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EPIDEMIOLOGICAL APPROACH TO PUBLIC HEALTH NEEDS IN OBSTETRICS

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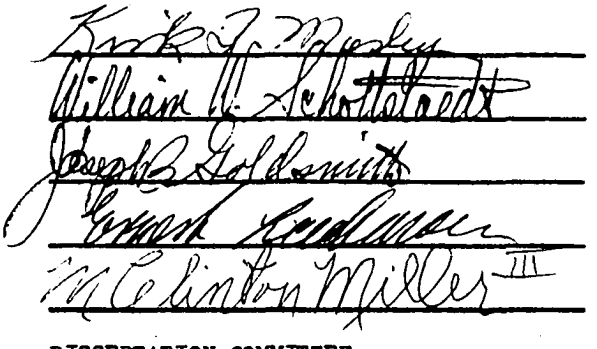
EPIDEMIOLOGICAL APPROACH TO PUBLIC HEALTH NEEDS

IN OBSTETRICS

APPROVED BY



DISSERTATION COMMITTEE

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATION

EPIDEMIOLOGICAL APPROACH TO PUBLIC HEALTH NEEDS IN OBSTETRICS

CHAPTER I

INTRODUCTION

Childbearing is usually a normal physiological process. Accordingly, the main emphasis in maternity care should be on the maintenance of the normal. However, complications do occasionally occur, and can result in grave consequence to the mother and/or the child. These can often be prevented, or the severity reduced, by proper prenatal care.

The objectives of obstetrical care are: (1) to produce healthy children and (2) to maintain the good health of the expectant mother so that she is capable of taking care of her offspring. Those most interested in these objectives are the mother-to-be, the father-to-be, the physician providing the obstetrical care, the pediatrician and the local health department. The concern of the local health department is identical with that of the obstetrician and the pediatrician, except that it is more involved with the problem as it affects the community, while the physicians involved are more cognizant of the needs of the individual patient.

Mankind is exceedingly adept at reproducing itself. This fundamental drive, along with the struggle for individual and collective survival,

accounts for perpetuation and progress in the human race. Possibly the greatest tragedy in this world is the loss of life at its very beginning. Man's progress toward civilization has been closely intertwined with his development of methods to protect life.

Throughout recorded history man has indicated interest and concern in the reproductive woman, although ancient concepts of reproduction and birth were cloaked in mysticism. It was not until the 18th century that fetal diseases were given serious consideration in the literature and even then, the interrelationship with maternal factors was not suggested before at least another century. The importance of maternal care was pointed out with remarkable clarity in 1803 when Dr. W. Buchan wrote a treatise for maternity patients entitled "Advice to Mothers" in which he stressed the need for examination by a physician during the pregnancy instead of only at the time for delivery.

In 1873, the American Medical Association organized a section on Obstetrics and Diseases of Women and Children. This was the first time that the medical profession singled out and placed emphasis on the care of mother and child.

Public health legislation designed specifically for children was first enacted in 1879 when the New York State Legislature passed a law requiring New York City to appropriate funds for child health. Physicians and nurses were employed to work with families in an effort to prevent severe outbreaks of summer diarrhea among infants and children. This meager beginning was the stimulus for the origin and growth of many child welfare societies and organizations.

In 1901, the Instructive Nursing Association of Boston initiated antenatal care in America. It was not until 1902 that difficult labor,

premature birth and asphyxia were suggested as important causative factors in cerebral palsy and mental deficiencies. This realization of the possible role of maternal influences upon the fetus gave greater weight to the value of antenatal and maternal care.

In 1958 the New York Commission for the Improvement of the Poor, in conjunction with the New York Outdoor Clinic, began to provide prenatal care for expectant mothers in the lower income groups. Thus, public health has meant a cooperative effort of obstetricians, general practitioners, pediatricians and public health officials to improve child health.

Mortality rates for all ages have shown a steady decline in the United States during the past half century, but the most striking reduction has been in infant mortality rates. The greatest reduction in mortality rates has been among infants after the first month of life. In the first month of life, the mortality rate has remained relatively high, having shown only a slight decline. In 1915 the infant mortality rate was 99.9 per 1000 live births. (The number of deaths of live-born infants during the first year of life per 1000 births in a specific year.) By 1958 the rate was down to 27.2. The neonatal mortality rate (number of deaths of live-born infants during the first 28 days of life per 1000 live births in a specific year) for this same year was 19.5 per 1000 live births, having declined from 60 per 1000 live births in 1915. Most of the reduction of neonatal mortality occurred in the period from seven days following birth through the twenty-seventh day. In 1958 three-fourths of all neonatal deaths occurred during the first three days of life and slightly over one-half of these deaths occurred in the first day of life. These facts indicate that the major share (up to 80 per cent) of neonatal deaths are closely related to obstetrical care and services. Furthermore

significant reduction in these deaths will come largely from improvement in maternity care.

Since 1900 the birth rate (number of live births per 1000 population in a specific year) for the United States has varied from a high of 31.8 in 1910 to a low of 18.4 in 1933 and 1936 to another peak of 26.5 in 1943, to 23.4 in 1961. In 1961 there were 4,329,000 babies born in the United States and in 1962, 4,209,000. In 1915 the maternal mortality rate for white mothers was 60 per 10,000 live births and in 1955 was down to 3 per 10,000 live births. The non-white rate in the same period dropped from 100 per 10,000 live births to 15 per 10,000. (52) One of the major factors for the decline in these rates has been the gradual improvement in the quality of antepartum care, some of which was stimulated by information obtained from public health statistics and analyses of maternal and infant mortality rates.

Maternal and infant mortality rates are often used to determine the status of public health in a community. Progress in the field of maternal and child health, as far as death is concerned, has been most marked in the reduction of maternal deaths. Improved standards of obstetrical care directed primarily toward saving mothers' lives have ushered in an era of reduced fetal and neonatal loss, but less remarkably so than maternal mortality reduction.

Both the fetal and neonatal deaths had to be combined for clarity and reliability in determining a single index that could be used to compare these death rates to maternal mortality rates. Fetal and neonatal deaths may be influenced by the same factors and thus they are not mutually exclusive. It is not always apparent in a given instance whether a fetus has been born alive or still. To take into account possible

variations in judgement as to the state of the fetus at delivery, a single figure is of most use. Perinatal death rate has been selected as the index of choice because it will pick up these variations as to actual conditions of fetus at birth.

The Committee on Maternal and Child Care of the Council on Medical Services, American Medical Association, has held many conferences to establish an exact definition of perinatal mortality. This Committee has set the following definitions: There is a Perinatal Group I and a Perinatal Group II.

Perinatal Group I begins with the death of a fetus weighing 1,001 grams (approximately 28 weeks gestation) and includes all deaths of newborn infants, regardless of birthweight, occurring in the first 7 days of life.

Perinatal Group II includes all deaths of a fetus weighing 501 grams or more (approximately 20 weeks of gestation) and all deaths of newborn infants, regardless of birth weight, occurring in the first 28 days of life--full neonatal period.

The perinatal mortality rate is to be calculated on the basis of total births in the perinatal group chosen for study. Perinatal Group II is the one chosen for this study and is calculated by the following formula:

$$\frac{\text{Fetal deaths 501 grams and over + all neonatal deaths (under 28 days)}}{\text{Fetal deaths 501 grams and over + all live births}} \times 1000$$

Perinatal death is the fourth ranking cause of death in the United States, outranked only by heart disease, cancer, and vascular diseases. Each year there are some 150,000 such deaths reported; in addition, it is

estimated that 15 per cent of all pregnancies (645,000) end in abortion each year. In 1958 the perinatal mortality rate per 1,000 live births was 35.2 and of this 16.2 per 1000 live births were due to fetal mortality. Many of the same factors leading to a lethal outcome in some pregnancies may lead to sub-lethal outcomes in others. (The surviving but damaged group includes such conditions as cerebral palsy, epilepsy, mental retardation, congenital malformations, or birth injuries. It has been estimated that each year some 60,000 infants are delivered with these conditions. (30) It has been further estimated that "in the United States today, there are approximately some 315,000 children with cerebral palsy, 310,000 with epilepsy, and 1,500,000 mentally retarded." In assessing the benefits from any program designed to reduce perinatal mortality, efforts should be directed to ascertain affects on the surviving but damaged group as well.

As reported by Wells from "North Carolina Fetal and Neonatal Death Study," the objective of obstetrical care is to secure healthy mothers and healthy babies. (68) The achievement of this objective not only involves careful medical supervision of the expectant mother throughout the pregnancy but also depends on her earlier health and education so that there is a close linkage with the wider field of hygiene and preventive medicine.

Present knowledge indicates that cause and effect in perinatal problems is a complex of many factors. Many of these factors appear to be closely related; other factors seem to act independently and in some instances interact with each other. The same phenomenon is true in most biological and sociological problems. The following factors are important:

I. Genetic Factors

A. Blood Groups

Hemolytic diseases affect to some extent about one infant in

200 deliveries. (15) Blood group differences between mother and fetus are the basis for the development of the disease. Since 1940 much has been learned about the etiology of this group of diseases. Much is known about the role of the Rh factor and as a result, considerable progress has been made in the prevention of perinatal deaths due to erythroblastosis. Recently ABO hemolytic disease has been diagnosed more frequently than formerly, but the extent of this problem is unknown at present.

B. Congenital Malformation

Present knowledge does not allow us to distinguish with certainty between the effect of defective chromosomes and genes and defective intrauterine environment, but it is relatively simple to recognize the overall effect of abnormal germ plasma whatever its etiology. (15) The inheritance of congenital defects depends on the matching of defective genes in the process of fertilization. Mutation of genes and chromosomes in man probably can be affected to some extent by environmental factors such as radiation.

C. Race or Nationality

The effect of race on the incidence of disease and death is not clear. There is evidence that various socio-economic factors which are correlated with race may be more important than race per se. A definite decline in infant mortality rates is reported in whites and non-whites with rising level of income, but there are still differences between whites and non-whites in the same economic group. (33) There is always the question whether the present economic grouping of two different races or the socio-economic grouping of the mothers ten or twenty years previously

is the more important determinant of this effect.

D. Other Genetic Factors

There are other possible genetic factors which may affect pregnancy wastage to some extent, such as the inheritance of defective reproductive organs, the tendency to diabetes or a hypertensive disease and similar defects which might influence perinatal mortality.

II. Non-genetic Biological Factors in Pregnancy Wastage

A. Mother's Age

Perinatal mortality tends to increase with the age of the mother. (73)

B. Number of Previous Pregnancies

Parity and mother's ages are correlated about as highly as other biological phenomena. (25)

C. Father's Age

It has been difficult to find the same relationship in regard to the age of the father as with the age of the mother. (72)

D. Family History

Family history is important in certain conditions which are probably genetic or environmental in nature. Among these are heart disease, diabetes and congenital deformities. (15)

E. Outcome of Previous Pregnancies

It has been recognized for many years that women with a history of previous fetal loss had a higher fetal loss in subsequent pregnancies than those who had no fetal loss previously. Yerushalmy observed a strong association between the outcome of the immediately preceeding and the present pregnancy in regard

to early fetal, late fetal, neonatal and late infant deaths. (68)

F. Birth Interval

A higher incidence of premature births has been recognized where there is either a very close or a very wide spacing of births. (34)

G. Size of Family

Stillbirth and neonatal mortality birth rates decreased with the size of the family, but infant death rate increased with the size of the family, indicating a possible environmental effect on infant deaths and the beneficial effects of parity on perinatal deaths. (68)

H. Season of the Year

A definite seasonal variation has been known in the death rate due to congenital malformations. (6) The rates were highest during November and March and lowest during June to September. Maternal toxemia with associated risk of perinatal mortality and toxemia has been thought to be related to changes of the weather or season.

III. Multiple Births

Multiple births result in an increased incidence of premature births which are subjected to higher mortality rates than mature infants. In the United States multiple births account for about 2 per cent of the live births but are associated with 6 per cent of the fetal deaths of 26 weeks gestation. Ten per cent of the neonatal deaths are associated with multiple births. (64)

IV. Birth Weight

Birth weight is probably the most crucial factor in perinatal death. Birth weight varies considerably by social class, age of mother,

parity and nutrition status of the mother during pregnancy. (68)

V. Socio-economic

A. Socio-economic Factors in Pregnancy Wastage

Much evidence has been accumulated on the effect of nutrition on health of the mother and the fetus. There are still many unanswered questions regarding the role of nutrition in perinatal mortality. (67)

B. Social Class

Studies in England and Scotland have shown a definite increase in mortality rates with decreasing social class. (3)

C. Work Outside the Home During Pregnancy

For many years work outside the home during the latter part of pregnancy was thought to result in increased risk of fetal and neonatal deaths. However, two recent studies found no significant effect of work outside the home on incidence of prematurity. (21) (32)

VI. Other Factors

A. Conditions occurring during pregnancy usually associated with increased perinatal mortality rates are the following: toxemia, pre-eclampsia and eclampsia, antepartum bleeding, placental bleeding, placenta praevia, abruptio placentae, multiple pregnancies, abnormality of fetal membranes, placental and cord.

B. Diseases which probably result in increased perinatal mortality but which are not directly related to pregnancy are the following: acute infections such as rubella, poliomyelitis, and others; chronic diseases such as syphilis, heart disease, cardiovascular disease and diabetes.

Thus the value of careful supervision of the expectant mother from the beginning of pregnancy is now well recognized since even healthy women sometimes fail to adapt completely to the strain of pregnancy. As stated previously, the object of obstetrical care is to secure healthy mothers and healthy babies. The achievement of this goal not only involves careful medical supervision of the expectant mother throughout the pregnancy but also depends on her general health, education and social environment; thus, there should be a close link with the hygiene of preventive medicine.

The basic principle upon which control measures for perinatal mortality are based is that the fetus is the product not only of its own internal constitution but also of its maternal and uterine environment and that, in most instances, if this environment is altered favorably either before conception or during pregnancy, improved perinatal salvage will be the inevitable dividend. Thus the solution of the problem of perinatal production is much more complicated than the mere acquisition of new knowledge concerning the classic art of obstetrics.

Since 95 per cent of all deliveries in the United States take place in the hospitals, many factors affecting perinatal mortality are related to events and circumstances within the hospital. On the other hand, some of the solution for perinatal mortality will be found in identifying and measuring other factors one might call exogenous factors. In other words, those factors beyond the control of the hospital phase of the actual labor and delivery, as contrasted with endogenous factors affected by the quality of hospital care.

These exogenous factors have to do with prenatal care and special attention being provided to that group of patients who are identified by epidemiological means as providing the highest incidence of premature births

and perinatal mortality. An epidemiological investigation is a fundamental public health method and can be used in studying this problem.

CHAPTER II

DESIGN OF PRESENT STUDY

This study is designed as an analytical survey; that is, factors which are associated with the observed results are studied, as opposed to an experimental study in which factors are varied "at will" and the results studied for the effect of the factors. The data are not completely retrospective because considerable information was collected during the pregnancy and then transferred to the code sheet at the time of the labor and delivery. The statistical methods used chiefly are chi square. Where other methods are utilized, it is so stated.

In view of the number of indigent patients admitted to the obstetrical service at the University of Oklahoma Medical Center, it was considered worthwhile to analyze the obstetrical care received by the patients. The overall purpose of the study was to ascertain the need for improved care as well as ways and means by which the necessary improvements might be accomplished; the assumption being that these improvements would, in turn, have beneficial effects on the perinatal mortality rate and a concomitant reduction in the number of damaged, but living, children.

The data were obtained on all deliveries occurring at the University of Oklahoma Medical Center Hospitals from July 1, 1959 through June 30, 1961.

A special code sheet was designed (Figure 1) to record the data.

Figure 1. Code Sheet for Obstetrical Care

		ADMISSIONS	13-14	7.	AGE OF MOTHER	24-	12.	F.B.Y. ON ADMISSION 1- Present 2- Absent 3- Doubtful
	1.	NAME	15-20	8.	DATE OF L.M.P. E.D.C.			
1- 2	2.	HOSPITAL	21-	9.	P. G. AB.	25-30	13.	BLOOD PRESSURE ON ADMISSION
3- 8	3.	CASE NUMBER	22-	10.	PREVIOUS PREGNANCIES (MULTIPLE) 1- No trouble 2- Perinatal mortality 3- Multiple births 4- Malpresentations 5- Rh trouble 6- Transfusions 7- Cesarean section	31-	14.	TIME PRENATAL CARE BEGAN 0- Unknown or not reported 1- No prenatal care 2- Started before 4 months of gestation 3- Started 4-6 months 4- Started after 6 months 5- Erractic prenatal care
9-10	4.	COUNTY						
11-	5.	TYPE HOSPITAL CARE 0- Unknown or not reported 1- Private patient 2- Other than private						ABNORMAL PHYSICAL FINDINGS ON ADMISSION:
12-	6.	RACE 1- Unknown or not reported 2- White 3- Negro 4- Indian 5- Other	23-	11.	Rh FACTOR IN MOTHER 'D' 0- Unknown or not reported 1- Rh negative 2- Rh positive 3- Rh not done			
32-	15.	ONSET OF LABOR 0- Unknown or not reported 1- Spontaneous 2- Induced- convenience 3- Induced- obstetrical indication 4- Induced- medical indication 5- Traumatically pr stated	34-	17.	DURATION OF LABOR 0- Unknown or not reported 1- No labor 2- Labor less than 1 hour 3- Labor 1-6 hours 4- Labor 6-12 hours 5- Labor 12-23 hours 6- Labor 24-35 hours 7- Labor 36-47 hours 8- Labor 48 hours or more	36-	19.	INTERVAL BETWEEN LAST ANALGESIA AND DELIVERY 0- Unknown or not reported 1- No analgesia 2- Less than 30 minutes 3- 30 minutes - 59 minutes 4- 1-3 hours 5- 3-4 hours 6- 5 hours and over
33-	18.	METHOD OF INDUCTION 0- Unknown or not reported 1- Not induced 2- Intravenous pitocin 3- Artificial rupture of membranes 4- Castor Oil 5- Intravenous pitocin and artificial rupture of membranes 6- Intravenous pitocin and Castor Oil 7- Artificial rupture of membranes and Castor Oil 8- Intravenous pitocin, Castor Oil, artificial rupture of membranes 9- Other	35-	18.	ANALGESIA (MULTIPLE) 0- Unknown or not reported 1- No analgesia 2- Demoral 3- Scopolamine 4- Morphine and substitutes 5- Nisentil 6- Phenergan 7- Other tranquilizing agents 8- Barbiturates 9- Other	37-	20.	MEMBRANE RUPTURED 0- Unknown or not reported 1- Not ruptured spontaneously 2- Less than 12 hours before delivery 3- 13-23 hours before delivery 4- 24-47 hours befor. delivery 5- 48-72 hours before delivery 6- 72 hours or more before delivery
		DELIVERY	53-	30.	PRESENTATION (MULTIPLE) 0- Unknown or not reported 1- Vertex anterior 2- Vertex posterior 3- Vertex rotated Position 4- Breech frank 5- Breech full 6- Breech footling 7- Face or brow 8- Compound 9- Transverse lie 10- Other	38-	35.	SEX 0- Unknown or not reported 1- Male 2- Female 3- Undetermined
38-40	21.	PHYSICIAN				58-62	36.	BIRTH WEIGHT
41-43	22.	ANESTHETIST				63-65	37.	LENGTH OF BABY IN INCHES
44-49	23.	DATE OF DELIVERY (MONTH, DAY, YEAR)	54-	31.	DELIVERY (MULTIPLE) 0- Unknown or not reported 1- Spontaneous 2- Forceps on A.C.H. 3- High forceps 4- Mid forceps 5- Low forceps 6- Breech extraction 7- Vacuum and extraction 8- Classical Cesarean section 9- Low cervical Cesarean section 10- Other	66-	38.	RESUSCITATION (MULTIPLE) 0- Unknown or not reported 1- No resuscitation 2- Aspiration pharynx 3- Aspiration trachea 4- Aspiration stomach 5- Caffeine 6- Metrazol 7- Coramine 8- Nalline 9- Carbon-dioxide
50-	24.	ANESTHESIA 0- Unknown or not reported 1- No anesthesia 2- Cyclopropane 3- Nitrous oxide 4- Ether 5- Trilene 6- Intravenous 7- Local 8- Subarachnoid 9- Caudel	55-	32	METHOD OF ROTATION 0- Manual 1- Scanzoni 2- Key lock	67-	39.	1- Tracheal catheter- visual 2- Tracheal catheter- blind 4- Oxygen 5- Manual artificial respiration 6- Mechanical artificial respiration 7- Mechanical stimulation 8- Laroplyn 9- Other
51-		AGENTS USED 1- Novocaine 2- Pontocaine 3- Nupercaine 4- Xylocaine __- Other	56-	33.	EPISIOTOMY (MULTIPLE) 0- L.M.L. 1- R.M.L. 2- Median 3- 1st degree 4- 2nd degree 5- 3rd degree 6- 4th degree	68-	40.	BIRTH ORDER 1- Single birth 2- Twin #1 3- Twin #2 4- Triplet #1 5- Triplet #2 6- Triplet #3 7- More than triplets
	25.	TIME ANESTHETIC STARTED						
	26.	TIME ANESTHETIC STOPPED						
	27.	TIME PATIENT RESPONDED						
	28.	TIME OF DELIVERY						
52-	29.	ANESTHESIA COMPLICATIONS (MULTIPLE) 0- Unknown or not reported 1- No complications 2- Vomiting 3- Hypotension 4- Laryngospasm	57-	34.	LACERATION WITHOUT EPISIOTOMY 0- 1st degree 1- 2nd degree 2- 3rd degree 3- 4th degree	69-	41.	POSTPARTUM BLEEDING 0- Unknown or not reported 1- Average 2- More than average
70-	42.	MISCELLANEOUS COMPLICATIONS OF PREGNANCY (MULTIPLE) 0- Unknown or not reported 1- No complications 2- Toxemia 3- Diabetes 4- Placenta previa- total 5- Placenta previa- partial 6- Placenta abruptio 7- Other bleeding 8- Surgery 9- Viral infections 10- Other	72-	44.	COMPLICATIONS OF LABOR (MULTIPLE) 0- Unknown or not reported 1- No complications 2- Rupture of uterus 3- Cephalopelvic disproportion 4- Abnormal contractions 5- Cervical dystocia 6- Intrapartum fever 7- Uterine inertia- primary 8- Previous Cesarean section	74-	46.	DEATH OF FETUS 1- Died before labor 2- Died during labor } Stillborn 3- Fetal death- time unknown 4- Not reported 5- Under 25 hours after delivery 6- 25-71 hours after delivery 7- 72 hours or more after delivery
71-	43.	HYPERTENSION 0- Unknown or not reported 1- None 2- Hypertensive heart disease 3- Other heart disease 4- Pre-eclampsia- mild 5- Pre-eclampsia- severe 6- Eclampsia	73-	45.	COMPLICATIONS OF LABOR (MULTIPLE) 1- Prolapse of cord 2- Cord around neck 3- Uterine inertia- secondary 4- Shock 5- Shoulder dystocia 6- Hydrocephalus 7- Other fetal dystocia 8- Father Rh different 9- Other	75-	47.	CONGENITAL MALFORMATIONS (MULTIPLE) 0- None reported 1- Monstrosity 2- Spina bifida meningocele 3- Congenital hydrocephalus 4- Other of nervous system or sense organs 5- Of circulatory system 6- Cleft palate and hare lip 7- Of digestive system 8- Of genito-urinary system 9- Of bone and joint 10- Other and unspecified
						76-	48.	CONDITION ON ADMISSION TO NURSERY 1- Routine care 2- Oxygen 3- Special treatment - premature 4- Special treatment - full term

At the present time, the Joint Commission on Accreditation of Hospitals does not approve of code sheets or check-off sheets to replace other records of labor and delivery. This code sheet was used to accumulate selected data on cases in such a fashion that the information could be readily analyzed by counter sorter and/or electric digital computer. (It was speculated that with the use of such code sheets the Joint Commission may in time be shown the value of such records.)

The code sheet was prepared in triplicate of NCR (no carbon required) paper. The first page (white) became a part of the patients' permanent hospital record. The second page (pink) was taken to the newborn nursery with the infant. Until the inception of this project, no record of the mothers' prenatal course, labor or delivery accompanied the baby to the nursery to be used by the pediatrician for further care of the infant. The third sheet (blue) was used by the punch card operator after it had been checked for clarity and accuracy by the project worker.

The data were punched directly on IBM punch cards from the blue code sheet. The tabulations were performed on an IBM 1620 electric computer.

The code sheet was divided into four sections:

1. The admission information obtained on the obstetrical labor floor by the obstetrical admitting house officer or medical student from the patient's prenatal history, if available, and directly from the patient, if no prenatal record, and from the initial physical examination.
2. The labor summary, checked by the house officer immediately following the delivery.
3. The actual delivery as to anesthetic, method of delivery and the

newborn's immediate condition; this was checked by the anesthetists throughout the proceedings or by a house officer immediately following delivery.

4. This area was for major or unusual complications concerning the mother during prenatal course, labor and/or delivery as well as complications concerning the baby.

The data on deliveries in the previous twenty-four hours were examined by the project worker each morning to check for omissions or discrepancies in the information. If certain items had been overlooked, the patient, her chart, nursing personnel and house staff were available to provide the missing information.

At the onset of this project it was decided to test the effect exerted on prematurity and perinatal mortality, both individually and collectively, by race, marital status, parity and residence in association with the time the patients began prenatal care. By an analysis of such data, there would be a demonstration of the public health needs of obstetrical patients in a community by the use of epidemiological methods. In addition, the data collected would be of such a nature that studies of greater depth and involving other obstetrical facts could be made and then correlated with the results of this present project, if desirable.

The data pertaining to maternity care used in this study were those in Columns 9-10, County or Residence; Column 11, Type of Hospital Care; Column 12, Race; Columns 13-14, Age of Mother; Column 21, Parity; Column 22-2, Previous Perinatal Mortality; Column 31, Time Prenatal Care Began; Column 59-62, Weight of Baby; Column 68, Birth Order; Column 74, Outcome of Fetus; Column 78, Marital Status of Mother.

This study has certain features of significance:

1. All except a very small number of patients would be service type patients; thus, as a consequence most of the patients would be in the same socio-economic class. Also, it is generally believed that this group is in more need of better services and care.
2. All service patients receive the same type of care during labor and delivery by the house staff. The following proposition we assume to be true: By using the same procedures and supervision, there would not be a great variation in actual labor, delivery and obstetrical care. The differences which might be observed would be those concerned with public health and preventive measures, rather than the actual obstetrical procedures used in the delivery room.
3. There are four clinics in Oklahoma County which provide prenatal care for these indigent patients. They are St. Anthony Hospital Clinic, Mercy Hospital Clinic, Variety Club Health Center Clinic, and University of Oklahoma Medical Center Clinic. Since the Medical Center admits a great majority of these indigent patients, this analysis would show if the needs of patients from these clinics were being met. The University Hospital admits some, but not all, of the patients from the one community type clinic, i.e., Variety Club Health Center, but none from the two other hospital centered clinics, i.e., St. Anthony and Mercy Hospitals.

From the revelations of needs as a result of this analysis, recommendations could be made to improve the public health aspects of obstetrical practices.

CHAPTER III

ANALYSIS OF DATA

From 12:01 A.M., July 1, 1959, through 12:00 P.M., June 30, 1961, there were 4,658 women delivered on the obstetrical ward at the University of Oklahoma Medical Center Hospital. These 4,568 women delivered 4,708 babies because 50 women had twins. Thirty-eight women were delivered by private physicians and are not included in this analysis. Consequently, the analysis is made on 4,620 women and 4,670 babies as no twins occurred on the private service.

The patients were from 57 of the 77 counties of the State of Oklahoma. The number from counties other than Oklahoma varied from 1 to 199 for the 24 month interval. In Oklahoma County 3,628 women delivered 3,678 babies. (All patients delivering twins were from Oklahoma County.) Thus, 992 women were from the other 56 counties; for the rest of the analysis they are grouped together as "other counties."

Table 1 shows the distribution of women for both Oklahoma County and "other counties" by race. Thus, in Oklahoma County there were 1437 whites, or 39.6 per cent, while from "other counties" there were 601 whites, or 60.6 per cent. In the total patient load there were 2,038 white births or 44.1 per cent.

The Negro race accounted for 2,365 births, or 51.2 per cent, of the total patients. Two thousand eight, or 55.3 per cent, of these births were

TABLE 1

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER
DISTRIBUTION BY RACE AND COUNTY OF RESIDENCE
JULY 1, 1959 - JUNE 30, 1961

	White	Negro	Indian	Other	Total
Oklahoma County	1437(39.6%)	2008(55.3%)	164(4.5%)	19(0.5%)	3,628
Other Counties	601(60.6%)	357(36.0%)	31(3.1%)	3(0.3%)	992
Total	2038(44.1%)	2365(51.2%)	195(4.2%)	22(0.5%)	4,620

from Oklahoma County. The other 357, or 36.0 per cent, were from "other counties."

There was a total of 195, or 4.2 per cent, Indian births. Of this, 164, or 4.5 per cent, were from Oklahoma County and 31, or 3.1 per cent, were from "other counties."

Grouped in the fourth classification of races designated as others are those of Mexican descent, a few Japanese and one or two Koreans. This group constituted 22, or 0.5 per cent, of the total. In Oklahoma County there were 19, or 0.5 per cent, and 3, or 0.3 per cent, were from "other counties."

Table 2 shows the marital status of the white and Negro race groups by counties.

Table 3 shows by number and percentages the exact marital status of the patients for races and counties, as listed on the admission history obtained directly from the patient. There was no statistical difference, using the chi square test, in the percentages of those from Oklahoma County and those from "other counties" for either race. However, there was a significant statistical difference when the classifications were compared by race. There was a higher percentage of single Negroes, a lower percentage of Negroes who were separated and divorced, and no significant percentage difference for widows.

The classification 0, prenatal care unknown or not reported, was included on the code sheet. There was a relatively high number of these patients because many from Oklahoma County came into the hospital in labor having received their prenatal care at the Variety Club Health Center. These charts were not immediately available upon their admission to the hospital. Some patients who had not previously received prenatal care were

TABLE 2

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION BY RACE, COUNTY OF RESIDENCE AND MARITAL STATUS
JULY 1, 1959 - JUNE 30, 1961

	Married	Unmarried	Total
White			
Oklahoma County	1244(86.6%)	193(13.4%)	1,437
Other Counties	499(83.0%)	102(17.0%)	601
Total	1743(85.5%)	295(14.5%)	2,038
Negro			
Oklahoma County	1241(61.8%)	767(38.2%)	2,008
Other Counties	185(51.8%)	172(48.2%)	357
Total	1426(60.3%)	939(39.7%)	2,365
Total All Races			
Oklahoma County	2638(72.7%)	990(27.3%)	3,628
Other Counties	713(71.9%)	279(28.1%)	992
Grand Total	3351(72.5%)	1269(27.5%)	4,620

TABLE 3

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION OF UNMARRIED BY RACE, COUNTY OF RESIDENCE AND MARITAL STATUS
JULY 1, 1959 - JUNE 30, 1961

	Single	Separated	Widow	Divorced	Total
White					
Oklahoma County	52(26.9%)	86(44.6%)	6(3.1%)	49(25.4%)	193
Other Counties	41(40.2%)	37(36.3%)	2(2.0%)	22(21.6%)	102
Total	93(31.5%)	123(41.7%)	8(2.7%)	71(24.1%)	295
Negro					
Oklahoma County	436(56.8%)	184(24.0%)	29(3.8%)	118(15.4%)	767
Other Counties	114(66.3%)	36(21.0%)	5(2.9%)	17(9.9%)	172
Total	550(58.6%)	220(23.4%)	34(3.6%)	135(15.4%)	939

hesitant to admit this fact because they were afraid that they might not be accepted for treatment without previous care. Women from "other counties" often did not or could not bring their prenatal care records so no record was immediately available for any care which may have been received. Erratic care is defined as one visit in the first six months, and at the most, only one other visit before admission in labor.

Table 4 shows the stage of pregnancy at which prenatal care began for all races and all counties by marital status. There was no statistical difference between patients first receiving care in the second trimester and those in the third trimester. However, there was a statistical difference between the married and unmarried groups as to the time when they first received prenatal care. For the unmarried group, a statistically significant difference appears between the percentage of patients receiving care in the second trimester (13.1 per cent) and those in the third trimester (34.1 per cent). A still greater number (40.6 per cent) waited until the third trimester to present themselves for care.

Table 4 also shows that for the white race the marital status of the patient did not significantly influence the time of gestation at which prenatal care was sought except that a slightly higher percentage of the married women sought care in the first trimester.

Table 5 shows the rate of premature births per 100 births in relation to the time of gestation that the patients began their prenatal care. For those patients who had received no prenatal care the prematurity rate was significantly higher (15.5), but for all other categories the difference in rate of prematurity was not significant. The prematurity rate for unmarried patients, with no prenatal care or erratic prenatal care, was higher than in the corresponding married patients.

TABLE 4

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION BY PRENATAL CARE RECEIVED, MARITAL STATUS AND RACE
JULY 1, 1959 - JUNE 30, 1961

	All			White			Negro		
	M	Un M	Total	M	Un M	Total	M	Un M	Total
No Prenatal Care	6.0%	9.7%	7.0%	4.9%	7.7%	5.3%	6.0%	8.7%	7.1%
First Trimester	17.7	13.1	16.4	20.3	12.5	19.2	13.6	13.3	14.7
Second Trimester	37.1	34.1	36.3	36.7	38.0	36.0	38.6	35.2	37.3
Third Trimester	37.4	40.6	38.3	36.0	39.7	36.6	38.5	40.5	39.3
Erratic Care	1.8	2.4	2.0	2.0	2.1	2.0	1.2	2.3	1.6
Total Number	3185	1196	4381	1657	287	1944	1356	885	2241

TABLE 5

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, PREMATURE RATE PER 100 BIRTHS BY PRENATAL CARE RECEIVED, MARITAL STATUS AND RACE
JULY 1, 1959 - JUNE 30, 1961

	All			White			Negro		
	M	Un M	Total	M	Un M	Total	M	Un M	Total
Prenatal Care Unknown	19.9	14.9	18.4	22.1	No Cases	22.1	11.9	18.5	18.5
No Prenatal Care	24.2	30.2	25.5	17.3	18.2	17.5	35.4	40.2	37.7
First Trimester	11.0	10.2	11.0	8.3	2.8	7.8	16.1	12.7	14.9
Second Trimester	10.5	12.7	11.0	8.9	2.8	8.0	12.2	15.1	13.2
Third Trimester	8.5	10.1	8.9	7.9	13.2	8.7	9.8	10.3	10.0
Erratic Care	8.6	17.2	11.4	5.9	33.3	10.0	11.8	10.0	10.8
Total	14.2	16.2	14.9	9.4	8.5	9.3	13.5	15.1	14.2

As shown by Table 5, the prematurity rate for the white race was significantly higher only for those patients who had received no prenatal care. There was no difference of prematurity rate within those categories of patients who did receive prenatal care, irrespective of which trimester it was started. In addition, there was no significant difference between the married and unmarried except a higher percentage of married women started prenatal care in the first trimester of pregnancy.

Table 6 shows the perinatal mortality rate per 1,000 births for these same categories of prenatal care. The overall perinatal mortality rate was 38.1 and it varied by category of prenatal care from 81.7 without prenatal care to 24.4 with those starting care in the third trimester. There was a significant difference in perinatal mortality rates by prenatal care from the first to the third trimester. The highest rate occurring in the first trimester. The overall white perinatal mortality rate was 32.4 and there was no difference, statistically, in this rate by prenatal care, except that those in the third trimester had the lowest rate.

The prenatal care by marital status for Negroes from all counties is also shown by Table 4. There was a significant difference between the married and unmarried in that more unmarried Negroes received no prenatal care and more began their prenatal care in the third trimester.

The prematurity rates for Negroes in all counties (Table 5) reveals a high of 37.7 per cent in the no prenatal care group and a statistically significant difference between married (35.4 per cent) and unmarried (40.2 per cent). There was a similar significant difference between married and unmarried by all categories of prenatal care by trimester, but no statistical difference within the trimester categories within the marital status groups themselves for the overall total.

TABLE 6

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER
PERINATAL MORTALITY RATE PER 1,000 BIRTHS BY
PRENATAL CARE RECEIVED AND RACE
JULY 1, 1959 - JUNE 30, 1961

	All	White	Negro
Prenatal Care Unknown	60.1	85.1	564.5
No Prenatal Care	81.7	48.5	132.1
First Trimester	44.4	42.9	45.6
Second Trimester	37.1	39.0	33.5
Third Trimester	24.4	12.7	33.0
Erratic Care	57.5	No Cases	54.0
Total	38.1	32.4	43.1

Table 6 shows the perinatal mortality rate for Negroes from all counties. The perinatal mortality rate for no prenatal care was 132.1 which was significantly higher than for those with prenatal care. However, no statistically significant differences appeared between rates for patients who had received at least some care regardless of when it began. The overall Negro rate of 43.1 per 1,000 was significantly different than the white rate of 32.4 per 1,000.

Table 7 is an analysis of prenatal care by marital status of all races for Oklahoma County. The married group had a higher percentage of patients who received their first prenatal care in the first and second trimester and a lower percentage receiving no care at all or care in the third trimester.

For the white race from Oklahoma County, there appears for the first time a significant statistical difference between second and third trimester care, with more obtaining care in the second trimester. Fewer white married patients received no prenatal care than unmarried patients; this held true also in the first trimester but not in the other trimesters. Thus, white married patients sought prenatal care earlier than did the unmarried.

For the Negroes from Oklahoma County who were delivered at the University Medical Center, a statistical difference occurs between patients receiving care in the first (16.3 per cent) and second (39.1 per cent) trimester, but little difference occurs in the other trimesters. A higher percentage of unmarried Negroes received no prenatal care and a lower percentage sought care in the first trimester; otherwise, no statistical difference occurred between categories by marital status.

In comparing white Oklahoma County patients with Negro Oklahoma

TABLE 7

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION OF PRENATAL CARE RECEIVED BY MARITAL STATUS AND RACE - OKLAHOMA COUNTY
JULY 1, 1959 - JUNE 30, 1961

	All			White			Negro		
	M	Un M	Total	M	Un M	Total	M	Un M	Total
No Prenatal Care	6.0%	10.6%	7.2%	4.8%	8.6%	5.3%	5.9%	9.1%	7.2%
First Trimester	18.7	14.5	17.6	22.2	13.9	21.1	16.3	14.7	15.7
Second Trimester	38.6	35.4	37.7	39.0	39.6	39.0	39.1	37.2	38.4
Third Trimester	35.1	37.3	35.7	32.1	36.4	32.7	37.4	37.1	37.3
Erratic Care	1.7	2.1	1.8	1.9	1.6	1.8	1.3	1.9	1.0
Total	2503	938	3441	1183	187	1370	1177	723	1900

County patients, the white group as a whole had fewer without prenatal care and more receiving care in the first trimester, but no statistical difference in the other categories. Fewer married white patients received no care at all and more sought earlier care as a whole than the Negro married patients; no statistical difference occurred in the unmarried groups.

Table 8 shows the premature rate per 100 births in relationship to marital status, race, and time of gestation that patients began prenatal care for Oklahoma County alone. For all races there was no statistical difference in premature rates between the married and the unmarried groups. The prematurity rate for those patients with no prenatal care was higher than those with any care whatsoever; no difference appeared if any care had been received.

In analyzing the prematurity rate for the white race only, the "no prenatal care" group was the only group to show a statistical difference; the prematurity rate for this group was considerably higher. There was no significant difference within the categories of prenatal care or between the married and unmarried classifications.

For the Negroes of Oklahoma County, higher prematurity rates appeared in the "no prenatal care" groups than in all of the other categories; no statistical difference occurred between the married and the unmarried groups.

The prematurity rate for Negroes in Oklahoma County was significantly higher than for the whites, both in the married and unmarried categories. For Negroes it was 14.9 per 100 births overall while for whites it was 9.4 per 100 births. In the unmarried category the overall rate for Negroes (16.2 per 100 births) was nearly twice the overall white rate (8.3 per 100 births).

TABLE 8

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, PREMATURE RATE PER 100 BIRTHS
BY PRENATAL CARE RECEIVED, MARITAL STATUS AND RACE - OKLAHOMA COUNTY
JULY 1, 1959 - JUNE 30, 1961

	All			White			Negro		
	M	Un M	Total	M	Un M	Total	M	Un M	Total
Prenatal Care Unknown	21.5	13.5	19.3	26.2	No Cases	23.9	18.8	15.9	14.8
No Prenatal Care	26.2	29.3	27.4	19.3	12.5	17.8	35.7	42.4	39.0
First Trimester	9.8	11.9	10.4	6.8	3.9	6.6	14.6	14.2	14.4
Second Trimester	11.4	13.0	11.8	9.3	2.7	8.4	13.3	14.5	13.7
Third Trimester	9.3	12.1	10.1	8.2	13.2	8.9	10.9	12.7	11.6
Erratic Care	7.0	15.0	9.5	No Cases	6.6	8.0	13.3	7.1	10.3
Total	11.7	14.1	12.4	9.6	8.3	9.4	14.2	16.2	14.9

Table 9 shows the perinatal mortality rate per 1,000 births by prenatal care received and by race for Oklahoma County. For all races the rates varied from a high of 88.7 per 1,000 for "no prenatal care" to a low of 26.9 per 1,000 for those who began their care in the third trimester. There were no significant statistical differences shown between the categories of those who received any prenatal care.

As shown in Table 7, only 5.3 per cent of the white patients received no prenatal care; this is not a valid statistical percentage so the perinatal mortality rate based on this figure is not valid. There was a difference in rate between those in the other two trimesters but with only four deaths out of 448 births this is not significant. Perinatal mortality rates for Negroes in Oklahoma County varied from 147.0 per 1,000 births for those with no prenatal care to 34.3 per 1,000 for those first receiving care in the second trimester.

In comparing the perinatal mortality rates for the white and Negro races in Oklahoma County, a significant difference was seen in the overall rates; the overall rate for whites was 30.6 per 1,000 births and for Negroes 46.3 per 1,000 births. The whites with "no prenatal care" and those receiving care first in the third trimester had a significantly lower perinatal mortality rate than did the Negroes in these categories.

Parity is defined as "having borne previous children." Table 10 shows by percentage distribution the parity by marital status for all races and all counties. In the overall group there were 21.3 per cent who had not borne previous children; they were classified as primiparas. Of the 4,620 women studied, 986 were primiparas and 86 women were having their tenth (or more) child. The highest percentage was in those women having their second child.

TABLE 9

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, PERINATAL MORTALITY RATE PER 1000 BIRTHS BY PRENATAL CARE RECEIVED AND RACE - OKLAHOMA COUNTY
JULY 1, 1959 - JUNE 30, 1961

	All	White	Negro
Prenatal Care Unknown	64.2	89.6	54.7
No Prenatal Care	88.7	27.4	147.0
First Trimester	41.4	34.6	47.0
Second Trimester	38.6	39.2	34.3
Third Trimester	26.9	8.9	35.3
Erratic Care	79.4	40.0	69.0
Total	40.5	30.6	46.3

TABLE 10

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION
BY PARITY AND MARITAL STATUS, BY COUNTIES
JULY 1, 1959 - JUNE 30, 1961

	Parity										
	0	1	2	3	4	5	6	7	8	9+	Total
All Counties											
Married	17.8%	20.8%	17.7%	14.5%	10.5%	6.9%	4.2%	3.3%	2.0%	2.2%	3351
Unmarried	30.8	18.2	14.4	12.4	8.4	6.6	4.1	2.4	1.5	1.2	1269
Total	21.3	20.1	16.8	13.9	9.0	6.8	4.2	3.1	1.9	1.9	4620
Oklahoma County											
Married	18.7	21.7	18.0	14.5	10.1	6.0	4.2	3.1	1.8	1.7	2638
Unmarried	28.9	16.8	15.8	13.4	8.9	7.0	3.6	2.7	1.8	1.1	990
Total	21.5	20.4	17.4	14.2	9.8	6.2	4.0	3.0	1.8	1.6	3628
Other Counties											
Married	14.2	17.2	16.8	14.6	11.8	10.4	4.2	3.9	3.1	3.8	713
Unmarried	37.6	23.3	9.7	8.6	6.4	5.4	5.7	1.4	0.3	1.4	279
Total	20.8	19.0	14.8	12.9	10.3	9.0	4.6	3.2	2.3	3.1	992

There was a statistically significant difference in percentage of primiparas in the married and unmarried groups. The former had 595 primiparas out of 3,351 births and the latter had 391 out of 1,269 births. There was a statistically significant higher percentage of unmarried women for para 0, 1, and 2. For parities 3, 4, 5, and 6 they were the same, but above this the higher percentages were in the married group.

The same percentage distribution of parity was seen in Oklahoma County and other counties as well as in the married and unmarried categories as was seen for all counties.

Table 11 is the same breakdown for white births as Table 10 was for all births. There was no statistical difference in the percentages of parity for total deliveries between Oklahoma County and the other counties. A significant statistical difference was seen in the percentage of parity in the married and unmarried groups between the two groups of counties.

Table 12 shows the parity percentages for Negroes by marital status and by county groups. For all counties there is a significant statistical difference in primiparas in the married and unmarried groups; 29.8 per cent of unmarried were primiparas, while only 16.4 per cent of married were in this class.

In comparing Tables 11 and 12, the unmarried whites had a higher percentage of primiparas than did the unmarried Negroes. This held true until para 4 was reached. From there on the Negro unmarried percentages were higher than the white unmarried. There was no difference in unmarried primiparas for either race from "other counties" but both were higher than from Oklahoma County.

In assessing when prenatal care began by parity there were too few cases from para 4 on to be statistically valid. Consequently, all cases

TABLE 11

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION BY PARITY AND MARITAL STATUS, BY COUNTIES - WHITE RACE
JULY 1, 1959 - JUNE 30, 1961

	Parity										
	0	1	2	3	4	5	6	7	8	9+	Total
All Counties											
Married	19.2	21.8	18.1	14.8	10.2	7.2	3.3	2.5	2.0	0.9	1743
Unmarried	34.0	21.1	16.7	14.6	5.1	3.4	3.1	0.7	1.4	0.0	294
Total	21.3	21.7	17.9	14.8	9.5	6.6	3.2	2.2	1.9	0.8	2037
Oklahoma County											
Married	21.5	22.3	18.2	15.1	9.7	6.2	2.9	2.2	1.5	0.4	1244
Unmarried	30.2	21.3	19.8	15.6	5.2	4.2	1.0	0.5	2.1	0.0	192
Total	22.6	22.2	18.4	15.2	9.1	5.9	2.6	1.9	1.6	0.3	1436
Other Counties											
Married	13.4	20.6	17.8	14.2	11.4	9.6	4.2	3.4	3.0	2.2	499
Unmarried	41.2	20.6	10.8	12.7	4.9	2.0	6.9	1.0	0.0	0.0	102
Total	18.1	20.6	16.6	14.0	10.3	8.3	4.6	3.0	2.5	1.8	601

TABLE 12

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION BY PARITY AND MARITAL STATUS, BY COUNTIES - NEGRO RACE
JULY 1, 1959 - JUNE 30, 1961

	Parity										
	0	1	2	3	4	5	6	7	8	9+	Total
All Counties											
Married	16.4	19.6	17.0	14.1	10.5	6.5	5.2	4.5	2.4	3.0	1426
Unmarried	29.8	16.7	13.7	11.8	9.5	6.6	4.5	3.0	1.7	1.6	939
Total	21.7	18.5	15.7	13.2	10.1	6.6	4.9	3.9	2.1	2.4	2365
Oklahoma County											
Married	16.4	21.0	17.6	13.9	10.4	5.9	5.3	4.3	2.2	3.1	1241
Unmarried	28.4	15.0	14.7	13.2	9.9	7.7	4.4	3.2	2.0	1.4	767
Total	21.0	18.7	16.5	13.5	10.2	6.6	5.0	3.9	2.1	2.5	2008
Other Counties											
Married	16.2	10.8	13.5	15.1	11.4	10.8	4.3	5.9	3.8	8.1	185
Unmarried	36.0	24.4	9.3	5.8	7.6	7.6	4.6	1.7	0.6	2.3	172
Total	25.8	17.4	11.5	10.6	9.5	9.2	4.5	3.9	2.2	5.3	357

are grouped together as one class and called "para 5 plus." The group "prenatal care unknown" was subtracted from the total figure and percentages were based on this new figure. The percentage by time prenatal care was started for each parity group for all races is shown in Table 13. Parity did not seem to statistically affect the time that prenatal care began.

For the white race, Table 13 shows that a low of 2.9 per cent of primiparas did not have prenatal care; the highest percentage occurred in the second trimester. The "para 5 plus" group had the highest percentage of no prenatal care (8.8 per cent) with 44.6 per cent of this group receiving no care until the third trimester. Otherwise, there was no significant statistical difference between parities as to time prenatal care began.

The greatest percentage of Negro primiparas sought prenatal care in the second trimester (Table 13). With later pregnancies the highest percentage did not seek care until the third trimester except for para 4 group.

In comparing the whites and Negroes as to the time prenatal care began in relation to parity, there was a significantly lower percentage of white primiparas with no prenatal care; more of all white parities reported earlier in their pregnancies for prenatal care, except for the para 4's and the "para 5 plus" groups.

The premature rate per 100 births for all deliveries (Table 14) shows that there was a statistically significant lower premature rate in the para 2 group, the primiparas and the para 1 group had somewhat higher rates than the others, but not significantly so. There was no significant difference in premature rate for married or unmarried by parity for this

TABLE 13

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, DISTRIBUTION OF PRENATAL CARE RECEIVED, BY PARITY AND RACE
JULY 1, 1959 - JUNE 30, 1961

All

Parity	0	1	2	3	4	5 +
No Prenatal Care	5.1%	7.6%	4.6%	8.4%	7.9%	8.3%
First Trimester	20.3	15.4	18.3	13.9	14.4	14.4
Second Trimester	41.6	37.7	36.0	36.8	33.7	31.5
Third Trimester	31.5	39.7	40.6	38.8	40.2	41.8
Erratic Care	1.9	1.3	1.9	1.8	3.7	2.1

White

Parity	0	1	2	3	4	5 +
No Prenatal Care	2.9%	6.2%	6.3%	6.0%	5.4%	8.8%
First Trimester	23.1	19.0	21.6	15.6	18.8	11.9
Second Trimester	41.0	39.2	36.5	39.0	29.0	31.9
Third Trimester	31.3	34.7	36.8	36.9	40.9	44.6
Erratic Care	1.4	9.5	1.7	2.4	5.9	2.5

Negro

Parity	0	1	2	3	4	5 +
No Prenatal Care	5.3%	8.8%	4.6%	9.4%	7.3%	7.6%
First Trimester	18.1	11.6	14.8	13.5	11.4	15.7
Second Trimester	42.9	36.1	37.3	35.1	39.7	32.0
Third Trimester	31.3	43.0	41.3	40.2	40.6	42.8
Erratic Care	2.4	4.8	2.0	1.7	0.9	1.9

TABLE 14

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, PREMATURE RATE PER 100 BIRTHS, BY PARITY, MARITAL STATUS, AND RACE JULY 1, 1959 - JUNE 30, 1961

All						
Parity	0	1	2	3	4	5+
Married	13.4	13.1	8.6	12.9	12.2	8.5
Unmarried	12.8	16.9	10.4	10.8	15.1	12.9
Total	13.2	14.0	9.0	12.4	12.7	9.6

White						
Parity	0	1	2	3	4	5+
Married	9.6	9.8	5.7	12.7	11.8	7.6
Unmarried	8.0	6.4	6.5	11.6	20.0	7.7
Total	9.2	9.2	5.8	12.6	12.4	7.6

Negro						
Parity	0	1	2	3	4	5+
Married	17.9	15.0	12.8	13.9	12.0	10.4
Unmarried	15.4	21.0	13.2	9.9	14.6	15.3
Total	16.5	17.2	12.9	12.5	13.0	12.1

small group of patients.

Table 14 also shows the premature rate by parity and marital status for whites and Negroes. The white primipara had a 9.2 per cent rate and the Negro primipara a 16.5 per cent which is statistically significant. There is no difference between the white unmarried rate of 8.0 per cent and the married rate of 9.6 per cent; nor is there a statistical difference between the Negro unmarried rate of 15.4 per cent and the married rate of 17.6 per cent. The overall premature rates for whites were lower for primiparas, para 1's, para 2's, and para 3's in comparison to the Negroes in the same parity class. However, the rates were no different for para 4's and above. Again, there was no significant difference with either the white groups or Negro groups as to married and unmarried as pertaining to parity.

The perinatal mortality rates by parity for all races in all counties is shown in Table 15. There was no statistically significant difference in perinatal mortality rates between parity groups. The number of perinatal deaths was too small to be statistically valid when broken down into white and Negro groups by parity classes.

TABLE 15

BIRTHS-UNIVERSITY OF OKLAHOMA MEDICAL CENTER, PERINATAL MORTALITY RATE PER 1000 BIRTHS BY PARITY
JULY 1, 1959 - JUNE 30, 1961

	Parity					
	0	1	2	3	4	5+
Perinatal Rate	38.5	34.5	39.9	41.9	28.4	46.0

CHAPTER IV

SUMMARY

The ratio of married to unmarried was the same for the group of patients from Oklahoma County and the group from "other counties." There was a significant difference for marital status in that 85.5 per cent of the whites were married while only 60.3 per cent of the Negroes were married.

The white married group from Oklahoma County started prenatal care earlier in their pregnancy than did the unmarried. The same held true for the Negroes of Oklahoma County. In addition, there was a greater percentage of both unmarried whites and Negroes without prenatal care.

A smaller percentage of white patients had no prenatal care, a higher percentage began their prenatal care in the first trimester and consequently a lower percentage of this group began prenatal care in the third trimester of gestation than did the Negro patients. There was no significant difference between unmarried whites and unmarried Negroes as to the time prenatal care began.

The white patients from Oklahoma County had a smaller percentage without prenatal care with a larger percentage beginning their prenatal care in the first trimester than did the Negroes from the same county. This same conclusion held for married whites and married Negroes, but there was no difference between the unmarried whites and unmarried Negroes.

The percentage of unmarried Negroes by parity remained at the same level throughout from para 0 to 9 plus; the percentage of white unmarried had a significant decrease after para 3 was reached.

There was no statistically significant difference by parity as to when the patients began their prenatal care. The white primiparas had the lowest percentage in the "no prenatal care" group. This was significantly less than it was for the Negro primiparas. All parities of white patients began their prenatal care significantly earlier than did the same parity of Negro patients until the para 3 was passed. Para 4 and the higher parities had the same prenatal time for both the whites and Negroes.

The premature rate was highest for those patients who did not have prenatal care. There was no difference in the premature rate between the married and unmarried groups. The premature rate was not statistically different whether the patients had prenatal care beginning in the first, second or third trimester of pregnancy.

Among the white patients there was no difference between married and unmarried as to premature rates.

The Negro patients from Oklahoma County had a higher premature incidence than did the whites from Oklahoma County. The unmarried Negro patients had twice the premature incidence of the unmarried whites from Oklahoma County. The increased incidence held true irrespective of the time of gestation that the patients started their prenatal care.

Para 2's had the lowest premature rate of all the parities while primiparas and para 1's had the highest premature rates. The number of cases was too small to ascertain a statistically significant difference in premature rates between married and unmarried by parity.

The overall perinatal mortality rate was the highest in the "no prenatal care" group followed by those who started their prenatal in the first trimester and next by those in the second trimester group. The lowest perinatal rate was in the third trimester group of patients.

The perinatal mortality rate was higher for the Negro patients than it was for the white patients irrespective of the time prenatal care was begun.

The white patients had a significantly lower perinatal mortality rate than did the Negro patients due to the smaller percentage of patients who did not receive any prenatal care and the smaller percentage who had not started their prenatal care until the third trimester of pregnancy.

There was no difference in the perinatal mortality rates for white married and unmarried.

There was no significant difference demonstrated in the perinatal mortality rates by parity. With the total number of births being fairly large, the resulting perinatal mortality was too small to even reveal a trend.

CHAPTER V

DISCUSSION

This project has been a test for utilizing an epidemiological approach to preventive medicine factors which are important to obstetrical care, with the ultimate goal of reducing prematurity and perinatal mortality along with the concomitant reduction in the number of damaged, but living, children, i.e., mental retardation.

An effort has been made to assess the relative importance of the time prenatal care began in relation to race, marital status and parity. These factors are not new, but in view of the fact that all patients were from essentially the same socio-economic class and hypothetically received the same type and quality of care throughout labor and delivery, it was revealing that the time prenatal care began gave the results it did.

There was a higher incidence of prematurity and perinatal mortality if the patient did not receive prenatal care. However, there was no statistically significant difference in the prematurity rate between those patients who had prenatal care beginning in any of the three trimesters. Thus, even a small amount of prenatal care reduces these incidences, but it makes no difference when this care begins. These results could signify that the prenatal care which is received is "adequate" rather than "good" care.

Another explanation could be that patients who have trouble report

early; others who did not experience complications report later in order to make fewer visits and yet be eligible for admission to the labor suite. Further investigation is needed to clarify as much as possible the relationship between kind and amount of care in relation to prematurity and perinatal mortality.

Parity per se is apparently not a causal factor in incidence of prematurity and perinatal mortality. Further analysis should include interaction effects of age and parity.

The Negro race did have a higher incidence of prematurity, but this could be explained by generally lower birth weights of their offspring. However, with the higher perinatal mortality rate, this explanation on weight alone is not necessarily valid. This, too, needs further study.

The marital status of all races had an effect on both premature and perinatal mortality rates but could be due partially to the fact that there were more unmarried women who had no prenatal care. The unmarried Negro had twice the premature rate as the unmarried white irrespective as to when in pregnancy prenatal care began.

There were fewer white primiparas than Negro without prenatal care and the whites reported earlier for any care received. Racial differences in incidence of prematurity and perinatal mortality are evident. However, race per se apparently is not a causative factor. These studies do show groups of patients in which an educational program from a preventive medicine viewpoint could help to reduce prematurity and perinatal mortality.

As a result of good prenatal care early in the first pregnancy, producing good final results for both the mother and the newborn babies, there could be more of a tendency to repeat the pattern with subsequent pregnancies. On the other hand, if the patients think prenatal care, at whatever

stage of pregnancy, is a waste of time, energy, and/or money in one pregnancy, they would be hesitant to make an effort to report earlier during the following pregnancies.

Compilation of these rates, both premature and perinatal mortality, for even these 4,600 cases, gives an indication of care received but the various factors could not be placed into too many sub-groupings without obtaining too few cases for statistical validity. However, it was revealed that generally perinatal mortality followed somewhat the same pattern as did prematurity. In an epidemiological approach in a small community of obstetrical patients, the premature rate alone can be utilized as an indicator of possible need rather than having to obtain a larger number of cases in order to calculate the perinatal mortality.

Further studies of this type should include "place of residence" in relation to distance from and accessibility to the prenatal clinics. This is one factor that could well be the main deterrent to the patients obtaining adequate prenatal care. With this added information, such an analysis could reveal where supplemental clinics are needed.

Prevention of obstetrical complications which result in lower prematurity and perinatal mortality rates is obviously a more efficient way to attack the overall obstetrical problem than improvement of delivery techniques. An evaluation to strengthen such a program is the earnest desire of those interested in maternal and child health.

One of the primary responsibilities of a public health department is in the maternal and child health area, irrespective of whether it is a local or state department. There is no better way to carry out this responsibility than to conduct surveys as to exactly what is happening. This can be performed in conjunction with another primary responsibility

of a health department--the registration of births and deaths. All of the information used in this project (including prematurity by weight) is available from the birth and death certificates required to be filed in Oklahoma. With the use of high speed and massive data equipment, a running epidemiological survey can be made at regular intervals. An evaluation of any change of causative factors reaches true significance when transmitted into action to overcome the discrepancies.

Such an epidemiological approach with available data can determine whether needed services are available, whether they are adequate, and what, if any, are the barriers to their use. The health departments can detect the deficiencies of prenatal care in their communities and obtain an indication as to why certain mothers do not obtain adequate care. These facts can then be translated into plans for appropriate improvement of local prenatal care.

Pregnancy in the adolescent girl has apparently occurred with increasing frequency during recent years. With the fact of higher premature rates as well as perinatal mortality rates associated with unmarried women, especially those without prenatal care and those of the Negro group as a whole, an intensive program of education can be adapted to their needs and is required for this special group; such an educational program would start early in their maturing years and stress the importance of prenatal care. This, also, is a function to be carried out under public health department auspices.

CHAPTER VI

CONCLUSIONS

Such an epidemiological study as this project can ascertain even for a relatively small number of patients, the changing needs of mothers. Such studies are a necessity for local interpretation of service required to insure comprehensive maternity and newborn care for all mothers and infants.

The indications from such data are necessary to keep pace with needed services, especially with a large proportion of mothers in need of public health services. In addition, it can be used for all patients as a means of planning for future obstetrical care by physicians, hospitals and public health nurses.

One main program to be instituted from similar surveys is the educational approach under stimulation of public health departments. The groups who are most in need of this special attention can thus be identified.

The major problems of maternal and child health services of health departments can be approached in the same way and with the same methods that are used in the epidemiological approach to other mass health problems.

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