 pre-eclamptic and eclamptic pregnancies at the obstetric unit of Kenyatta National Hospital during a two year period from 1980 to 1981. There were 167 babies delivered, out of which 49(29.3%) died perinatally.

A significantly high perinatal mortality rate was observed. The morbidity of these babies in terms of intra-uterine growth retardation, low birth weight and asphyxia was also high. The factors that appeared to contribute a major role towards the unfavourable outcome of the pregnancies were severe toxaemia, early termination of pregnancy, high rates of vacuum deliveries and caesarian sections, inadequate antenatal care and low socio-economic status. Other factors that appeared to contribute a relatively lesser role were twin pregnancy, foetal distress and neonatal septicaemia.

Several recommendations are suggested that would improve the wellbeing and survival of the babies from toxaemic pregnancies. These are, effective antenatal care, availability of properly trained medical auxiliaries, co-operation of the paediatricians and obstetricians and the long term efforts to raise the economic status of the community. The need of a simple and effective drug regime is also stressed.

AIMS AND OBJECTIVES OF THE STUDY

TO DETERMINE THE PERINATAL MORBIDITY AND MORTALITY OF BABIES FROM PRE-ECLAMPTIC AND ECLAMPTIC PREGNANCIES AND THE POSSIBLE CONTRIBUTORY FACTORS.

INTRODUCTION

Pre-eclampsia is a clinical syndrome characterised by the three physical signs of oedema, hypertension, and proteinuria, occurring as a complication in the later half of pregnancy. The three physical signs do usually but not invariably appear in that order of sequence. Conventionally, pre-eclampsia is diagnosed by the presence of two of the three physical signs. However, there is a lack of a unified definition of pre-eclampsia. It now appears that proteinuria indicates a much more severe form of the disease (1) and that oedema is a regular feature of normal pregnancy. Studd (2) defined pre-eclampsia as an acute hypertension of pregnancy which if severe, may result in a measurable leak of protein into the urine. In the present study, pre-eclampsia was diagnosed as the presence of hypertension with either oedema or proteinuria.

Pre-eclampsia is initially asymptomatic but if left alone may prove detrimental to the lives of both the mother and the baby. Eclampsia supervenes as a complication of pre-eclampsia, the mother thereby experiencing generalised grandmal seizures. Improvement in antenatal care has resulted in a great reduction in the incidence of eclampsia with its attendant maternal and foetal mortality. Although the incidence of

pre-eclampsia has remained unchanged, effective antenatal care would reduce other pre-eclamptic complications on both the mother and the baby.

Attention is increasingly being focussed on the concept of perinatal mortality. This is defined as the total number of stillbirths and deaths during the first week of life per 1000 births. Neonatal mortality rate is defined as the number of liveborn infants who die under the age of 28 days per 1000 live births. Foetal and neonatal life is a continuum during which the growth and development of the human organism are affected by genetic and by intra-uterine and extrauterine environmental factors, the latter being modified by social, economic and cultural influences. For example, low economic status is one of the factors most frequently associated with low birth weight, which in turn is associated with high rates of morbidity and mortality, not only in the neonatal period but also throughout infancy. Although social influences such as the unwillingness of physicians and their families to live in areas of social and economic poverty affect the availability of medical care to those most in need of it, the failure of many mothers in these areas to make effective use of antenatal and other preventive care, even when it is available to them, also contributes to foetal and infant morbidity and mortality (3).

Social factors leading to illegitimate births, and cultural practices, including the use of drugs which may damage the foetus, also increase the incidence of foetal and neonatal death and disease.

Some interest is also being focused on the noxious factors influencing perinatal morbidity and mortality, emphasizing the need for early identification of the high risk group of babies expected. Consequently, the Obstetrician and the Paediatrician must maintain effective communication to ensure that prenatal and natal problems are anticipated and preventive and therapeutic measures are taken promptly.

The perinatal and infant mortality rates vary from country to country. They are lowest in the Scandinavian countries and the Netherlands and highest in the developing countries, for instance, the perinatal mortality rate of Sweden is 11.1, England 17.9, India 30.2, Tunisia 24.7 and Mauritius 61.1 per 1000 births (4).

Extensive literature is written on the management of babies born of pregnancies complicated by conditions such as Diabetes mellitus, Rhesus incompatibility and many others. However, relatively little seems to have been written about the babies born of pre-eclamptic and eclamptic (toxaemic) pregnancies and the efforts aimed at safeguarding and maintaining the life of these babies.

The present study aims at evaluating the perinatal

morbidity and mortality of these babies and finding out the possible influencing factors.

MATERIALS AND METHODS

The present study was conducted at the Obstetric Unit of Kenyatta National Hospital, the country's referral hospital, serving mostly high risk pregnancies in African patients of predominantly low social economic status.

The admission registers covering the time period from first of January 1980 to 31st December 1981 were obtained from the records office of the unit. All the patients admitted into the Labour Ward are recorded into these registers. The data entered into them include antenatal, natal and postnatal details. The specific complication associated with the pregnancy, if any, is clearly indicated.

The hospital in-patient numbers of patients admitted with pregnancies complicated by hypertension, pre-eclampsia or eclampsia were extracted from the registers. The patient case records that corresponded to these numbers were obtained. Each set of the patient records was scrutinised by the author and those that fulfilled the criteria for pre-eclampsia and eclampsia were included in the study. No diagnosis of pre-eclampsia was made in the absence of hypertension. This was in agreement with the international classification of diseases (5). Hypertension was taken as a blood pressure equal to or greater than 140/90 mm of mercury for more than one reading. Proteinuria was

diagnosed if it was found to be of at least 1+(0.5 gm per 24 hours) or more, by dipstick. Oedema was observed clinically.

Pre-eclampsia was classified into mild and severe forms. Pre-eclampsia was taken to be severe if any one of the following features was observed:-

(a) Systolic blood pressure of 160mm Hg or more on at least two readings.

(b) Diastolic blood pressure of 100mm Hg or more on at least two readings.

(c) Proteinuria of 3+ (5gm per 24 hours) or more.

This was also in agreement with the international classification of diseases, 1977.

Eclampsia was diagnosed when a non-epileptic pregnant woman developed convulsions antenatally or during labour, with obvious evidence of pre-eclampsia.

The coding using the international classification of diseases was also utilised in locating the case-records for the study. However,this coding system was not of much use to the author as it was still in the early stages of development in the records department, particularly for obstetric records.

The toxaemic pregnancies that were associated with hypertension before pregnancy were excluded from the study.

The required data was obtained from the case records of those that fulfilled the criteria for the study. This data was entered into an already prepared proforma, (attached in the appendix). This included the gestational age of the baby as clinically estimated at birth, the birth weight, and the sex of the baby. The gestational age of the baby was estimated in the unit by both clinical assessment and also by calculation from the dates given by the mother. If there was wide discrepancy between the two, reliability was placed on the age obtained from clinical assessment. The babies were grouped into livebirths and stillbirths. The stillbirths were grouped into macerated and fresh stillbirths. An abortion was taken as products of conception weighing 500 grams or less.

The Apgar scores taken at one minute and at 5 minutes after delivery were recorded as follows:-

0-3----------Severe asphyxia.

4-6----------Mild asphyxia.

7-10----------Normal.

The babies with neonatal septicaemia were also recorded. Septicaemia was diagnosed on clinical grounds in the unit, that is, a combination of signs and symptoms of lethargy refusal to feed, fever or hypothermia, diarrhoea and vomiting, apnoeic attack and seizures. Most of the babies suspected to be septicaemic were subjected to a septic screen. However, antibiotic therapy was commenced on all of them irrespective of whether the septic screen results were positive or negative.

The baby was classified preterm if the estimated maturity was less than 37 weeks, term if between 37 and 41 weeks, and post-term if more than 41 weeks. The baby was also classified into one of the following groups:-

(a) S.G.A.---------Small for gestational age.

(b) A.G.A.---------Appropriate for gestational age.

(c) L.G.A.---------Large for gestational age.

This classification was based on weight charts for newborn babies by Gairdner and Pearson (6) in which babies with birth weights lower than the 10th percentile were classified small for gestational age; those with birth weights between 10th and 90th percentiles were appropriate for gestational age; and those with birth weights above 90th percentile were large for gestational age (6,7).

The pregnant woman was classified as of single marital status if she had never been married, or was divorced or widowed at the time of delivery. The antenatal patients who had attended the antenatal clinic of Kenyatta National Hospital were referred to as booked patients. Those that had not attended that clinic were referred to as unbooked patients. Majority of the latter were emergency admissions.

The mode of delivery was specified as follows;

(a) V.D.--------- vaginal delivery.

(b) V/E---------- vacuum extraction.

(c) C/S---------- caesarian section.

The drugs administered to the mother within 24 hours before delivery, the mode or onset of labour, that is spontaneous or induced, were all noted.

R E S U L T S

This study was composed of data obtained during a two-year period beginning from first of January 1980 to 31st December 1981. 156 toxaemic mothers delivered at the Obstetric Unit, from whom 167 babies were born.

TABLE I : THE BREAKDOWN OF CASES UNDER STUDY.

Description	Number
Pre-eclampsia	156
Pre-eclampsia complicated by Eclampsia	29
Multiple pregnancies	9
Babies delivered	167

Among the 156 toxaemic pregnancies, 29 (18.6%) were complicated by eclampsia, and 9 (5.8%) were twin pregnancies. Therefore the twin pregnancy incidence was 1 per 17.3 toxaemic pregnancies.

TABLE II : DISTRIBUTION OF BABIES FROM MULTIPLE PREGNANCIES.

DESCRIPTION	NUMBER
Multiple pregnancies	9
Babies delivered	18
Abortions	2(11.1%)
S.G.A.	9(50.0%)
A.G.A.	7(38.9%)
L.B.W.	14(77.7%)

Among the 156 toxaemic mothers, 9 were twin pregnancies giving birth to 18 babies. 77.7% of these babies were low birth weight (L.B.W.), 50.0% were small for their gestational age, 38.9% appropriate for gestational age, and 11.1% were abortions. The 18 babies accounted for 10.7 % of the babies born from toxaemic mothers.

TABLE III : SEVERITY OF TOXAEMIA OF PREGNANCY.

Degree of Severity	Number	Percentage
Mild	6	3.8
Severe	150	96.2
Total	156	100.0

This table shows that 96.2% of the toxaemic pregnancies managed at the obstetric unit were severe while only 3.8% were mild.

TABLE IV: FOETAL AND INFANT LOSSES FOLLOWING TOXAEMIA.

OUTCOME	NUMBER	PERCENTAGE
Fresh stillbirths	15	30.6
Macerated stillbirths	9	18.4
Neonatal deaths	21	42.9
Abortions	4	8.1
Total	49	100.0

Out of 167 babies, 49 (29.3%) were lost perinatally. The distribution of the 49 perinatal losses was as shown in Table IV. 24 (49%) were stillbirths, 21 (42.9%) were neonatal deaths, and 4(8.1%) were abortions. 18.4% were macerated stillbirths and 30.6% were fresh stillbirths. All the 49 pregnancies had premature inductions of labour due to the severity of the pre-eclampsia. Only 1 out the 6 babies born from mild toxaemic pregnancies died; this was a neonatal death following caesarian section due to foetal distress.

Most of the neonatal deaths occurred shortly after birth. However, out of the 21 neonatal deaths, 4(19%) occurred after 10 days of life and were associated with various causes, viz., low birth weight, asphyxia, and septicaemia. The perinatal mortality rate was 245/1000 births from toxaemic pregnancies.

TABLE V : OUTCOME OF BABIES FROM ECLAMPTIC PREGNANCIES.

Outcome	Number	Percentage
Stillbirths	6	20.7
Neonatal deaths	5	17.2
Babies that survived	18	62.1
Total	29	100.0

Among the 29 babies from eclamptic pregnancies, 20.7% were stillbirths, all of which were fresh. There were 5 neonatal deaths which occurred within the first week of life. Hence, the perinatal mortality rate of these babies was 379/1000 births and the neonatal mortality rate was 217/1000 live births from eclamptic mothers.

Eclampsia accounted for 11(22.4%) of the 49 foetal and infant losses due to toxaemia of pregnancy.

TABLE VI : ASPHYXIA AT BIRTH

Apgar score	At 1 minute		ac 5 minutes	
	Number	%	Number	%
0-3	64	38.4	37	22.2
4-6	35	21.0	25	15.0
7-10	68	40.6	105	62.8
Total	167	100.0	167	100.0

At one minute after birth, 38.4% of the babies were severely asphyxiated, 21% mildly asphyxiated, and 40.6 % were normal. At 5 minutes after birth, 22.2% were severely asphyxiated, 15.0% mildly, and 62.8% were normal.

TABLE VII : CLASSIFICATION OF THE NEWBORN

Gestation	TERM(%)	PRETERM(%)	TOTAL(%)
A.G.A.	45(27.5)	35(21.3)	80(48.8)
S.G.A.	24(14.5)	58(35.5)	82(50.0)
L.G.A.	2(1.2)	----	2(1.2)
TOTAL	71(43.2)	93(56.8)	164(100)

164 babies were classified since 3 deliveries were excluded because they were abortions. 48.8% of the babies were appropriate for gestational age, 50.0% were small for gestational age, and 1.2% were large for gestational age. 21.3% of the babies were preterm, appropriate for gestational age; and 35.5% were preterm, small for gestational age. 56.8% of the babies were preterm.

TABLE VIII: NEONATAL SEPTICAEMIA

Description	Number	% of live births
Babies with septicaemia	26	18.7
Babies that died from Septicaemia	4	3.4

From the 139 live babies delivered from the toxaemic pregnancies, 26(18.7%) developed neonatal septicaemia, 4(2.9%) of whom died. Neonatal septicaemia therefore seems not to have constituted a major role towards early neonatal morbidity and mortality of these babies.

TABLE IX : FOETAL DISTRESS

Description	Number
Foetal distress	19
Fresh stillbirth	1
Neonatal deaths	4

In the present study, 19(11.4%) of the babies had foetal distress before delivery, out of which one was a stillbirth and 4 were neonatal deaths. This shows that 14(73.7%) of the babies who had had intra-uterine foetal distress in presence of pre-eclampsia survived.

TABLE X : SEX DISTRIBUTION.

Sex	Number	Percentage
Male	84	50.3
Female	83	49.7
Total	167	100.0

84 (50.3%) of the babies were males and 83(49.7%) were females. This resulted in a male to female ratio of 1.01:1 indicating that babies born to toxaemic gestations had no significant sex predilection.

TABLE XI : WEIGHT DISTRIBUTION AT BIRTH

Weight (gm)	Number	Percentage
Less than 1000	13	7.8
1001-1500	26	15.6
1501-2500	48	28.8
2501-3000	31	18.6
3001-4000	47	28.1
4000+	2	1.1
Total	167	100.0

Out of 167 babies , 87 (52.2%) were of low birth weight, that is upto 2500gm. 13(7.8%) of them were less than 1000gm and 49(29.2%) were above 3000gm.

TABLE XII: MATERNAL AGE DISTRIBUTION

AGE (YEARS)	NUMBER	PERCENTAGE
Less than 16	6	3.8
17-20	55	35.3
21-25	41	26.4
26-30	30	19.2
31-35	19	12.2
36-40	4	2.5
40+	1	0.6
TOTAL	156	100.0

Of the 156 mothers with toxaemia of pregnancy, 102 (65.5%) were below 25 years of age. Only 5(4.1%) were above 35 years of age.

TABLE XIII : TRIBAL DISTRIBUTION

Tribe	Number	Percentage
Kikuyu	48	30.8
Luo	44	28.2
Luhya	25	16.0
Kamba	22	14.1
Other	17	10.9
Total	156	100.0

The tribal distribution pattern of the mothers with toxaemic pregnancies showed that 30.8% were Kikuyu, 28.2% Luo, 16.0% Luhya and 14.1% Kamba.

TABLE XIV : DISTRIBUTION OF PARITY

Parity	Number	Percentage
0	91	58.3
1	11	7.0
2	12	7.7
3	12	7.7
4	9	5.8
5	5	3.2
6	16	10.3
Total	156	100 .0

Among the 156 mothers with toxaemic pregnancies, 58.3% were primigravidas, and 13.5% were grandmultiparas. Thus pre-eclampsia affects young primigravidas in majority of cases.

TABLE XV : MARITAL STATUS

Marital Status	Number	Percentage
Married	99	63.5
Single	57	36.5
Total	156	100.0

99 (63.5%) of the mothers were married and 57 (36.5%) were single by the time of delivery. This is a reflection of the fairly high level of pregnant mothers who are single in our society.

TABLE XVI : ANTENATAL ATTENDANCES.

Booking	Number	Percentage
Unbooked	108	69.2
Booked	48	30.8
Total	156	100.0

108 (69.2%) of the mothers had not received antenatal care at the hospital's antenatal clinic. 48(30.8%) had formally been accepted for antenatal care at the same clinic and therefore planned for delivery at the obstetric unit. This shows that most of the cases managed at the unit were admitted as emergency cases.

TABLE XVII : MODE OF DELIVERY

Type	Number	Percentage
Vaginal delivery	79	50.6
Vacuum extraction	24	15.4
Caesarian section	53	34.0
Total	156	100.0

79 (50.6%) of the deliveries were normal deliveries, 24(15.4%) were vacuum deliveries, and 53(34.0%) were caesarian section deliveries.

D I S C U S S I O N

Pre-eclampsia and eclampsia, both conditions referred to as toxaemia of pregnancy in this study, are important clinical complications of pregnancy, owing to their consequent perinatal and maternal morbidity and mortality. Toxaemia of pregnancy varies greatly in frequency between nations, various communities, racial, and socio-economic groups (8). The disorder is more common in the poor deprived populations (2) than in the more prosperous nations, giving credence to the view that environmental and particularly nutritional influences may be important in the genesis of the disorder. A variety of genetic explanations have also been offered for these differences (8). The variable incidence has been attributed to differing criteria for diagnosis, antenatal care and the general health of community.

PRE-ECLAMPSIA

(a) Incidence:

During the two year study period, a total of 10,432 mothers delivered in the obstetric unit of Kenyatta National Hospital. Of these, 156 mothers developed pre-eclampsia, giving an incidence of 1.5%. This was the same finding as that by Mati (9) in his

study of hypertension complicating pregnancy in the same unit. As mentioned earlier, the incidence of pre-eclampsia varies in different countries, and in different zones in a given community. Thus it was 0.75%-3% in Ethiopia (10,8); 1-13% in Nigeria (11); 0.6-1.3% in Uganda (12); 6-7% in U.S.A.(13); and 7-9% in Great Britain (1,2). Studies carried out by Mati (9), Studd (2), Chamberlain (14), and Butler and Bonham (15) all found that pre-eclampsia is responsible for majority of the cases of hypertension in pregnancy.

b) Severity.

Most of the mothers with pre-eclampsia had the severe form of the disorder (Table III), forming 96.2% of the cases. This was as expected since the obstetric unit of Kenyatta National Hospital is the country's referral unit and hence often gets only highly selected cases.

PERINATAL MORTALITY RATE

That pre-eclampsia is a dangerous complication of pregnancy was clearly highlighted in this study. The perinatal mortality rate in these pregnancies complicated by pre-eclampsia was 245/1000 births. This contrasts sharply with the findings of

Johnstone and Ochiel (16) who found an overall perinatal mortality rate of 97/1000 births in the same unit. Thus the perinatal mortality rate from toxaemic pregnancies was about two and a half times the general perinatal mortality rate in the unit. In a similar but prospective study in United States of America, Naeye and Friedman (17) found a perinatal mortality of 37.9/1000 births in pre-eclamptic pregnancies compared to the perinatal mortality rate of 17.2/1000 births among their normotensive non-proteinuric pregnant women. In their study, the loss of life from pre-eclamptic pregnancies was twice that from the normotensive pregnancies. It is however worth noting that the high perinatal mortality rate shown by studies at the Kenyatta National Hospital obstetric unit compared to the figures in the United States of America reflects the typical picture of the poor health services available in a developing country. This was also demonstrated by Butler and Bonham (15) in their study of perinatal mortality in England in which they found a 50% drop in perinatal mortality rate between 1958 to 1963; this was attributed improved socio-economic status and better antenatal care.

In the same obstetric unit, Mati (9) found that the perinatal mortality rate of pregnancies complicated by hypertension was 82.5/1000 births. This is much lower than the high figure from toxaemic pregnancies, that is, 245/1000, found in the present study. This observation is consistent with that of Mati (9) and Nelson (18) that pre-eclampsia is responsible for more perinatal mortality than uncomplicated hypertension.

MATERNAL MORTALITY

In this study, there was no maternal death. This was probably due to the small number of the study patients, that is 156. However, it is well known that pre-eclampsia poses a danger to a mother's life especially if she develops eclampsia. Studd(2) suggested that in England and Wales, pre-eclampsia was the third most common cause of maternal death following abortion and pulmonary embolism. In Kenyatta National Hospital, the set-up is different in that the commonest causes of maternal mortality are cephalo-pelvic disproportion leading to rupture of uterus, anaemia, antepartum and post-partum haemorrhages, and puerperal sepsis. Mati (9) found a general

maternal mortality rate of 2.1/1000 births while Donald (19) found a maternal mortality rate in pre-eclamptic pregancies of 0.2/1000 births in Britain. This is again a reflection of the low quality of health services in the developing nations.

MORBIDITY IN PRE-ECLAMPSIA

(a) Birth Asphyxia.

Pre-eclampsia and eclampsia represent a serious threat to both the mother and the neonate. The newborns of mothers affected by these conditions are at high risk of antepartum and intrapartum asphyxia. The Apgar score is used to identify those infants who require resuscitation or assistance to sustain life. A low score at one minute of life is associated with a greatly increased threat to the survival of the infant. Infants who score poorly at 5 minutes of life have a higher fatality rate than infants with a low score at one minute . Furthermore, the chance that an infant will develop a neurological abnormality at one year of age is enhanced if the Apgar score is below 7 at 5 minutes of life.

In the present study, 38.4% of the babies were severely asphyxiated at one minute, while 22.2% were severely asphyxiated at 5 minutes of life (Table VI). The relatively high proportion of the severely asphyxiated babies is an indication of the need for preventive measures and of adequate resuscitation of these babies at birth.

(b) Intra-Uterine growth retardation

Pre-eclampsia has been shown to lead to intra-uterine growth retardation (20,21). Naeye (22) conducted a study in Burlington that demonstrated that organ abnormalities in infants from pre-eclamptic mothers usually resembled those in infants with known placental insufficiency. In both groups, body length, brain, heart, and lung weights were nearest normal values, while adrenals, liver, spleen and thymus were disproportionately small. The organs were subnormal in size because parenchymal cells had a subnormal amount of cytoplasm although some organs had a subnormal amount of parenchymal cells as well. Both at the gross and histologic levels, tissue abnormalities in the babies of pre-eclamptic mothers resembled abnormalities observed in infants with post-natal

alimentary malnutrition. The cause of the intra-uterine malnutrition in babies with pre-eclamptic mothers presumably resides in maternal uterine and placental abnormalities. Tafari et al (8) studying perinatal deaths due to pre-eclampsia in Addis Ababa found that there was multiple evidence of foetal undernutrition in the infants who died including a relative undergrowth of adrenals, spleen and liver and a relative acceleration of lung maturation.

The foetus depends on the placenta for its metabolism. There has been evidence for many years that the blood flow in choriodecidual space is reduced in the presence of hypertension. The measurement of flow is limited by technical problems but Browne and Veall (23) showed a 60% reduction in blood flow in hypertension. Naeye (22) found that the placentas from pre-eclamptic gestations appear to be subnormal in size for gestational age. There was a high incidence of infarcts in such placentas and the basement membrane of the foetal capillaries was thickened in the disorder. Wentworth (24) studied 679 consecutive placentas which were serially sectioned to determine the incidence of placental infarction. A marked rise in infarction was found in the placentas from the severe pre-eclamptic cases (67%),

and a moderate increase was found in the mild pre-eclamptic group (11.7%). In the same study, an increase in maternal antepartum haemorrhage, stillbirths, and foetal morbidity was noted in the pre-eclamptic groups, particularly the severe one. Naeye and Friedman (17) found that 42% of the total excess perinatal mortality was due to large placenta infarcts, 15% to placental growth retardation and 13% to abruptio placenta.

In the present study, it was not possible to have an accurate analysis of the frequency of placental infarcts from pre-eclamptic and eclamptic pregnancies. This is because only a few of the placentas were examined for placental infarcts; and even when it was done, it was only possible to carry out naked eye examination of the placenta. Histological assessment of these placentas would be useful as some of the placental infarcts may only be detected microscopically. However, in the present study 50.0% of the babies from the toxaemic pregancies were small for gestational age. This high association of small for gestational age babies with toxaemic pregnancies was also shown by Meme and Hillman (25) who found that 70% of the

low birth weight babies from toxaemic pregnancies were small for gestational age. The small for gestational age are at a disadvantage in comparison with normal babies in that they are more prone to hypoglycaemia, aspiration pneumonia and intraventricular haemorrhage which are potential causes of death (26,27,28 29). It is therefore imperative that these high risk pregnancies be recognised early and resuscitation measures taken during delivery

(c) Foetal distress

Among the 156 toxaemic pregnancies studied, 19(11 1%) delivered babies who had had foetal distress. One of them was a stillbirth and four were neonatal deaths, while 14(93 7%) survived (Table IX). 3 of the neonatal deaths, occurred late in the neonatal period probably due to other causes. Hence a cause and effect between the neonatal deaths and foetal distress could not be clearly established. These findings indicate that foetal distress plays a relatively minor role towards the morbidity and mortality of babies of toxaemic pregnancies.

(c) Preterm deliveries.

An important finding in this study was the high incidence of preterm deliveries associated with toxaemic pregnancies, that is 56.8% (Table VII). All the perinatal losses in this study followed pregnancies that were induced into premature labour or the pregnancy was terminated before term. Driscoll et al (30) found that despite such interference in the progress of pregnancy, the foetus was usually viable except in the few cases of early onset. However, this is not consistent with the finding in the present series in which all the toxaemic pregnancies that underwent termination of pregnancy due to the severity of the disease resulted in stillbirths or early neonatal deaths. This is most likely because majority of the terminations of pregnancy were conducted at relatively early gestations. Mati (9) studying pregnancy hypertension similarly found that majority of the neonatal deaths occurred as a result of immaturity as most of the pregnancies had to be terminated because of the severity of the disease.

The high figure of preterm deliveries from toxaemic pregnancies is significant as it shows that most of the babies delivered would be liable to develop certain complications such as respiratory distress syndrome, intraventricular and intrapulmonary haemorrhages, hypoglycaemia, etc (26). These complications may contribute to their higher morbidity and mortality than term babies.

(e) Low birth weight

Meme and Hillman (25) studied 3700 babies born in 1974 at Kenyatta National Hospital and found that 18.9% were low birth weight. This high figure closely correlated with the high incidence of low birth weight in East Africa found by Bwibo (31) in a review of literature. He estimated it to be between 13.6-15.2%. In the same review, he found that the perinatal mortality rate was highest in the smallest babies, that is, it approached 100% in those under 1000gm and between 80-100% in those between 1000-1500gm. Besides the risk of perinatal death for these babies, Driscoll (30) found that other possible complications could occur in these babies. He found that babies with birth weights of 1000 gm and below had a higher

risk of developing neurological, intellectual and behavioural complications.

In the present study, 52.2% of the babies from the toxaemic pregnancies were of low birth weight (Table XI). This was partly due to the fact that most of the severe pre-eclamptic pregnancies were either terminated or induced into premature labour in order to save the life of the mother. However, a large number of these low birth weight babies (76.6%) were above 1500gm (Table XI). Most of these babies would survive if given proper obstetric and paediatric care as was shown by Driscoll(30) who in his series found that upto 89% of the newborns between 900-1000gm survived. The need for improvement in such care in the obstetric unit is further demonstrated by the finding of Johnstone and Ochiel (16) who found that nearly all the babies who died perinatally in the same unit were of low birth weight and only one weighed more than 2500gm.

TWIN PREGNANCY.

The incidence of twin pregnancy in the obstetric unit of Kenyatta National Hospital was found by Kilonzo et al (32) to be one in 57 pregnancies. This was much higher than the reported twin pregnancy rate in America of one in 88 pregnancies (25).

In the present study, there were 9 twin pregnancies among the 156 pre-eclamptic pregnancies, that is, an incidence of one in 17 pre-eclamptic pregnancies. This shows that pre-eclampsia often complicates multiple pregnancies as has been shown elsewhere (2).

It is also a common finding that babies from twin pregnancies are generally of low birth weight as was shown by Meme (33), who found an incidence of low birth weight babies among twins of 51.0%. Butler and Bonham (34) also found that 54.1% of babies from multiple pregnancies were of low birth weight. The present study revealed that 77% of babies from twin pre-eclamptic pregnancies were of low birth weight (Table II).

SOCIO-ECONOMIC STATUS.

Abramowicz et al (35) demonstrated that toxaemia of pregnancy was more common in the low socio-economic class irrespective of race. This was the same finding by Chamberlain (14) who also showed that mortality rates of babies vary with socio-economic class- the higher the social class, the better the chances of survival of the babies.

The obstetric unit of Kenyatta National Hospital mainly serves the low socio-economic group. It is the same group that exhibits such adverse factors found in this study as high proportion of single mothers (36.5%), unbooked emergency admissions (69.2%), and young mothers (65.5%) who were less than 25 years of age, (Tables XV, XVI, XII, respectively).

PARITY OF MOTHERS WITH PRE-ECLAMPSIA

MacGillivray (1) found that the incidence of pre-eclampsia fell drastically after the first pregnancy. Thus he noted that pre-eclampsia is principally a disease of primigravida, so much so that even a previous abortion tended to reduce the incidence of the disease. 58.8% of the toxaemic mothers in the present study were primigravidas, falling to 7.0% in para 2, and 7.7% in para 3, etc. These findings confirmed that pre-eclampsia is essentially a disease of the primigravida even at Kenyatta National Hospital as found elsewhere (1,34).

AGE OF PRE-ECLAMPTIC MOTHERS.

The present study revealed that 65.5% of the mothers with pre-eclampsia were below 25 years of

age. Mati (9) studying pregnancy hypertension found that 83% of the women with toxaemia of pregnancy were under 25 years of age. These findings conform to the well known observation that pre-eclampsia is principally a disease of the young mothers, as shown elsewhere (2).

TRIBAL DISTRIBUTION.

Mati (9) indicated that pregnancy hypertension has a definite tribal distribution, being more common among the Luo, Luhya and the Coastal tribes than the Kikuyu, irrespective of the area of residence. The present study showed that 30.8% of the toxaemic mothers were Kikuyu, 28.2% Luo, 16.0% Luhya and 14.1% Kamba. These figures showed that the Kikuyu and the Luo mothers had almost the same incidence of pre-eclampsia. Though the exact tribal breakdown of attendances at Kenyatta National Hospital has not been worked out, it is fair to assume that the Kikuyu forms the highest proportion of patients. This is likely to be so considering that the Kikuyu tribe dominates Nairobi and the surrounding areas, while the Luo are much fewer in proportion. Hence this study showed that toxaemia of pregnancy was more common in the Luo than in the Kikuyu, as was also shown by Mati.

ANTENATAL ATTENDANCES

This study showed that 69.2% of the toxaemic mothers were admitted as emergency patients (Table XVI). This was partly due to the high risk and referral nature of the obstetric unit of Kenyatta National Hospital and partly due to the non-attendance or inadequate antenatal care given to the mothers with toxaemic pregnancies in the peripheral health units. The management of high risk cases in an emergency environment has its expected risk of both maternal and perinatal morbidity and mortality. Improved antenatal care including education of society on its importance would increase the coverage and hence reduce the number of emergency cases.

MODE OF DELIVERY

Chamberlain (14) observed that the presence of a raised maternal blood pressure was associated with an increase in operative delivery rates almost parallel with the severity of the pre-eclampsia. Similarly the spontaneous cephalic delivery rates were reduced in each of the categories of pre-eclampsia. A greatly raised perinatal mortality rate was observed when

caesarian sections were done in the presence of severe pre-eclampsia. He found a perinatal mortality rate of 35.0/1000 births for normotensive women delivered by caesarian section and 105.9/1000 in severe pre-eclamptic women delivered by caesarian section. The perinatal mortality rate of babies born by caesarian section in the obstetric unit of Kenyatta National Hospital was 51.9/1000 births (36). In the present study, 50.6% of the babies born to toxaemic mothers were born normally 34.0% by caesarian section and 15.4% by vacuum extraction.

DRUG ADMINISTRATION

A review of the literature concerning the effect of various drugs administered to the mother in labour reveals that these drugs may affect both the foetus and the newborn. The dynamics of blood flow in the uterus plays a major role in controlling the transfer of drugs across the placenta for the foetus. When uterine arterial flow decreases during active uterine contractions late in labour, the foetus is protected from acquiring large doses of anaesthetic drugs given during the last few minutes before delivery even if the drugs are given intravenously.

The placental has a marked influence upon the rate at which a drug passes from the mother to the foetus and hence the final concentration attained in the foetal circulation. Maternal diseases which lead to an altered placental vascular bed also affect the distribution of drugs to the foetus, e.g., diabetes mellitus, systemic lupus erythematosus, chronic hypertension and toxaemia of pregnancy. These diseases are frequently associated with placental insufficiency. The drugs may cross to the foetus less readily when one of these diseases is present. However, if asphyxia is present, as often occurs in pre-eclampsia, it may potentiate the effect of whatever amount of drugs that may have passed through the placenta.

The management of pre-eclampsia in the obstetric unit during the study period involved the usage of a wide variety of drug combinations; indeed there were not less than 56 different combinations. The most frequently used drugs were barbiturates , diazepam and paraldehyde. All these drugs may cause marked intrapartum and post-partum asphyxia, particularly if given within 4 hours prior to delivery. This is often shown by the low Apgar Score of the baby so affected. Hence, Turner (37) indicated that the treatment of choice is one that deals

with maternal problems without compromising the foetus.

Paediatricians in a unit like the one in Kenyatta National Hospital can help in reducing the incidence of drug related asphyxia and other possible untoward effects by cautioning restraint on excessive usage of drugs in labour. They would probably influence the formulation of a simple standardized drug regimen in pre-eclampsia.

ECLAMPSIA

This is a life threatening complication of pre-eclampsia presenting with fits. This endangers the mother and the foetus when the latter is already compromised by placental insufficiency which is common in pre-eclampsia (38). Therefore, measures undertaken for the eclamptic mother such as control of fits, maintaining the airway, oxygen administration, as well as continuous foetal monitoring are vital for the survival of the foetus and the mother. The present study showed a very high perinatal mortality rate of 379/1000 births from eclamptic pregnancies. This was similar to the findings of Wightman et al (39) who found a high perinatal mortality rate of 213/1000 births from eclamptic patients. It is therefore imperative that adequate and effective antenatal measures are taken to prevent pre-eclampsia being complicated by eclampsia.

C O N C L U S I O N

This is a retrospective study of 156 cases of pre-eclamptic pregnancies, 29 of which developed eclampsia. These mothers presented at the obstetric unit of Kenyatta National Hospital, Nairobi, from 1st January 1980 to 31st December 1981. A total of 167 babies were delivered; 9 of the deliveries were twins.

The mortality and morbidity of these babies were studied together with the possible contributory factors. A high perinatal mortality rate of babies from pre-eclamptic pregnancies, (245/1000), and an even higher perinatal mortality of babies from eclamptic pregnancies, (379/1000), were observed. The study also showed that a significant proportion of the babies were severely asphyxiated at one minute (38.4%), and five minutes, (22.2%), of life; a large number of babies were small for gestational age at birth, (50.0%), a reflection of marked intra-uterine growth retardation found in toxaemic pregnancies. There was a high rate of preterm deliveries (56.8%), and of low birth weight babies (52.2%).

These significantly high figures of morbidity and mortality were attributed to various factors. The factors which appeared to play a major role were severity of toxaemia; early termination of pregnancy resulting in preterm deliveries; high rate of vacuum deliveries and caesarian sections; inadequate antenatal care and low socio-economic status of these mothers who , in addition, were often young and primigravidas. The factors which appeared to contribute a relatively lesser role were twin pregnancy, neonatal septicaemia, and foetal distress. These occurred at a relatively lower frequency than the other factors mentioned earlier.

In the study, the obstetricians used a very wide range of therapeutic agents in managing the toxaemic mothers. The exact effect of these agents in contributing to the high perinatal morbidity and mortality found in this group could not be ascertained; indeed it would require a separate study to draw conclusions on this.

The high perinatal mortality found, (245/1000), in the present study is about two and half times the general perinatal mortality, (97/1000),determined by Johnstone and Ochiel(16) in their study at Kenyatta National Hospital's obstetric unit. These are depressing figures when compared to those of Naeye and Friedman who found corresponding figures of 37.9/1000 and 17.2/1000, respectively, in America. This is a reflection of the inadequate health services - both in provision and in their utilisation. It is also a feature found in most developing countries where infant and toddler morbidity and mortality are appallingly high in comparison to the developed countries.

RECOMMENDATIONS

1. Attempts should be made to offer an effective antenatal care service particularly in the rural areas of the country where most of the population lives. Emphasis should be placed on mass health education compaigns stressing the value of consistent antenatal care. These would increase the utilisation of these services so that effective identification of high risk cases for referral would be accomplished.

2. The medical auxiliaries especially nurses and clinical officers should be thoroughly drilled to identify the pregnant mother with this high-risk problem of pre-eclampsia and eclampsia. This is because many of the emergency cases presenting with this condition often have visited a health facility centre at one time or other but the condition was not recognised.

3. The Paediatrician should be involved in the management of the toxaemic mother. Certainly, he should be made aware of the many drugs administered to such a mother, the state of the foetus, and possible intervention in delivery of the baby (vacuum extraction, caesarian section, etc)

that may be anticipated This is analogous to physician - surgeon relationship in managing a patient with gastro-intestinal haemorrhage. In the same context, regular meetings between Paediatricians and Obstetricians would focus on this important problem with the aim of reducing this unacceptable morbidity and mortality.

4. Community oriented development projects would be of paramount importance in raising the socio-economic status of the community. These include water supply, Literacy Campaigns and others.

5. A study of the drug regimens used on the toxaemic mother before delivery would be a useful undertaking. This would reveal the drug effects on the baby particularly on the perinatal outcome. It would also assist in formulating a simple standardised, and effective drug regimen with minimal unpleasant effects on the baby.

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A P P E N D I X I

P R O F O R M A

THE OUTCOME OF BABIES BORN FROM ECLAMPTIC AND PRE-ECLAMPTIC PREGNANCIES AT KENYATTA NATIONAL HOSPITAL 1/1/80-31/12/81

A. THE BABY

1. Estimated maturity at delivery (weeks)..... .....
2. Weight at birth (g) .....
3. Sex.....
4. State at birth.....abortion/alive/stillbirth.....
   macerated/fresh.
5. Apgar score at 1 minute.....at 5 minutes.....
6. Evidence of septicaemia.....Yes/No.....
7. Classification of foetus-preterm/term.....
   S.G.A./A.G.A./L.G.A.....
8. Evidence of meconium staining of liquor.....Yes/No.

A P P E N D I X II

B. THE PRE-ECLAMPTIC/ECLAMPTIC MOTHER

1. Name.....
2. Hospital Number.....
3. Age.....
4. Tribe.....
5. Parity.....
6. Marital status.....
7. Associated medical disease.....
8. Antenatal care.....Booked/Not booked.
9. Mode of delivery.....V.D./C.S./V.E.
10. Development of eclampsia.....Yes/No.....
    Number of fits.....
11. Highest data recorded before delivery
    Bp.....Proteinuria .....and oedema.....
12. Drug combinations before delivery.....
13. Labour.....Spontaneous/Induced/Termination of pregnancy.
14. Degree of severity of Pre-eclampsia.....Mild/Severe.