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**High Risk Pregnancy and Infant Outcome in the Kassena-Nankana
District - An Analysis of the Panel Survey of the
Navrongo Health Research Centre**

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This dissertation is submitted in partial fulfillment of the requirements for the degree
of Masters in Public Health at the University of Ghana, Legon.

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DECLARATION

I declare that this dissertation was produced by me from secondary data collected by the Navrongo Health Research Centre under the supervision of my academic advisors Professor John S. Nabila and Professor R. Biritwum.



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Abbreviations

UNICEF	United Nations Children’s Emergency Fund
WHO	World Health Organisation
DHS	Demographic and Health Survey
NHRC	Navrongo Health Research Centre
CHFP	Community Health and Family Planning Project
DHMT	District Health Management Team
TBA	Traditional Birth Attendant
ICOUR	Irrigation Corporation of the Upper Region
CSM	Cerebrospinal Meningitis
MIS	Management Information System
YZ	Yezura Zenna
YN	Yezura Nakwa
VAST	Vitamin A Supplementation Trials
NGO	Non Governmental Organisation
MOH	Ministry of Health

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Summary

High Risk Pregnancy is defined as a pregnancy that may have a predisposition to an unfavourable outcome, either for the mother or the child, as a result of certain factors that may increase the potential of poor outcome. Many of these risk factors have been widely studied, are well documented and as such have gained wide acceptance. The detection of risk in pregnancy is included in many national policies and maternal and child health services, particularly antenatal care.

The Kassena-Nankana District of the Upper East Region, from where this data was collected, is one such area that is largely traditional and pronatalist, with high fertility and high mortality rates, much the same as most rural areas throughout the country. As such, it would thus seem that a large majority of women would be at increased risk for an unfavourable outcome.

It was thus the intention of this analysis, to identify pregnant women who fall into this high risk category within the district and to examine whether their risk status has an effect on their infant outcome.

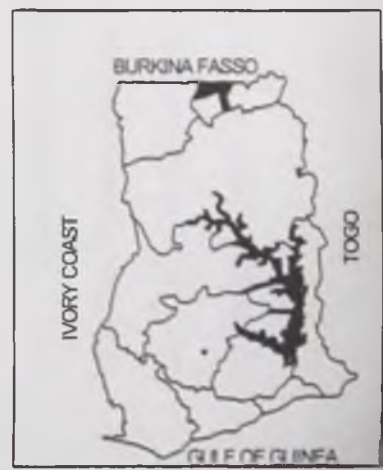
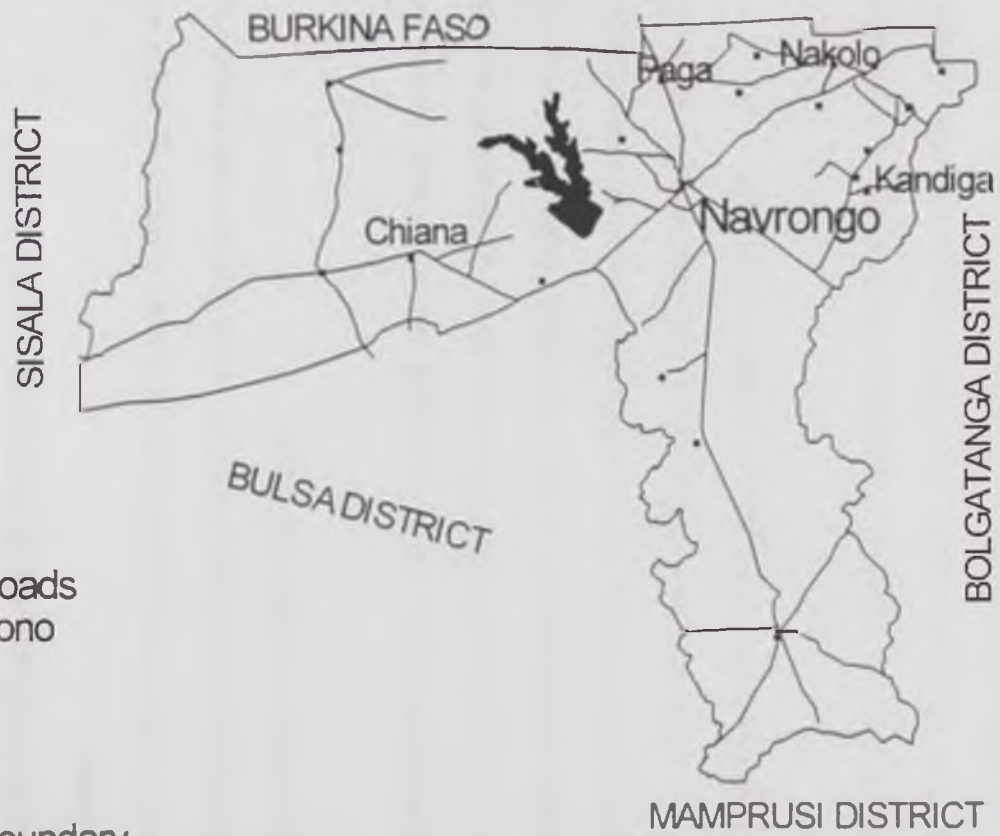
For the purpose of the study, four risk factors and combinations of them were investigated. The factors which placed a woman at risk were **age** (below 18 years of age or more than 34 years of age), **parity** (no previous births or has given birth 3 times or more), **short birth interval** (current pregnancy has occurred within 2 years of a previous birth) and **past poor obstetric history** (a history of previous neonatal or infant deaths).

Other socio-demographic factors such as educational status, use of antenatal care, place and assistance at delivery were also examined as to their importance to infant survival.

The prevalence of high risk pregnancy was found to be high, with over 80 percent of the women having at least one risk factor. It was surprising to find very few perinatal and neonatal deaths. Infant deaths were more, but this required cautious interpretation since not all the infants would have reached the age of one year. Because of the small number of deaths, only two risk factors or combination of risk factors were found to be statistically significant. These were short birth interval as a single risk factor and short birth interval in combination with past obstetric history. A factor that showed a surprising association was use of antenatal care. Women who received antenatal care from qualified health personnel such as a doctor or a nurse, had a higher risk of poor outcome.

Evidently, that improvements in the environmental conditions as well as better utilisation of maternity services, especially family planning, could have a substantial effect in improving the infant survival in a rural area such as Kassena-Nankana.

KASSENA NANKANA DISTRICT HEALTH CENTRE



 Roads
 Tono
Towns

 Boundary

10 0 10 Kilometers


CHAPTER ONE

THE PROBLEM AND RESEARCH METHODOLOGY

1.1 Introduction

The survival of children is a major concern of the Ghanaian Ministry of Health and other multinational organisations such as UNICEF, which have promoted a number of cost-effective strategies to counteract its upsurge.

Although environmental factors play a substantial role in the poor survival of children, it has been found that certain reproductive factors of the mother have the potential of negatively affecting the survival of her infant, simply by virtue of the interdependent existence of the two. Numerous studies have been conducted to qualify and quantify the risk factors that a woman may possess that adversely affect the outcome of her pregnancy and subsequent years of growth of her child.

As such, the term “high risk pregnancy” has received a lot of attention in recent times and a myriad of risk factors have been identified that could negatively affect outcome of pregnancy and child survival. However, not all risk factors necessarily apply to all areas and different communities must identify risk factors that apply to their own situations.

1.1.1 Infant Mortality in Context

It has been estimated that between the year 1985 and 2000, 2 billion children will be born - and more than 87 percent will be born in the developing world. [1] Tragically, a substantial number of these children will not live to see their fifth birthday. Each

year, 7 million infants die within a week of birth and more than 20 million low birthweight babies are born [2], many of whom do not survive. These infants also have two to three times the risk of congenital abnormalities, a greater risk of school failure and are generally robbed of reaching their full potential [3].

As the developing world stands on the precipice of the epidemiological transition, when it will move from a high fertility, high mortality, infectious disease environment to that of a low mortality, low fertility, non-communicable disease environment, it continues the struggle to control the issues of the pretransition and fend off the ever increasing post transition challenges.

In line with this development, infant mortality rates, defined as the risk that a child will die before it's first birthday, have seen a significant decrease over the last two decades throughout the developing world. This decrease has been largely attributed to the general improvement in the quality of life and socio-economic development throughout these areas. Some of these socio-economic improvements include better access to education, health care and general modernisation. The infant mortality rate is thus a very sensitive and apt measure for the general development of a country as it depends on and measures social affluence, access and utilisation of health care. It is therefore often used as an indicator of a country's development [4].

Perinatal mortality rate, defined as the sum of stillbirths and first-week deaths, which is included in the infant mortality rate, is indicative of the quality of antenatal or

obstetric care as well as the health of women of reproductive age. It is also therefore a useful though indirect measure of the quality of the health care delivery system.

As such, the rate of decrease of the infant mortality rate, comprising the perinatal, neonatal and post neonatal mortality rates, is crucial in understanding the socio-economic development of a country. Ghana itself has enjoyed only a 27 percent reduction in its infant mortality rate, from 111 deaths per 1000 in 1972 to 81 deaths per 1000 in 1990, while neighbouring countries such as Nigeria and Senegal have achieved 40 and 42 percent reductions respectively [5]. Although Ghana's current rates are generally at par with those of her neighbours, the fact that our rates have not dropped as drastically indicates the need for a faster pace of socio-economic development.

1.1.2 The Linkage Between High Mortality and High Fertility

The reasons for the persistence of high mortality rates have been explained through several mechanisms. One of the primary causes is the linkage between high mortality and high fertility, which has been established to be interdependent and interactive. The most apparent evidence of this can be aptly called the "post replacement" or "insurance" phenomenon. Couples who live in areas of high infant mortality and low child survival, tend to overcompensate by having large numbers of children "just in case" because of their uncertain survival. This therefore becomes a vicious cycle in which having more children will decrease their chances of survival through mechanisms such as competition for resources, shorter birth intervals, high parity and maternal depletion.

Because of this interaction, it seems obvious that improvement in child survival will ultimately lead to a decrease in fertility as couples will seek to have their desired number of children without the fear of loss. Likewise, a decrease in fertility can ultimately improve the chances of child survival because with fewer children, couples will be able to effectively look after and provide for their children. Also, when a child survives, it has been found that there is a longer birth interval between it and the next pregnancy than when a child does not survive [1].

Child survival has also been linked with another important indicator of socio-economic development - female education. As one of the core strategies of improving child survival, female education is said to be the single most important influence on child survival. Data from 13 African countries between 1975 and 1985 showed that a 10 percent increase in female literacy rates reduced child mortality by a corresponding 10 percent [5].

Other characteristics that in an ideal situation can be considered “woman or family controllable”, such as age and parity, can significantly affect not only a mother’s health, but also the health and chances of survival of her newborn. The lives of a mother and her fetus are so interconnected, that the fate of the fetus and the resultant infant and child is often inextricably bound to that of it’s mother. Because of this dependency, the risk of an infant dying in it’s first year of life is said to be highest when a woman is less than 20 or above 35 years of age that is, when either the reproductive system is not fully developed or when the system may not be able to function as efficiently. Grand multiparity is also claimed to present a risk to both

mother and child. Furthermore, children who are born seventh or later have a 40 percent higher chance of dying than those born earlier [1]. How then is risk defined and measured? Is it reliable in determining outcome and for determining the efficient management of resources? These are some of the issues that need to be critically examined.

1.1.3 The Concept of Risk

Maternal factors that a woman may possess that could affect the outcome of a pregnancy are well documented throughout the literature and the concept of “risk” in maternal and child health often discussed. How then is risk quantified and to what extent does the presence of a risk factor result in an adverse event? The Risk Approach is a concept promoted by the World Health Organisation (WHO) basically as a managerial tool to focus special attention on those at greatest risk of an adverse event and thus at greatest need; to identify and make appropriate interventions early enough to prevent a negative event. In maternal and child health, the Risk Approach involves the identification of risk factors which may predispose the mother or the child to an adverse event and recommends that interventions be put in place to forestall the occurrence.

The risk approach or at risk screening related to pregnancy and childbearing is often done at the antenatal clinic, where nurses are supposed to identify these “at risk” women by virtue of certain characteristics and target them for specific interventions. The “Risk Approach” is defined by the WHO as a,

"... managerial tool for the organisation of health services- in particular for mothers and children. It's aim is to give special attention to those in greatest need within a framework of improved health care for all. Individuals and groups with an increased expectation of complications or disease are defined as being "at risk" and the aim of the health services should be to identify them as early as possible and to intervene in order to reduce the risk."[6]

The concept of the risk approach is generally a guideline, and each country or area is to define the concept according to her local situation, what is considered "at risk". This is done by identifying specific risk factors. The WHO further defines a risk factor as,

"...any ascertainable characteristic or circumstance of a person or group of persons that is known to be associated with an abnormal risk of developing or being especially adversely affected by a morbid process."[7]

High risk pregnancy can therefore be defined as a condition or conditions that exist prior to or which occur during pregnancy that may predispose a woman to an unfavourable pregnancy outcome. Because the lives of mother and fetus are intertwined, and therefore interdependent, an unfavourable pregnancy outcome can apply either to the mother, the baby or to both.

1.2 Statement of the Problem

Factors, which place pregnant women at risk, may serve as signals and indications for the need for special management, and thus can aid in health service planning, since they are to be used to identify a potential event, prior to the event's occurrence. In maternal and child health, the risk approach or identification of pregnant women at high risk is often carried out at the antenatal care level, during which nurses usually are given specific indicators to assess this level and to make appropriate intervention or referral.

Since the overall aim of antenatal care is to produce a healthy mother and baby at the end of pregnancy, at risk screening has been promoted as one of antenatal care's most prominent objectives. Antenatal care, when conducted properly, has the potential of averting potential negative events but requires the commitment of both the mother and the health system to be effective. A health system must be able to identify the factors, which, in their local situation place a woman at risk.

The commitment on the part of the mother is regular attendance at antenatal clinic and the health system in general, because to make an impact, at risk screening must be carried out regularly to make an impact. The Safe Motherhood Initiative emphasizes that;

“Risk assessment is not a once-only measure, but a procedure continuing throughout pregnancy and labour. At any moment early complications may become apparent and may induce the decision to refer the woman to a higher level of care.”[9]

This statement however brings to light some of the inadequacies of the risk approach in our situation. Without regular attendance and a proper medical history, women who may potentially be at risk may not be identified and may go on to have complications. The same applies to women who are identified as at risk but go on to have normal deliveries. Additionally, because of the wide range of risk factors that could logically result in complications, a disproportionately large number of women are categorised as “at risk”. As a health service planning tool, it is difficult to assess who is at greatest need thus negating the use of the concept. The Risk Approach has therefore met with strong criticism and a school of thought has emerged calling the “potential utility of the approach ... overly enthusiastic.”^[10]

With the multitude of factors that can potentially put a mother and her baby at risk, it would seem that in our local situation, vast numbers of women could be classified as at risk. In an area characterised by early marriage, early and frequent childbirth like many of our rural areas across the country, this would potentially be the case. Kassena-Nankana District is an area that typifies this scenario, but just how significantly is pregnancy outcome affected by what is considered a pregnancy at “high risk”?

The intention of the study is to estimate the prevalence of high risk pregnancy in the rural areas of the district and to identify factors which have the greatest negative effect on child survival or infant outcome. By so doing, it could bring to light just how important and useful applying the Risk Approach could be in antenatal care and

identify the risk factors that health workers should be most concerned about, to protect women from poor infant outcomes.

1.3 Objectives

The objectives of this study, were to estimate the prevalence of high risk pregnancy and the extent to which associated risk factors can predispose women to an unfavourable pregnancy outcome. By identifying some of these risk factors, recommendations can be made to the district about which risk factors are most detrimental to the survival of an infant, as a start to making their risk screening specific to their individual or local situation.

Because the lives of mother and fetus are intertwined, and therefore interdependent, unfavourable pregnancy outcome can apply either to the mother, the baby or both. However, within the scope of this study, only infant outcome will be examined.

There are a vast number of risk factors that have been documented throughout the available literature. However, for the purpose of this study, risk factors that classified a pregnancy as high risk were as follows;

- **Age** of respondent at time of pregnancy a woman was considered at risk if she was below the age of 18 or above the age of 34.
- **Parity** - a woman was considered at risk if she was either primigravida or if she was grand multigravida having 4 births or more.
- **Short Birth Interval** a woman who had a child less than 24 months of age prior to her current pregnancy was considered to be at risk.

- ✓ **Past Poor Obstetric History** a history of previous perinatal or infant deaths was considered to place a woman at risk.

Short birth interval and past poor obstetric history apply to multiparous women only. Other variables that were of interest were educational background, use of antenatal care, place of delivery and assistance at delivery. Additionally, the levels of risk were assessed.

- * **Low Risk** the presence of **one risk factor** (age, parity, short birth interval or past poor obstetric history)
- * **Medium Risk** the presence of **two risk factors** (either age and parity, age and short birth interval, age and poor obstetric history, parity and short birth interval, parity and poor obstetric history or birth interval and poor obstetric history)
- * **High Risk** the presence of **three or more risk factors** (either age, parity and short birth interval, or age, parity and poor obstetric history or having all four risk factors, age, parity, short birth interval and poor obstetric history)
- ✓ **No Risk** the **absence of any of the four risk factors** classifies a woman at no risk.

1.4 Literature Review

There are few studies available that look specifically at outcome of pregnancy in relation to high risk status. One of the cardinal studies, however, was a longitudinal population based project conducted in the Machakos District of Kenya with the overall objective of improving maternal and child health in rural Kenya [11]. The study examining the outcome of pregnancy followed pregnancies over a four year period that resulted in a total of 4768 children born of which 4627 were live births. Although stillbirth, perinatal, neonatal and infant mortality rates were found to be high, they tended to be lower than these of other tropical African countries registering 29.6, 46.4, 23.1 and 49.1 deaths per 1000 live births respectively.

It was discovered that age as a risk factor in pregnancy had the least negative impact in the 25-34 age group which was also found to have the lowest stillbirth rate. There were however no significant differences in terms of neonatal and infant death rates between that age group and those in the high risk groups.

In an analysis of the results of five studies, Trussell and Pebley who investigated the potential impact that family planning could have on infant and child mortality, found that if childbearing was confined to the "prime" reproductive ages, 20-34, infant and child mortality rates would fall by about 5 percent [12]. They go on to show that the risk is moderately higher for infants of very young mothers and for first births. This risk declines for infants of mothers in their twenties and of parities of two and three but the risk then rises with further increases in age and parity.

The impact of parity on outcome in the Machakos study, was exhibited among the nulliparae who had higher rates of stillbirth, neonatal and infant death rates. Previous obstetric history was also examined showing that the perinatal death rate was significantly lower and survival rate to one year significantly higher in women who had never experienced a perinatal death. However, survival of a previous child up to a week or more after birth did not influence the outcome of the current pregnancy.

An interesting finding which seems to contradict the findings of many other studies on birth interval, was that although there were a relatively higher proportion of mothers with a birth interval of under 18 months who had had previous poor obstetric history, their perinatal and infant outcomes were found to be no different from those with longer intervals. This contradicts the study carried out by Pebley and Millman as quoted by Boerma et al, that analysed data for 39 countries in the World Fertility Survey. This study established that the relative risk of dying was 58 percent higher in the neonatal period, 96 percent higher in the postneonatal period, 45 percent higher in the second year of life and 30 percent higher in the 2 – 5 year old age group among children with preceding birth intervals of less than two years [13]. This study exhibits the extent of effect that a woman's reproductive characteristics can have on her child, from the fetal period all the way into childhood. Pebley and Trussell also estimated that if all pregnancies were spaced at least two years apart, there is the potential of reducing infant mortality by 10 percent and child mortality by about 21 percent [12].

Another prospective survey which was designed after the Machakos study was conducted in Gambia by the Medical Research Council. Greenwood and others

followed 672 pregnancies over a one year period in a rural area where medical resources were very limited. Stillbirths and neonatal death rates were found to be high (35 and 65 per 1000 respectively). The risk factors that were associated with poor infant outcome were first pregnancy, high parity of 5 or more pregnancies, age of less than 20 years or greater than 40 years, and strangely, chloroquine administration during pregnancy. Cases that had had a previous stillbirth, were of short stature or experienced prolonged labour were suggestive of poor outcome, but were not statistically significant [14].

It is noteworthy that the mortality rates were significantly higher in the Gambian study than the previous one conducted in Machakos despite its shorter study period. This could be attributed to the fact of Machakos being more urbanised as it is fairly close to Nairobi. Thus, though there were limited medical resources, the facilities may have been more accessible and available to the populace.

The study however advises that because the sample size was relatively small and the survey period relatively short, its interpretations should be cautiously generalized.

A one month hospital based study conducted in Tanzania [15] assessed the Risk Approach as a tool for effective referral and an efficient tool in reducing childbirth mortality. A number of risk factors were used to denote high risk factors, namely short stature, parity of 8 or more, antepartum hemorrhage, pre-eclampsia, bad obstetric history, previous cesarean section, previous perinatal death, history of third stage complications, multiple pregnancy, abnormal lie and severe anaemia. Among the 234

births, 24 percent were classified at high risk with 65 percent of the classified pregnancies having complicated deliveries.

The weakness of the Risk Approach did, however, become evident in the study. Of the women who were classified at low risk, 7.3 percent of them developed complications. Hayes [10] argues that accuracy of identification of risk factors depends on two crucial points - the ability of risk factors to accurately predict future outcomes and the ability of the strategy users to measure risk factors appropriately. The Safe Motherhood Initiative Guidelines describe risk screening as an on-going process rather than a one-time measure. In communities such as ours where antenatal contacts are few and irregular, it prompts one to think whether the Risk Approach is truly of use in our local situation.

Nevertheless, the study concluded that the Risk Approach is a good method for selecting high risk pregnancies for referral and that it was highly sensitive and specific.

In terms of low level of education as a risk factor in infant and child mortality, there have been many studies which have shown a positive association. According to the World Bank, female education has been shown to be the single most important influence on child survival in house hold surveys conducted in Ghana, Nigeria and Sudan [5]. However, a study conducted by Adetunji in Ondo State, Nigeria has contradicted this theory. His findings suggest that children of secondary school graduates in the 1986/87 Ondo State Demographic and Health Survey (DHS)

experienced a higher rate of infant mortality than children of less educated mothers [16]. A multivariate analysis based on the many articles written about this relationship revealed that less than a quarter of the studies found a significant effect of mother's education on infant mortality. Virtually all of them rather found a significant effect on under-five mortality instead. Adetunji's study results showed that maternal age and breastfeeding duration were the most significant predictors of infant survival rather than education.

He concluded that secondary school graduates who were not prepared for family life and underwent economic hardship, tended to breastfeed for a shorter period heightening the risk of death among their infants.

Use of antenatal care is often touted as one of the methods that could potentially reduce mortality. Yet, there is still a school of thought which views this as a controversial issue. Data collected at Korle-bu Teaching Hospital in Accra have established a positive association between antenatal and child survival [17]. The results indicated that in primiparae, multiparae and grandmultiparae who delivered in the hospital, the higher the number of antenatal visits, the lower the percentage of infants dying before the mother's discharge. In the primiparae, approximately 10 percent of infants died in cases where the mother received no antenatal care versus less than 2 percent in cases who had seven or more visits. A similar dramatic decrease in infant death was also exhibited in the multiparae and grandmultiparae groups.

The argument that use of antenatal care could perhaps be associated with level of education also associated with increases in child survival, was also refuted. It was established that only women with more than nine years of education made more antenatal visits than those with less education - a median number of 5.5 visits. Those without education, 1 to 6 years of education and 7 to 8 years of education had a median number of 4.3, 4.4 and 4.5 of visits respectively, not notably different.

Still, in looking at this data, one must take into consideration that a teaching hospital in Accra, the capital and urban centre would be able to attract more affluent clientele and accessibility (financial and physical) is greater than in a rural setting. Secondly, child survival may have been greater in the groups that had had more contact with the health system possibly because of their familiarity and their knowledge of how to exploit health facilities to their advantage.

Others argue that the effectiveness of antenatal care is doubtful at best and further research must be conducted to establish what measures should be put in place to improve it's effectiveness. McDonagh argues that there is no concrete evidence in the literature that shows that antenatal care is effective and that in fact, there is no agreed criteria about what constitutes antenatal care [18].

Although McDonagh concedes that there is a basic core of risk factors such as parity, age, height and birth interval that the literature does agree on, studies on the sensitivity and specificity of the Risk Approach are very sparse thus making it difficult to evaluate whether risk screening meets it's objectives. She concludes by

stating that antenatal care may have been exported from developed countries to developing countries with good intentions but that in examining the prevailing conditions in these countries, antenatal care cannot possibly make that much of an impact.

The Demographic and Health Surveys Comparative Studies also looked at the impact that high risk births have on infant and maternal mortality with specific reference to age, parity and birth interval. It was found that children born to mothers under 18 years of age were found to have a 64 percent increase in mortality. Those born after short birth intervals had an increased mortality of 50 percent. Births to women with multiple risk factors carry even greater risks. On average, women who are under 18 and have births within a 24 month period have a 130 percent increase in infant and child mortality [19].

It is clear from the literature that risks during pregnancy have the potential of resulting in poor pregnancy outcome. It is therefore necessary to identify the prevailing risk factors in our conditions and to put in place measures to avert mortality in these groups. Measures may include better accessibility to healthcare prenatally, during pregnancy and postnatally, as exhibited in other studies. Targeted family planning programmes as a part of the health service delivery system, will undoubtedly remain the most effective method by preventing women in high risk groups from getting pregnant at the outset.

1.5 Hypothesis

This study will thus test the hypothesis that high risk status in pregnancy effects a negative impact on infant survival. Furthermore, the study examines the specific variables that effect this impact. The null hypothesis is thus;

There is no difference in infant outcome between women who have the stated risk factors individually or in combination, and those who do not.

1.6 Methods

This is a retrospective study using secondary data collected by the Navrongo Health Research Centre (NHRC) in the Kassena-Nankana District of the Upper East Region.

The data was extracted from data collected from the Panel Survey of Reproductive Preferences of Husbands and Wives, Spousal Communication and Social Interaction Study. This survey is a sub-project being carried out under the umbrella of the Navrongo Community Health and Family Planning Project (CHFP). The CHFP is a unique and eagerly watched project, as its implementation and success could have far reaching implications on the health system as we now know it. This important project basically involves the concept of “bringing health to the community” in the true sense, by placing nurses to live and work in various communities and training community volunteers in the rudiments of treatment of minor ailments and family planning. The focus of treatment thus becomes the homes of the community members, where nurses can easily build rapport with their clients, treat their ailments, provide confidential family planning services and visit all the members of the community regularly to help them take their health seriously and make it a priority.

The Panel Survey Project was started in 1993 with the intention of monitoring the dynamics of spousal communication and social interaction in the district. This is under the premise that in a patriarchal society such as the Kassena-Nankana District, where decision-making is often left in the hands of the males, improvements in communication between spouses could positively affect the adoption of family planning practices. As such, the Panel Survey System is a longitudinal study, in the

same vein as the Demographic and Health Survey (DHS) examining various aspects of reproduction, reproductive behaviour and outcome, family planning adoption and preferences, breastfeeding and weaning practices, family formation patterns as well as a multitude of other factors.

The Panel Survey System consists of a representative sample of 1,800 compounds, located and selected randomly throughout all areas of the district, which are followed in annual rounds, generating approximately 7,000 interviews of women of child-bearing age. In 1995, the Panel Survey System added husbands of these women into the study.

The questionnaire for both men and women is adapted from the standard DHS interview format with appropriate modifications to suit the local situation. The results are reviewed annually and additional sections modified if necessary. Additionally, new modules and questions are added for specific research purposes, but generally, the core questionnaire on contraceptives use and attitudes remain the same.

For the analysis of risk factors and outcome, variables of interest were selected from the questionnaire. These included the information on age, parity, obstetric history, age of last born child (to enable the calculation of birth interval), educational level, previous unwanted pregnancy, use of antenatal care, place of delivery and assistance at delivery.

Out of the 5293 interviews conducted in 1995 amongst women in the District, 413 women confirmed that they were pregnant. These women were selected and linked to the 1996 Panel Survey to examine their infant outcome and access information about place of delivery, assistance, survival of infant and age at death.(See Appendix A for variables used from the 1995 and 1996 Panel Survey Questionnaire). From these 413 women, only 319 women were retrieved due to migration, death or change in name or identification numbers.

Despite the limitations which exist in using secondary data, such as the inability to probe questions, or to double check responses, analysis of the data posed a unique challenge and required an in depth understanding and comprehensive manipulation of data.

CHAPTER TWO

STUDY AREA

2.1 General Background

The Kassena-Nankana District is located in the Upper East Region of Ghana bordered by the Builsa District and Mamprusi District in the south, Sissala District on the west, Bolgatanga District on the east and Burkina Faso in the north (see map). The district is divided into five zones or sub-districts - these being the Central, North, South, East and West Sub-districts.

2.2 Climate

The district lies within the Guinea Savannah woodland of Ghana giving it two main climatic seasons. A short rainy season, with an average rainfall between 850 - 1000 mm, generally lasts from June to September. During this period, many communities on the peripheries are cut off from the centre due to flooding. The dry season lasts from October to May, with the harmattan winds peaking in February and March. The temperature ranges from the 20°C to 40°C.

The climate has a significant effect on the health profile of the area, with higher rates of malaria in the wet season and high incidence of cerebrospinal meningitis (CSM) during the harmattan period. The 1997 harmattan period saw a dramatic rise in the incidence of CSM, leading to an unprecedented epidemic where reported cases exceeded 18 per 100,000.

2.3 Ethnicity

There are two main ethnic groups in the District - the Kassenas who comprise of 58% and speak Kassim and the Nankanis which make up 41% and speak Nankam. The Kassim and Nankam languages belong to the Grussi-Gurma subgroup of the Gur language. The Kassenas originated from modern Burkina Faso while the Nankanis originated from the Frafra people south of the present day district. The other ethnic group living in the district are primarily Builsas (1%) who come from the neighbouring Builsa district.

Because of the proximity to Burkina Faso as well as the common language, large numbers of Burkinabes use the health facilities in Navrongo and the cross border migration has potential health implications. At the District Hospital based in Central Navrongo, it was estimated in 1996 that 25 percent of outpatient department cases reside in Burkina Faso [20].

2.4 Population

According to the Upper East Regional Health Administration, the population of the Kassena-Nankana District is estimated as of January 1997, to be approximately 219,895 residents. This is however a gross overestimate. The Navrongo Demographic Surveillance System, which regularly updates the vital events of every person in the district and thus has at any given time the accurate population of the entire district, places the population at approximately 145,000 residents. The difference in the figures often leads to substantial problems with the district's statistics and health coverage. Obviously, this problem is not limited to Kassena-Nankana District alone,

but the Navrongo Demographic Surveillance System underscores just how serious this disparity is.

The population of the district is mostly rural, apart from those living in Central Navrongo. The settlements or family compounds in Kassena-Nankana are widely dispersed with close knit extended families living in the same compounds. The number of residents can range from ten to well over one hundred in some cases. The compounds are made up of several small connected huts surrounded by the compound's farming land with an attached animal kraal, which also have potential health implications. With the dispersed settlement pattern and no compact villages, health service delivery is often difficult.

Kassena-Nankana District covers an area of 1,658 square km, and thus has a population density of approximately 87 people per square kilometre, further exhibiting the pattern of dispersed settlements. Within this area, the district consists of 151 settlements, the majority of which are rural only 13% of the population live in towns.

2.5 Economy

The Kassena-Nankana district has no large scale industries. In fact, one of the biggest employers in the region besides the Ministry of Health is the Navrongo Health Research Centre. A large irrigation project Irrigation Company Of Upper Region (ICOUR), is primarily used to irrigate the tomato, soyabean and rice farms. It irrigates an area of 3840 hectares with 42 kilometres of canals as well as 90 small dugout

dams, which provide water to the people and their livestock especially during the dry season when most of the river beds have dried up.

The Tono irrigation scheme in Kassena-Nankana District was completed in 1985. The project was to boost the economy of the district and improve the financial situation of the residents. The local residents, however, generally cannot afford to lease the land to do the lucrative commercial farming and thus work mostly as hired labour on the farms.

Most of the residents therefore are small scale subsistence farmers, with millet, sorghum and groundnuts being the main cultivated crops. Other occupations include petty trading and animal husbandry, but no other large scale industries exist within the district.

2.6 Educational Institutions

Education is necessary as a means for development. However, the vast majority of the population (80% of the men and 88% of the women) have had no formal education.

The district has only a few educational institutions, which because of the dispersed settlements and generalized poverty are not well attended. In total, there are only 51 functioning primary schools throughout the district. They are scattered throughout the subzones. Junior Secondary Schools are fewer at 22 with only 5 Senior Secondary Schools, concentrated in the urban area of Central Navrongo. Day care centres, the

Training College and the recently established University of Development Studies (UDS) are also located in the Central area.

2.7 Status of Women

Kassena-Nankana District is a highly patriarchal and traditional society, which usually denies and limits a woman's status in the community. Women in this area as in most areas of the country, carry the brunt of the workload, fetching water and fuelwood, nurturing the family as well as farming or petty trading. Despite their numerous roles, they are however not allowed to make decisions that affect their own health and bodies. Husbands often oppose the use of family planning and forbid their wives to use it. However, the popularity of Depo-Provera Contraceptive Injection in the district, partially lies in the fact that women can use it secretly and safely without their husbands finding out.

This lack of decision making power is also exhibited in the Births History Survey carried out by the NHRC where 96.7 percent of the married women required permission to go to the hospital 54 percent from their husbands, 38.6 percent from the compound head and 3.8 percent from their mother-in-law [21]. As such, the lack of authority that a woman has can often affect her health as well as that of her child.

2.8 District Health System

The mission of the Government of Ghana, implemented through the Ministry of Health, is to provide health care services to the population of Ghana, both to prevent disease and to promote healthy lifestyles. Since the adoption of the Primary Health

Care Strategy in 1978, the Ministry of Health, as one of the key components of the strategy, has advocated the decentralisation of health care management, to the district level to bring the best health care closer to the people. The district thus heavily relies on the sub-district concept to make health service delivery more efficient.

The health administration of the district is managed by the District Health Management Team (DHMT) which is under the leadership of the District Director of Health Services. The DHMT, which is made up of program heads of various specialities, is responsible for planning, budgeting, implementation, supervision and evaluation of all district health activities.

The Sub-District Health Management Team (SDHMT) is a team of programme heads at the sub-district level. They are responsible for health delivery at the static facilities, providing outreach services on a regular basis, supervision and training for auxiliary workers such as the village health workers and traditional birth attendants. The SDHMT is headed by the Sub-district head, who regularly participates in meetings with the DHMT.

At the community or village level, there are village health volunteers or *Yezura Zennas* (YZs), who are hand-picked by the community to provide the very basic preventive, promotive and curative care. These volunteers are monitored by the *Yezura Nakwa* (YNs), the village health committee, who are also chosen by the community. The YZs and the YNs can play a vital role because, as members of the community, they are trusted and truly understand the problems of their own people. They work with the

community health nurses in the field, mobilizing the people and helping in outreach services and immunization exercises. The YZs and YNs work as part of the Community Health and Family Planning Project (CHFP) of the Navrongo Health Research Centre.

2.8.1 Health Facilities

The District is equipped with 5 static health facilities. The Navrongo War Memorial Hospital, the District Level C facility, is located in the district capital, Navrongo Central and serves as a referral point for all health centres and clinics.

There are three other Level B health centres in the district; one in the North subdistrict at Paga, one in the West subdistrict at Chiana and one in the East subdistrict at Kandiga. The Maternal and Child Health and Family Planning Clinic, a level A institution also located in the Central zone, presently provides preventive services only, such as child welfare clinics and immunization. The plan is to however upgrade it to a static facility, by including a dispensary to enable basic curative services to be carried out. The South subdistrict has no static facility but is served by outreach services. There are three other clinics built by the Catholic Church (in Sirigu, Nakolo and Biu), two of which are manned by MOH staff. There is also one private maternity home operating in Navrongo Central.

Although there are a number of sub-district health facilities, by nature of the dispersed settlements of the populace, attendance and utilization of services is low. At some health centres, medical assistants see on average only 10 - 15 patients a day.

There are also eight nutrition feeding centres that are managed by the community, who appoint a Centre Attendant. The meals are cooked by women whose children are enrolled in the centre. Each centre concentrates on children 0–5 years of age and has on average 200 children registered per centre. Pregnant and lactating women are also registered and supplied with dry rations in the dry or lean season, when foodstuffs are scarce, to supplement their nutritional intake. Each centre registers up to 120 pregnant and lactating women.

2.8.2 Navrongo Health Research Centre (NHRC)

The Navrongo Health Research Centre (NHRC), which was borne out of the Vitamin A Supplementation Trials (VAST) in 1989, has initiated a number of health projects in the district that have had a tremendous impact on the population.

Upon completion of the VAST, other projects such as the impregnated bednet trial was undertaken in 1993. The NHRC has truly made a tremendous impact in the community, not only by through the provision of health services, but also by fostering good community relations and promoting effective community participation and mobilisation. The Navrongo Demographic Surveillance System, a project of immense proportions, makes Kassena-Nankana District the only area in Ghana that has a true population and vital events register.

Currently, the Community Health and Family Planning Project has passed the experimental stage and now collaborates with the DHMT in health service delivery at

the grassroots. This project has serious policy making implications as its findings could change our health system as we currently know it by making health more accessible to the communities.

The project accomplishes this with help from the communities, by placing retrained Community Health Nurses into the communities to provide not only family planning advice, but also basic curative services. These nurses work along with health volunteers (Yezura zennas), who are hand-picked by the community, to help in providing first aid, promoting family planning and in mobilizing the population.

Outreach services, which are routinely carried out by the Ministry of Health, are also supported by the NHRC by providing personnel, equipment, drugs and meals to workers. These activities carried out at the village level offer a crucial means of reaching the people, who, because of financial or physical inaccessibility are not able to attend static health facilities. Through this initiative, a number of clinics have been built by the communities themselves, to serve as outreach posts.

2.9 Water and Sanitation

Water and sanitation have implications on the disease profile of a community. Diarrhoeal disease, which is the second highest killer of under-fives in developing countries and which ranked as the fourth highest cause of admission in 1996 in the Kassena-Nankana District, reflects the relevance of water and sanitation to health.

The water table in the Upper East Region is generally very high, making the acquisition of water relatively easy. With the help of NGO's such as Action Aid and Rural Water Aid over the years, access to potable water throughout the region is excellent. According to the Ghana Water and Sewage Corporation Water and Sanitation Survey, 1992, it was estimated that 76 percent of the rural population of the region and 93 percent of the urban has access to safe water, giving an overall figure of 79 percent of the population. This figure is surpassed only by Greater Accra Region, with an overall figure of 81 percent.

The population of Kassena-Nankana district also has good access to potable water with a minimum of one borehole for each village and large numbers of hand-dug wells.

Conversely, in terms of sanitation, the Upper East Region has a very poor sanitation record. It was estimated from the GWSC survey that only 7 percent of the rural and 20 percent of the urban population have access to adequate human waste disposal facilities. This gives an overall figure of 9 percent, the worst in the country.

In Kassena-Nankana district, sanitation facilities are woefully inadequate and most of the facilities are located in Navrongo, with very few in the rural areas. As a result, people defecate in open spaces, contaminating the surface water and contributing to disease.

CHAPTER THREE

RESULTS

3.1 Introduction

Using the 1995 Panel Survey data, pregnant women who were identified from the representative sample initially numbered 413. However, in trying to link these women in the 1996 data, information on 94 women could not be retrieved due to migration out of the district, death or changes in their identification numbers. As a result, information on a total of 319 women was retrieved. Of these 319 women, 32 women did not indicate an outcome of pregnancy, which could have been for two main reasons. They had either not given birth as at the time of the 1996 interview or they had had a spontaneous abortion or stillbirth. The possibility that they had had stillbirths, miscarriages and perinatal deaths is high, since these events are often underreported. So although their characteristics and risk factors were identified, the effect on the outcome of their pregnancy was not evaluated. Of these 287 women, only 14 had perinatal, neonatal or infant deaths.

3.2 Demographic Characteristics of Respondents

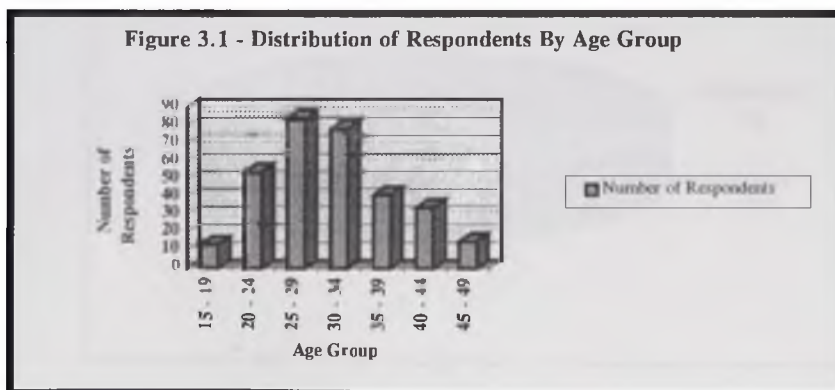
3.2.1 Age Distribution

The majority (67%) of the respondents fell into the “prime” and least risky age of reproduction 20 – 34. The 25 – 29 age group being the largest subgroup. In an area where the mean age at first union is 18 for women aged 20 - 49 with consequent early childbirth, one would expect a higher number of pregnancies in the teenage year group. However, only 4 percent of the respondents indicated that they were pregnant. Conversely, quite a substantial number of women, (32%) over the age of 34 indicated that they were pregnant, with 5 respondents being 48 years old.

Table 3.1 Age Distribution of Respondents

Age Group	Percentage	No. of Women
15 - 19	4.1	13
20 - 24	16.9	54
25 - 29	26.3	84
30 - 34	24.5	78
35 - 39	12.8	41
40 - 44	10.7	34
45 - 49	4.7	15

Mean Age = 30.8 years

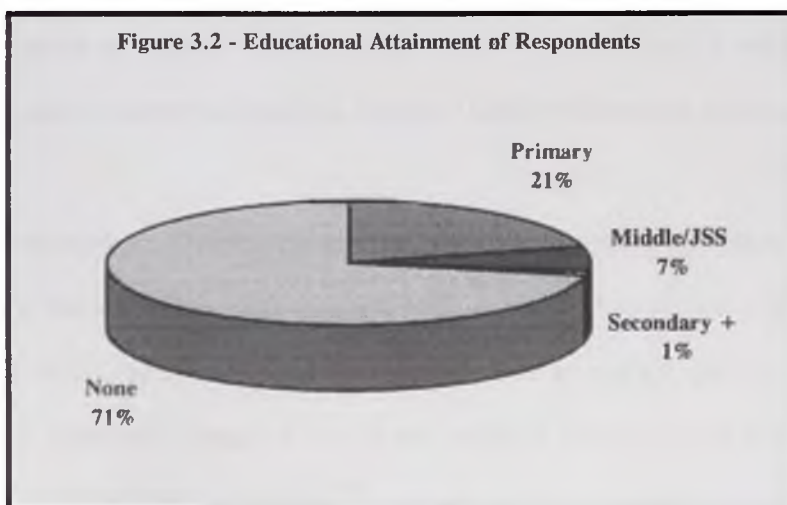


3.2.2 Educational Attainment

The majority of the population of Kassena-Nankana District 80% of the men and 88% of the women, have had no formal education. It was therefore not surprising that 71.5% of the respondents had never attended school and that only 0.9 percent had gone as far as secondary school.

Table 3.2 Educational Attainment by Level and Percentage

Age Group	Highest Level of Education				Total	No. of Women
	None	Primary	Middle*	Secondary #		
15 - 19	46.2	46.2	0	7.6	100	13
20 - 24	62.9	22.2	13.0	1.9	100	54
25 - 29	65.4	26.2	7.2	1.2	100	84
30 - 34	75.7	19.2	5.1	0	100	78
35 - 39	78.1	14.6	7.3	0	100	41
40 - 44	85.3	11.8	2.9	0	100	34
45 - 49	93.3	6.7	0	0	100	15



3.3 Utilisation of Maternity Care Services

3.3.1 Antenatal Care

In the Kassena-Nankana District, antenatal care has enjoyed wide patronage as in most areas of the country, and often, routine antenatal services have become just that routine. Nevertheless, antenatal clinic is the most utilised service of maternity care. According to the Kassena-Nankana District Management Information System (MIS)⁴, it was estimated that in 1996, 47 percent of the expected pregnant population attended antenatal service.

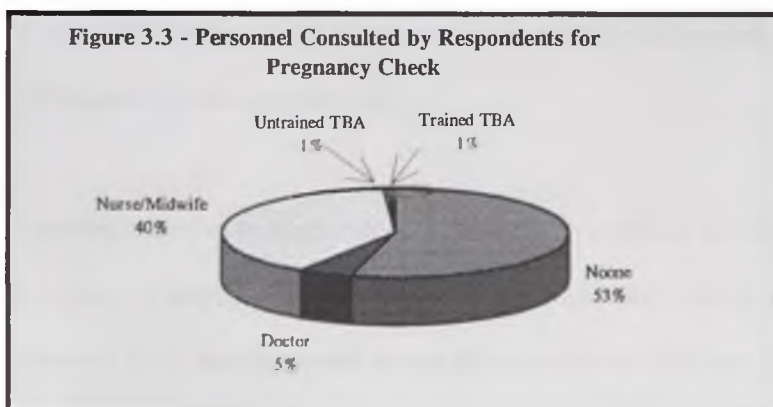
The Risk Approach, as previously stated, must be tailor made to fit individual situations. For example, in Ghana, where it was conservatively estimated that in 1993, 66.7 percent of our antenatal clinic clients were found to be anaemic with a haemoglobin level of less than 10 grams [8], iron and folate supplementation should be provided at a cost which is affordable to all. Anaemia tends to be severe due to the high incidence of malaria, malnutrition and hookworm infestation. It can be fatal in children and in mothers can lead to a myriad of health problems and consequences.

In Kassena-Nankana District, the practice at antenatal clinics is to supply a week's supply of ferrous sulfate, folic acid and B-Complex to clinic clients at the cost of 700cedis (\$0.35) as most of the clients cannot afford to pay any more. Considering that clinic attendance averages 2.5 visits per woman in the Upper East Region, it can then be surmised that on average, a woman that does attend antenatal clinic in

⁴####The District Management Information System (MIS) is the management tool used to compile data in the district. It comprises the collection of weekly or monthly reports submitted from the sub-district and health facility level on information such as it's activities, number of patients seen, number of vaccinations administered, types of diseases seen, etc. in a standard format for compilation by the DHMT for submission to the Regional Health Administration for final submission to National Headquarters. The system has the potential of being efficient except that it is logistically fraught with problems. Untimely reporting often leads to delays in data compilation, double registration of clients leads to overestimation of coverage and most importantly, the

then be surmised that on average, a woman that does attend antenatal clinic in Kassena-Nankana, may receive about an 18 day supply of prophylactic medication for her entire pregnancy. Additionally, the facilities to test haemoglobin levels are non-existent through most of the country. If the facilities are not available, can at risk screening truly be effective?

From the responses, only 44.5 percent (142) of the women saw either a doctor or nurse/midwife for antenatal services, which is consistent with the picture of the district. One interesting cultural aspect in the Kassena-Nankana District, is that pregnancy is often considered a “private” matter and when a woman finds that she is pregnant, the compound head (usually the oldest male) is informed and a soothsayer consulted to foretell the development of pregnancy. This must be done before she can announce her status to those outside the compound.



3.3.2 Tetanus Toxoid Injection

Neonatal tetanus is a major neonatal public health problem and significantly affects the survival of an infant. In an area such as Kassena-Nankana District where environmental hygiene is very poor and the majority of births take place in compounds under unhygienic conditions, it would appear that the potential for neonatal tetanus would be relatively high. According to Senah et al, childbirth is considered unclean and often delivery takes place in the animal kraal or compound yard, thereby increasing the potential for infection. [23] Despite this, neonatal tetanus does not appear to be a problem in the district.

The World Health Organisation recommends that all women receive two tetanus toxoid injection during their first pregnancy, a third dose six to twelve months later or during the next pregnancy, a fourth dose at least a year later or during a subsequent pregnancy and a fifth dose at least one year later or during a subsequent pregnancy. The fifth dose confers lifelong protection.

Thus, the administration of prophylactic medication, such as tetanus toxoid, is another important aspect of antenatal care, however there often seems to be a disparity between antenatal clinic attendance and receipt of tetanus toxoid injection. If a woman states that she has attended antenatal clinic, yet has not received an injection for tetanus toxoid, this indicates a missed opportunity. In this case, only 38.9 percent (124) of the respondents had received a tetanus toxoid injection out of the 44.5 percent (142) who had received antenatal care. Although this is not a great disparity, it does indicate some level of missed opportunity. The interpretation of issues like

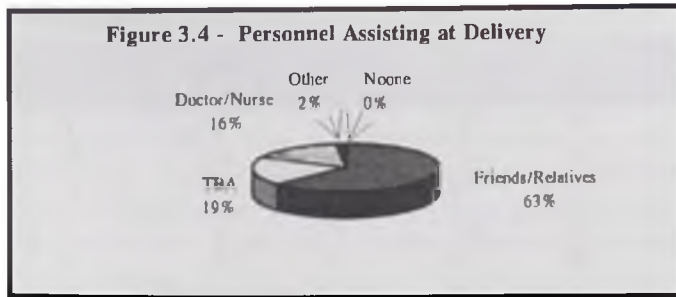
these, however, is difficult because oftentimes health personnel do not adequately explain the procedures carried out on their clients, so there may be cases in which they have received the injection but just may not know it.

3.3.3 Place of Delivery

The place of delivery can be an important determinant in child survival. In cases of complications, trained health personnel can help to save the life of a child as well as the mother. However, given the dispersed settlement pattern of the community, it is often difficult to transport a woman in labour to a health facility for appropriate care. Also, because of the culture of privacy that surrounds pregnancy and childbirth, most women prefer to deliver in a familiar area such as their compound. As a result, it is not surprising that the vast majority of women (83.1 percent) gave birth in their compounds rather than a health facility. Only 51 women (16 percent) gave birth in a health facility.

3.3.4 Assistance at Delivery

In line with the place of delivery, 62.7 percent of the respondents (200) gave birth with the assistance of their relatives or friends. 16.3% (52) gave birth with the assistance of a doctor or nurse. Only 61 women (19.1%) gave birth with the help of a traditional birth attendant (TBA). What is interesting about this is although many TBA's were trained as in other areas of the country, they are rarely used in the district because of this culture of privacy. Women tend to be assisted by the women in the compound, making the training of TBAs in this area seem somewhat unnecessary.



3.4 Maternal History and Characteristics

3.4.1 Parity of Respondents

Parity, is also an important determinant of child survival. The relationship has been documented to be a J-shaped curve, with high risks associated with first births and high order births[19]. Of the 317 responses, 26 women (8.2%) were nulliparous, 144 (45.4%) had had one to three births and 147 (46.4%) had 4 or more previous births.

Twenty-seven (8.5%) of the respondents were primigravida, and included all the teenagers except for one 18 year old and ranged from ages 16 to 33.

Table 3.3 Parity by Percentage and Number of Women

Parity	Percentage	No. of Women
0	8.1	26
1	14.7	47
2	14.7	47
3	15.7	50
4	17.9	57
5	10.9	35
6	8.8	28
7	5.0	16
8	2.8	9
9	0.6	2

The mean number of births per woman was 3.7.

Table 3.4 - Parity by Age Group

Age Group	Parity					Total
	0	1	2	3	4	
15 - 19	11	1	0	0	0	18
20 - 24	9	31	13	1	0	54
25 - 29	5	15	28	25	11	84
30 - 34	1	0	6	20	51	78
35 - 39	0	0	0	4	36	41
40 - 44	0	0	0	0	34	34
45 - 49	0	0	0	0	15	15
All Ages	26	47	47	50	147	319

3.4.2 Birth Intervals

The traditional culture of the Kassenas and Nankanis accepted the concept of birth spacing. It was expected that a man would abstain from sexual intercourse with his newly delivered wife until the child could walk. This period generally ranged from 3 to 5 years [22]. This tradition has, however, eroded due to urbanisation which makes it more difficult for new mothers to return to their mother's home for the period.

Table 3.5 Number of Respondents by Birth Intervals and Age Group

Age Group	< 12 mths	12 - 24 mths	> 24 mths	Total
15 - 19	0	1 (100%)	0	1
20 - 24	0	18 (39.1%)	28 (60.8%)	46
25 - 29	0	25 (33.8%)	49 (66.2%)	74
30 - 34	1(1.3%)	22 (29.3%)	52 (69.3%)	75
35 - 39	0	9 (21.9%)	32 (78.0%)	41
40 - 44	1(3.6%)	4 (14.3%)	23 (82.1%)	28
45 - 49	0	1(6.3%)	15 (93.7%)	16
Total	2 (0.7%)	80 (28.5%)	199 (70.8%)	281

Table 3.2.4 shows that although most of the women responded have birth intervals of more than 2 years (70.8%), 29.2 percent have short birth intervals which place them at increased risk.

3.4.3 Past Obstetric History of Respondents

166 of the 318 (52.2%) respondents indicated that they had previously lost an infant.

The proportion of past obstetric deaths increase by age group as would be expected.

Table 3.6 Past Obstetric Deaths and Total Births by Age Group

Age Group	Past Obstetric Deaths	Total Births	Number of Respondents
15 - 19	0	1	13
20 - 24	10	60	54
25 - 29	70	190	84
30 - 34	77	300	77
35 - 39	59	202	41
40 - 44	52	202	34
45 - 49	27	101	15
Total	295	1056	318

3.4.4 Unplanned Pregnancy

In the 1996 survey, the women were asked whether they had ever experienced an unplanned pregnancy. An unplanned pregnancy usually indicates an unmet need for family planning and as such, these women may get pregnant at a time of increased risk, such as at a short birth interval. Only 50 women (15.7%) indicated that they had ever experienced an unplanned pregnancy. The majority 262 women (82.1%) answered that they had never experienced one, and the remainder did not know.

3.5 Pregnancy Outcome

3.5.1 Infant Survival

The outcome variable, infant survival, was retrieved from the 1996 survey, where the women who were pregnant in 1995 indicated the outcome of their pregnancy. Of the 287 women who were pregnant in 1995, only 14 (4.9%) had since lost their infants since delivery. Of the 14 deaths, 8 (57.1%) were infant deaths, taking place after 1 month of age, 4 (28.6%) were perinatal deaths taking place in the first week of life and 2 (14.2%) death took place within the first month of life, the neonatal period.

Table 3.7 indicates that the age groups 15 - 19 and 45 - 49 had the highest proportion of deaths due most likely to the small number of respondents in these two groups.

One of the main limitations of the study was that many of the infants had not reached the age of one year, which would obviously limit the number of infant deaths reported. It was expected that there would have been a larger number of perinatal and neonatal deaths for analysis, however these deaths often go underreported.

Table 3.7 Types of Infant Deaths and Proportion Dead by Age Group

Age Group	Perinatal Deaths	Neonatal Deaths	Infant Deaths	Total
15 - 19			1	1
20 - 24		1		1
25 - 29	1	1	2	4
30 - 34	2		2	4
35 - 39			2	2
40 - 44			1	1
45 - 49	1			1
Total	4	2	8	14

3.6 The Prevalence of Risk Factors in Respondents

3.6.1 The Prevalence of Single Risk Factors

For the purpose of the study, the impact of a single risk factor is considered low risk. Of the 287 respondents, those with age as their only risk factor (those that were either under the age of 18 or over the age of 34) numbered 82 (28.6%). Parity, those who primiparous or who had 4 births or more, numbered 155 (54.0%). The respondents who had a birth interval of less than 2 years prior to this pregnancy, comprised 71 women (27.3%) the same number who had previously lost an infant. There were more women that had single risk factors than women who had a combination of two, three or four risk factors.

3.6.2 The Prevalence of Multiple Risk Factors

A woman who has two risk factors is classified at medium risk. Parity and poor obstetric history were the most common combination of risk factor in the medium risk group with 106 women (40.8%). Age and parity as risk factors were present in 77 (26.8%) women. Birth interval and poor obstetric history were found in 37 women (14.2%).

Women who fall into the high risk category were those who presented with three or all four risk factors. Only 12 (4.6%) of the women had the combination of age, parity and birth interval. Nine women (3.5%) had all 4 risk factors.

Only 61 women (19.2%) did not have any of the four risk factors, indicating that the vast majority of the respondents (80.8%) fell into one or more of the risk groups.

3.6.3 The Effect of Risk Factors on Infant Survival

Two by two contingency tables were used to calculate the level of risk of poor outcome using the odds ratio for each risk category. The odds ratio compares the risk of having a poor outcome in a risk category to having a poor outcome in a no risk category. As such, no risk is equal to 1.00. Table 3.8 shows that many of the odds ratios indicate an increased risk, however, because they are not statistically significant, the likelihood that the increased risk is due to chance is high as chance factors cannot be totally eliminated.

There were only two risk factors that were found to be strong indicators of poor infant survival. Birth interval as a single risk factor and in combination with poor obstetric history produced an odds ratio of 2.39 and 2.90 respectively.

A factor that showed a surprising association was use of antenatal care. Women who received antenatal care from qualified health personnel such as a doctor or a nurse, had a higher risk of poor outcome. This may also be attributed to high risk women seeking health care from the outset of pregnancy.

The effect of education on outcome also produced a curious result. The odds ratio indicated that there was an increased risk in outcome within the no risk group - that is, those who had had some formal education.

Table 3.8 Number of Respondents with each Risk Factor and Poor Outcome, Odds Ratio and P values of Risk Factors

Risk Factor	No. with Risk Factor	No. with Poor Outcome	Odds Ratio	P-Value
Age	82 (28.6%)	5 (6.0%)	1.41	0.37
Parity	155 (54.0%)	7 (4.5%)	0.84	0.48
Poor Obstetric History	147 (56.5%)	9 (6.1%)	1.75	0.24
Short Birth Interval	71 (27.3%)	6 (8.4%)	2.39	0.10
Age & Parity	77 (26.8%)	5 (6.5%)	1.54	0.31
Age & Birth Interval	13 (5.0%)	1 (7.6%)	1.67	0.49
Age & Obstetric Hist.	59 (22.7%)	4 (6.7%)	1.58	0.32
Parity & B. Interval	29 (11.2%)	2 (6.8%)	1.51	0.43
Parity & Obs. Hist.	106 (40.8%)	6 (5.7%)	1.29	0.42
B. Interval & Obs. Hist.	37 (14.2%)	4 (10.8%)	2.90	0.09
Age, Parity & B. Interval	12 (4.6%)	1 (8.3%)	1.83	0.46
Age, Parity & Obs. Hist.	59 (22.7%)	4 (6.8%)	1.58	0.32
Age, Parity, B. Interval & Obstetric History	9 (3.5%)	1 (11.1%)	2.54	0.37
Antenatal Care	152 (53%)	10 (6.6%)	2.32	0.12
Tetanus Toxoid Injection	157 (57%)	9 (5.7%)	1.73	0.27
Place of Delivery	234 (81.5%)	13 (5.6%)	2.88	0.26
Education	199 (69.3%)	7 (3.5%)	0.42	0.09

Note: () in Risk Factor column indicates percentage of the 287 total respondents. () in the Poor Outcome column indicates percentage of respondents in risk factor category.

The odds ratio for those not at risk = 1.00

Chapter Four

Conclusions

As hypothesized, the overwhelming majority of women (80.8%) in the study population fell into one risk category or another. Despite this, only very few (4.9%) had a poor infant outcome. Therefore, to use the risk approach as a means of targeting women who may be classified at risk for special care, would in essence defeat the purpose of appropriate management of resources. It appears, as was stated by the critics of the risk approach, that it is indeed difficult if not impossible in most cases to predict cases that will result with an unfavourable outcome.

On the other hand, it must be stated that none of the 61 women without the stated risk factors had a poor infant outcome which gives credence to the fact that the absence of risk factors could be important in infant survival. This stresses the need for the identification of risk factors appropriate to local circumstances.

Although this analysis only showed short birth interval, the combination of that and poor obstetric history and use of antenatal care to be statistically significant, drawing conclusions from the analysis should however be done with caution as the size of the study population was small. The fact that most of the risk factors did not emerge as strong predictors of mortality does not mean that they are unimportant. It is often difficult to identify factors that contribute to poor outcome especially in an area of homogeneity and high mortality. The fact that most of the infants were born under the same conditions make it next to impossible to determine factors which contributed to death. Environmental factors as well as the reproductive factors of the mother all

contribute to the potential of infant death. Since environmental factors were not examined in this analysis, their impact on infant outcome can not be assessed.

Because two of the risk factors did have an impact on infant outcome, the null hypothesis is rejected. That is, there is a difference in infant outcome between those women who have certain risk factors, individually or in combination and those who do not.

However, this difference is not increased by the presence of more than one risk factor. In other words, there is no difference between women who are classified at low, medium or high risk in terms of their infant outcome, according to the results obtained in this particular analysis.

4.1 Recommendations

From the results, it is difficult to suggest interventions at the district level that could substantially change the way in which the Risk Approach could be used, particularly in the case of the four investigated risk factors. Many of the programmes that are instituted at the district level are appropriate and can help to minimise high risk pregnancies, such as targeted family planning programmes. What however minimises their effectiveness is the lack of health contacts by those potentially at risk.

Antenatal, delivery and postnatal services in this country need to be reviewed and made appropriate for our situation, not only in terms of the kinds of programmes offered, but also to attract and encourage the women to properly utilise the services. Resorting to competitions and give-aways can help to an extent, but also has the potential to be counter-productive.

Antenatal clinic is the most successful maternal care service nationwide as well as in Kassena-Nankana district. Where we have failed is in encouraging pregnant women to come for supervised delivery and postnatal services. Antenatal clinic should therefore be exploited and procedures reviewed to make the most out of this contact. There is too much emphasis on the perfunctory procedures and not enough stress on what is truly important making the women understand that although pregnancy and childbirth is a natural event, it can be deadly for either the mother, the infant or both and as such, supervised delivery and postnatal attendance is of utmost importance. Equipment should be updated and referrals taken seriously to further emphasize the potential risk.

Navrongo Health Research Centre, through its Community Health and Family Planning Project, is however improving contacts with the health system by placing health workers in the communities. Part of the responsibilities of these workers should be not only to identify those women who have risk factors, but to ensure that they are targeted for delivery and postnatal services. Women who have just given birth should be targeted for family planning to ensure that they space their births properly.

Fortunately, the possibility of increasing surveillance and preventing high risk pregnancies exists in the Kassena-Nankana District, more so than anywhere else in the country, because of the community based project. It however requires commitment on behalf of the health workers, training and additional resources from the government to improve infant survival.

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Appendix I**Variables Used From the Panel Survey of Reproductive Preferences of Husbands and Wives, Spousal Communication and Social Interaction Study****Panel Survey 1995**

1. Are you pregnant now?
(question # 210) **FPREG**

This question is meant to identify only the pregnant women in the 1995 Panel Survey whose risk status is to be determined. These same women will be identified in the 1996 Panel Survey to determine the infant outcome of the pregnancy.

2. Did you see anyone for a check on this pregnancy?
(#212) **- FPCHK**

This question will serve as an indication of at least one contact with a health worker as a proxy for use of antenatal care.

3. During this pregnancy, have you been given any injection in the arm to prevent the baby from getting tetanus, that is, convulsions after birth?
(#213) **- FTTAN**

Although there are limitations to the interpretation of this question because the woman may not always recall what injections she has received, it can serve as a proxy for the potential risk of tetanus to the infant. Additionally, it is a further indication of at least one visit to antenatal clinic.

4. How old are you? (#103) **- FAGE**

This indicates the age of the woman, one of the specific factors being examined to denote high risk status.

5. Have you ever attended school?
(#104) **- FSCHOOL**

6. What is the highest level of school you attended? Primary, middle secondary or higher?
(#105) **- FLEVEL**

Educational level is important not only because of the documented linkages with infant survival, but may also be used as a proxy in controlling for socio-economic development.

7. Have you ever given birth?
(#201) **- FBORN**

The women who answer “no” to this question will fall into the nulliparous category, which is also one of the factors to be examined which denote high risk status.

8. Have you ever given birth to a son or daughter who was born alive but later died? IF NO PROBE: Any baby who cried or showed any sign of life but survived only a few hours or days?
(#206) - FDIED

This will provide some indication into past obstetric and infant mortality history.

10. In all, how many sons have died? and how many daughters have died?
(#207) - FSDIED & FDDIED

The answer to this question provides the extent of past poor pregnancy outcome.

11. Total Births (#208) - FTBIRT

Within the scope of the study, parity of more than four births classifies a woman in the high risk status.

12. In what month and year was your last child born?
(#403) FMBOR & FYBOR

A birth interval of less than two years characterises a woman at high risk. This will not apply to nulliparous women.

Panel Survey 1996

1. In what month and year was your last child born?
(#403) **FMBOR & FYBOR**

The women who were found to be pregnant in the 1995 Panel Survey will be identified in the 1996. This question will confirm the pregnancy status of the women in the 1995 Panel Survey.

2. Is he/she still alive?
(#404) **- FALIVE**

The answer to this question will indicate the pregnancy outcome and infant survival. This outcome will be compared in women with the risk classification derived from analysis of the 1995 Panel Survey data requested.

3. How old was he/she when he died?
(#405) **- FADIED**

This will verify early neonatal, neonatal or infant mortality.

4. Where was he/she born?
(#414) **- FPLACE**

5. Apart from friends and relatives, who assisted you at delivery?
(#415) **- FASSIST**

Low utilisation of maternity care services is also an indicator of high risk status. Additionally, since the maternity care services throughout the district will be looked at in terms of utilisation and coverage, it will be necessary to look at how many women in the survey opted for supervised delivery.

6. Sometimes a woman can become pregnant when she is not ready to be. In the past, have you ever been pregnant at a time when you were not ready for the pregnancy?
(#215) **- FUPREG**

Because family planning is one of the most effective methods to minimise the number of high risk pregnancies, an unplanned pregnancy indicates unmet need for family planning. An unplanned pregnancy also categorises women as high risk.

Appendix II**Programme Used for Analysis with Epi Info 6.0**

```

READ C:\NAVRONGO\THESIS\AKUA0497.DBF
route C:\NAVRONGO\THESIS\AKUA0497.ept
FREQ * NOT FPERMID FADIED1 FADIED2 FADIED3 FDIED FMBOR95 FYBOR95 FYBOR96\
  FMBOR96 FPREG
SELECT FBORN = "2"
TITLE 1 PRIMIGRAVIDAE
TITLE 2 EDUCATION IN PRIMIGRAVIDAE
FREQ FLEVEL
TITLE 1
TITLE 2
TITLE 1 AGES OF PRIMIGRAVIDAE RESPONDENTS
FREQ FAGE
TITLE 1 ANTENATAL CARE IN PRIMIGRAVIDAE
FREQ FPCHK
TITLE 1 INFANT OUTCOME IN PRIMIGRAVIDAE
FREQ FALIVE
TITLE 1 AGE OF INFANT DEATH
SELECT FALIVE = "2"
LIST FADIED1 FADIED2 FADIED3
TITLE 1 PLACE OF BIRTH OF INFANT AND ASSISTANCE
LIST FPLACE FASSIST
SELECT
SELECT FBORN = "1"
TITLE 1 MULTIGRAVIDAE
TITLE 2 EDUCATION IN MULTIGRAVIDAE
FREQ FLEVEL
TITLE 1
TITLE 2
TITLE 1 ANTENATAL CARE IN MULTIGRAVIDAE
FREQ FPCHK
TITLE 1 INFANT SURVIVAL
FREQ FALIVE
TITLE 1 AGE OF DEATH, PLACE OF DELIVERY, ASSISTANCE
SELECT FALIVE = "2"
LIST FADIED1 FADIED2 FADIED3 FPLACE FASSIST
TITLE 1 PAST OBSTETRIC HISTORY
FREQ FDIED
SELECT FDIED = "1"
LIST FSDIED FDDIED FTBIRT
TITLE 1 TOTAL DEATHS
DEFINE TOTDEATH ##
TOTDEATH = FSDIED + FDDIED
FREQ TOTDEATH
SELECT
TITLE 1 SINGLE RISK FACTORS
TITLE 2 AGE AS A SINGLE RISK FACTOR
DEFINE RISK1A #
IF (FAGE < 19) OR (FAGE > 34) THEN RISK1A = "1"
IF (FAGE > 18) AND (FAGE < 35) THEN RISK1A = "0"
FREQ RISK1A
TITLE 1
TITLE 2
TITLE 1 PARITY AS A SINGLE RISK FACTOR

```

```

DEFINE RISK1P #
IF (FBORN = 2) OR (FTBIRT > 3) THEN RISK1P = "1"
IF (FBORN = 1) AND (FTBIRT < 4) THEN RISK1P = "0"
FREQ RISK1P
TITLE 1 SHORT BIRTH INTERVAL AS A SINGLE RISK FACTOR
SELECT FBORN = "1"
DEFINE BINTERVAL ##
BINTERVAL = (95 - FYBOR95)
DEFINE RISK1BI #
IF BINTERVAL < 3 THEN RISK1BI = "1"
IF BINTERVAL > 2 THEN RISK1BI = "0"
FREQ RISK1BI
TITLE 1 PAST OBSTETRIC HISTORY AS A SINGLE RISK FACTOR
DEFINE RISK1OB #
IF (FDIED = 1) THEN RISK1OB = "1"
IF (FDIED = 2) THEN RISK1OB = "0"
FREQ RISK1OB
TITLE 1 SINGLE RISK FACTORS
TITLE 1 MULTIPLE RISK FACTORS-TWO RISK FACTORS = MEDIUM RISK
TITLE 2 AGE AND PARITY
SELECT
DEFINE RISK2AP #
IF (RISK1A = 1) AND (RISK1P = 1) THEN RISK2AP = "1"
IF RISK2AP < > 1 THEN RISK2AP = "0"
FREQ RISK2AP
TITLE 1
TITLE 2
TITLE 1 AGE AND SHORT BIRTH INTERVAL
SELECT FBORN = 1
DEFINE RISK2ABI #
IF (RISK1A = 1) AND (RISK1BI = 1) THEN RISK2ABI = "1"
IF RISK2ABI < > 1 THEN RISK2ABI = "0"
FREQ RISK2ABI
TITLE 1 AGE AND OBS. HISTORY
DEFINE RISK2AOB #
IF (RISK1A = 1) AND (RISK1OB = 1) THEN RISK2AOB = "1"
IF RISK2AOB < > 1 THEN RISK2AOB = "0"
FREQ RISK2AOB
TITLE 1 PARITY AND BIRTH INTERVAL
DEFINE RISK2PBI #
IF (RISK1P = 1) AND (RISK1BI = 1) THEN RISK2PBI = "1"
IF RISK2PBI < > 1 THEN RISK2PBI = "0"
FREQ RISK2PBI
TITLE 1 PARITY AND OBSTETRIC HISTORY
DEFINE RISK2POB #
IF (RISK1P = 1) AND (RISK1OB = 1) THEN RISK2POB = "1"
IF RISK2POB < > 1 THEN RISK2POB = "0"
FREQ RISK2POB
TITLE 1 BIRTH INTERVAL AND OBS HISTORY
DEFINE RISK2BIOB #
IF (RISK1BI = 1) AND (RISK1OB = 1) THEN RISK2BIOB = "1"
IF RISK2BIOB < > 1 THEN RISK2BIOB = "0"
FREQ RISK2BIOB
TITLE 1 MULTIPLE RISK FACTORS- 3 OR MORE RISK FACTORS - HIGH RISK
TITLE 2 AGE, PARITY AND INTERVAL
DEFINE RISK3APB #
IF (RISK2AP = 1) AND (RISK1BI = 1) THEN RISK3APB = "1"
IF RISK3APB < > 1 THEN RISK3APB = "0"

```

```

FREQ RISK3APB
TITLE 1
TITLE 2
TITLE 1 AGE, PARITY AND OBS HISTORY
DEFINE RISK3APO #
IF (RISK2AP = 1) AND (RISK1OB = 1) THEN RISK3APO = "1"
IF RISK3APO < > 1 THEN RISK3APO = "0"
FREQ RISK3APO
TITLE 1 AGE, PARITY, INTERVAL, OBS HIST
DEFINE RISKALL #
IF (RISK3APB = 1) AND (RISK1OB = 1) THEN RISKALL = "1"
IF RISKALL < > 1 THEN RISKALL = "0"
FREQ RISKALL
SELECT
SELECT FALIVE < > "8"
TITLE 1
TABLES FSCHOOL FALIVE
SELECT FPLACE < > 3
TABLES FPLACE FALIVE
SELECT
SELECT FASSIST = 1 AND FASSIST = 2
SELECT FALIVE < > 8
TABLES FASSIST FALIVE
SELECT
SELECT FTTAN < > 8
SELECT FALIVE < > 8
TABLES FTTAN FALIVE
DEFINE AGEGROUP _____
RECODE FAGE TO AGEGROUP BY 5
DEFINE TOTDEATH ##
TOTDEATH = (FSDIED + FDDIED)
TABLES AGEGROUP TOTDEATH
DEFINE BINTERVAL ##
BINTERVAL = (95 - FYBOR95)
SELECT FPCHK < > 08 AND FPCHK < > 88 AND FPLACE < > 3
TABLES FPCHK FPLACE
SELECT
SELECT FYBOR96 = 95 OR FYBOR96 = 96
SELECT FALIVE < > "8"
TABLES RISK1A FALIVE
TABLES RISK1P FALIVE
TABLES RISK1BI FALIVE
TABLES RISK1OB FALIVE
TABLES RISK2AP FALIVE
TABLES RISK2ABI FALIVE
TABLES RISK2AOB FALIVE
TABLES RISK2PBI FALIVE
TABLES RISK2POB FALIVE
TABLES RISK2BIOB FALIVE
TABLES RISK3APB FALIVE
TABLES RISK3APO FALIVE
TABLES RISKALL FALIVE
TABLES FSCHOOL FALIVE
TABLES ANTE FALIVE
SELECT FPLACE < > 3
TABLES FPLACE FALIVE
SELECT
SELECT FYBOR96 = 95 OR FYBOR96 = 96

```

```
SELECT FASSIST = 1 AND FASSIST = 2
SELECT FALIVE <> 8
TABLES FASSIST FALIVE
SELECT
SELECT FYBOR96 = 95 OR FYBOR96 = 96
SELECT FTTAN <> 8
SELECT FALIVE <> 8
TABLES FTTAN FALIVE
```