CHAPTER ONE

INTRODUCTION

Background To the Study

Infant mortality is the death of a child less than one year of age. Childhood mortality is the death of a child before the child's fifth birthday. National statistics tend to group these two mortality rates together. The first obligation of health professionals is to preserve life. This preservation starts from in-utero throughout life cycle. However there are so many factors that may negate this obligation which may include factors from the mother/parents and factors from the infant.

Infants are babies from one month to one year of age. Many of these babies die before their families can celebrate their first birthday. The death of a child is usually devastating to the family. The death of these babies prematurely is referred to as infant mortality (IM) while the statistic for these deaths is called the infant mortality rate (Lucas & Gilles, 2003; Sullivan, & Sheffrin, 2003).

Infant mortality rate (IMR) is the number of new-borns dying under a year of age divided by the number of live births during the year times 1000. The infant mortality rate is also referred to as the infant death rate. Ogbalu (2009)

however stated that it is the number of deaths that occur in the first year of life for 1000 live births.

Rao, Chakladar, Nair, Kutty, Acharya, Bhat, …. Krishnan (2007) contended that infant mortality rate is generally regarded as a reliable and sensitive index of the total health status of a community and often used as an indicator to gauge the level of socio-economic development of a country and partly on the environmental factors associated to the people of that country. Rao, et al. (2007) further stated that in recent years, socio-economic development has been incorporated as one of the parameters to compute physical quality of life index. It is the opinion of Lucas and Gilles (2003) that infant mortality rate is widely accepted as one of the most useful single measures of health status of a community and that it may be very high in communities where health and social services are poorly developed. Infant mortality is a major issue in developing countries according to Lucas and Gilles. However if predisposing factors are identified, infant mortality can respond positively to relatively simple measures. Where health hazards are high, the infant mortality rate is high but if medical care and public health measures improve, the infant mortality rate will fall.

The mortality of these children could result from many factors which may include infant and maternal factors. Infant factors may include birth defects

and congenital abnormalities, low birth weight, among others. Maternal factors may include socio-economic and environmental factors such as maternal literacy, maternal nutrition, maternal age, birth spacing, parity, tobacco smoking, maternal health, and lack of utilization of medical facilities, place of residence, exposure to mass media, standard of living, customs and beliefs, among others. There may be a significant connection or similarity between these factors and infant mortality.

According to Wikipaediainformation (2013) and Ehonwa (2013) among others noted that ninety-nine per cent of these infant deaths occur in developing nations. Infant mortality takes away society's potential physical, social, and human capital. Many factors affect infant mortality such as the mother's level of education, environmental conditions, political and medical infrastructure (Norton, 2005). However, Kembo and Van Ginneken (2009) identified maternal factors of infant mortality as important although they were looked at as subsequent determinants rather than main determinants of infant mortality. These maternal factors were first identified by Mosley and Chen (1984) as birth intervals, parity and mothers' age at first birth. Similar to Mosley and Chen's (1984) assertion, Kembo and Van Ginneken (2009) found that short birth intervals and high parity increases

risk of infant mortality and similarly age had a comparable impact if mothers are too young or too old.

However, other factors not related to mother or child which could be contributory include sleep related deaths such as accidental overlay, accidental suffocation, unexplained sudden infant death syndrome, abuse, neglect, accidents, homicides and so on (Jacksonville Community Council Inc.(JCCI), 2008).

Observing the world indices, through Factsheet, the United Nations Children's Fund (UNICEF) (2003) noted the decline in infant mortality from 126 in 1960 to 57 in 2001. However, infant mortality rate (IMR) remained higher in less developed countries (LDCs). In 2001, the infant mortality rate for LDCs was about 17 times as high as it was for more developed countries (MDCs). UNICEF (2003) also posited that, while both LDCs and MDCs made dramatic reductions in infant mortality rates, reductions among the LDCs were, on average, much less than those among the MDCs. In America, the picture of overall infant mortality rate in 2002 for all races was 7.0 per 1,000 live births, which was a slight increase over the previous year (U.S. Department of Health and Human Services, 2005).

In Nigeria, according to World Factsheet on Wikipedia (2011), the infant mortality rate has remained high (109.5 per 1000 live births) as against Iceland 2.9, Japan 3.2, Germany 4.3, Ghana 51.0 deaths/1000 life births (LB), Senegal 58.9 deaths/1000LB, Cameroon 63.9 deaths/1000LBamong others, despite all efforts to reduce it. CIA World Fact book (2014) however indicated that for Nigeria, the infant mortality rate was 74.09 deaths/1000Live Birth, Sierra Leone 73.29 deaths/1000LB, Liberia 69.19 deaths/1000, Gambia 65.31 deaths/1000LB, Cote d'Ivoire 60.16 deaths/1000LB, Cameroon 55.10 deaths/1000LB, Kenya 40.71 deaths/1000LB, and Ghana 38.44 deaths/1000LB.

Adetunji (1994),in his study carried out in Ondo State, Nigeria observed that infant mortality in Nigeria varies with region of residence, religion, period of birth, rural-urban residence, place of delivery, and mother's education. Using Nigerian data, Caldwell (1979) argued that education of the woman plays an important role in determining child survival even after controlling a number of other factors such as socio-economic characteristics of the husband, including his educational level and occupation.

Buhari (2009) however posited that an estimated 5,909,000 babies are born annually in Nigeria, while approximately 284,000 die in the neonatal period, and 1,048,600 die before their 5th birthday. Obasanjo (2007) stated that, the

national infant mortality rate rose from 71 deaths per 1,000 live births in 1999 to 100 in 2003. The under -five mortality rate Obasanjo noted, also showed the same trend, starting at 133 deaths per 1,000 live births in 1999 and rising to 201 in 2003.

In Anambra State, looking at the picture/indices of other countries and the information on infant mortality studies,such as literacy, maternal age at the birth of the child, birth spacing or order of birth, state place of residence, place of delivery, utilization of medical facilities such as antenatal visits, religion, and parent's occupation, which formed the focus of this study, the researcher could barely find publications that dealt with thesesocio-economic and environmental factors affecting infant mortality in Anambra State.Therefore it becomes pertinent to determine factors that affect infant mortality in Anambra State in order to fill the gap. Hencethe motivation for the researcher to study the socio-economic and environmental factors affecting infant mortality in Anambra State.

Statement of the Problem

Every child is born with the right to live but not an equal chance. Although there has been a substantial reduction in infant and child mortality rates in most developing countries in the recent past, it still remains a major public

health issue in Sub-Saharan Africa, with special reference to Nigeria (Adeleye & Ofoegbu, 2013). The Nigeria infant mortality rate according to Central Intelligence Agency (CIA) World Fact book (2009) was 94.35 deaths/1,000 live births. This figure ranked Nigeria in 212th position in 2009. This position is against 2.31deaths/1,000 live births in Singapore (1st position), France, 3.33 deaths/1,000 live births (8th position), U.S. A. 6.26 deaths/1,000 live births (46th position), Egypt 27.26(144th position), Ghana 51.34 deaths/1,000 live births (175 position) among others.

Although the 2008 Nigeria Demographic and Health Survey (NDHS) indicated some improvement in IMR and under 5 mortality rate(U5MR), these rates still fall short of the World Summit for Children (WSC), national goals for reducing IMR (50/60 per 1,000LB) and U5MR (70/80 per 1,000LB) by one-third by 2000. The huge variations in these rates among different parts of the country, notably urban and rural areas and north and south, are striking (Adeleye & Ofoegbu, 2013; Mesike & Mojekwu, 2012).

Similarly, UNICEF (2010) in the State of the World's Children Report noted that 8.1 million children across the world who died in 2009 before their fifth birthday lived in developing countries and died from a disease or a combination of diseases that could easily have been prevented or treated. It also noted that, half of these deaths occurred in just five countries namely,

India, Nigeria, the Democratic Republic of Congo, Pakistan and China; with India and Nigeria both accounting for one third of the total number of under five deaths worldwide. The report described the phenomenon as disturbing and grossly insufficient to achieve the Millennium Development Goals (MDGs) by 2015 as only 9 out of the 64 countries with high childmortality rate are on track to meet the MDGs.

The main target for the MDGs Goal 4 (To Reduce Child mortality) is to reduce by two thirds the mortality rate among children under five. UNICEF (2006) predicted a worldwide reduction at 22.0 per 1000 live births by 2015. The status in Anambra State is poor as reflected in the high infant mortality rate (IMR) of 74 per 1000 live births according to National Health Demographic Survey (NDHS) (1999) Report.

Currently, the situation in Anambra State in respect of information gathered by the researcher from parents, health workers and paediatric doctors in some hospitals in the state is not certain. However, from their collective opinion, there is deteriorating condition in relation to infant mortality in the state despite all efforts to reduce rate of child death through the provision of primary health centres and health posts virtually in every town and ensuring skilled attendants at every delivery.

Besidesfew studies on infant mortality that have been carried out in Nigeria, most studies conducted in this area were in other countries and were on particular factors such as education or socio-economic factor. Others were on particular infant factors as a Sudden Infant Death (SID), prematurity and child's sex. Not much research has been done on socio-economic and environmental factors affecting infant mortality in Anambra State. The study of infant mortality is important in any given society as infant mortality is recognised as a general health indicator of a population (Reidpath & Allotey, 2003). Studies have shown that infant mortality has a high correlation with other social issues and negative health outcomes (Schell, Reilly, Rosling, Perterson, Ekstrom,2007). Infants suffer the highest consequences of negative health outcomes from socio-economic issues and social disadvantages. This is because infants, more than any other age group, are particularly vulnerable to their immediate living conditions (Gortmaker & Wise, 1997. Thus it is important that infant mortality be a focalpoint of any society to ensure that the infant mortality levels are kept low.

Therefore, this study was to find out the socio-economic and environmental factors (such as maternal age, parents' education, parity, birth spacing, state of place of residence, place of delivery, religion, and parents' occupation) that affect infant mortality in Anambra State in other to fill the gap.

Purpose of the Study

Generally, the study was designed to determine socio-economic and environmental factors affecting infant mortality in Anambra State. Specifically the study determined the:

1. age of mothersas it affects infant mortality in Anambra State.
2. mothers' education as it affects infant mortality in Anambra State.
3. fathers' education affects infant mortality in Anambra State.
4. parityas it affects infant mortality in Anambra State.
5. birth spacing as it affects infant mortality in Anambra State.
6. antenatal visits/attendance during pregnancy as it affects infant mortality in Anambra State.
7. place of deliveryas it affects infant mortality in Anambra State.
8. state of place of residenceas it affects infant mortality in Anambra State.
9. religionas it affects infant mortality in Anambra State.
10. mother's occupationas it affects infant mortality in Anambra State.
11. father's occupationas it affects infant mortality in Anambra State.

Significance of the Study

The result of this study will hopefully be beneficial to so many people in so many ways. This study will contribute tofill the gap in knowledge as there are few studies in the socio-economic and environmental factors affecting infant mortality in Anambra State.

Mothers will benefit from this study, as the information from the result when disseminated would expose how mother's age affect infant mortality, which will enable the mothers to know the good age to have their babies in order to reduce infant mortality rate in the state.

Findings of the studyshow that mother's poor state of residence could contribute to infant mortality and this will help to educate the mothers on good hygiene and on how to keep their environment clean. Consequently, nurses, health educators and other public health workers would stem on this knowledge to prepare health documents to serve as preventive measures for documentary on health and infant mortality.

One of the objectives of this study was to determine how parental level of education affects infant mortality, and this showed significant difference to infant mortality. Thus health planners/policy makers will use the findings to identify the areas of priority in intervention to reduce infant mortality such as

planning for free girl child education. It is assumed that adequate girl child education will invariably help to prepare the girl child for child bearing and subsequently reduce infant mortality.

The knowledge of the socio-economic and environmental conditions affecting infant mortality will helpin programme planning and formulation of policies that will reduce infant mortality in the state.

The findings would also be a basis for comparison within and outside the state as it will help to identify how each socio-economic and environmental factor relates to infant mortality and as well as show how far progress is being made to reach the MDG goal in the state.

The NGOs that have interest in infant mortality programmes will find the results of this study very useful for planning and implementing programmes with a specific objective to reduce infant mortality.

Scope of the Study

This study basically focused on some socio-economic and environmental factors affecting infant mortality. These factors were delimited to the ages of mother, parent's education, parity, birth spacing, place of residence, place of delivery, antenatal visits/attendance, religion, and parent's occupation. The study was carried out in sampled 14 communities in seven Local Government

Areas in Anambra State and included all mothers who have experienced infantmortality during the years 2000 - 2011.

Research Questions

The following research questions guided the study:

How does:

1. age of the mothers affect infant mortality in Anambra State?
2. mother's education affect infant mortality in Anambra State?
3. father's education affect infant mortality in Anambra State?
4. parity affect infant mortality in Anambra State?
5. birth spacing affect infant mortality in Anambra State?
6. antenatal visits/attendance affect infant mortality in Anambra State?
7. place of delivery affect infant mortality in Anambra State?
8. place of residence affect infant mortality in Anambra state?
9. religion affect infant mortality in Anambra State?
10. mother's occupation affect infant mortality in Anambra State?
11. father's occupation affect infant mortality in Anambra State?

Hypotheses

The following null hypotheses will be tested at 0.05level of significance;

1. Ageof mothers donot have significant effect on infant mortality in Anambra State.
2. Mother's education does not have significant effect on infant mortality in Anambra State.
3. Father's education does not have significant effect on infant mortality in Anambra State.
4. Parity does not have significant effect on infant mortality in Anambra State.
5. Birth spacing of mothers in Anambra State doesnot have significant effect on infant mortality.
6. Antenatal visits/attendance of mothers in Anambra State does not have significant effect on infant mortality.
7. Place of delivery of mothers does not have significant effect on infant mortality in Anambra State.
8. Place of residence of mothers does not have significant effect on infant mortality in Anambra State.
9. Religion of mothers does not have significant effect on infant mortality in Anambra State.

10. Mother's occupation does not have significant effect on infant mortality in Anambra State.
11. Father's occupation does not have significant effect on infant mortality in Anambra State.

Operational Definition

- ✓ Socio-economic and environmental factors- These factors were grouped under demographic (age of mother, mothers age at birth of dead infant, religion, number of children, birth spacing), socio-economic (maternal education, father's education, occupation of mother and father), environmental (place of residence, standard of living index) and health care utilization (place of delivery, antenatal visits).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The purpose of this study was to determine the socio-economic and environmental factors affecting infant mortality in Anambra State. The chapter reviewedrelated literature on infant mortality under the following subheadings:

Conceptual Framework

Infants

Infant Mortality

Infant Mortality Rate

Socio-economic and Environmental factors

Theoretical Framework

Health Belief Model

Theory of Reasoned Action

Theoretical Studies

Age and Infant Mortality

Education and Infant Mortality

Parity and Infant Mortality

Place of Delivery and Infant Mortality

Antenatal Visits and Infant Mortality

Place of Residence and Infant Mortality

Religion and Infant Mortality

Occupation and Infant Mortality

Empirical Review

Summary of Review of Related Literature

Conceptual Framework

Infants. The concept of infant according to Merriam-Webster encyclopaedia is "a child in the first period of life". The term typically is applied to young children between the ages of 1month and 12 months; however definitions may vary between birth and 3years of age. Infant Mortality in the field of public health is a commonly used statistical measure that is defined as the ratio of infant deaths to live births.

Infant Mortality. Infant mortality is the death of a baby up to the age of 12 month and these deaths are often expressed in ratio between the numbers of deaths of infants less than 1year of age and the number of live births occurring in the same year (Klossner& Hatfield, 2006). This ratio signifies the rate and is known as the infant mortality rate which is the number of deaths among infants under one year per 1,000 live births (Ogbalu, 2009; Lucas & Gilles, 2003; Adetunji, 1994; Da Vanzo, & Habicht, 1986).

Infant Mortality Rate (IMR). The statistics of infant deaths are referred to as infant mortality rate (IMR).IMR is the number of deaths that occur in the first year of life for 1000 live births(Ogbalu,2009) or the number of newborns dying under a year of age divided by the number of live births during the year times 1000(Lucas & Gilles, 2003). IMR is one of the most important sensitive indicators of the socioeconomic and health status of a community. This is because more than any other age-group of a population, infant's survival depends on the socioeconomic conditions in their environment (Madise, 2003). Infant mortality is one of the components of United Nations Human Development Index (United Nations, 1985). Hence its description is very vital for evaluation and planning of the public health strategies (Park, 2005).

In Nigeria, approximately, eight out of every 100 live births die before their first birthday, representing huge wastage of potential manpower (Adetunji, 1995). Achieving the MDGs simply means reducing infant mortality rate to about 22.0 per 1000 live births by 2015. The level of IMR per 1000 live births had shown an increase. However, the subsequent increase is a matter of debate, but some researchers suggested the impact of the HIV/AIDS epidemic especially in this region (Rutstein, 2000; Hill, Cicero & Mahy, 2001) and the "continuous economic crisis, the widespread political

instability and civil strife" in the sub-region of East and North Africa (Amouzou & Hill, 2004) as the reasons for the increase.

Socioeconomics and Environmental Factors. Socioeconomic factors are the social and economic experiences and realities that help mold one's personality, attitudes, and lifestyle. The factors can also define regions and neighborhoods.It could also be referred to, as a person's class in society based on how much money he/she makes. It is relating to, or involving both economic and social factors. Environmental factor according to Businessdictionary.com is an identifiable element in the physical, cultural, demographic, economic, political, regulatory, or technological environment that affects the survival, operations, and growth of an organization. It is the external conditions or surroundings, especially those in which people live or work or in Ecology, the external surroundings in which a plant or animal lives, which tend to influence its development and behaviour.The lawdictionary.org views environmental factors as known characteristics in an environment that impact the survival, operations, and growth of an organization. This identifiable element exists as a physical, cultural, demographic, economic, political, regulatory, or technological characteristic. Some existing studies on child health have focused on medical causes of infant and child mortality (McElroy TerKuile, Hightower, Hawlley, Phillips-

Howard, Oloo, Lal & Nahlen, 2001) and factors associated with under-five mortality (Hill et. al., 2001 and Mutunga 2004). Other researchers using data from different regions of the world have reported of association between infant mortality rate and socioeconomic and demographic factors. These studies are limited on the number of variables examined while there was no rank-ordering of the factors that predict infant mortality most. Hence the programme implications of these findings tend to involve interventions in various sectors of the economy. In the face of dwindling economic resources and global economic meltdown, there is a need to identify only the most important factors that affect infant mortality. This can be done by rank-ordering of the important factors so that health education interventions should focus on those key sectors that will have direct and immediate impact on child health instead of engaging in multifaceted approach with no visible impact (Gunasekran, 1997; Hill, et. al., 2001).

Theoretical Framework

It is very important scientifically and practically, to recognize implicit theories that may be applied to this study for better understanding. This is because they powerfully enhance understanding of health care activities. By understanding both the subject area and the theoretical underpinnings of successful behaviour change, an outline for the intervention can then begin to

take shape. The Health Belief Model and Theory of Reasoned Action were selected to explain behaviours in health care activities.

Health Belief Model- this model was postulated by Rosenstock (1964). It is a psychological model that attempts to explain and predict health behaviours by focusing on the attitudes and beliefs of the individuals. The HBM was developed in the 1950s as part of an effort by social psychologists in the United States Public Health Service to explain the lack of public participation in health screening and prevention programmes (e.g., a free and conveniently located tuberculosis screening project). Since then, the HBM has been adapted to explore a variety of long-term and short-term health behaviours, including sexual risk behaviours and the transmission of HIV/AIDS. The key variables of the HBM are as follows (Rosenstock, Strecher& Becker, 1994):

Perceived Threat: Consists of two parts: perceived susceptibility and perceived severity of a health condition.

Perceived Susceptibility: One's subjective perception of the risk of contracting a health condition.

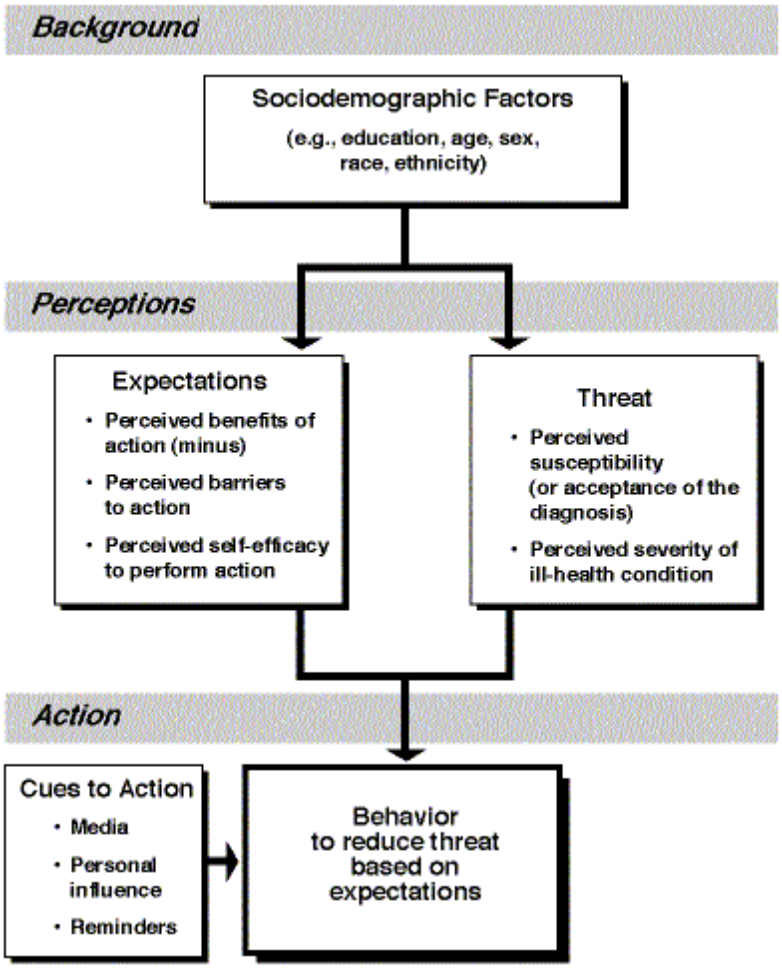
Perceived Severity: Feelings concerning the seriousness of contracting an illness or leaving it untreated (including evaluations of both medical and clinical consequences and possible social consequences).

Perceived Benefits: The believed effectiveness of strategies designed to reduce the threat of illness.

Perceived Barriers: The potential negative consequences that may result from taking particular health actions, including physical, psychological, and financial demands.

Cues to Action: Events, either bodily (e.g., physical symptoms of a health condition) or environmental (e.g., media publicity) that motivate people to take action. Cues to actions is an aspect of the HBM that has not been systematically studied.

Components of Health Belief Model:



Source: Rosenstock I., Strecher, V., and Becker, M. (1994). *The Health Belief Model and HIV risk behaviour change*. In R.J. DiClemente and J.L.Peterson (Eds.).*Preventing AID: Theories & Methods of behavioural interventions* (pp. 175-188) New York: Plenum Press.

HBM research has been used to explore a variety of health behaviours in diverse populations. For instance, researchers have applied the HBM to studies that attempt to explain and predict individual participation in programmes such as influenza inoculations, Tay-Sachs carrier status

screening, high blood pressure screening, smoking cessation, seatbelt usage, exercise, nutrition, and breast self-examination. The model also has been used to gain a better understanding of sexual risk behaviours (Rosenstock et al., 1994).

In a literature review of all HBM studies published from 1974-1984, the authors identified, across study designs and populations, perceived barriers as the most influential variable for predicting and explaining health-related behaviours (Janz and Becker, 1984). Other significant HBM dimensions were perceived benefits and perceived susceptibility, with perceived severity identified as the least significant variable. More recently, though, researchers are suggesting that an individual's perceived ability to successfully carry out a "health" strategy, such as using hospital facility for delivery consistently, greatly influences his/her decision and ability to enact and sustain a changed behaviour (Bandura, 1989).

The general limitations of the HBM include that most HBM-based research to date have incorporated only selected components of the HBM, thereby not testing the usefulness of the model as a whole. As a psychological model it does not take into consideration other factors, such as environmental or economic factors, that may influence health behaviours. Also the model does

not incorporate the influence of social norms and peer influences on people's decisions regarding their health behaviours(Raczynski& Diclemente, 1999). Some of the maternal variables mentioned in this study may be influenced by this model as some mothers may, because of their previous experiences decide to take their deliveries in the hospital where there are facilities for emergency situations.

Theory of Reasoned Action (TRA).The theory of reasoned action advanced in the mid-1960s by Martin Fishbein and Icek Ajzen, is based on the assumption that human beings are usually quite rational and make systematic use of the information available to them, and that people consider the implications of their actions in a given context at a given time before they make choices about whether to engage in a particular behaviour or not. The theory states that attitude toward behaviour, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions and behaviours.There is perceived control of one's behaviour, that is, a behaviour is under a person's conscious control; decisions are made on a rational basis following a comparison of the benefits and drawbacks of adopting a new behaviour. This theory is conceptually similar to the Health Belief Model but adds the construct of behavioural intention as a determinant of health

behaviour.Research using the Theory of Reasoned Action (TRA) has explained and predicted a variety of human behaviours since 1967. Based on the premise that humans are rational and that the behaviours being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, and intentions. (Fishbein, Middlestadt & Hitchcock, 1994). The theory variables and their definitions, as described by Fishbein et al., (1994), are of four components namely:

Behaviour: A specific behaviour defined by a combination of action, target, context, and time (e.g., implementing antenatal care (action) by keeping to appointments (target) in the maternal and infant clinics (context) every time (time).

Intention: The intent to perform behaviour is the best predictor that a desired behaviour will actually occur. In order to measure it accurately and effectively, intent should be defined using the same components used to define behaviour: action, target, context, and time. Both attitude and norms, described below, influence one's intention to perform a behaviour.

Attitude: A person's positive or negative feelings toward performing the defined behaviour.

Behavioural Beliefs: Behavioural beliefs are a combination of a person's beliefs regarding the outcomes of a defined behaviour and the

person's evaluation of potential outcomes. These beliefs will differ from population to population. For instance, married heterosexuals may consider introducing condoms into their relationship as an admission of infidelity, while for homosexual males in high prevalence areas it may be viewed as a sign of trust and caring.

Norms: A person's perception of other people's opinions regarding the defined behaviour.

Normative Beliefs: Normative beliefs are a combination of a person's beliefs regarding other people's views of behaviour and the person's willingness to conform to those views. As with behavioural beliefs, normative beliefs regarding other people's opinions and the evaluation of those opinions will vary from population to population.

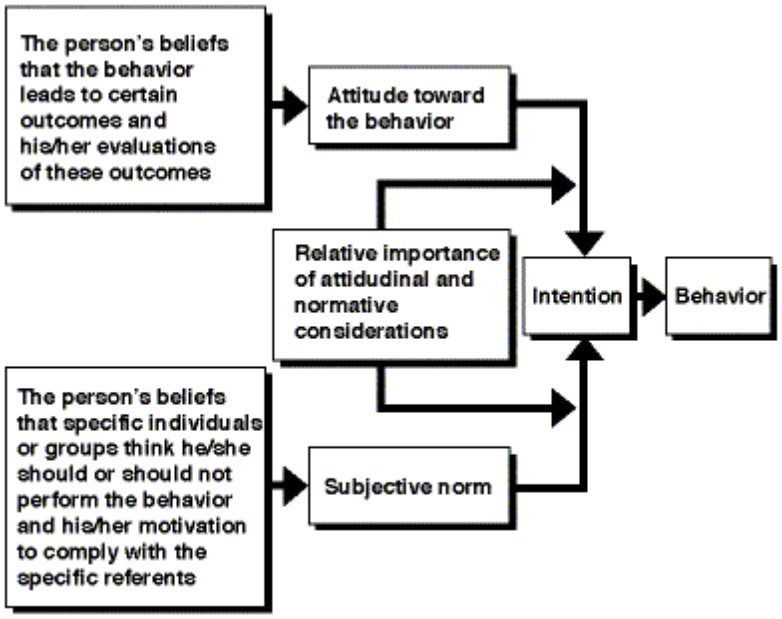
Essentially, the behavioural and normative beliefs referred to as cognitive structures influence individual attitudes and subjective norms, respectively. In turn, attitudes and norms shape a person's intention to perform behaviour. Finally, as the authors of the TRA argue, a person's intention remains the best indicator that the desired behaviour will occur. Overall, the TRA model supports a linear process in which changes in an individual's behavioural and normative beliefs will ultimately affect the individual's actual behaviour.

The attitude and norm variables, and their underlying cognitive structures, often exert different degrees of influence over a person's intention. For example, results from a study of northern Thai males revealed that men's perceptions of peer norms were the best predictor of condom use (VanLandingham, Suprasert, Grandjean & Sittitrai, 1995). Yet in a study of college females in the United States, attitudinal beliefs exerted greater influence on the intent to use condoms by sexually inexperienced females (Middlestadt & Fishbein, 1990). In order to develop appropriate interventions for a specific population and behaviour, therefore, it is important to determine which variable and its corresponding cognitive structures exerts the greatest influence on the study population (Fishbein et al., 1994). To date, behaviours explored using the TRA include smoking, drinking, signing up for treatment programmes, using contraceptives, dieting, wearing seatbelts or safety helmets, exercising regularly, voting, and breastfeeding (Fishbein et al., 1994; Wilson, Zenda & Lavelle, 1993; Kasprzyk & Wilson, 1990).

Some limitations of the TRA include the inability of the theory, due to its individualistic approach, to consider the role of environmental and structural issues and the linearity of the theory components (Kippax & Crawford, 1993). Individuals may first change their behaviour and then their beliefs or attitudes about it. For example, studies on the impact of seatbelt laws in the

United States revealed that people often changed their negative attitudes about the use of seatbelts as they grew accustomed to the new behaviour.

Patterns of theory of Reasoned Action:



Source: Adjen, I., Fishbein, M. (1980) *Understanding attitudes and predicting social behaviour*. New Jersey: Prentice-Hall, Inc. Preventive behaviour (pp. 253-269). New York: Pergamon

In this study, the Health Belief Model was adopted because if mothers are aware of the relationship of socio-economic and environmental factors affecting infant mortality, it is believed that most of them will change certain attitudes as the result of this research will help to educate the mothers and hopefully contribute in change of certain attitudes and beliefs of the mothers. TRA also is related to the study as it is belived that changes in an

individual'sbeliefs will ultimately affect the individual's actual behaviour. Also the attitude and norm variables exert different degrees of influence over a person's intention and in this case mother's intention as to the place of delivery and residence.

Theoretical Studies

Age and Infant Mortality. Age is described as a stage of life i.e. a stage or phase in the life time of somebody or something. Mother's characteristics that are controlled are age at birth of the child (in years). Mother`s age at birth of child and birth order according to Uddin and Hossain, (2008) had significant influence on infant mortality and it was lowest for the children having birth interval over 30 months. It was also found that timing of first antenatal check, Tetanus Toxoid (TT) during pregnancy and numbers of antenatal visit had significant influence for both mortality cohorts. Several studies documented that demographic factors such as mother's age at the birth of child, birth order, type of birth, birth spacing with previous child, sex of child, breastfeeding status were important factors of infant and child mortality (Uddin & Hossain, 2008; Hobcraft, 1993; &Gubhaju, 1986). Few studies had shown a classic U shaped relationship between age of mother at the birth of child and infant mortality (Naghavi, Jafari, JamshidBeiggi, Vasegh, Azad, & Akbari, 2005; Rutstein, 2000). A

higher risk of infant and child mortality were indicated for four specific types of pregnancies such as before 18 years of age, after 35 years of age, after four deliveries, interval between births of less than 2 years (Forste, 1994). Dube (2012) confirmed an association between mothers' age at first birth and infant mortality as infants born to mothers of 18 years and younger suffer higher risk of infant mortality.

According to Kaldwei (2010) other household level determinants include the age of the mother at the time of birth. While this is likely to be an important determinant for infant and child mortality, owing to differences in biological health status, he did not expect to find a linear relationship. However, Rutstein, (2000) and Uddin & Hossain, (2008) had a higher probability of mortality for children of very young mothers (before 18 years) and for those born to older mothers (after 35years).

Education and Infant Mortality. Education is the art of imparting and acquiring of knowledge through teaching and learning especially at a school or similar institution.Adeleye and Ofoegbu (2013) opined that the risk of death among infants and young children is closely associated with their mother's characteristics as well as the environment in which they live. Women's education has been reported as a key factor in reducing infant and child mortality. The higher a woman's level of education, the more likely it is

that she will marry later, play a greater role in decision making, and exerciseher reproductive rights. Her children will tendto be better nourished and enjoy better health. They also noted that the lack of primary education and lack ofaccess to health care contribute significantly tochild and maternal mortality statistics. Moreover, womenwho complete secondary education are morelikely to delay pregnancy, receive prenatal andpost natal care and have their birth attended toby aqualified medical personnel. Data from theNDHS (2008) revealed that low educational levelsamong females were related to higher infant.

Studies from developing countries have suggested that child mortality is more closely associated with maternal education than with any other factor. Using Nigerian data, Caldwell (1979) argued that education of the woman plays an important role in determining child survival even after controlling a number of other factors such as socio-economic characteristics of the husband, including his educational level and occupation.

An attempt was made to investigate the predictors of neonatal and post-neonatal mortality in Bangladesh by utilizing the data of Bangladesh Demographic and Health Survey (BDHS) 1999-2000. In this study the cross-tabulation analysis revealed that infant mortality varied significantly by several variables. Among these variables, parent's education had significant

effect on infant mortality (Uddin & Hossain, 2008). Mosley (1985) identified the risk of childhood morbidity and mortality that were directly influenced by education of mother, sanitation facilities, access to safe drinking water and maternal and child health care services. Cleland (1990) and Gitter, (2003) found that early childhood mortality is highly associated with the maternal education for all major developing regions. Uddin and Hossain (2008) and Hossain (2000) studied the determinants of infant and child mortality and identified that receiving of health care services; birth interval and education of mother were the major determinants of infant and child mortality.

Most demographic researches indicated that there were strong statistical association between maternal education and infant mortality (Bicego & Boerma 1991; Hobcraft, McDonald, &Rutstein 2000; Mensch, Lentzer, & Preston 1985). These findings have led some researchers (Caldwell 1979; 1994) to conclude that there is a causal relationship between mother's education and child health and mortality. Dashtseren (2002) identified that infant and child mortality were lower for the children whose mother read newspaper, watch TV, listen to radio compared with those children whose mothers had no access of such media. Pandey, *et al.* (1998) concluded that mother's exposure to mass media has no effect in neonatal mortality.

However, statistically significant effect for post-neonatal mortality and child mortality in India was noted.

Rosenzweig and Schultz (1982); Caldwell and Caldwell (1993) as well as Hobcraft (1993) stated that mother's education may influence child health and mortality through different pathways viz-a-viz:

(1) Education enhances the acquisition and use of health knowledge.

(2) Education enhances the use of health services.

(3) Mother's education increases family resources, either through their own work or that of their husband, which in turn affect the health of family members.

(4) Education affects preferences for child health and family size.

Generally, mothers with higher education also have higher incomes or marry husbands who have higher incomes. They also tend to live in rich communities with better access to health services (Palloni 1981). Consequently, when socioeconomic and community characteristics of mothers are controlled, the associations between maternal education and child health and mortality are attenuated, sometimes to negligible levels (Hobcraft 1993; Desai & Alva 1998; Kravdal 2004). Hobcraft (1993) agreed that these socioeconomic and community characteristics may be capturing the pathways through which maternal education influences child health and

mortality (the use of health services is one such pathway). Regarding the association between socioeconomic status and infant and child mortality, Caldwell (1979) reported on the effect of mother's education on reducing the child mortality. He put up a theory that mother's education works through changing feeding and care practices, leading to better health seeking behaviour and by changing the traditional familial relationships. In supporting Caldwell's explanation, Hobcraft (1993) explained that education can contribute to child survival by making women more likely to marry and enter motherhood later and have fewer children, utilize prenatal care and immunize their children. The results also, showed mysterious conclusion that effect of maternal education on child survival is weaker in sub-Saharan Africa. Similar findings were reported elsewhere by Devlieger, Martens, and Bekaert (2005). These findings led some researchers (Hobcraft, McDonald, and Rutstein 1984; Mensch, Lentzer, & Preston 1985; Caldwell 1979; 1994) to conclude that there is a causal relationship between mother's education and child health and mortality.

Other researchers, Desai & Alva (1998) reject the existence of a strong causal relationship. They maintain that the nature of disease during the first year of life is such that mothers cannot do much in order to prevent death of their children. Using fixed effect models, Desai and Alva (1998) showed that the

association between maternal education and infant mortality declines considerably in some countries and disappears in others when they control for socioeconomic status and community characteristics of mothers with such models. The question is important because if there is a causal relationship, then education of mothers can enhance the health of children and reduce infant mortality. This is particularly important for poor households and countries. Cleland and van Ginneken, (1988) also indicated that mother's education is less important for infants than for children.

Evidences from studies that used data of censuses (Tulasidhar, 1993) and demographic surveillance systems (Bhuiyat, & Streatfield, 1991) showed the same mortality differential by maternal education. The only identified counter intuitive result on this association was brought by Adetunji (1995) who had examined the 1986-1987 Ondo State Demographic Health Survery using birth history data from 2635 women aged 15-49. The study showed that infant mortality was higher in those born to mothers with secondary education compared to uneducated mothers. He suggested that the lower maternal age at birth and less duration of breastfeeding which were associated with this group of women could be responsible for this finding.

Desai and Alva (1995) rejected the existence of a strong causal relationship. However, a Tanzanian study had shown lack of infant and child mortality

differentials by such socioeconomic factors as maternal education, partner's education, urban/rural residence, and presence of radio in the household (Mturi& Curtis, 1995). In Kenya, Hill, et al. (2001) reported an inverse relationship between mother's educational level and economic status (wealth index) and child mortality.

Although the controversy on this subject centres on the existence of a causal relationship between maternal education and infant mortality, researchers have failed to use the extensive literature on causal analysis (Mturi & Curtis, 1995). Cleland and Van Ginneken (1988) argued that the effect of maternal education on childhood mortality has little to do with shifting reproductive behaviour, whereas others have argued for reproductive linkages between maternal education and child survival (Mason, 1984).

Certain characteristics of mothers could be correlated with her education and infant mortality. These include mother's biological and psychological characteristics, preferences, socioeconomic status (SES), and access to health services. Generally educated mothers have higher SES due to their own or their husband's higher income. Educated women are more likely to live in communities with access to health services, mainly due to their higher SES, but also due to their political activities (Palloni, 1981) or health seeking behaviour. Some biological and psychological characteristics of mothers may

influence both their acquisition of cognitive skills and the health of their children (either through genetic transmission or their nursing practices). Mother's socioeconomic status and access to health services can be controlled through the variables place of residence, religion, and household characteristics. The main determinants of mother's education are the socioeconomic status of her parents, their education, and access to educational services. Reproductive factors provide another pathway between education and child health and previous studies have attempted to link maternal education and reproductive behaviours to child survival (Mason, 1984; Le Vine, LeVine, Richman, Tapia, Uribe, & Sunderland Correa, 1994). They concluded that with higher levels of education, women are more likely to view reproduction as being within their direct control.

Parity and Infant Mortality. Parity is a term that is used to indicate the number of pregnancies a woman has undergone that have resulted in the birth of a baby capable of survival. Parity also refers to the birth order of the child. Mothers of preterm infants with a lower number of children, especially first time mothers, seem to have positive enough expectations for their babies, perhaps distant from the reality they are experiencing at the moment (Padovani, Linhares, Pinto, Duarte, & Martinez, 2008). The infant mortality was found higher in small families, while low for the children whose

mothersbreastfed and it decreased significantly with the increase of mothers standard of living index (Uddin & Hossain, 2008). Many studies identified the negative relationship between birth interval and infant and child mortality (Bicego&Boerma (1992); Hossain, (2000); Inayatullah, (1986); Pebley and Millman, (1986); Winikoff, (1983). Kabir, Chowdhury, and Amin, (1995) in their report, concluded that the birth order of a child had strong effect on the survival in the first year of life but the effect diminished thereafter. Investigations on the effect of breastfeeding on child survival showed that infants who were exclusively breast-fed survived longer and healthier than artificially fed children (Habicht, Davanzo & Butz, 1986; Ruttenberg, Finello, & Cordeiro, 1997). Child's characteristics that were controlled include parity, sex, and the incidence of multiple births. Moreover, decisions regarding the timing of births are conscious, and reproductive behaviour is monitored to prevent undesired pregnancies. Previous research has found an association between higher education and lower fertility, reproduction at low-risk ages, and longer birth intervals (Cleland & Van Ginneken, 1988). These reproductive factors are all associated with increased child survival.

Higher levels of infant mortality are associated with both child bearing among adolescents and women over the age of 35 (Tagoe-Darko, 1995; Gubhaju, 1986; Martin, Trussell, Salvail, & Shah, 1983 ;). Birth intervals of

less than 2 years are associated with increased childhood mortality rates (Sullivan & Sheffrin, 2003; Curtis & Steele, 1996; Tagoe-Darko, 1995; Gubhaju, 1986). Children spaced two or more years apart have a greater chance of being well cared for, of being breast-fed longer, and of being taller and heavier (Bastien, 2002; Gubhaju, 1986). Additionally, stunting is more common among children with a prior birth interval of less than 24 months than among children following longer birth intervals (Sommerfelt & Stewart, 1994; Burma, Sommerfelt, & Rutstein, 1991; Forste, 1994).

Regarding parity, first-order and high parity births are at greater risk of mortality than lower parity births, noted Tagoe-Darko, (1995); Sullivan et al., (1994); Pebley & Millman, (1986); and Gubhaju, (1986). Furthermore, past research findings showed that stunting increases as birth order increases (Sommerfelt & Stewart, 1994; Forste, 1994).

Birth order may also play a role in the probability of infant and child mortality, though the direction of the effect is ambiguous (Kaldewei, 2010). Parity has been identified in past studies as an important factor in infant mortality (Omariba et al, 2007).According to the hypothesis of intra household resource competition, first born children are more likely to capture vital resources such as food and care, thereby reducing their mortality risk (Vos, Rob, Ruth Lucia, Mauricio León, José Rosero, & José Cuesta, 2004).

On the other hand, it has been found that first born children, who are more likely to be born to mothers at younger reproduction ages, experience a higher mortality risk than children of a higher birth order. A number of studies indeed point to a U-shaped effect of birth order, with the probability of infant mortality declining after the first child and increasing again for children of birth order four and higher (Titaley, Agho, Roberts & Hall, 2008; Uddin and Hossain, 2008). Adjusting for a number of socioeconomic factors Mutunga (2004) found that child survival was found better for those who were of birth order 2-3, birth interval more than 2 years, not outcomes of multiple births.

Place of Delivery andInfant Mortality. This could be a building or location for a particular purpose. In this context, it is a building or location for the expulsion or extraction of a baby from the mother's womb or uterus. Some authors agree that receiving of health care services during antenatal and post-natal period has very positive impact on the survival of the children (Hill,*et al*. 2001; Hossain, 2000; Gunasekaran, 1997; Adetunji, 1994). The maternal health care variables such as timing of first antenatal check, number of antenatal visit during pregnancy, tetanus toxoid (TT) injection during pregnancy, taking iron and folic acid tablets, delivery assistance and place of delivery have profound importance in reducing the infant and child mortality.

In Bangladesh, an inadequate health care service for mothers is an important reason for the high rates of infant and child mortality (Kabir & Amin, 1995). Contrarily, Kaldewei (2010) in his study found no significant effect for the choice of delivery location.

Antenatal Visits andInfant Mortality. Antenatal care according to Women's care (n.d.) is the clinical assessment of mother and foetus during pregnancy, for the purpose of obtaining the best possible outcome for the mother and child. To achieve this objective, history and examination are complemented by screening and assessment using a combination of methods, including biochemical, haematological and ultrasound. Efforts are made to maintain maternal physical and mental wellbeing, prevent preterm delivery, to anticipate difficulties and complications at delivery, ensure the birth of a live healthy infant, and to assist the couple in preparation for parenting.

Antenatal care traditionally involves a number of 'routine' visits for assessment, to a variety of healthcare professionals, on a regular basis throughout the pregnancy. This approach to antenatal care evolved as an art in an era that preceded the current evidence-based approach to medicine(Women's care, n. d.).

Early monitoring and on-going care during pregnancy is associated with more favourable birth outcomes. Compared with no antenatal surveillance, factors such as preterm delivery, low birth weight, maternal and perinatal mortality may occur. While some traditional practices, such as strict weight-gain restriction, the use of diuretics and the liberal use of x-rays, have been discontinued, many current clinical practices fail to stand up to scientific scrutiny. Despite this, antenatal care continues to be centred about clinical assessment, with emphasis on the regularity of visits, rather than a focus on what can be achieved at key visits during the antenatal period. Marks (1997) suggested that early initiation of prenatal care is believed to promote healthy pregnancy outcomes. However, in the United States in 1994, approximately 20 percent of the infants were delivered to women who had received prenatal care after the first trimester of pregnancy or received no prenatal care at all. Marks also noted that wide differences exist in rates of delayed initiation of prenatal care by State, county, ward, and neighbourhood. Moreover, studies have demonstrated an association between delayed prenatal care initiation and various demographic characteristics (Marks, 1997).

Place of Residence and Infant Mortality. Place of residence is the building or area where a house, apartment or other dwelling in which somebody lives. It could be urban or rural. It is regarded as an important

factor of child mortality, because the health care services including higher coverage of immunization, more safe delivery could be available in urban areas than rural areas (Kabir, *et al*. 1995). Socioeconomic status of households varies from place and region of residence. Adeleye and Ofoegbu (2013) noted that UNICEF's 1999 Multiple Indicator Cluster Survey (MICS) showed that U5MR was almost 1.5 times higher in rural areas than in urban areas and that almost twice as many children died before their fifth birthday in the Northwest than in the Southwest of Nigeria.Access to educational services also varies by place of residence. An adequate family environment, with favourable conditions, such as parental responsibility, acceptance of the child's behaviour, and availability of toys, may reduce or compensate for adverse prenatal risk factors (Kalmár & Boronkai, 1991). This way, the adequate family environment may become a psycho-social protection mechanism for infants vulnerable due to adverse neonatal conditions, attenuating or neutralizing the negative effects of prematurity (Linhares, 2003). In a study, Shaik and Rahman (1991) documented that mother`s occupation has no impact on child mortality in rural areas of Bangladesh, but there is a volatile difference in infant mortality between children of employed and unemployed mothers in urban areas. Nonetheless, prenatal risk may be intensified when the family situations are inadequate (Bradley, Whiteside,

Mundfrom, Casey, Kelleher, & Pope, 1994). For infant and young children, the risk of dying as stated by Uddin and Hossain, (2008) is closely related to the environment in which they live. The environment they noted depends on commitment of nation to provide proper nutrition. The categories of places of residence (urban areas, main villages, satellite villages, and mobile villages) indicate differential access to health services. Urban areas have better access to health services and the mobile villages do not have access to any established health services in their community (Mostafavi, 2009).

Hill (2001) stated in his study that the relationship between urban/rural residence and child mortality, urban areas showed higher mortality risks than rural, but when adjusted for HIV prevalence, child mortality was lower in urban areas.

Separately from drinking water and sanitation, overall socioeconomic status or living standard is expected to affect the wellbeing of household members, including that of mothers and children. Typically used measurements for this are household income or consumption expenditures per capita (Deaton & Zaidi, 1999).

Religion and Infant Mortality. Religion involves the personal beliefs or values i.e. a set of strongly held-beliefs, values and attitudes that somebody lives by. It is very important because of many religious beliefs.

Literature that examines the effects of religion on child survival and health remains scarce, especially in sub-Saharan Africa, the region of worst child health outcomes. A study by Agadjanian and Menjivar, (2008) however examined the relationship between mother's religious affiliation and child survival and selected child health measures in southern Mozambique, a predominantly Christian area with great denominational diversity. Preliminary results suggested that mother's church membership decreases the likelihood of child death and led to better child health outcomes, relative to not belonging to a church. However, the analyses also detected instructive variations across denominations. These results are interpreted in light of the role of religion in general and of specific religious denominations in providing social support and facilitating access to formal health care resources. Numerous studies however found religious involvement to be beneficial to health of individuals and populations (Chatter, 2000; Elifson, Klein, & Sterk, 2003; Powell, Shahabi, & Thoresen, 2003; Ellison & Levin, 1998). However, the effect of religion on health differs from type of religion and religious denomination (Ellison & Levin, 1998). Sloan, Bagiella, & Powell (1999) in fact concluded that religious denominations vary in the extent to which they create group supports to assist members in case of need; promote religiosity and faith among their members as well as in the way that

members gain feelings of guidance in life from their faith and religious involvement. Although at the individual level belonging to certain denomination may not reveal much in terms of the individual's involvement with the denomination (Sloan, *et al.*1999), at the population level, belonging to a certain denomination may suggest an alignment with that denomination's doctrine. The pathways through which religion may affect health include discouraging health-seeking behaviour, promoting salutary lifestyles, enhancing social support and enabling individuals to have a positive opinion about life (Ellison & Levin, 1998).

However, religion may have a negative effect on health and the risk of mortality by prescribing health-damaging behaviours and proscribing those aspects and behaviours that may prevent illness and enhance treatment (Gregson, Zhuwau, Anderson, & Chandiwana, 1999). They are of the opinion that when religious involvement discourages professional help-seeking behaviour for health care, promotes inappropriate use of health care services, and encourages exclusive treatment by clergy and prophets may have detrimental effect on physical and mental health (Chatter, 2000; Gregson, Zhuwau, Anderson, & Chandiwana, 1999). However, the relationship between religion and health appears not to be clear-cut. Sloan, and Bagiella, (2002), however questioned whether the observed association between

religion and health outcomes is a valid one and whether a causal link between religion and health outcomes may be established. In another context, Gregson,et al. (1999) also raised concerns about the significance of the relationship between religious attendance (a measure of religious involvement often used) and health. Studies by Sloan, Bagiella, and Powell, (1999); Sloan and Bagiella, (2002) found weak empirical support to the relationship between religious involvement and health. In sub-Saharan Africa, religious involvement is a growing phenomenon in urban and rural areas of most countries in the region (Agadjanian & Menjivar, 2008; Takyi, 2003; Pfeiffer, 2002; Ellis & Haar, 1998; Gifford, 1994). And increasingly, religion is considered one of the most influential factors in people's lives in sub-Saharan Africa (Gyimah, 2007; Agadjanian, 2005; Pfeiffer, 2004; Ellis & Haar, 1998; Gifford, 1994). At the same time, sub-Saharan Africa is the region on earth with highest levels of child mortality and child-related health problems (Black, Morris & Bryce, 2003; Delaunay, Etard, Preziosi, Marra, & Simondon, 2001). Yet, there is a dearth of studies assessing the effect of religion on child mortality and health in sub-Saharan Africa. Few studies that have examined the effects of religion on health outcomes in sub-Saharan Africa have suggested an association between religious affiliation and mortality and health (Antai, 2008; Gregson, et al. 1999). Gregson and

colleagues sought explanation for the differential in mortality between members of Spirit-type churches (predominantly Zionists and Apostolic) and members of Mission churches in Zimbabwe, and suggested that the avoidance of professional medicine by members of Spirit-type churches in Zimbabwe could explain higher death rates among members of these churches when compared to members of Mission churches in the past. In this era of HIV/AIDS however, the more restrictive sexual behaviour within Spirit type denominations may have limited the spread of HIV infection, leading to small increase in contemporary mortality (Gregson, et al. 1999). In a study of the relationship between mother's religious affiliation and children's immunization status in Nigeria, Antai (2008) found that Islamic religion was significantly associated with reduced risk of full immunization and not associated with the risk of partial immunization in Nigeria.

Occupation and Infant Mortality. Occupation is the job by which somebody earns a living. Uddin and Hossain, (2008) posited that occupation of parents had significant influence on post-neonatal mortality only. Shaik and Rahman (1991) documented that mother`s occupation has no impact on child mortality in rural areas of Bangladesh, but there is a volatile difference in infant mortality between children of employed and unemployed mothers in urban areas. Barret and Brown (2006) showed that the child mortality rate is

lower if mothers engaged in traditional sector jobs and higher if mothers engaged in farming or modern sector jobs. Adjusting for a number of socioeconomic factors Mutunga (2004) found that child survival was found better for those who were of birth order 2-3, birth interval more than 2 years, not outcomes of multiple births. Maternal age, maternal education and gender of the child had significant association with child mortality.

Comparative studies have found that maternal occupation is strongly correlated with neonatal, infant, and child mortality, with agricultural and blue collar workers having the highest childhood mortality levels and professional/white collar workers the lowest (United Nations, 1985).

Further, post-neonatal mortality varied significantly by education and occupation of father, family size, breastfeeding status, mother`s age at birth, type of birth and tetanus toxoid (TT) during pregnancy.

Empirical Review

Various studies have attempted to model the effects of maternal variables, socio-economic(age of mother, education of parents, parity, birth spacing, religion & occupation), and environmental factors(ANC visits, place of delivery, & place of residence) on child survival and health outcomes.

Adeleye and Ofoegbu (2013) studied infant and child mortality in Nigeria. The main purpose of their study was to ascertain the influencing factors on

infant and child mortality in Nigeria. Survey data from the National Health Demographic Survey was used to examine the patterns of infant and child of mortality. The simple regression estimation technique by Mojekwu and Ajibola (2011) was employed to investigate the effects of some selected socio-economic variables on infant and child mortality. The selected variables include: the educational attainment of mothers, place of delivery, women's status respecting decision making in the house which are; final Say on Mother's Health Care, final Say on Making Large Household Purchases, final Say on Making Household Purchases for Daily Needs, final Say on Visits to Family or Relatives, final Say on Deciding What to do With Money Husbands Earns. The study revealed that their exist positive linear association between infant and child mortality and each of the variables serving as indicators for women's status. This study was able to find out that place of delivery plays a crucial role, as better places of deliveries significantly reduce infant and child mortality in Nigeria. Also that higher level of educational attainment hasprofound impact on infant and child mortality.

Mesike and Mojekwu (2012) in their study " Environmental determinants of Child mortality in Nigeria" examined the environmental determinants of child mortality using principal componentanalysis as a data reduction

technique with varimax rotation to assess the underlying structure for sixty-fivemeasured variables, explaining the covariance relationships amongst the large correlated variables in a moreparsimonious way and simultaneous multiple regression for child mortality modelling in Nigeria. For purpose ofrobustness, a model selection technique procedure was implemented. Estimation from the stepwise regressionmodel showed that household environmental characteristics do have significant impact on mortality. They concluded that for socio-economic variables, better survival prospect were found to exist in homes with high income and that lower mortality rate was found in smaller households. Mesike and Mojekwu however recommended that greater efforts should be put in place to ensure adequate provision of healthcare and basic services like good waste management facilities, good sanitation facilities and economic mechanisms to encourage fuel sources as this will generate employmentopportunities that will translate into increased earnings and poverty reduction.

Dube (2012) in his study on “the relationship between mothers' maternal age and infant mortality in Zimbabwe” examined the relationship between mothers’ age at first birth and infant mortality in Zimbabwe. Childbearing at a significantly young age has been noted to be a predictor of infant mortality, as children born to “baby” mothers are at a greater risk of early death. The

methods was a cross-sectional, secondary study which used the data from the Zimbabwe Demographic and Health Survey 2005-2006. The population of interest were women of reproductive ages in Zimbabwe, who have had children within the last five years prior to the survey. A total of 4074 women were used as the sample in this study. The dependent variable was infant mortality, which was understood as the deaths of infants between the period of birth and their first birthday. The independent variables included demographic, socio-economic and reproductive characteristics of the women. The analysis of data was undertaken at three levels. Univariate analysis, binary logistic regression and multivariate logistic regression were conducted. In addition, stepwise logistic regression was applied to the multivariate analysis to analyse the relationship between the significant variables found in the study in relation to infant mortality. The results confirmed an association between mothers' age at first birth and infant mortality. The infants born to mothers of 18 years and younger suffer higher risk of infant mortality, as they have a 33% increased risk in comparison to infants born to older women. Dube, (2012) concluded that there was need for policy development focused on the issue adolescent childbearing and how childbearing can be delayed in Zimbabwe in order to reduce infant mortality.Furthermore, that the reproductive characteristics of the mother

prove to have great impact on infant mortality within the country. Thus the importance of policies focused on women's reproductive health care.

The study therefore confirmed that mothers' age at first birth is a central influential factor in infant mortality in Zimbabwe. Infant mortality cannot be isolated from the characteristics of mothers, in particular her age at first birth, as they are more often the primary care-givers thus have immense influence on whether the infants survive or not.

Kyei (2011) in his study "Socio-Economic factors affecting under five mortality in South Africa- An investigative study" investigated the under five mortality situation in South Africa has using South African Demographic and Health Survey data. About ten socioeconomic,demographic, environmental and health-related variables were analyzed using chi-square test and categorical datamodeling (catmod) analysis. On the basis of the analyses, the study concluded that education of both parents,marital status of the mother as well as her occupation, the loss of older children previously and the duration ofbreastfeeding, are the factors affecting under five mortality in South Africa.

Mondal, Hossain, and Ali (2009) studied factors influencing infant and child mortality in Bangladesh, The main purpose of their study was to observe the influencing factors on infant and child mortality ofsuburban and rural areas

of Rajshahi District, Bangladesh. Primary data was used to examine the differential

patterns of infant and child mortality. A multivariate technique was employed to investigate the effects of thosevariables both socioeconomic and demographic on infant and child mortality. The study results revealed that severalsocioeconomic, demographic and health related variables affect infant and child mortality. Multivariate analysisresults indicated that the most significant predictors of neonatal, post-neonatal, and child mortality levels were immunization, ever breastfeeding, mother's age at birth and birth interval. Again, the risk of child mortality was 78.2% lower among the immunized child than never immunized child and also the risk of neonatal mortality was 57.7% lower after a birth interval of 36 months and above than under 18 months. Parents' education, toilet facilities

and treatment places were significant predictors during neonatal and childhood period but father's occupation wassignificant at post-neonatal periods. Mondal et. al. (2009) noted for instance, that the risk of neonatal mortality was 31.40% lower among the womenhaving primary education and 52.3% lower among the women having secondary and higher education than those having no education. It was observed that the risk of child mortality 32.0% lower among the household having

hygienic toilet facility than those who did not have such facilities. Similarly, risk of child mortality decreased withincreased female education and wider access to safe treatment places. They concluded that attention should be given to femaleeducation and expansion of public health system for reducing the risk of infant and child mortality.

Feresu and others (2005) assessed the contribution of socio-demographic and reproductive risk factors as contributors to infant mortality in Zimbabwe and found that few studies have been done there concerning peri-natal deaths, which is surprising with the rate of peri-natal mortality being at a relatively high rate. Furthermore, it has a significant contribution in the infant mortality rate within the country. Similar to other studies on infant mortality, including Frisbie (2004), this study found that low birth weight is a contributing factor to infant mortality in Zimbabwe. There are high levels of premature births experienced, leading to infants being born with low birth weight, which consequently increases their risk of infant mortality (Feresu et al, 2005).

A study by Zerai's (1996) regarding infant mortality Zimbabwe examined the influence of socio-economic and demographic factors. With the utilisation of the Zimbabwe 1988 Demographic and Health Survey, a multilevel framework was used to determine the rate of infant survival within the country (Zerai, 1996). This study employed the Cox regression multilevel

analysis and concluded that education was an important factor in infant mortality in Zimbabwe. Similar to a study in Nigeria (Adetunji's, 1995), which concluded that the relationship with education was not static and differed to the inverse relationship other studies spoke of, this study found the usual trend in education. Education was found to have greater significance on infant mortality rates at a community level rather than at the mother's individual level of education. This study used the Zimbabwe Demographic and Health Survey of 1988, thus it is important that up-to-date research is completed to determine whether this relationship still exists in Zimbabwe more than 20 years later, and more importantly, whether the relationship remains unchanged over the years.

Kembo and Van Ginneken (2009) conducted a study in Zimbabwe with the objective of determining the impact of maternal, socio-economic and sanitation variables on infant and child mortality using the Zimbabwe Demographic and Health Survey 2005 - 2006. This study found that maternal factors had a significant influence on infant mortality; birth order of 6 and above shows a significant increase in mortality and that high birth order increases infant mortality by up to 2.75 more times in comparison to low birth order (Kembo and Van Ginneken, 2009). This figure is higher than that reported in the Zimbabwe Demographic and Health Survey 2005-2006,

which recorded high birth order of 4 or more children increasing risk of infant mortality (Zimbabwe Demographic and Health Survey, 2007). Birth intervals and multiple births were also highlighted as significant in this study, alongside low mother's age at first birth, which increases the risk of infant mortality by up to 15% (Kembo and Van Ginneken, 2009). Some findings in this study deviate from previous studies of determinants of infant mortality thus there is a still a need to conduct a study in Zimbabwe to highlight these maternal determinants of infant mortality.

Kyu, Shannon, Georgiades, and Micheal (2013) studied the association of urban slum residency with infant mortality and child stunting in low and middle income countries. The study aimed to (i) examine the contextual influences of urban slum residency on infant mortality and child stunting over and above individual and household characteristics and (ii) identify factors that might modify any adverse effects. Data was obtained from Demographic and Health Surveys conducted in 45 countries between 2000 and 2009. The respondents were women (15–49 years) and their children (0–59 months). Results showed that living in a slum neighbourhood was associated with infant mortality (OR = 1.34, 95% CI = 1.15–1.57) irrespective of individual and household characteristics and this risk was attenuated among children born to women who had received antenatal care

from a health professional (OR = 0.79, 95% CI = 0.63–0.99). Results also indicated that increasing child age exacerbated the risk for stunting associated with slum residency (OR = 1.19, 95% CI = 1.16–1.23). The findings suggested that improving material circumstances in urban slums at the neighbourhood level as well as increasing antenatal care coverage among women living in these neighbourhoods could help reduce infant mortality and stunted child growth. They concluded that cumulative impact of long-term exposure to slum neighbourhoods on child stunting should be corroborated by future studies.

Mason (1984) hypothesized various pathways linking female education and infant and child mortality. Her model included contraceptive use, female autonomy, and family socioeconomic status as potential pathways. LeVine, LeVine, Richman, Tapia-Uribe and Sunderland-Correa (1994) linked female schooling to fertility and child survival through intervening mechanisms including the acquisition of skills related to health, socioeconomic aspirations, and interactive interpersonal behaviours.

Based on both qualitative and quantitative research in Mexico, they found some empirical support for these pathways (LeVine, et al. 1994). Other models examined the pathways between women's education and fertility in Latin America specifically. Castro-Martin and Juarez (1995), drawing upon

sociology of education literature, modelled the mediating influences of knowledge, socioeconomic status, and attitudes on the number of children ever born. They hypothesized that education operates as a source of knowledge by providing literacy skills, information, and cognitive changes. In addition, education is a vehicle for socioeconomic improvement, opening economic opportunities and encouraging social mobility. Lastly, education is a transformer of attitudes by encouraging the acceptance of modern ideas over traditional beliefs and authority structures.

Using Demographic and Health Survey data from nine Latin American countries, Castro-Martin and Juarez (1995) found that a substantial portion of the effect of maternal education on fertility was mediated through indicators of knowledge, socioeconomic status, and attitudes. Glewwe (1999) connected parental schooling to child health through parental values, parental cognitive skills (literacy and numeracy), parental health knowledge, and household income. He argued that possible mechanisms linking mother's education and child health include: health knowledge - formal education directly teaches health-related information; literacy and numeracy skills - formal education helps mothers diagnose and treat child health problems; and exposure to modern society - formal schooling makes women more receptive to modern medicine.

In addition to the individual influence of maternal education on child health, studies also indicated that aggregated levels of maternal education at the community level had influence on child nutrition (Alderman, Hentschel, & Sabates, 2003). Thus, maternal education appeared to contribute to child health outcomes both at the community level and at the individual level. Communities with higher proportions of more educated women were likely to provide better sanitation and medical services and shared health knowledge within the community (Alderman et al., 2003; Desai & Alva, 1998).

At the individual level there were at least five potential pathways linking maternal education and child health based on the models previously discussed: improved socioeconomic status (Desai & Alva, 1998; LeVine, et al. 1994; Mason, 1984), health knowledge (Glewwe, 1999; Castro-Martin& Juarez, 1995; LeVine, et al. 1994); modern attitudes towards health care (Glewwe, 1999; Castro-Martin & Juarez, 1995); female autonomy (Castro-Martin& Juarez, 1995; Mason, 1984); and reproductive behaviours (Castro-Martin & Juarez, 1995; LeVine et al., 1994).

Uddin and Hossain (2008) in their study in Predictors of Infant Mortality in a Developing Country said that a total of 6,686 children were found in neonatal cohort, of which 327 were dead during neonatal period. Among socio-

economic variables they studied, the variation of neonatal mortality was found significant for education of parents, family size and mother`s standard of living index. Their results indicated that the neonatal mortality was decreasing with the increasing of mother`s education. The health care in the first month of life was very important for new-born child. The educated mother could utilize the existing health facilities and could take the adequate nutritious food among the available food baskets as she might have a significant role in family decision-making process. They therefore concluded that mother`s education is one of the most important factors for reducing neonatal mortality and increasing child survival.

A significant variation in neonatal mortality was also found also according to education of father. The percentage of death was decreasing (from 5.44 to 3.01%) with the increasing level of education of father. An educated father they noted may be more conscious for taking proper care of the new-born baby and his wife during antenatal and post-natal period, which might be helpful for reducing infant mortality.

Another study demonstrated that the survival of a mother’s children was positively associated with her autonomy level (Kishor, 1995). Jejeebhoy (1995) linked education with maternal decision-making autonomy and

increased child survival. The more education a woman received, the more likely she is to be the primary decision-maker with regards to her children's health. Thus, past findings suggest that female autonomy was another pathway through which maternal education influences child health (Jejeebhoy, 1995; Mason, 1984).

Female education also influenced child health by increasing the decision-making power of women within the family. Women generally were the primary care givers in their home, devoting more time to the protection and care of their children than men (Caldwell & Caldwell, 1993; Caldwell, 1993). Mothers, therefore, were usually the first to recognize a child was sick. However, in many traditional cultures uneducated women often do not act until other traditional authority figures notice the child's illness (Caldwell, et al. 1990).

In addition, studies suggested that educated mothers were better able to comply with doctors' treatment and care regimens for their children (Ware, 2004), and that they could better understand, question, and communicate with health care professionals (Joshi, 2004). Maternal education also operated through community level variables in addition to individual level factors (Alderman et al., 2003). Das Gupta (2000) argued that the basic abilities and personality characteristics of the mother influence on child health outcomes

was independent of education or economic wealth. She concluded that women with greater decision-making power in the household have children with better health outcomes. Additionally, Simon, Adams and Madhavan (2002) found that mothers indicated the felt power to influence outcomes were better able to mobilize resources to meet the nutritional needs of their children.

Given environment with sufficient resources, maternal education can influence child nutritional status by promoting the utilization of modern health care, as well as improving health care knowledge and reproductive behaviours. Increased maternal education changes the traditional balance of power in familial relationships, granting educated women more authority. Educated mothers feel personally responsible for their children and were more likely to draw attention to the illness, demand that action be taken, and take a sick child to the health clinic, rather than deferring decisions to traditional authority structures (Caldwell, 1979, 1993; Caldwell, et al. 1990).

Uddin and Hossain (2008) also considered the births and deaths that occurred during 5 years prior to the survey: the analysis was carried out using all births between November 1994 to October 1999 and all deaths occurred during November 1994 to September 1999. The sample children were then divided into two cohorts: neonatal (deaths within 0-28 days of age) and post neonatal

(deaths between 1-11 months of age). The study considered the socio-economic variables-education of mother, education of father, occupation of mother, occupation of father, religion, family size, exposure to mass media, standard of living index and place of residence. The bio-demographic variables considered were breastfeeding status, birth order, sex of child, birth spacing with previous child, mother's age at birth of the child, complication during birth and type of birth and maternal health care service utilization variables were timing of first antenatal check during pregnancy, TT during pregnancy, number of antenatal visit during pregnancy and place of delivery. Pandey, Choe, Luther, Sahu, and Chand (1998) in their study of Infant and Child Mortality in India, Mumbai, India and Honolulu also found similar result.

Gunasekaran (1997) in his study of determinants of Infant and Child Mortality in Rural India found that neonatal mortality declined considerably when the mother was exposed to any mass media and argued that the effective uses of mass media to propagate health and family welfare messages would help to reduce mortality. The variation of mortality was also examined according to the mother`s standard of living index (SLI), which was computed based on few background characteristics. The SLI was

considered as an alternative measure of household`s socio-economic standardsasserted Gunasekaran (1997).

Kaldwei (2010) in his study of the Determinants of Infant and Under-Five Mortality – The Case of Jordan, noted that among the personal and biological characteristics, there were clear differences in mortality rates according to birth weight (our proxy for premature delivery), multiple deliveries, birth order, and the preceding birth interval. As expected, low birth weight was associated with higher infant mortality, as were being part of a multiple delivery, and being born only a short interval after a preceding birth. Mortality rates also varied with birth order. In line with other findings in the literature, infant mortality was highest for children with birth order four or higher, while it was lowest for children with birth order two or three. Kaldwei (2010) also asserted that they found that more children were born to poorer households than to richer households. In the result of the study, he noted also that the square of a mother's formal education in years reduced the risk of infant mortality, and was highly significant in all estimation results. Concerning household size, they found that a larger number of household members decreased the risk of infant mortality, thus supporting the argument of a beneficial effect of a larger number of caregivers.

The empirical evidence, thus, demonstrated that socioeconomic status had a strong influence on children's health outcomes (Sommerfelt & Stewart, 1994; Forste, 1994; Burma, Sommerfelt, & Rutstein, 1991). Other studies on determinants of infant and child mortality had supported the significant effect of some biological and demographic predictors on the phenomenon. (Troe, 2006; Hessol, 2005; Gyimah, 2002; Forste, 1994; Hobcraft 1985).

Study by Frost, Froste, and Haas (2005) found that optimistic and enterprising mothers were successful in maintaining good nutritional status of their children in spite of impoverished surroundings. In addition, ethnicity was also examined as an indicator of attitudes towards health care. This included ethnicity as an indirect indicator of attitudes towards health care.

Socioeconomic factors had consistently explained half or more of the effect of maternal education on child health outcomes in prior researches (Desai &Alva, 1998; Cleland & Van Ginneken, 1988). We therefore expected socio-economic status to be the most important pathway linking maternal education and child nutritional status. Knowledge on explicit goal of formal education was knowledge transmission. Education facilitates mothers' learning about the causation, prevention, recognition, and cure of disease, as well as nutritional requirements that could subsequently affect their health behaviour (Caldwell, 1979; Cleland & Van Ginneken, 1988). Furthermore, education

can lead women to greater exposure and better understanding of health messages and recommendations through mass media or other sources (Cleland, 1990; Streatfield, Singarimbun, & Diamond, 1990). The link between knowledge and children's health implied that mental understanding of the health process directly impacted behaviours focused on improved health. If true, acquired knowledge ''should lead to greater protection against infection through improved hygiene, reduced susceptibility to infection through nutrition, and enhanced recovery from infection through more effective domestic and external health care'' (Defo, 1997).

Socio-economic and Environental factors on infant mortality: Universally, there is huge literature that focused on the determinants of infant and child mortality. Most of the studies have shown significant association between maternal socioeconomic factors (education, wealth index, & place of residence), demographic factors (age at first birth, ethnicity, religion, & region) and infant-child mortality (SDI, breastfeeding, prematurity & birth weight) (Debpuur, Wontuo, Akazili & Nyarko, 2005; Hosseinpoor, Mohammad, Majdzadeh, Naghavi, Abolhassani, Sousa, Speybroeck, Jamshidi, & Vega, 2005; Madise & Diamond, 1995; Caldwell, 1979).

Like in most other parts of the country, children and women have been among the principal victims of these combined; economic, social and

political crises in the state. Available reports indicate that even though efforts have been made to improve the general condition of children and women since the creation of the states, these efforts do not seem to be having significant impact (Adetunji, 1994). For instance, infant mortality and under five mortality which was 6911000 and 12611000 respectively in 1999 are believed to be currently worse. Likewise in Anambra State, women still face high risks in pregnancy or during delivery due mainly to the decay of public sources of medicare and the high cost of medicare from private sources. The maternal mortality ratio is still about 100 times higher than in the industrialized nations (Anambra State Economic Empowerment & Development Strategy (SEEDS) Document, 2010).

Summary of Review of Related Literature

Literature was reviewed based on concepts of infant mortality, infant mortality rate and socio-economic and environmental factors that affect infant mortality.

In the review, it was identified that Kaldewei (2010) established a number of individual and socioeconomic characteristics that influenced the probability of early childhood death. A lot of literature supported the fact thatsocio-economic variables (education,occupation, income, marital status, etc.) affectinfant and child mortality (Caldwell,1979, 1986; Tekce & Shorter, 1984; Behm,1986;Ruzicka et al. 1989; Behm & Soto, 1991).Education of the mother has often been treated as a proxy forsocio-economic status, yet many studies including that of Caldwell (1979) argued that theeducation of the mother has a more direct effect onchild mortality through improved health care (Hobcraft et al., 1984; Ebigbola, 1999).

Some studies found health knowledge to be a mediating factor between maternal education and child health (Glewwe, 1999); whereas others found little or no association between education and health knowledge (Cleland & Van Ginneken, 1988; Cleland, 1990). However, some of the studies described accurately the connection between education and health attitudes in which mothers with higher levels of education were more acceptable of

modern medicine, more likely to use preventive health services, more willing to take their children to a medical centre, and less likely to attribute the future health of their child to fate (Cicero & Burma, 1993).

Few studies examined the effect of maternal age on child nutritional status. A comparative study using DHS data did not find a consistent pattern between stunting and maternal age (Sommerfelt& Stewart, 1994); however, a study using a Bolivian population found that the likelihood of stunting decrease with maternal age (Forste, 1998). However, education retains its strong statistical significance after controlling for socioeconomic status and geographic residence, suggesting that other factors explain portions of the maternal education effect as well.

It was observed by the researcher that literature on education as it contributes to infant mortality was available but not much have been done on the other variables such as age, parity, place of residence, place of delivery, religion and occupation. The researcher therefore intend to find out which of these variables also contribute to infant mortality in Anambra State.

Most literature reviewed dealt specifically with under five mortality. However very few dealt with infants. There was no literature on socio-economic and environmental factors on infant mortality in Anambra State. This gap in the literature is what the researcher intend to address.

Specifically, the study tried to explore the socio-economic and environmental factors that affect infant mortality, These variables included maternal age, level of education, parity, birth spacing, ante natal visits, place of delivery, place of residence, religion and occupation.

CHAPTER THREE

METHOD

This chapter discussed the methodolgy used in carrying out this research. It is presented under the following subheadings: Research Design, Area of The Study, Population of The Study, Sampling and Sampling Technique, Instrument for Data Collection, Validation of The Instrument, and Reliability of The Instrument, Method of Data Collection as well as Method of Data Analysis.

Research Design

The research design used in this study was the descriptive survey design method which was used to determine the socio-economic and environmental factors to infant mortality in Anambra State. A descriptive study is one in which information is collected without changing the environment that is, nothing is manipulated (Research Design, n.d.).Descriptive involve observation of all of a population, or a representative subset, at a defined time. They may be used to describe some feature of the population, such as prevalence of an illness, or they may support inferences of cause and effect. Akuezuilo and Agu (2007) described descriptive survey as seeking to find out factors that are associated with certain occurrences. Other similar studies

by Mustafa and Odimegwu (2003) on "Socioeconomic Determinants of Infant Mortality in Kenya" and studies by Mostafavi, (2009) on "Estimating the Causal Effect of Maternal Education on Infant Mortality with in Iran"; were in the past done with this same design.In this study, the infant mortality had taken place and information is needed as to the factors in relationship with the mortality. This method was therefore considered appropriate for the nature of the study as this study is concerned with the relationship of socio-economic and environmental factors with infant mortality in Anambra State.

Area of the Study

The study was conducted in Anambra state which is one of the thirty six (36) states of Nigeria and is situated on a generally low elevation on the Eastern bank of the River Niger. Anambra State was created in 1991 with 21 LGAs, three senatorial Zones, six education Zones and 177 communities. The state shares common boundaries with Abia and Imo states by the South, Delta state by the west, Enugu state by the East, and in the North with Kogi state. It is known for its industrial centres and markets, with about 75 percent of the population involved in agriculture. Located in the South-East Zone of Nigeria, Anambra State is the centre of the East-West highway. The position of the state makes it a focal point for transport and trade in Nigeria. The big

markets in the state attract traders from other states and other West African countries, including Cameroon and other West African countries.

According to United Nations Population Fund (UNFPA) State Population and Development Programmes (2006) Anambra State has a land space mass of 4,416 square kilometres and a projected population of 4.03 million giving a population density of 912 per square kilometre of which 1,009,324are women of child bearing age. The problems related to population and development strategies in Anambra State include but are not limited to lack of needed reliable comprehensive data and information for the integration of population issues such as mortality issues, into development planning; near absence of the culture of record keeping as well as the non-involvement of data producers and users in the private sector in the data collection/analysis effort, and inadequate number of qualified planners/statisticians especially at the LGA levels (UNFPA State Population and Development Programmes, 2006).

Previously, the number of children in a family determined how wealthy that family is in terms of domestic produce. People in this part of the country are very hard working including the women who work to supplement whatever their husbands give them for the upkeep of the family. This makes them

involved in several roles in the family thus, procreation, childrearing as well as supplementing whatever the husband presents for family upkeep.

Population of the Study

The population of the study involved women of reproductive age who had experiencedinfant mortality between years 2000 to 2011 in Anambra State.These women were interviewed to get information on the socio-economic and environmental factors affecting infant mortality.

Sample and Sampling Technique

A sample according to Uzoagulu (2011) is a small group of subjects drawn through a definite procedure from a specified population. He further stated that samples are meant to represent population when the entire population cannot be studied. Uzoagulu (2011) opined that sample size can be statistically determined using the "Yaro Yamane" formula for a finite population. The minimum sample size for this study was 398 which was determined using the 'Yaro Yamane' formula for a finite population (Chikezie, 2007; Uzoagulu, 2011). The reproductive age women (15-49years) in Anambra State according to NPC (2012) is 49% of female population. Based on this, the 49% of the female reproductive age in the selected 14 communities was 53,705 (Appendix F, p. 172) as published by

(NPC, 1999). Applying the Yaro Yamane formula, the minimum sample size for the study was then calculated at 398 subjects. (Appendix B, p 164).

Random sampling technique was used to select the samples of the study. Firstly, the local governments were listed and a systematic random sampling technique was used to select seven LGs out of the existing 21 LGAs in Anambra State (See Appendix D, p168). The researcher determined the seven LGsfor the study based on the alphabetical list of the LGAs in the state (Anambra State Vision 2020, in Nigeria Vision 2020) where the 21 LGs were divided by the number of LGs to be selected (seven LGs). This gave a sum of three. Thereafter every third LG was selected from the list until the seven LGAs were drawn (See Appendix E, p 171).

Secondly, simple random sampling technique was used to draw two communities from each of the seven LGAs, making a total of 14 communities (Appendix E, p 171). In this, all the communities in the list (Appendix D, p 168) of the selected seven LGs were listed on pieces of paper which was put inside a bag and mixed. The researcher then picked from this bag employing method of sampling with replacement. Thereafter every mother who have experienced infant mortality during the year 2000 – 2011 in the selected communities and who was willing to participate in the study was

included in the study and interviewed on a house to house basisto enable the researcher draw adequate sample size for the study.

Instrument for Data Collection

The instrument for collecting data was astructured interview questinnaire on infant mortality (Appendix A, p 158). It consisted of four sections, A, B, C and D. Section A considered items eliciting demographic data of the women: mother's age at the time of birth of the child, parity and birth spacing, among others. Section B considered the Socio-economic factors: education of mother, education of father, occupation of mother, and occupation of father. Section C considered the Environmental factors which included exposure to mass media, place of residence and standard of living (Appendix G, p173). Section D considered others: place of delivery, timing of first antenatal check during pregnancy, Tetanus Toxoid shots during pregnancy among others. The mothers were interviewed using this schedule and their responses recorded accordingly.

Validation of the Instrument

The face and content validity of the structured interview schedule was established by experts in the Department of Human Kinetics and Health Education of Nnamdi Azikiwe University Awka and from the Department of

Community Medicine, College of Medicine, Nnamdi Azikiwe University, Nnewi Campus.

They examined the purposes, research questions, as well as the hypotheses of the study in line with the specific items in the instrument to justify the content in relation to the purpose of the study. Some of the items were modified before the final approval by the project supervisor. For instance, the title of the instrument was changed from pro-forma to Structured Interview Schedule on Infant Mortality (SISIM), items (questions) on beliefs and values which were an open ended question were removed. Place of residence, religion and others were placed under environmental factors as well as other modifications.

Reliability of the Instrument

A Split-half reliability method was used to determine the reliability of the instrument. The instrument was administered to some women who were not part of the population in the study but have experienced infant mortality. This was collected and analysed using the split-half reliability method toascertain whether the instrument measured accurately and consistently what it was supposed to measure. The reliability co-efficient of the split halves was found using the co-efficient of the two halves, applying the Pearson's Product

Moment Correlation Coefficient (PPMCC) formula. The summary for split half co-efficient reliability test result gave a value of 0.90 indicating positive reliability of the instrument (Appendix C, p 165).

Method of Data Collection

Data was collected from the women who have experienced infant mortality during the year 2000 to 2011. The data was collected from villages in the 14 sampled communities on a house to house basis. To ascertain that all the women that met the criteria of the study were interviewed and also to be sure the community was covered, efforts were made to get other women who were not met and interviewed in their houses. The researcher and the team made enquiry as to where those mothers were. The researcher and the assistants went to the different places referred such as their stores in market places and churches, to meet with those women who were not met at home (their whereabouts were identified by members of their households). On each visit, the researcher and research assistants were introduced and the purpose of the study explained to the women in other to gain their consent and cooperation. In this, information on various issues on the interview schedulewas elicited. This includes items on demographic, socio-economic, environmental and health care service utilization. The women were allowed to freely give their consent to the interview.

Five research assistants were trained on how to retrieve information involved in the data collection. The training was done centrally at a venue and time that was convenient for the research assistants. The training session included explanation of the items in the interview schedule and the areas to cover. The training lasted for two days as the assistants were allowed to practice with the interview guide in other to be conversant with retrieval and recording of the information. The assistants were then grouped to visit the communities. The exercise lasted for sixteen weeks and a total of 432 women were interviewed.

Method of Data Analysis

The analysis was carried out using deaths of infants among reproductive age women that occurred between January 2000 and December 2011. Data collected were fed into the computer. Data entries fed into the computer wereanalysed using Statistical Package for Social Sciences software (SPSS). The final scores obtained were presented in tables and figures to enable the researcher have an index score of each variable as well as for easy comparison.

The variables were tallied against the infant deaths using percentages. These percentages were used to answer the research questions. Further analysis was done using Fisher's exact test coefficient. Fisher's exact test calculates the exact probability of the table of observed cell frequencies (chi square test

Fishers' Exact text, n.d.). It is a nonparametric statistical significancetest used in the analysis of contingency tables wheresample sizes are small. The test is useful for categoricaldata that result from classifying objects in two differentways; it is used to examine the significance ofthe association (contingency) between two kinds ofclassifications(chi square test Fishers' Exact text, n.d.). The Fishers' Exact test coefficient was used to determine the difference between parental education, age of mothers at the time of the child's birth, parity and birth spacing, parent's occupation, place of residence, place of delivery, antenatal visits, and religion with infant mortality. The null hypothesis was tested at 0.05 level of significance.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the data related to the research questions and hypotheses in relation to socio-economic and environmental factors affecting infant mortality in Anambra State. Summary of the major findings are also presented according to the research questions and the hypotheses that guided the study.

RESEARCH QUESTIONS

Research Question 1

How does age of the mothers affect infant mortality in Anambra State?

Data in table 1 was used to answer research question 1

Table 1: Age groups of mothers atthe time of birth of the dead infantand infant mortalities

AGE (YEARS)	*f*	%
10-14	7	1.6
15-20	33	7.6
21-25	72	16.7
26-30	92	21.3
31-35	144	33.3
36-40	65	15.0
41-45	38	8.8
46-50	8	1.8

NOTE: multiple responses werepermitted.

Majority of the infants' mothers (33.3%) in Table1, who experienced infant mortality, belonged to the age group of 31-35 years as at the time of birth of the dead infants, followed by mothers in age group 26-30 years (21.3%). Mothers in the age group 10-14 and 46-50 had the lowest number of respondents (1.6% and 1.8% respectively) of mothers with infant mortality. The table showed that mothers age 31-35 had more infant mortality while the other ages indicated a lesser infant mortality percentage.

Research Question 2

How does mothers' education affect infant mortality in Anambra State?

Data in figure 1 was used to answer research question 2

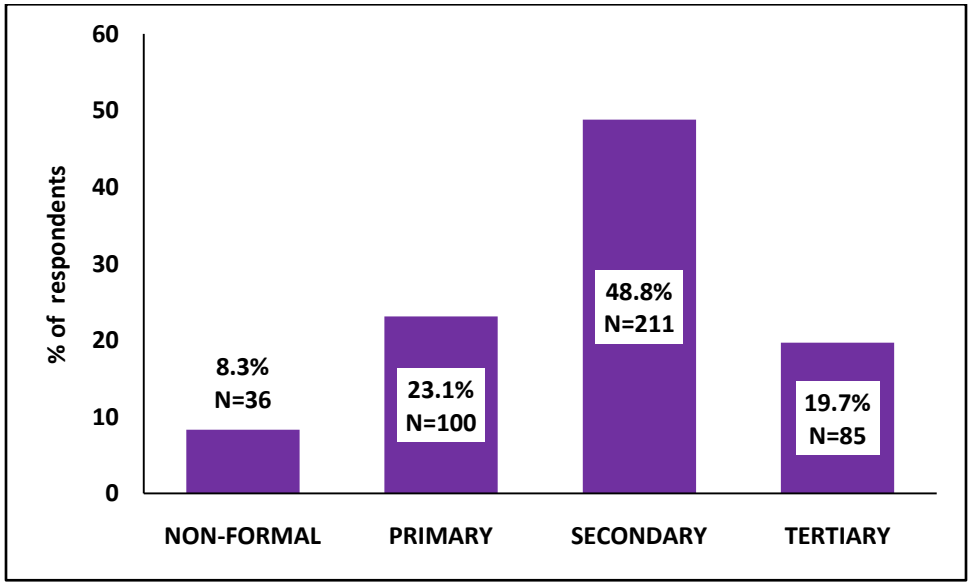


Figure 1: Educational status of mothers and infant mortalities.

Figure 1 indicates that majority of the dead infants' mothers (48.8%) had secondary education while 23.1% had primary education and 19.7% with tertiary education. The least were those who had non-formal education (8.3%). The figure above showed that mothers with infant mortality who had secondary education were more while those in the other categories showed lesser percentage of infant mortality.

Research Question 3

How does fathers' education affect infant mortality in Anambra State?

Data in figure 2 was used to answer research question 3

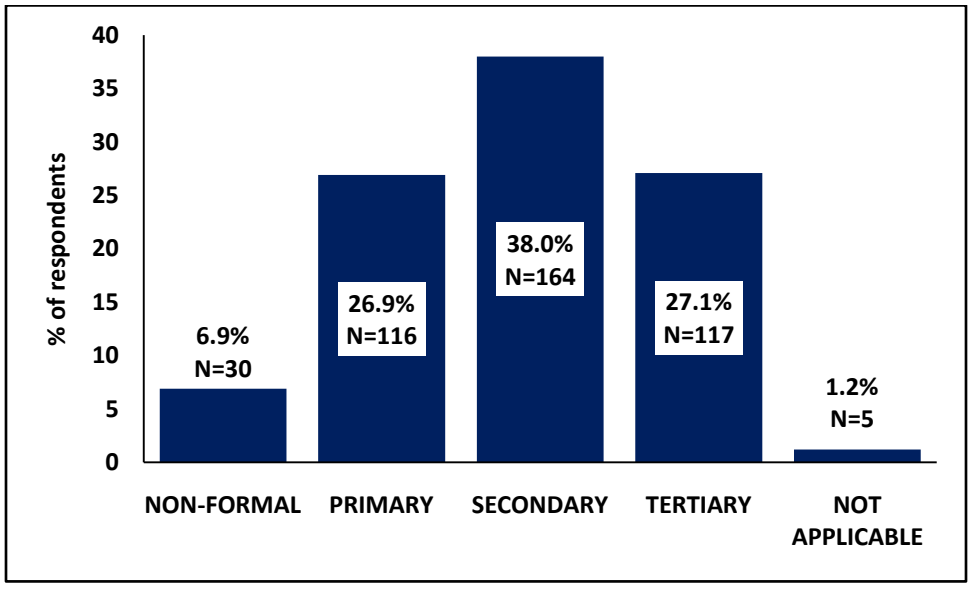


Figure 2: Educational status of fathers and infant mortalities.

Figure 2 indicates that majority of the dead infants' fathers (38%) had secondary education, followed by 27.1% who had tertiary education while 26.9% obtained primary education. The least were fathers who had non-formal education (6.9%). Educational status of fathers was not applicable to about 1.2% of the respondents, who were single mothers. Fathers with tertiary, secondary education and primary showed a higher percentage of infant mortality compared to fathers with non-formal education.

Research Question 4

How does parity infant mortality affect in Anambra State?

Data in table 2 was used to answer research question 4

Table 2: Total number of infants born (parity) by the mothers and infant mortalities

NUMBER OF CHILDREN	*f*	%
One	19	4.4
Two	51	11.8
Three	80	18.5
Four	102	23.6
Five	53	12.3
Six	74	17.1
Seven	38	8.8
Eight	10	2.3
Above Eight	5	1.1
TOTAL	432	100

Table 2 showedthat 23.6% of mothers who experienced infant mortality had four children (23.6%) followed by those with three children (18.5%).

Minority of these mothers (1.1%) had number of children greater than eight. Generally, there was a lower infant deaths with parity one, eight, eight and above.

Research Question 5

How does birth spacing affect infant mortality in Anambra State?

Data in table 3 was used to answer research question 5

Table 3: Spacing between immediate older childand infant mortalities.

SPACING (MONTHS)	*f*	%
9-14	108	25.0
15-20	172	39.8
21-26	44	10.2
27-32	25	5.8
33-38	34	7.9
39-44	21	4.9
OTHERS	56	12.9

NOTE: multiple responses were permitted.

Majority (39.8%) of infants in table 3, had 15-20 months (1year 3months – 1year 8months) of birth spacing between immediate older child and the dead infants. Infants who had 9-14 months of birth spacing were 108 (25.0%). The least number of infants had birth spacing between 39-44 months (3years

3months – 3years 8months). From the data above, dead infants with birth spacing between 9 -14 months (9mths – 1year 2months) and 15-20 months (1year 3months – 1year 8months) showed a higher percentage of infant mortality while the dead infants in the other categories (above 44 months) of birth spacing showed a lower percentage (0 – 24%) of infant death.

Research Question 6

How does antenatal visits/attendance affect infant mortality in Anambra State?

Data in table 4 was used to answer research question 5.

Table 4:Antenatal visits by mothers during pregnancy and infant mortalities.

TIME OF FIRST ANTENATAL VISIT	*f*	%
3 months	101	23.4
4 months	240	55.6
5 months	62	14.4
6 months	23	5.3
Others	6	1.3
TOTAL	432	100
NUMBER OF VISITS		
ONCE	2	0.5
TWICE	25	5.8
THRICE	54	12.5
FOUR TIMES	39	9.0
FIVE TIMES	158	36.6
SIX TIMES	150	34.7
NONE	4	0.9
Total	432	100

Table 4 indicatedthat majority of the mothers who experienced infant mortality (55.6%) commenced antenatal visits at 4 months of pregnancy, followed by mothers who commenced in the 3rd month (23.4%). The least frequent (1.3%) were ‘others’ who commenced at 7 months and above or those who did not make any antenatal visits during pregnancy. The table showed a high percentage of mothers who commenced antenatal visits at 4months while the others showed a very low percentage.

On the number of antenatal visits, data showed that majority of the mothers who experienced infant mortality (36.6%) made a total number of five antenatal visits during pregnancy, followed by mothers who made six antenatal visits (34.7%). Mothers with the least visits were those who made only one antenatal visit during pregnancy. However those who made five and six visits to antenatal care showed a higher percentage `as against those who made one, two, three and no visits. These groups had a lower percentage that is 0 – 24%.

Research Question 7

How does place of delivery affect infant mortality in Anambra State?

Data in table 5 was used to answer research question 7.

Table 5: Place of delivery and infant mortalities

PLACE OF DELIVERY	*f*	%
Maternity Home	101	23.4
State Hospital	91	21.1
Private Hospital	176	40.7
Teaching Hospital	31	7.2
Traditional Birth Attendant	31	7.2
Others	5	1.2
TOTAL	432	100

Majority of the dead infants (40.7%) in Table 5 were delivered in private hospitals, followed by those mothers that delivered in maternity homes (23.4%). Mothers with the least frequency (1.2%) were those who in 'other' options such as churches or home for delivery of their babies. Based on the table, those mothers whose place of delivery was Private, Maternity, and

State hospital showed a higher percentage (40.7%, 23.4%, 21.1%) while those in the other categories had a lower percentage of infant mortality.

Research Question 8

How does state of place of residence affect infant mortality in Anambra State?

Data in figures 3 and 4 were used to answer research question 8.

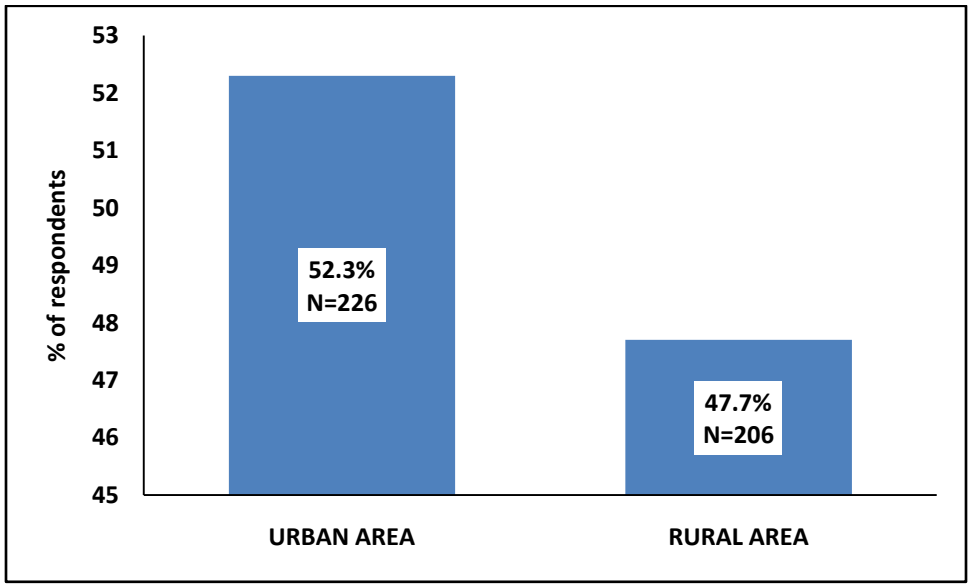


Figure 3: Mothers' place ofresidence and infant mortalities

Figure 3 showed that a majority of dead infants' mothers live in urban areas (52.3%) while 47.7% live in rural areas. This indicated that place of residence affects infant mortality.

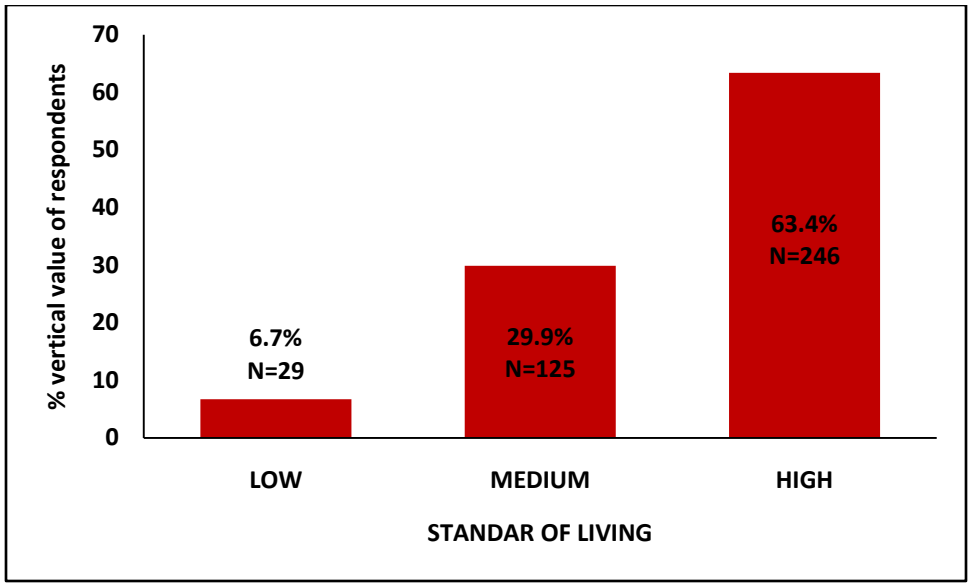


Figure 4: The standard of living (using the standard of living index) and infant mortalities.

Figure 4 above indicated that a greater percentage of dead infants' belonged to the high standard of living group (63.4%), followed by those who had medium standard of living (29.9%). Those with low standard of living (6.7%) had the least frequency. The data showed that standard of living index affects infant mortality.

Research Question 9

How does religion affect infant mortality in Anambra State?

Research Question 9 was answered with the data in figure 5 and table 8.

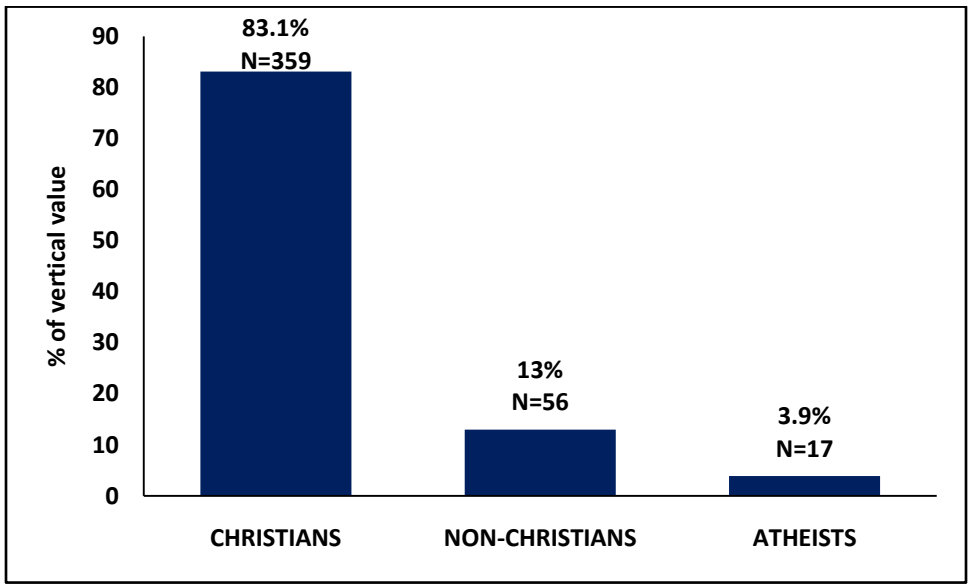


Figure 5: Religion of mothers and infant mortalities

Table 6: Religious Beliefs and infant mortality

		f	%
Mothers who forbid drugs, blood transfusion, hospital services, certain foods, and meat due toreligious beliefs.	Yes	59	13.7
	No	373	86.3
Forbidden Options	Drugs	4	6.8
	Blood Transfusion	29	49.2
	Antenatal Services	2	3.4
	Meat	20	33.4
	Certain foods	2	3.4
	Not Applicable	2	3.4
	Total	59	100

Figure 5 indicated that mothers who experienced infant mortality, and who were Christians had the highest frequency (83.1%) compared to those who were non-Christians (13.0%) and those who were atheists (3.9%). This showed that religion affects infant mortality.

Table 6 indicated that 86.3% of the mothers who had infant mortality did not forbid drugs; blood transfusion; hospital services; certain foods; and meat due to religious beliefs. However, 13.7% stated that they forbid drugs; blood transfusion; hospital services; certain foods; and meat due to religious beliefs.

Out of the 59 mothers who stated that they forbid drugs, blood transfusion, hospital services, certain foods and meat due to religious beliefs, 49.2% said they forbid blood transfusion. Meat consumption was the second most forbidden option (33.9%). The least forbidden options were certain foods and antenatal services which showed 3.4% respectively.

Research Question 10

How does mothers' occupation affect infant mortality in Anambra State?

Data in table 7 was used to answer research question 10.

Table 7: Occupation of mothersand infant mortalities

OCCUPATION	*f*	%
Civil Service	120	27.7
Trading	189	43.8
Farming	60	13.9
Artisanship	55	12.7
Others	8	1.9
TOTAL	432	100

Table 7 indicated the occupational status of the mothers who experienced infant mortality were 43.8% traders, followed by civil servants (27.7%). 'Others' who were house wives, students or National Youth Service Corp members had the least percentage (1.9%). Mothers who were civil servants and trading showed a high percentage of infant mortality while mothers in the other categories showed a low percentage of infant mortality, 0- 24 %.

Research Question 11

How does fathers' occupation affect infant mortality in Anambra State?

Data in table 8 was used to answer research question 11

Table 8: Occupation of fathers and infant mortalities.

OCCUPATION	*f*	%
Civil Servants	122	28.2
Trading	146	33.8
Farming	76	17.6
Artisanship	79	18.3
Others	9	2.1
TOTAL	432	100

Table 8 indicated the occupational status of the dead infants fathers' of which majority of the fathers (33.8%) were traders, followed by civil servants (28.2%). The option with the least frequency (2.1%) was 'Others' which included the unemployed and those in which father's occupation were not applicable to. This showed that fathers' who were civil servants and trading showed a higher percentage of infant mortality while fathers in the other occupational categories showed a lower percentage of infant mortality.

HYPOTHESES

Hypothesis 1

Ages of the mothers donot have significant effect on infant mortality in Anambra State.

Data in table 9 verified hypothesis 1.

Table 9: Analysis of age group of mothers and infant mortalities

AGE OF MOTHER (YEARS)	INFANT MORTALITY N (%) 1	2	≥ 3	TOTAL N (%)
10-14	6 (100%)	0 (0%)	0 (0%)	6 (100%)
15-20	14 (93.3)	1 (6.7)	0 (0)	15 (100)
21-25	33 (97.1)	1 (2.9)	0 (0)	34 (100)
26-30	55 (91.7)	4 (6.7)	1 (1.7)	60 (100)
31-35	81 (81.0)	12 (12.0)	7 (7.0)	100 (100)
36-40	68 (73.9)	21 (22.8)	3 (3.3)	92 (100)
41-45	48 (78.7)	11 (18.0)	2 (3.3)	61 (100)
46-50	27 (62.8)	13 (30.2)	3 (7.0)	43 (100)
>50	16 (76.2)	4 (19.0)	1 (4.8)	21 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)
Fisher's Exact test	coefficient	= 27.43; P = 0.02		

P < 0.05 Significant

Table 9 showed the data that analysed the hypothesis. In the table, out of 100 mothers between ages 31 – 35, 81% of mothers experienced one infant mortality, while 7% of them experienced 3 and above infant mortality. Among the mothers between ages 36-40, 21 (22.8%) out of 92 of them experienced two infant mortality. On the other hand, 6 (100%) mothers between ages 10 – 14 had one infant mortality while mothers between ages 26 – 30, and 50 and above had infant mortality of 3 and above.

Fisher's exact test result in table 9 showedthat there was significant effect (P=0.02) of mothers' age on infant mortality, hence the hypothesis that age of mothers does not have significant effect on infant mortality in Anambra Statewas rejected.

Hypothesis 2

Mothers' educationdoes not have significant effect on infant mortality in Anambra State.

Table 10: Analysis of mother's educational status and infant mortality.

EDUCATIONAL STATUS	INFANT MORTALITY. N (%)			TOTAL N (%)
	1	2	≥ 3	
Non-formal	27 (75.0%)	7 (19.4%)	2 (5.6%)	36 (100%)
Primary	75 (75.0)	19 (19.0)	6 (6.0)	100 (100)
Secondary	175 (82.9)	30 (14.2)	6 (2.8)	211 (100)
Tertiary	71 (83.5)	11 (12.9)	3 (3.5)	85 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)
Fisher's Exact	test coefficient	= 4.99; P = 0.49		

P > 0.05 Not Significant

The result in table 10 showed that 82.9% of mothers that had secondary education had one infant death, 30% had two infant deaths while 2.8% had three and above infant deaths. Out of 36 mothers with non-formal education, 21(75%) had one infant death. The table showed that Fisher's exact test

coefficient value was 4.99 and the P-value is 0.49. The Fishers exact test therefore indicated that no significant effect was observed between mother's educational status and infant mortality. The null hypothesis that mother's educational status does not have significant effect on infant mortality in Anambra Statewas accepted.

Hypothesis 3

Fathers' education does not have significant effect on infant mortality in Anambra State.

Data in table 11 verifies hypothesis 3

Table 11: Analysis of father's educational status and infant mortality

EDUCATIONAL STATUS	INFANT MORTALITY N (%) 1	2	≥ 3	TOTAL N (%)
Non-formal	20 (66.7%)	6 (20.0%)	4 (13.3%)	30 (100%)
Primary	85 (73.3)	23 (19.8)	8 (6.9)	116 (100)
Secondary	131 (79.9)	29 (17.7)	4 (2.4)	164 (100)
Tertiary	107 (91.5)	9 (7.7)	1 (0.9)	117 (100)
Not Applicable	5 (100.0)	0 (0)	0 (0)	5 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)
Fisher's Exact	test coefficient	= 22.90;		
		P = 0.001		

P < 0.05 Significant

Data in Table 11 indicated that 79.9% of fathers with secondary education had one infant mortality, 17.7% had two while 2.4% had three or more infant

mortality. 66.7% of father with non-formal education had one infant mortality, 20.0% had two while 13.3 % had three or more infant mortality.

The table showed that Fisher's exact test coefficient value is 22.90 and the P-value was 0.001. The Fishers exact test therefore indicated that a significant effect was observed between father's educational status and infant mortality hence thehypothesis that father's educational status does not have significant effect on infant mortality in Anambra State was rejected.

Hypothesis 4

Parity does not have significant effect on infant mortality in Anambra State.

Data in table 12 verifies hypothesis 4

Table 12: Analysis ofparity and infant mortality

PARITY	INFANT MORTALITY. N (%)			TOTAL
	1	2	≥ 3	N (%)
ONE	19 (100%)	0 (0%)	0 (0%)	19 (100%)
TWO	47 (92.2)	4 (7.8)	0 (0)	51 (100)
THREE	74 (92.5)	4 (5.0)	2 (2.5)	80 (100)
FOUR	92 (90.2)	9 (8.8)	1 (1.0)	102 (100)
FIVE	37 (69.8)	13 (24.6)	3 (5.7)	53 (100)
SIX	52 (70.3)	16 (21.6)	6 (8.1)	74 (100)
SEVEN	21 (55.3)	16 (42.1)	1 (2.6)	38 (100)
EIGHT	3(30.0)	4(40.0)	3(30.0)	10(100)
NINE	2(50.0)	1(25.0)	1(25.0)	4(100)
TEN	1(100)	0(0)	0(0)	1(100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)

Fisher's Exact test coefficient = 71.62; P = 0.001

P < 0.05 Significant

The result in table 12 showed that 90.2% of mothers that had 4 children, had one infant death, and all the 19 mothers that had one child, had one infant death. Out of 74 mothers with 6 children, 21.6% had two infant deaths while 70.3% had one infant death each. The data also showed that out of 4 mothers that had 9 children, 50% (2) had one infant death while 1(25%) had two infant death and another 1 (25%) had 3 infant deaths.

The Fisher's exact test coefficient value is 71.62 and the P-value was 0.001. The Fishers exact test therefore indicated that significant effect ($P<0.001$) was observed between parity and infant mortality. The null hypothesis that parity does not have significant effect on infant mortality in Anambra State was rejected.

Hypothesis 5

Birth spacing of the mothersdoes not have significant effect on infant mortality in Anambra State.

Data in table 13 verifies hypothesis 5

Table 13: Analysis of birth spacing and infant mortality

BIRTH SPACING (MONTHS)	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
9-14	73 (85.9%)	9 (10.6%)	3 (3.5%)	85 (100%)
15-20	135 (87.1)	18 (11.6)	2 (1.3)	155 (100)
21-26	23 (69.7)	7 (21.2)	3 (9.1)	33 (100)
27-32	21 (87.5)	3 (12.5)	0 (0)	24 (100)
33-38	24 (77.4)	7 (22.6)	0 (0)	31 (100)
39-44	17 (89.5)	2 (10.5)	0 (0)	19 (100)
OTHERS	55 (100.0)	0 (0)	0 (0)	55 (100)
Multiple Responses	0 (0)	21(70)	9 (30)	30 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)
Fisher's Exact P < 0.05 Not Significant	test coefficient	= 128.34;	P = 0.0001	

Table 13 showedFisher's exact test summary of the analysis done to test hypothesis 5. The Table 13 showed that 87.1% of mothers with birth spacing of 15-20 months had one infant death, 18% had two infant deaths and 1.3% had three infant deaths. From the data, 55 mothers where birth spacing was not applicable (OTHERS) experienced infant mortality with their first babies. Thirty (30) mothers had multiple responses where the birth spacing differed with each child that died. 70% of these mothers with multiple responses had two infant deaths while 30% had three and above infant deaths.

The Fisher's exact test coefficient value was 128.34 and the P-value was 0.001. The Fishers exact test indicated a significant effect ($P<0.001$) between birth spacing and infant mortality. The null hypothesis that birth spacing does not have significant effect on infant mortality in Anambra State was rejected.

Hypothesis 6

Antenatal visits/attendance by the mothersdoes not have significant effect on infant mortality in Anambra State.

Hypothesis 6 was verified by table 14.

Table 14:Analysis of antenatal visits / attendance during pregnancy and infant mortality

ANTENATAL VISITS	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
ONCE	2 (100.0%)	0 (0%)	0 (0%)	2 (100%)
TWICE	20 (80.0)	2 (8.0)	3 (12.0)	25 (100)
THRICE	42 (77.8)	11 (20.4)	1 (1.9)	54 (100)
FOUR TIMES	25 (64.1)	11 (28.2)	3 (7.7)	39 (100)
FIVE TIMES	128 (81.0)	25 (15.8)	5 (3.2)	158 (100)
SIX TIMES	127 (84.7)	18 (12.0)	5 (3.3)	150 (100)
NOT APPLICABLE	4 (100.0)	0 (0)	0 (0)	4 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)
Fisher's Exact coefficient	test	= 15.66; P = 0.18		

P > 0.05 Significant

In table 14, out of the 158 mothers who experienced infant mortality and had antenatal visits five times before delivery, 3.2% had three and above infant deaths and 81% had one infant death while 15.8% had two infant deaths. The table also shows that out of the total 432 mothers, 80.6% of the mothers had one infant death while 15.5% and 3.9% had two infant deaths and three infant deaths respectively.

The summary of the table shows Fisher's exact test coefficient value as 15.6 while the P-value = 0.18 ($P > 0.05$). The Fishers exact test indicated that there is no significant effect on antenatal visits during pregnancy and infant mortality. The null hypothesis that antenatal visits during pregnancy do not have significant effect on infant mortality in Anambra State was accepted.

Hypothesis 7

Place of delivery of mothers does not have significant effect on infant mortality in Anambra State.

Table 15 verifies hypothesis 7

Table 15:Analysis ofplace of delivery and infant mortality

PLACE OF DELIVERY	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
Maternity Home	83 (83.0)	14 (14.0)	3 (3.0)	100 (100)
State Hospital	61 (68.5)	22 (24.7)	6 (6.7)	89 (100)
Private Hospital	152(87.9)	18 (10.4)	3 (1.7)	173 (100)
Teaching Hospital	25 (80.6)	5 (16.1)	1 (3.2)	31 (100)
Traditional Birth Attendant	23 (74.2)	6 (19.4)	2 (6.5)	31 (100)
Others	4 (80.0)	1 (20.0)	0 (0)	5 (100)
Total	348(81.1)	66 (15.4)	15 (3.5)	432(100)
Fisher's Exact	test coefficient	= 30.61; P = 0.0001		

P < 0.05 Significant

Table 15 tested hypothesis 7.Table 15 showed that 173 (40.1%) out of the total 432 mothers delivered in the private hospital. Out of these, 152 mothers had one infant mortality.

The summary of the table shows Fisher's exact test coefficient value as 30.61 and the P-value as 0.001. The Fishers exact test indicates significant effect ($P < 0.05$) between place of delivery and infant mortality. The null hypothesis that place of delivery does not have significant effect on infant mortality in Anambra State was rejected

Hypothesis 8

State of place of residence of the mothers does not have significant effect on infant mortality in Anambra State.

Data in table 16 verifies hypothesis 8

Table 16: Analysis ofmother's state of place of residence and infant mortality

PLACE OF RESIDENCE	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
URBAN AREA	191(84.5%)	29 (12.8%)	6 (2.7%)	226 (100%)
RURAL AREA	157(76.2)	38 (18.4)	11 (5.3)	206 (100)
Total	348(80.6)	67 (15.5)	17 (3.9)	432 (100)

Fisher's Exacttest coefficient= 5.03; P = 0.06

P > 0.05 Not Significant

Table 16 shows that 226 of the mothers live in urban area out of which 191 of the mothers hadonly one infant mortality. Fishers' exact text in table 16 indicates that no significant difference (P=0.06) was observed between mother's place of residence and infant mortality. The null hypothesis that mother's place of residence does not have significant effect on infant mortality in Anambra State was accepted.

Hypothesis 9

Religion of the mothers does not have significant effect on infant mortality in Anambra State.

Data in table 17 verifies hypothesis 9

Table 17: Analysis of mother's religion and infant mortality.

RELIGION	INFANT MORTALITY. N (%)			TOTAL
	1	2	≥ 3	N (%)
CHRISTIANS	296(82.5%)	51 (14.2%)	12 (3.3%)	359 (100%)
NON-CHRISTIANS	37(66.1)	14 (25.0)	5 (8.9)	56 (100)
ATHEISTS	15(88.2)	2 (11.8)	0 (0)	17 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)

Fisher's Exacttest coefficient= 8.80;P = 0.04P < 0.05 Significant

In table 17, the summary of Fisher's exact test shows that significant differenceP=0.04 was observed between infant mortality and mother's religion. The null hypothesis that mother's religion does not have significant effect on infant mortality in Anambra Statewas rejected.

Hypothesis 10

Mothers' occupation in Anambra does not have significant effect on infant mortality in Anambra State.

Table 18 verifies hypothesis 10.

Table 18: Analysis of mother's occupation and infant mortality.

OCCUPATION	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
Civil Servants	97 (80.8%)	21 (17.5%)	2 (1.7%)	120 (100%)
Farming	156 (82.5)	27 (14.3)	6 (3.2)	189 (100)
Trading	39 (65.0)	14 (23.3)	7 (11.7)	60 (100)
Artisanship	48 (87.3)	5 (9.1)	2 (3.6)	55 (100)
Others	8 (100.0)	0 (0)	0 (0)	8 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)

Fisher's exact test coefficient= 15.77;P = 0.03. P < 0.05 Significant

In table 18, mothers whose occupation was farming were 189 out of which 82.5 had one infant mortality. Table 18 shows that Fisher's exact test coefficient is 15.77 and the P <0.05. The summary of Fishers exact test indicates that a significant effect (P<0.05) was observed between infant

mortality and mother's occupation. The null hypothesis that mother's occupation does not have significant effect on infant mortality in Anambra State was rejected.

Hypothesis 11

Fathers' occupation does not have significant effect on infant mortality in Anambra State.

Data in table 19 verifies hypothesis 11

Table 19:Analysis of father's occupation and infant mortality.

OCCUPATION	INFANT MORTALITY. N (%) 1	2	≥ 3	TOTAL N (%)
Civil Servants	104 (85.2%)	14 (11.5%)	4 (3.3%)	122 (100%)
Farming	117 (80.1)	26 (17.8)	3 (2.1)	146 (100)
Trading	54 (71.1)	13 (17.1)	9 (11.8)	76 (100)
Artisanship	64 (81.0)	14 (17.7)	1 (1.3)	79 (100)
Others	9 (100.0)	0 (0)	0 (0)	9 (100)
Total	348 (80.6)	67 (15.5)	17 (3.9)	432 (100)

Fisher's Exacttest coefficient = 15.54; P = 0.03 P<0.05 Significant

In table 19, fathers whose occupation was farming were 146 out of which 80.1% had one infant mortality. Table 19 shows that Fisher's exact test coefficient is 15.54 and the P=0.03. The summary of Fishers exact test indicates that a significant effect (P<0.05) was observed between infant mortality and father's occupation. The null hypothesis that father's occupation does not have significant effect on infant mortality in Anambra Statewas rejected.

Summary of Major Findings

1. Mothers between ages 31-35 had high infant mortality while the other ages in the study showed a lower Infant Mortality Rate(Table1).
2. Mothers with secondary education had a higher percentage of infant mortality than the mothers with primary, tertiary and non-formal education (Figure 1).
3. Fathers with secondary education also had a higher percentage of infant mortality than the others who had non formal, primary, and tertiary education (Figure2)
4. Parity showed that mothers who had four children had a higher percentage of infant mortality than those who had 2, 3, 5, 6 or more in the other categories (Table 2).
5. The percentage of infant deaths within the birth spacing of 9-14 and 15-20months were higher than the percentage indicated in the 21 -26, 27 – 32, 33 -38, 39 – 44 (Table 3).
6. Those mothers who started their first antenatal visitsat four months showed the highest number of infant deaths. Mothers who visited five and six times showed a higher percentage of infant mortality. Others who had twice, thrice, and fourth in these tables showed a very low percentage infant mortality (Table 4).

7. Place of delivery for mothers who delivered in private, maternity and state hospitals showed a higher percentage compared with those mothers who delivered their infants with traditionalbirth attendants (Table 5).
8. Mothers who lived in urban area and who had a high standard of living index had a high percentage (63.4%) of infant deaths compared with mothers who lived in rural areas and with a low standard of living index (Figures 3 & 4).
9. Religion of mothers who were Christians with infant mortality was higher than mothers in other religion. Those mothers who because of their religion forbid blood transfusion, drugs, hospital services, and meat were 13.7%. However among mothers who forbid, those that forbid blood transfusion and meat showed a higher percentage of infant mortality (Figure 5 & Table 6).
10. Occupation of the parents showed that those mothers and fathers in civil service and trading had a higher percentage of infant mortality (28.2% & 33.4% respectively) (Tables 7& 8).
11. Age of mothers in Anambra State had statistical significant effect on infant mortality therefore Null hypothesis that age of mothers

does not have significant effect on infant mortality in Anambra Statewas rejected (Table 9).

12. There was nosignificant effect of mothers' educational status on infant mortality. On the other hand, there was asignificant effect fathers' educational status and infant mortality (Tables 10 & 11).
13. There was a significant effect ofparity on infant mortality. Null hypothesis that parity does not have significant effect on infant mortality in Anambra Statewas rejected (Table 12).
14. Birth spacing of mothers in Anambra State had significant effect on infant mortality. Null hypothesis that birth spacing does not have significant effect on infant mortality in Anambra Statewas rejected (Table 13).
15. There was nosignificant effectofantenatal visits during pregnancy on ifant mortality. Null hypothesis that antenatal visits do not have significant effect on infant mortality in Anambra State was accepted (Table 14).
16. Place of delivery of mothers in Anambra State hadsignificant effect on infant mortality. Null hypothesis that place of delivery does not have significant effect on infant mortality in Anambra State was rejected. (Table 15).

17. Place of residence of mothers in Anambra State had nosignificant effect on infant mortality. Null hypothesis that place of residence does not have significant effect on infant mortality in Anambra State was accepted. (Table 16).
18. Religion of mothers in Anambra State hadsignificant effect on infant mortality. Null hypothesis that religion does not have significant effect on infant mortality in Anambra State was rejected (Table 17).
19. Parent's occupation in Anambra State had statisticalsignificant effect on infant mortality. Null hypothesis that mother's occupation and father's occupation do not have significant effect on infant mortality in Anambra Statewas rejected (Tables 18 & 19).

CHAPTER FIVE

DISCUSSION OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS

This chapter discussed the results of the study, conclusions, and implications of the study, as well as recommendations. Also limitations of the study and suggestions for further research were made.

Discussions of Results

The results from this study were discussed under the following subheadings:

- ✓ Socio-economic relationship with infant mortality
- ✓ Environmental relationship with infant mortality

Socio-economic relationship with infant mortality

Age and Infant Mortality: There was low percentage of age of mothers between ages 31-35 (33.3%) with infant mortality while ages 10-14, 15-20, 41-45 and 46-50 in the study showed very low percentage with infant mortality. On the other hand, the ages of mothers in the study had significant on infant mortality therefore null hypothesis that age of mothers does not have significant effect on infant mortality in Anambra State was rejected (Tables 1 & 9). These findings were likely to be as a result of the fact that the

peak of childbirth is within these ages of 31- 35 years. Over the years women go to school and get to work bringing about an increase in age of marriage and subsequently first pregnancy. The result is contrary to the findings of Kaldwei (2010); and Forste, (1994), who indicated that increased risk of infant mortality was for mothers over the age of 35 and that higher risk of infant mortality were indicated for four specific types of pregnancies such as before 18years, after 35 years, after four deliveries, and interval births of less than 24months. The result in this study also contradictedthe findings of Huang ,Sauve, Birkett, Fergusson, and Van Walrauen (2008), who particularly focused on older ages of childbearing as being influential in child health outcomes and infant mortality. This varied age in the result indicates that the findings concerning mothers' age vary in different regions, which points to the importance of studying mother's age at first birth as it affects infant mortality which was one of the purposes of this study. Dube (2012) also noted that childbearing at a significantly young age has been noted to be a predictor of infant mortality, as children born to young mothers are at a greater risk of early death.He confirmed an association between mothers' age at first birth and infant mortality as infants born to mothers of 18 years and younger suffer higher risk of infant mortality.

Education and Infant Mortality: There was low percentage (48.8%) of parents with secondary education with infant mortality. The other levels of education (non-formal, primary, tertiary) showed very low percentage (8.3%, 23.1%, 19.4%) on infant mortality. The statistical analysis showed there was no significant effect between mothers' educational status and infant mortality. On the other, there was a significant effect between fathers' educational status and infant mortality (Figures 1&2; Tables 10 & 11). This result could be due to the fact that the women are known to be the ones who take care of the children at all times as well as see to the welfare of the children. However, men in this part of the country where the study was carried out are assumed to have an upper hand and they are the decision makers in families. They are assumed to be wiser and make better decisions than most women. Mondal et. al.(2009) also posited that fathers education plays an important role in the earning income, which in turn ensures nutrition, clothing, housing among others. The findings of this study could also be due to the fact that many of the mothers were educated, thus education as a comparable variable became insignificant as only 8.3% of the mothers were uneducated. This result is contrary to Adeleye and Ofoegbu's (2013) assertion that mother's status has been found to influence infant mortality through women's ability to control resources and make decisions.

The findings of this studyfound a similar assertion as Rutstein (2000) posited that mothers with secondary education have 20% less chance of infant mortality compared to mothers' who are not educated. Similarly, studies by Mturi and Curtis (1995) in Tanzania and Kembo and Van Ginneken (2009) in Zimbabwe also found a lack of difference in infant mortality in relation to education levels of the mother which is similar to the result in this study. Kyei (2012) however, asserted that female education is a necessary and essential factor to promote a decline in infant mortality. Caldwell (1979) further argued that education of the woman plays an important role in determining child survival. The result is also similar to a study in Nigeria (Adetunji, 1995), which concluded that the relationship with education was not static and differed to the relationship of some other studies, which found education to be significant. Conclusively, in this study education was found to have a greater significance on infant mortality rates as mother's individual level of education will help the mother to be well informed on the care of the child.

Parity and Infant Mortality: There was a very low percentage(less than 25%) of parity with infant mortality. However the Fisher's exact test showed a significant effect between parity and infant mortality which made the null hypothesis that parity does not have significant effect on infant mortality in

Anambra Stateto be rejected (Tables 2 & 12). This finding may be related to the fact that parity has been identified in past studies as an important factor in infant mortality (Omariba et al, 2007). The findings agree with the study by Uddin & Hossain (2008) which identified that infant mortality was found higher in families where the children were many. Many studies identified the negative relationship between birth interval and infant and child mortality (Hossain, (2000); Bicego&Boerma (1992); Inayatullah, (1986); Pebley and Millman, (1986); Winikoff, (1983). Kabir, Chowdhury, & Amin, (1995) concluded that the birth order of a child had strong effect on the survival in the first year of life.

Birth Spacing and Infant Mortality: There was a lowpercentage of birth spacing of 9-14 and 15-19months (25.0% and 39.8%) with infant mortality.Birth spacing of mothers in this study had significant effect on infant mortality. Therefore the null hypothesisthat birth spacing does not have significant effect on infant mortality in Anambra Statewas rejected (Tables 3, & 13). These results could be because the length of the preceding intervals is the prime factors that influence mortality during infancy as the more the spacing the better time the mother has to take care of the infant both nutritionally, psychologically, physically and otherwise. Women with short intervalsbetween two pregnancies have insufficient timeto restore their nutritional reserves, a situation which is thought to adversely affect fetal growth. It is evident that the majority of women who experienced infant mortality had less than 20 months (9 – 14; 15 – 20months) births spacing

intervals (64.8%). These findings are supported by the studies done by Mondal et. al. (2009);Titaley, Agho, Roberts & Hall, 2008; Uddin and Hossain, (2008);Hossain, (2000); Kabir, Chowdhury, & Amin, (1995) (Bicego&Boerma (1992); Inayatullah, (1986); Pebley and Millman, (1986); Winikoff, (1983) which concluded that the birth spacing of a child has strong effect on the survival in the first year of life. There is need to educate women on the importance of child spacing and family planning.

Religion and Infant Mortality: There was a very high percentage (86.3%) of religion of mothers who were Christians with infant mortality compared to non-Christians and atheists. Those mothers who because of their religion forbid blood transfusion, drugs, hospital services, meat etc had a very low percentage (13.7%) on infant mortality. However among these mothers, those that forbid blood transfusion and meat showed a high percentage (49.2% and 33.4%) on infant mortality. Statistically, religion of mothers in this study had statistical significant difference with infant mortality and so the null hypothesis was rejected ((Figure 5; Tables 6 & 17). These results may have been as a result of the fact that religion involves the personal beliefs or values of people and majority of the respondents (83. 1%) were Christians. In the contrary opinion of Agadjanian and Menjivar (2008), mother's religion may decrease the likelihood of infant and child death and can lead to better infant survival. Elifson, Klein, & Sterk, (2003);Powell, Shahabi, & Thoresen, (2003);Chatter, (2000); Ellison & Levin, (1998), posited that religious

involvement is beneficial to health of individuals and populations. In agreement withChatter, (2000); Gregson, Zhuwau, Anderson, & Chandiwana, (1999), that when religious involvement discourages professional help-seeking behaviour for health care; promotes inappropriate use of health care services; and encourages exclusive treatment by clergy and prophets, its effect may be detrimental to physical and mental health. However, Gregson, Zhuwau, Anderson, & Chandiwana, (1999) agreed that religion may have a negative effect on health and the risk of mortality by prescribing health-damaging behaviours. Antai (2008) in his study posited an association between religious affiliation with mortality and health. In this study, religion had a significant association with infant mortality.

Occupation and Infant Mortality: There was low percentage of parents' occupation (less than 43.8 mothers and 33.8% for fathers)on infant mortality. Parent's occupation in this study had significant effect on infant mortality therefore, the null hypotheses were rejected ((Tables 10, 11, 18 & 19). These results could be because parents who have good jobs are expected to have good lifestyle. It is expected that majority of women are family helpers on fields and mortality level is high among non-working women than self-employed women. In this study, more parents were civil servants and traders who are expected to have at least enough resources to have a good lifestyle

but these groups of parents recorded a higher infant mortality. Also one's occupation is expected to be the reflection of the physical environment, social environment, education background, income and lifestyle and for this reason,occupation is taken as an index of socioeconomicstatus.According to Mondal et. al. (2009), father's occupation determines theeconomic status, nutrition and housing condition,access to health care facilities and clothing of a family which in turnrelates with the health and life style of the infant. So father'soccupation may be counted as an importantdeterminant of infant and child mortality in apopulation. This is in agreement with the study by Uddin and Hossain (2008) which posited that occupation of parents had significant influence on post- neonatal mortality. Barret and Brown (2006) study in agreement with these results stated that the child mortality rate is lower if mothers engaged in traditional sector jobs and higher if mothers engaged in farming or modern sector jobs.

Environmental relationship with infant mortality

Antenatal Visits and Infant Mortality: There was high percentage(55.6%) of mothers who started their first antenatal visits at four months with infant mortality. Mothers who visited five and six times had low percentage (14.4% & 5.3%) of infant mortality. In Table 4, those mothers who started antenatal visitat three monthshad a very low percentage (23.4%) of infant mortality.

Statistically, there was no significant effect oninfant mortalitybased onantenatal visits during pregnancy therefore the null hypothesis that antenatal visit does not have significant effect on infant mortality in Anambra State was accepted (Tables 4 & 14). This result could be due to the fact that government in Anambra State established either health posts or primary health centers in almost all the communities. The government also established a free antenatal visits to all pregnant mothers. It is expected that mothers who utilize these facilities should not have problems during pregnancy. This result agrees with the assertion of Mark (1997) that early initiation of prenatal care is believed to promote healthy pregnancy outcomes.

Place of Delivery and Infant Mortality: There was higherpercentage(40.7%) of place of delivery for mothers who delivered in private hospitals on infant mortality compared to mothers who delivered their infants in other areas of the study who showed very low percentage. Statistically place of delivery of mothers in Anambra State had statistical significant difference with infant mortality, therefore the null hypothesis was rejected (Tables 5 & 15). This finding could be so because if a woman delivers in a hospital where there is expertise care, the tendency of infant death is reduced as a lot of investigations would have been done to identify

complications with the purpose of prevention and treatment if any. It is expected that early monitoring and on-going care during pregnancy is associated with more favourable birth outcomes. Other studies such as Adeleye and Ofoegbu (2013); Mondal et. al (2009) agrees with the assertion that place of delivery is an important determinant of child survival as survival is higher among children born inhealth facilities and attended by professionaldoctors and health team than those born at home attended by untrained personnel. Contrarily, Kaldewei (2010) in his study found no significant effect for the choice of delivery location.

Place of Residence and Infant Mortality: There was high percentage of mothers (52.3%) who lived in urban area compared to mothers who lived in rural areas with infant mortality. There was a high percentage with infant mortality with mothers who had a high standard of living compared to those with medium and low standard of living, who showed low percentage and very low percentage respectively. Statistically, place of residence of mothers in Anambra State had no statistical significant difference with infant mortality, Therefore the null hypothesis was accepted (Figure 5, Tables 6, &17). This result could because 52.3% of the dead infants mothers live in the urban areas while 47.7% live in the rural area. In Anambra State, some of the so called rural dwelling places have access to some of the facilities that are

found in urban areas such as light, roads, health facilities, schools, high population among others. It is therefore expected that based on the focus on the reduction of the 4th MDGs, the facilities are provided to reduce infant mortality. However this result is contrary to the assertion of Adetunji (1994) that children born in modern health facilities, irrespective of their mothers' place of residence, experienced significantly lower rates of infant mortality than those born elsewhere.Uddin and Hossain (2008) agreed that mother`s standard of living index was a predictor of infant mortality. Kyu et. al. (2013) agreed that living in a slum neighborhood was associated with infant mortality irrespective of individual and household characteristics.

Conclusions

The objective of this study was to examine how socio-economic and environmental factors affect infant mortality and it was found that indeed there is an existing association at different levels. Based on the findings, the following conclusions were made:

1. There was a low percentage of mother's age (< 33%), parent's with secondary education (< 38%), parity (< 23%) and birth spacing (<39%), and place of delivery (<40%) with infant mortality in Anambra State.

2. Antenatal visits (55%), religion (83%) and place of residence (52%), had a high percentage with infant mortality.
3. Parent's occupation (33%) had a low percentage with infant mortality.
4. Statistically, there were significant differences of age group of the mothers, father's education, parity, birth spacing, place of delivery, religion and parent's occupation with infant mortality.
5. There were no statistical differences between mother's education, antenatal visits, and place of residence with infant mortality.

Implications of the Study

It is evident that there are differences of the independent variables under study with infant mortality.

The findings indicated that ages of the mothers during the time of birth of the infant has a statistical significant effect on infant mortality. This calls for health education of the mothers on the age of marriage to reduce infant mortality. These days, mother's aim so high on education and this occupies their mind so much that every other thing is secondary. Education of the girl-child should start early so it will not be a hindrance to child bearing. An educated woman will have a contribution to make in the upkeep of the family as well as being well informed. This implies the need for more health

educators, to create awareness on the importance of early girl child education.

The study also indicated a significant difference between parity, birth spacing and parent's occupation. Parents need to understand the implication of these findings. It therefore call for health education of couples to know how to space their children in other to have enough time with them and be able to identify what their needs are and attend to the needs accordingly. Parent's occupation determines what they earn to look after their family. Therefore, government should create job opportunities so that couples will earn their living and be able to take care of their family accordingly. This therefore implies that the government should create a policy on number of children as well as increase maternity and paternity leave.

Recommendations

Based on the findings, the following recommendations were made:

1. In view of the fact that Anambra State and Nigeria is committed to the Millennium Development Goals, the fourth of which is the reduction of child mortality, the state should continuously thrive to achieve these goals by careful data collection of infant mortalities and their attributed causes which will help creating awareness and encourage

implementation of health strategies to avoid infant mortality. Those factors that had statistical significant effect with infant mortality, such as age of mother, education, occupation among others should be monitored by use of Demographic Health Data Collection.

2. Though majority of the women had health education delivered in the hospital/clinic by nurses, there is need for more health educators.
3. As a matter of policy, government should introduce special subsidy policy or waiving of fees for the low income earners as well as encourage free mother and child medical care.
4. Teaching of Health Education in senior secondary schools should be encouraged to enable the women enter for Joint Admission and Matriculation Board examination so they can educate themselves and educate others.

Limitations of the Study

1. The study sample were women who have experienced infant mortality during the period 2000 – 2011 that is twelve years prior to the study thus the respondents have to recall information of up to twelve years back in other to recall the years/months when the child died which was an unpleasant memory to recall. However this did not affect the result presented.

2. Some of the women were not ready to recount the experience of their dead infant but reported it after referral by neighbours. However, this did not affect the results.

Suggestions for Further Research

1. Anambra State is a culturally diverse place; it would therefore be beneficial if a study is conducted on infant mortality from the cultural perspective.

2. Further studies should be conducted using Anambra State Health Demographic Data to see relationship to the under-five infant mortality in Anambra State.

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APPENDIX: A

STRUCTURED INTERVIEW SCHEDULE ON INFANT MORTALITY.

Dear respondent,

This schedule aims in collecting data to study the relationship of socio-economic and environmental factors with Infant Mortality in Anambra State between years 2000 – 2011.

The researcher is a Ph.D. student in the Department of Human Kinetics and Health Education, Nnamdi Azikiwe University, Awka.

The various important data obtained from this issue will help determine what existed, as well as make recommendations.

Below are some questions on those issues. Your response will be completely confidential and you are kindly requested to respond honestly.

Thank you for your co-operation.

Agbapuonwu, N. E. (Mrs)

SECTION A

This instrument contains the items expected to use in answering the research questions and the hypothesis. The researcher or the assistant is expected to tick the appropriate options.

Demographic Data

1 Age of the Mother:

10 -14 ☐ 15- 20 ☐ 21- 25 ☐

26 - 30 ☐ 31- 35 ☐ 36 - 40 ☐

41- 45 ☐ 46 - 50 ☐ ≥51 ☐

2. Mother's age at birth of the dead infant:

10 - 14 ☐ 15- 20 ☐ 21- 25 ☐

26 - 30 ☐ 31 - 35 ☐ 36 - 40 ☐

41 – 45 ☐ 46 -50 ☐ ≥50 ☐

3. What is your religion?

Christian ☐ Non-Christian ☐ Atheist ☐

4. How many children do you have?

1 ☐ 2 ☐ 3 ☐ 4 ☐

5 ☐ 6 ☐ 7 ☐ 8 ☐

Above 8, Specify ☐

5. How many children did you have between years 2000 - 2011?

1 ☐ 2 ☐ 3 ☐ 4 ☐

5 ☐ 6 ☐ 7 ☐ 8 ☐

6. Do you have any infant that died before 12 months between years 2000 - 2011?

   Yes ☐ No ☐

7. If Yes, how many? 1 ☐ 2 ☐ 3 ☐

   4 ☐ ≥ 5 ☐

8. When was the infant born?

   2000 ☐ 2001 ☐ 2002 ☐

   2003 ☐ 2004 ☐ 2005 ☐

   2006 ☐ 2007 ☐ 2008 ☐

   2009 ☐ 2010 ☐ 2011 ☐

9. How old was the infant before he/she died?

   0-28days ☐ 1month ☐ 2mths ☐

   3mths ☐ 4mths ☐ 5mths ☐

   6mths ☐ 7/8mths ☐ 9/10mths ☐

   11/12mths ☐

10. What was the birth position of the dead infant?

   1st ☐ 2nd ☐ 3rd ☐

   4th ☐ 5th ☐ 6th ☐

   7th ☐ Others (Specify) ☐

11. What was the space between the previous child and the infant that died?

9-14months ☐ 15-20months ☐ 21-26mnths ☐

27-32mnths ☐ 33-38mnths ☐ 39-44mnths ☐

Others (Specify) ☐

12. Type of birth Normal delivery-Single ☐

Normal delivery- Multiple ☐

Caesarean delivery- Multiple ☐ Caesarean delivery- Multiple ☐

Section B: Socio-economic Factors

13. Maternal education Non formal education ☐ Primary ☐

Secondary School ☐ Tertiary ☐

14. Father's Education Non formal education ☐ Primary ☐

Secondary School ☐ Tertiary ☐

15. Mother's Occupation:

Civil Service ☐ Trading ☐ Farming ☐

Artisan ☐ Others (Specify) ☐

16. Father's Occupation:

Civil Service ☐ Trading ☐ Farming ☐

Artisan ☐ Others (Specify) ☐

Section C: Environmental Factors

17. Exposure to mass media:

Yes ☐ No ☐

18. Place of residence of the mother Urban area ☐ Rural ☐

19. Standard of Living

i. Type of Toilet : Pit Latrine ☐ Septic Latrine ☐ No Facility ☐

ii Type of wall of the house: Brick ☐ Wood ☐ Natural ☐

iii. Source of water: Pipe ☐ Well ☐ Pond/River ☐ Others ☐

iv. Ownership of household goods: Motor ☐ Motorcycle ☐ ☐

Telephone

TV ☐ Bicycle ☐ Radio ☐

Section D:Health Care Service Utilization.

20. Where was the place of delivery of the infant that died?

Maternity Home ☐ State Hospital ☐ Private Hospital ☐

Teaching Hospital ☐ Traditional Birth Attendant ☐ Others ☐

(Specify)

21. When did you commence antenatal during the pregnancy of the dead infant?

3 months ☐ 4 months ☐ 5 months ☐

6 months ☐ Others (specify)…….. ☐

22. How many antenatal visits did you attend during thedead infant's pregnancy?

1 ☐ 2 ☐ 3 ☐

4 ☐ 5 ☐ ≥6 ☐

23. Did you receive Tetanus Toxoid during the pregnancy? Yes ☐ No ☐

24. Indicate which of the following complications you had during the pregnancy, if any?

Ante partum hemorrhage ☐ Severe vomiting (≥6) ☐ Malaria ☐

Always having fever (Malaria) ☐ Anemia ☐

Swelling of the face and legs ☐ Others

(Specify)…….

25. Does your religion forbid drugs, blood transfusion, hospital services, certain foods and meat or any other? Yes ☐ No ☐

26. If Yes, which one exactly?

Drugs ☐ blood transfusion ☐ antenatal services ☐

Meat ☐ Others

(Specify)……..

27. Do you use treated mosquito net? Yes ☐ No ☐

APPENDIX B

Sample Size according to Yaro Yamane in Chikezie (2007).

The formula is

$$n = \frac{N}{1+N(e)^2}$$

Where

n = the sample size

N = the finite population

e = level of significance (or limit of tolerable error)

1 = Unity (a constant)

$$\frac{53{,}705}{1 + 53{,}705\,(0.05)^2} = \frac{53{,}705}{1 + 53{,}705(0.0025)} = \frac{53{,}705}{1 + 134.26}$$

$$\frac{53{,}705}{135} = 397.8 = 398$$

APPENDIX C: COMPUTATION OF SPLIT-HALF RELIABILITY.

PILOT TEST

S/N	X	Y	XY	X^2	Y^2
1	4	3	12	16	9
2	2	3	6	4	9
3	3	3	9	9	9
4	3	4	12	9	16
5	2	2	4	4	4
6	5	6	30	25	36
7	5	5	25	25	25
8	3	4	12	9	16
9	3	2	6	9	4
10	4	5	20	12	25
11	7	6	42	49	36
12	6	5	30	36	25
13	8	7	56	64	49
14	7	7	49	49	49
15	5	4	20	25	16
16	6	6	36	36	36
17	2	3	6	4	9
18	7	8	56	49	64
19	7	7	49	49	49
20	6	5	30	36	25
21	7	7	49	49	49
22	6	8	48	36	64
23	3	6	18	9	36
24	7	8	56	49	64
25	6	6	36	36	36
26	5	6	30	25	36
27	7	7	49	49	49
28	5	7	35	25	49
29	8	7	56	64	49
30	9	9	81	81	81
31	6	8	48	36	64
32	5	9	45	25	81
33	7	9	63	49	81
34	9	11	99	81	121
35	3	5	15	9	25

36	6	7	42	36	49
37	5	8	40	25	64
38	8	7	56	64	49
39	10	12	120	100	144
40	10	11	110	100	121
41	3	7	21	9	49
42	7	7	49	49	49
43	4	6	24	16	36
TOTAL N=43	**241**	**273**	**1700**	**1541**	**1957**

Calculation of the reliability Coefficient of the Split halves of the test using Pearson's Product Moment Correlation Coefficient (PPMCC)

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Where r = Pearson's r

$\sum X$ = Sum of scores in odd numbered split half

$\sum Y$ = Sum of scores in even numbered split half

$\sum XY$= Sum of product of paired X and Y Scores

$\sum X^2$=Sum of squares of scores in X

$\sum Y^2$= Sum of squares of scores in Y

N = Number of paired X and Y Scores

N=43

$\sum X$= 241

$\sum Y$= 273

$\sum XY$= 1700

$\sum X^2$=1541

$\sum Y^2$ =1957

Substituting in

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{[N\sum X^2 - (\sum X)^2]\,[N\sum Y^2 - (\sum Y)^2]}}$$

$$r = \frac{43x\ 1700 - (241x273)}{\sqrt{[43x1541 - (241)^2]\,[43x1957 - (273)^2]}}$$

$$= \frac{73100 - 65793}{\sqrt{[66263 - 58081]\,[84151 - 74529]}}$$

$$= \frac{7307}{\sqrt{8182 \times 9622}}$$

$$= \frac{7307}{\sqrt{78727204}}$$

$$= \frac{7307}{8872.8}$$

$$= 0.8235$$

$$= \mathbf{0.82}$$

Using Spearman Brown Prophesy Formula to solve for the reliability of the whole test

$$r^i = \frac{2r}{1+r}$$

Substituting where r = 0.82 the reliability of the split halves of the test;

$$r^i = \frac{2x\ 0.82}{1+0.82}$$

$$r^i = \frac{1.64}{1.82}$$

$$r^i = 0.901$$

$$r^i = \mathbf{0.90}$$

APPENDIX D: 21 LOCAL GOVERNMENT AREAS (LGAs) AND COMMUNITIES

S/N	LGAs	COMMUNITIES
1	Aguata	Achina, Aguluezechukwu, Akpo, Amesi, Ekwulobia, Ezinifite, Igboukwu, Ikenga, Isuofia, Nkpologwu, Oraeri, Uga, Umuchu, Umuoma (14).
2	Anambra East	Aguleri, Enugwu-otu, Ezi-Aguluotu, Igbariam, Nando, Nkpunando, Nsugbe, Otuocha, Umuleri, Umuoba-Anam (10).
3	Anambra West	Ezi-Anam, Ifite-Anam, Olumbanasa, Oruma-Etiti, Umuenwelum-Anam, Umueze-Anam (6).
4	Anaocha	Adazi-Ani, Adazi-Enu, Adazi-Nnukwu, Agulu, Aguluzigbo, Akwaeze, Ichida, Neni, Nri, Obeledu (10).
5	Awka North	Achalla, Amansea, Amanuke, Awba-Ofemili, Ebenebe, IsuAniocha, Mgbakwu, Ugbenu, Urum (9).
6	Awka South	Amawbia, Awka, Ezinato, Isiagu, Mbaukwu, Nibo, Nise, Okpuno, Umuawulu (9).

7	Ayamelum	Anaku, IfiteOgwari, Igbakwu, Omasi, Omor, Umueje, Umuerum, Umunbo (8).
8	Dunukofia	Ifitedunu, Nawgu, Ukpo, Ukwulu, Umudioka, Umunnachi (6).
9	Ekwusigo	Ichi, Ihembosi, Oraifite, Ozubulu (4).
10	Idemili North	Abacha, Abatete, Eziowelle, Ideani, Nkpor, Obosi, Ogidi, Oraukwu, Uke, Umuoji (10).
11	Idemili South	Akwukwu, Alor, Awka-Etiti, Nnobi, Nnokwa, Oba, Ojoto (7).
12	Ihiala	Amorka, Azia, Ihiala, Isseke, Lilu, Mbosi, Okija, Orsumoghu, Ubuluisiuzo,Uli (10)
13	Njikoka	Abagana, Abba, Enugwu-Agidi, Enugwu-Ukwu, Nawfia, Nimo (6).
14	Nnewi North	Nnewi
15	Nnewi South	Akwaihedi, Amichi, Azigbo, Ebenato, Ekwulumili, Ezinifite, Osumenyi, Ukpor, Unubi, Utuh (10).
16	Ogbaru	Akili-Ogidi, Akili-Ozizu, Amiyi, Atani, Mputu, Obeagwa, Ochuche, Odekpe, Ogbakuba, Ogwu-

		Aniocha, Ogwuikpele, Ohita, Okpoko, Ossomala, Umunankwo, Umuodu, Umuzu (17).
17	Onitsha North	Onitsha
18	Onitsha South	Fegge Onitsha
19	Orumba North	Ajalli, Amaetiti, Amaokpala, Awa, Awgbu, Nanka, Ndikelionwu, Ndiokpaleke, Ndiokpaleze, Ndiokolo, Ndiowu, Ndiukwuenu, Oko, Okpeze, Omogho, Ufuma (16).
20	Orumba South	Agbudu, Akpu, Enugwu-Umuonyia, Eziagu, Ezira, Ihite, Umuchukwu, Nawfija, Ogboji, Ogbunka, Onneh, Owerre-Ezukala, Umunze, Umuomaku (14).
21	Oyi	Awkuzu, Nkwelle-Ezunaka, Nteje, Ogbunike, Umunya (5).

Source: Anambra Vision 2020 in Nigeria Vision 2020: Input into Nigeria Vision 2020 Document For Anambra State.

APPENDIX E

SAMPLED 14 COMMUNITIES

LGAs	COMMUNITIES
Aguata	Ekwulobia, Umuona
Anaocha	Aguluzigbo, Obeledu
Ayamelum	Igbakwu, Umuerum,
Idemili North	Obosi, Uke
Njikoka	Enugwu-Agidi, Nimo
Ogbaru	Amiyi, Ossomala.
Orumba North	Ajalli, Ndiokpaleke,

Source: Anambra Vision 2020 in Nigeria Vision 2020: Input into Nigeria Vision 2020 Document for Anambra State

APPENDIX F

SAMPLING FRAME

S/N	LGA	COMMUNITY I	POPULA-TION	COMMUNITY 2	POPULATION	TOTAL
1	AGUATA	EKWULOBIA	17,973	UMUONA	2,281	20,254
2	ANAOCHA	AGULUZOIGBO	5,344	OBELEDU	4,069	9,413
3	AYAMELU	IGBAKWU	3,151	UMUERUM	3,015	6,166
4	IDEMILI NORTH	OBOSI	38,550	UKE	6,608	45,158
5	NJIKOKA	ENUGU-AGIDI	6,177	NIMO	13,157	19,334
6	OGBARU	AMIYI	1,252	OSSOMALA	3,046	4,298
7	ORUMBA NORTH	AJALLI	4,310	NDIOKPALEKE	669	4979
TOTAL			76, 757		32,845	109,602

Population of women in the seven local governments = 109, 602

Population of women of child bearing age = 49% of 109,602

$$= {}^{109,\,602}/_{49} \text{ X } {}^{49}/_{1} = 53,\,704$$

Therefore, population is 53, 704.

APPENDIX G

STANDARD OF LIVING INDEX

Variables	Scores
Types of toilet used by mother	Hanging/open = 1
	Septic latrine = 2
	Other (no facility) = 3
Types of wall of the house	Brick/tin = 3
	Rudimentary (wood) = 2
	Natural = 1
	Other = 0
Source of water for the household work	Pipe water = 3
	Tube well/surface = 2
	Pond/river = 1
	Other = 0
Ownership of household goods	Motorcycle/telephone+ TV + bicycle + radio = 4
	TV+bicycle+radio = 3
	Bicycle = 2
	Radio = 1
	None = 0
Standard of Living Index (SLI)	Score Range: 00-13
Categories of SLI	Range
Low SLI	0-5
Medium SLI	6-9
High SLI	10-13