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Impact of Maternal Employment on Childhood Mortality in Swaziland

Research Project Submitted to the Faculty of Humanities,

University of the Witwatersrand, Johannesburg,

in Partial Fulfilment of the Requirements for the

Degree of Masters of Arts in Demography and Population Studies

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Declaration:

I **Rebaone Petlele** declare this research report to be my own work. This paper is submitted to the Faculty of Humanities and School of Social Sciences at the University of the Witwatersrand. The paper is submitted for the partial fulfilment of a Masters of Arts in Demography and Population Studies at the University of the Witwatersrand, Johannesburg. I confirm that this report has never been submitted before for any degree in the University as well as any other university.

[Rebaone Petlele]

15 May, 2012

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Abbreviations: moved to come after abstract

AIDS: Acquired Immune Deficiency Syndrome

AOR: Adjusted Odds Ratio

CSO: Central Statistics Office

CSPs: Child Survival Programmes

EAs: Enumeration Areas

HIV: Human Immunodeficiency Virus

MDGs: Millennium Development Goals

MOHSW: Ministry of Health and Social Welfare

RC: Reference Category

SDHS: Swaziland Demographic and Health Survey

UNDP: United Nations Development Programme

UOR: Unadjusted Odds Ratio

USAID: United States Agency for International Development

Key Words: maternal employment, working mothers, non-working mothers, childhood mortality, sub-Saharan Africa, Swaziland

CHAPTER ONE: Introduction

1.1.Background

Childhood mortality in Swaziland remains a big problem as the mortality rate has continued to increase over the last 17 years (UNDP, 2011). This increase is assumed to have occurred as a result of paediatric AIDS. The UNDP suspects that despite some stability in the mortality rates in recent years, if action is not taken, infant and child mortality could make a sharp increase again (UNDP, 2011). With continued poverty, inadequate education facilities, paediatric AIDS, poor health services as well as lack of household indicators, childhood mortality continues to be a crisis in Swaziland.

Before the Millennium Development Goals (MDGs) were established in 2000, several child survival programmes (CSPs) had been initiated in an attempt to alleviate the desperate situation of high childhood mortality plaguing African countries, including Swaziland. The World Summit for Children held in 1990 had called for a special task team to reduce childhood mortality in developing countries to below 70 child deaths per 1,000 live births by 2000 (Kulkarni, 2006). This target was not reached.

According to the report established by the Swaziland Demographic and Health Survey (SDHS, 2006/7) commissioned in 2008, there is severe underreporting of deaths which occur at early stages of infancy. Despite this , infant and child mortality calculated from the use of this data indicated infant mortality to be at a high of 85 deaths per 1,000 live births and under-five mortality 120 deaths per 1,000 live births, which is also extremely high (SDHS, 2006/07).

The UNDP has estimated that if the current patterns of child mortality persist, in 2015 there will be 5.1 million deaths of children around the world, with Africa contributing to 57 percent of these deaths (Okonofua, 2005). According to Okonofua (2005), countries in sub-Saharan Africa are expected to achieve the MDGs for reduction of child mortality in 2115. These estimates demonstrate the seriousness and devastation African countries face in their plight to curb childhood mortality. There is an urgent need to try and reduce this avoidable phenomenon as childhood mortality rates in some developed countries are in the single digits. There is, therefore, no reason for African children to continue to die where solutions specifically tailored for African countries can be found.

There is no doubt that female autonomy is beneficial for childhood survival, as mothers' income is seen to translate into better care and access of resources for children in the household (Sivakami, 1997). However, mothers who are working are less likely to spend time with their children, ensuring that they are cooked for, fed, bathed and all other responsibilities accompanying having a child in the household. There is strong evidence in studies that women who work suffer more from cases of childhood mortality than women who are not involved in the labour market (Basu and Basu, 1991). As stated above, economic empowerment may not only facilitate improved circumstances for women and their children but having women outside of the household may prove to be detrimental to the survival of their children.

The association between maternal employment and childhood mortality is not yet readily established. It is appropriate to emphasise here that previous studies may have looked into this relationship but not many have used maternal employment as a key independent predictor variable of childhood mortality in their studies, as this study will do. A recent study conducted in Swaziland showed that childhood mortality is heavily influenced by maternal education, access to health care as well as susceptibility to diseases (Masuku-Maseko and Owaga, 2012). These are the main predictor variables, which most studies consider yet they neglect maternal employment.

Very few if any have considered researching this phenomenon in sub-Saharan Africa and the continent as a whole. Conducting the study in Swaziland will therefore provide evidence in an African and sub-Saharan African context and will equip this study to be used as a tool which provides a comparable report with studies conducted in different demographic settings. It will contribute to closing the gap bridged by the little existing empirical knowledge surrounding the relationship that exists between maternal employment and childhood mortality.

1.2.Problem statement:

- **Problem of high childhood mortality in Swaziland**

A study done by Rajaratnam and others (2010) compiled and assessed a database with the records of childhood deaths from 187 countries. This data revealed that in 1970 childhood mortality in Swaziland was recorded at a high of 188 deaths per 1,000 live births; in 1980 it was recorded at 122.3 deaths; 1990 it was 73.7 deaths; 2000 was 99.3 deaths and increased to

101.2 deaths per 1,000 children born in 2010 (Rajaratnam, 2010). These figures illustrate the increase of the situation in recent years.

Graciana (2010) also conducted a study in Swaziland, which aimed to assess whether improvements in the water supply had encouraged hygienic behaviour which was in turn aimed to improve health conditions to help reduce childhood mortality. The results of this study showed that despite improvements in the supply of water to households childhood mortality continued to rise from 60 childhood deaths per 1,000 live births in 1996 to 120 childhood deaths per 1,000 children born in Swaziland in 2006 (Graciana, 2010). This means that under-five mortality doubled in a space of a decade. The study concluded that even with improved water supply, one of the reasons why households had not experienced sufficient improvements in child health is because this implementation needs to be accompanied by sanitary behaviour, which requires economic capacity from household members (Graciana, 2010).

- The socioeconomic condition of Swaziland

Socioeconomic indicators are very important to ensure efficient resources for the wellbeing of a population, including effective child care. According to Okonofua (2005), sub-Saharan African countries are hardest hit by dire poverty which limits resources and services essential for human survival. This is as a result of lack of social development and economic opportunities available for individuals. There is high unemployment as well as inaccessibility to health facilities. In Shoo's (2007) study conducted in 13 countries including Swaziland, the results indicate that as poverty levels increase there is also an increase in food insecurity. This contributes to the high malnutrition experienced by children in Swaziland.

Shoo (2005) also noted that the health system favours those who are more privileged in terms of financial and material positions, which contributes to the high childhood mortalities as a result of preventable illnesses. Access to education also contributes greatly to good health outcomes. For instance, in the case of Graciana's (2010) study conducted in Swaziland, it indicated that literacy on hygienic behaviours such as washing of hands before preparing foods would decrease the likelihood of infectious diseases which promote susceptibility to diarrhoea and other infectious diseases.

- Maternal employment and impact on childhood mortality

Income from employed individuals is an advantage for the improvement of a household's socioeconomic condition. Employment of mothers is an added bonus to the household as mother's income is seen to be invested in household expenditure and this encourages childhood survival (Short et al. 2002). Women are often concerned with the best interests of the child and are seen to invest in child care more readily than any other members of the household. The problem is not the economic benefits that come with mother's participation in the work force because that is in favour of the child's survival. The problem lies in the way which work affects the amount of time which the mother is able to spend with the child (Short et al. 2002).

Work physically removes mothers from the place where their children are located for certain hours of the day and the children are ultimately left in the care of someone other than the mother. This study, which aims to investigate the relationship between childhood mortality and maternal employment, is of paramount importance as participation in employment may contribute to the increasing childhood mortality in Swaziland. If this is found to be the case, solutions to this problem need to be discussed in an effort to inform policy. This study is likely to find that maternal employment in contemporary society is not designed to accommodate childrearing practices, which needs to change in order for childhood survival in Swaziland and other developing nations to improve.

1.3. Research Question:

Does maternal employment have an adverse influence on childhood mortality in Swaziland?

1.4.Research objectives:

Main research objective:

1.4.1. To examine the relationship between maternal employment and childhood mortality in Swaziland.

Specific research objectives:

1.4.2. To highlight the proportion of childhood mortality experienced by mothers in Swaziland five years preceding the SDHS 2006/07;

1.4.3. To determine the relationship between maternal employment and childhood mortality considering other indicators (extraneous variables); estimate the net effect of maternal employment on childhood mortality.

1.5. Justification of Research:

- How study will add to existing literature.

With high childhood mortality in Swaziland, research which investigates determinants of childhood mortality remains a priority in society. With evidence provided in previous studies, the need for more studies which consider maternal employment as an important predictor variable for childhood mortality are necessary. Studies are yet to explore the relationship between maternal employment and childhood mortality in an African context (as this study will do). This will make a valuable contribution to limited empirical evidence in social sciences in this discussion. Establishing a link between maternal employment and childhood mortality will help advocate for policy which encourages maternal employment and finds a way around the negative impact it may have on childhood survival in Swaziland.

- How study will help improve child care and survival.

Child care is an important element of childhood survival. Children below the age of five are susceptible to a number of illnesses as well as injury (Graciana, 2010). Good quality child care is imperative to ensure that child survival is maintained. Ability to notice symptoms of illnesses, provide nutritionally rich foods and a hygienic environment provides space for child survival. Routine checks, vaccinations and proper feeding of infants are essential and to ensure that these practices are not taken for granted, mothers are an important link in this equation.

Employment opportunities remove the mother from the home (Short et al. 2002). At times mothers are forced to leave the child in inferior care and this increases the child's susceptibility to childhood mortality. Work is not complementary to childrearing practices as some practices only mothers can implement, for instance breastfeeding. Careful consideration should be given to the benefits of having a mother present in the household to nurture the child in their early stages of childhood. This study emphasises the benefits of having a mother present to raise their own as they require constant monitoring.

- How study will improve policy

This study will inform policy on labour laws, which advocate for job reservation for mothers after childbirth. Previous studies noted that the majority of childhood mortalities occur during infancy as children are more susceptible to death in their first two years of life (Glick and

Sahn, 1998). This policy will promote allowance for mothers to take leave of two to three years to attend to her child without the threat of losing their jobs. Mothers often rush to return to the work place after the birth of the child due to fear of losing their position, which puts the child at risk of death.

Lester (2004) stands firm in defence of paid family leave for women in order to take care of a new born or look after a sick relative. This will actually encourage more participation of women who would not normally be in the labour market due to fear of not being able to attend to their families' needs at home (Lester, 2004). Therefore this policy is beneficial to social development in two ways: improving childhood mortality by mother's attendance, as well as encouraging female autonomy.

1.6.Definition of terms:

Terms	Definitions	Operational definitions
Childhood mortality	The term used in demography to describe childhood mortality is under-five mortality: the probability of dying between birth and the fifth birthday (SDHS Report, 2008)	For the purpose of this study, childhood mortality refers to the death of children under the age of five. Still-born children are not included in this description, only children who died after being born alive.
Maternal employment	Currently employed is defined as having work in the past seven days. Includes persons who did not work in the past seven days but who are regularly employed and were absent from work for leave, illness, vacation, or any other such reason (SDHS Report, 2008)	For the purpose of this study, 'employed mothers' refer to women who are currently working. This includes all mothers working regardless if it is at home or away from home as well as if they work all year or just from time to time (part time employment).
Maternal unemployment	Currently unemployed is defined as not having work in the past seven days. Includes persons who did not work in the past seven days and regularly unemployed and they were not absent from work for leave, illness, vacation, or any other such reason (SDHS Report, 2008)	For the purpose of this study, unemployed mothers are currently not working. These mothers do not participate in any form of work at home or away from home, they also do not work full or part time. This means these mothers who do not get a wage of any kind.

CHAPTER TWO: Literature Review and Theoretical framework

2.1. Introduction

This section considers studies which have researched under-five mortality in developing countries in Swaziland, Africa and abroad. Previous studies which have looked into determinants of childhood mortality such as the impact of maternal education are discussed. The literature review also reported on previous studies which considered maternal employment as a confounding factor for childhood deaths. With consideration from previous studies as well as the use of the Mosley and Chen (1984) theoretical framework, a conceptual model was developed as a framework for this study. Both the theoretical and conceptual are outlined later in the chapter.

2.2. Childhood mortality in Africa

Infant and under-five mortality is a great indicator of societies' progress in terms of social development as well as a good measure of their health care system (Franz and FitzRoy, 2006). Children are extremely vulnerable to the conditions of their immediate and external environment. This, therefore, makes childhood mortality a good indicator of the current state of African countries. This phenomenon remains undeniably high in Africa despite a huge decline in child mortality in other countries across the world.

This reality is a reflection of dire poverty and diseases, which continue to plague developing countries. Even though the childhood mortality rates have declined in the 20th century this has not been the case in countries in sub-Saharan Africa (Franz and FitzRoy, 2006). According to Baker (1999), of the 20 countries in the world which experience the highest rates of childhood mortality, 18 of these are in sub-Saharan Africa.

It is important to highlight that childhood mortality trends and patterns are also indicative of a society's socio-political condition. The fluctuations over the decades in both infant and under-five mortality rates in African countries can be attributed to a country's political, social and economic climate. Garrene and Gakusi (2006) explain that dramatic changes in childhood mortality rates occurred in the second half on the 20th century. The impact of vast medical developments had contributed to this decline, political stability in the gaining independence as well as decreasing violence also contributed (Garrene and Gakusi, 2006). A good political climate stimulated economic growth for Africa, which therefore resulted in dramatic social improvements.

Almost all African countries witnessed a similar decline in childhood mortality after the 1950s but drastic changes occurred which resulted in a sudden increase of childhood mortality in the 80s and early 90s (Garenne and Gakusi, 2006). This was the case for Botswana, which had experienced fast economic growth, urbanisation and education that led to rapid childhood mortality decline (Garenne and Gakusi, 2006). This was all brought to a halt in the 1980s when HIV/AIDS plagued the country. Like Botswana, Lesotho's infant mortality rate was seen to be dropping from 144 deaths in 1950s to 47 deaths in the 90s but a sudden increase in infant mortality occurred where 57 deaths were recorded in 2000 (Tabutin and Schoumaker, 2002).

According to Daniel (2000), the leading causes of infant and under-five mortality in Africa, to name a few, are paediatric AIDS, diarrhoea, malaria and several other respiratory related diseases. There are of course other factors, such as nutrition, hygiene, access to water and sanitary conditions, which all play a role in facilitating childhood mortality trends in Africa (Hohmann and Garenne, 2010). With the present situation of childhood mortality, projections of life expectancy for African children are relatively low compared to children who reside in more developed countries. The projected life expectancy for children born in sub-Saharan Africa in 2020 is 43 years (Daniel, 2000). With widespread education, availability of drugs, vaccines, access to economic opportunities and improved living conditions, this projected age may improve.

2.3. Childhood mortality in Swaziland

A limited number of studies have been undertaken in recent years with regard to both infant and under-five mortality in Swaziland. Despite this unfortunate discovery, data available confirms that Swaziland is no exception to the high rates of childhood mortality experienced by other countries in the sub-Saharan region. Sub-Saharan countries have been attributed to suffering the most social inequalities as this is the most disadvantaged region in the world (Tabutin and Schoumaker, 2002).

A study performed by Rajaratnam and others (2010) was a compilation and assessment of a database with the records of childhood mortality trends in 187 countries. Swaziland was included in this study. A time series was designed to display estimates of under-five mortality and the results were displayed in intervals of childhood mortality rates experienced by each respective country in decades starting from 1970 to 2010 (Rajaratnam et al. 2010).

The data revealed that in 1970 childhood mortality in Swaziland was recorded at a 188 deaths per 1,000 live births, in 1980 it was recorded at 122.3 deaths, in 1990 it was 73.7 deaths, 2000 was 99.3 deaths and increased to 101.2 deaths per 1,000 live births in 2010 (Rajaratnam et al. 2010). These figures illustrate the increase of the situation in recent years as other studies have continued to highlight this increase in the sub-Saharan region.

The impact of the HIV/AIDS pandemic in Swaziland is undeniable and this has had a substantive impact on childhood mortality starting in the late eighties. The effect of HIV/AIDS has resulted in an increase in orphans in most countries in sub-Saharan Africa, including Swaziland. According to Buvinic and others (2009), children who are orphaned are associated with poor schooling as well as poor health outcomes. This is especially rife in poorer households as orphaned children experience significant disadvantages.

Childhood mortality in Swaziland is also heavily influenced by preventable infectious diseases. According to Graciana's (2010) study done in Swaziland, other leading causes of childhood mortality include diarrhoeal infections and respiratory infections. Malnutrition also accounts for a large number of childhood mortalities in Swaziland. The SDHS report (2006/7) confirms malnutrition to be prevalent amongst the children in Swaziland. Using the height-for-age as a measure of malnutrition amongst the children, the results show that 29 percent of Swaziland's children under the age of five are stunted. The highest portion of children who are severely stunted are those between 18 and 23 months at 43 percent (SDHS report, 2008).

Malnutrition, according to Masuku-Maseko and Owaga (2012), is a serious confounder of childhood mortality and morbidity in Swaziland. This study conducted in Swaziland showed that in 31 percent of the children under the age of five have stunted growth; where 1 percent are wasted and 6 percent are stunted (Masuku-Maseko and Owaga, 2012). The region which the capital city of Swaziland resides in was seen to experience the highest number of under-weight children under the age of five compared to the other regions of Swaziland. This study undertaken by Masuku-Maseko and Owaga (2012) identified three categories of potential determinants of childhood mortality in Swaziland. Immediate causes included diet, diseases including pneumonia; underlying causes include inability to access food, health care as well as exposure to unhealthy living conditions and lastly basic causes encompassed the impact of mother's education, knowledge on nutrition as well as knowledge surrounding available resources in Swaziland (Masuku-Maseko and Owaga, 2012).

Poverty can result in food shortages which residents on Swaziland have experienced. Insufficient food supply compromises child nutrition and Mbabane (2002) has mentioned that the less nutrition children have the more “compromised their immunity systems” (Mbabane, 2002). The deficiency of vitamin A in children living in Swaziland has proven to be a variable which has a great impact on the high childhood mortality rate experienced in Swaziland. According to Mbabane (2002), a study performed in Swaziland in 1995 showed that 8 percent of children under the age of five had a serious deficiency of vitamin A and 40 percent had a mild deficiency of the vitamin. Due to the high childhood mortality in Swaziland, from 2000 provision of vitamin A capsules had been made to children living in Swaziland.

Despite the prevalence of diseases influencing the heavy burden of childhood mortality in Swaziland, there are socioeconomic differentials which contribute to the high childhood mortality. Levels of education in Swaziland remain low amongst females (SDHS report, 2008) and as studies have shown maternal education has a notable influence on childhood mortality. Residence as well as the income of a family plays a role in influencing childhood mortality in Swaziland. These factors determine the resources which ensure nutritional status of a child, if they have access to vaccinations, drugs when illnesses occur, adequate shelter and a safe environment which will ensure their survival. Graciana (2010) asserts that it is imperative for improvements on the living conditions of Swaziland residents in an effort to decrease childhood mortality as household conditions play an important role in childhood mortality.

2.4. Childhood mortality and maternal employment

Childhood is a vulnerable stage of human life and the mother’s characteristics are observed to play a fundamental role in facilitating child survival as well as continued wellbeing. The mother’s characteristics as well as the immediate surroundings of the child are important as they determine the support, resources as well as the care the child receives (Shen and Williamson, 1997). Authors have based studies of infant and child mortality on various determinants identified by Mosley and Chen (1984). This framework explores factors which have an impact on the survival of both infants and children. The mother is often the care giver and nurturer and this means that factors she is exposed to will be those factors and circumstances the child is also exposed to.

More so after the Second World War, women have long been the centre of studies which have focused on change in social behaviours. One of which is the growth of female autonomy and women's growing occurrence in the labour market, a market which, until recent days, was predominantly male dominated. Things have changed as women are encouraged and even self-motivated to seek employment.

Particular focus in demographic studies has been the striking impact which women's participation in work has had on the fertility transition in societies (Basu and Basu, 1991). Compared to the impact of female employment on other demographic components, namely mortality and migration, impact of female employment on fertility is extremely well documented. It is highlighted in various studies that very little is known about the impact which maternal participation in the work force has on the survival of children (Basu and Basu, 1991). Studies, including that of Short and others (2002), emphasise that the link is the amount of time the child spends with the mother.

These authors assert that mothers who are employed differ from those who are at home as the mother at work has less time for feeding, bathing, cooking and caring for her children when compared to the mothers at home (Sivakami, 1997). Type of employment also has a bearing on the amount of time a mother has to attend to her child. Despite what may seem an evident differentiation between employed and unemployed mothers, trouble defining employment is marked as the ability to conceptualise, define and measure work is difficult and will vary from study to study.

Employment varies according to differences in occupation, salary packages, working hours as well as if a woman works at home or away from home (Sivakami, 1997). Mothers who work at home seemingly have the advantage of being able to spend more time with their children and are able to perform tasks which stay-at-home mothers also do for their children (Short et al. 2002). This form of female employment is thought to overcome the constraints of time spent with the child as opposed to putting the child at risk with mothers in formal employment, although this is not always the case.

Adequate replacement for the mother in many societies is naturally a grandmother, an extended family member or a neighbour. With a growing pattern of families becoming more and more detached from their extended family, as well as individuals leading isolated lives in urbanised areas, there is a move towards women leaving their children in the care of nannies

or older siblings (Brewster and Padavic, 2002). Due to the changes which come with modernisation, there is a definite move away from close family ties.

This view is highly supported by Brewster and Padavic (2002), who affirm that due to changes in familial structures and conditions such as migration, the reliance of black families in America (as well as in other societies) on their next of kin for support, physical and material, has noticeably declined. One of the things black families in most societies really depended on their relatives for was child care and this is seen less frequently.

Due to cultural change and economic conditions in today's society, authors Brewster and Padavic (2002) concluded that ironically, the entry of women into the labour force results in both an increasing need for child care from next of kin as well as a decline in its availability (Brewster and Padavic, 2002). This is an accurate analysis as women who enter the labour market may relocate to their area of employment, a new residence where she has no relatives who can assist her with the responsibilities of childrearing when she's at work. On the other hand, female relatives for childcare purposes can also be scarce due to availability of job opportunities for them (Brewster and Padavic, 2002).

Even though the option of appointing a nanny is there for working women, not all women in an employed situation can afford this additional cost on top of administering the household. Studies have shown that mothers who are less privileged (employed or unemployed) experience the most childhood mortality (Edwards et al. 2006). Childhood mortality may be higher because mothers who are constrained economically need the work more than their counterparts and this desperate situation may result in child neglect. A mother may need to take on more working hours, leaving their children in the care of less skilled individuals (Mosley and Chen, 1984).

Mothers who are working have more decision making ability and control over resources, so it makes sense that they have the capacity to decide and implement what they feel is necessary and pivotal for their child's wellbeing and overall health. Ssengonzi and others' (2002) study done in Uganda revealed that children who were living in households which were headed by females were 93 percent more likely to survive than children who live in households headed by any other person besides the mother. This shows the need for policy, which encourages female autonomy (work) in an effort to assist in the decrease of childhood mortality in developing countries. What remains important is not financial capabilities of mothers but the amount of time they are able to invest in childrearing activities.

A pivotal study in the analysis and documentation of female employment and its impact on child survival was that of Short and others (2002) based in China. It can be said that this study is a good point of reference for the impact of mother's employment on child care as more than 90 percent of Chinese women between ages 25 and 44 work (Short et al. 2002). What is enlightening and significant about this study is its ability to represent women in labour categories (occupation groups) which are relevant for a developing country (including work in agricultural and informal sectors). The study also calculated and compared the difference in the number of hours which working mothers invest in child care a week compared to non-working mothers (Short et al. 2002).

This study cleverly investigated the amount of time all mothers (working and not working) spend doing other things during the day, which do not involve child care. This is very important because a mother may be unemployed but that does not mean that she spends a superior amount of time with her child (Short et al. 2002). She too has other activities within as well as outside the household she may attend to.

With the use of this method, the study was beneficial in highlighting the importance of the mother's time invested in child care and the child's chances of survival. The results revealed that women with intense work demands provide less time for care of their children. Results also show that the quality of care they provide is less adequate than those who are unemployed. The overall results reveal that women with work demands provide fewer hours of child care but this does not translate into inferior child development or survival.

It is important to bring to light Bianchi's (2000) article which questions if maternal employment has, in fact, really taken time away from childrearing and if the effects are as detrimental as some studies have found it to be. Bianchi (2000) reckons that in past years, it is possible that there was an over-estimation of the amount of time mothers had spent with their children. This is worth considering as mothers have always had other responsibilities in the household beside the children.

Mothers have other household duties, other social and familial responsibilities to attend to on a daily basis, despite their employment status. Activities other than childrearing which are done by women who are of non-working status may be equivalent to the number of hours working women invest in work (Bianchi, 2000). There may be a possibility, therefore, that only a small difference in time spent away from home exists between employed and unemployed mothers.

Bianchi (2000) also states that studies have under-estimated the lengths to which mothers who work go to in order to protect their children. The extent to which it has been undervalued can be seen in studies which only emphasise the adverse impact of maternal employment on children and reduce the emphasis of good which accompanies the mother's autonomy. Bianchi (2000) also points out the fact that children grow and their needs and dependence on their mothers change too.

As children approach pre-schooling years they too tend to be absent from the household (Bianchi, 2000). What is important here is that children are more vulnerable during infancy and a couple more months thereafter. Children need much of their mother's attention between birth and three years of age at most. This is not to say that children do not need their mothers after the tender age of three, but rather that vulnerability decreases with age.

From this discussion, it can be concluded that maternal employment has its advantages as well as disadvantages when it comes to child survival. It can also be concluded that the impact of mother's employment is worth investigating as a worthy maternal characteristic. Mother's employment does not affect child survival as an isolated factor; there are other maternal, household, socioeconomic, demographic indicators which influence childhood survival and these also need to be explored.

2.5. Other important maternal characteristics that influence childhood mortality

What has received much attention over the years is how a mother's education plays a role on infant and child mortality. According to Omariba and others (2007), maternal education is a big contributor to infant and child mortality. Their study done in Kenya showed that childhood mortality was 20 percent higher for women who had primary level education than women who had secondary education. Heaton and Amoateng's (2007) study also stressed how the education level is strongly associated with childhood survival. As maternal education increases so too do the chances of childhood survival.

Mothers' education is deemed to have a positive impact on childhood mortality because education allows women to have better control over their lives in terms of income, occupation and control of possessions in the household (Heaton & Amoateng, 2007). Women who are educated are also associated with greater power to make decisions which will have a positive impact on the livelihood of the child. With an opportunity for higher pay comes

improved living conditions and an environment which is conducive for good health as well as safety for the child.

Heaton and Amoateng (2007) also point out that maternal education influences women to trust more in biomedicine, which reduces the likelihood of engaging in more traditionalist health seeking practices, and as a result improves the chances of childhood survival. Maternal education impacts child survival in two ways, through access to better knowledge on health care, and through improved hygiene in the home (Heaton and Amoateng, 2007).

Educated mothers have the advantage to find higher paying employment than mothers who are less educated. This ultimately allows for higher autonomy of the mother and her ability to take care of the child's financial needs. In Tulasidhar's (1993) study conducted in India, educated mothers were found to have better knowledge about diseases, and were also more likely to seek treatment for their children compared to women with less education.

Education also influences reproductive behaviour; which is an important contributing factor to childhood mortality. Mother's age at birth of the child, parity as well as birth spacing are observed to play significant roles in increasing childhood mortality. Omariba and others (2007) highlight the significance of mother's age; 22 percent of children born to mother's who were below the age of 20 and 37 percent of children born to mother's above 35 years of age were more likely to die than those who were born to mothers in the age interval 20 and 35. According to Frisbie (2004), maternal age has shown to increase the likelihood of infant mortality as adverse pregnancy outcomes are expected for mothers who are too young or too old. Maternal age is associated with low birth weight which has dire consequences for the infant.

Both Frisbie (2004), and Omariba and others (2007) demonstrate how short birth spacing has a negative effect on childhood survival as risk of death is increased with shorter birth spacing; increasing opportunity for complications to arise. These factors are detrimental to child survival, and with increased autonomy women have the ability to decide when to have children as access to contraceptive use is increased (Frisbie, 2004). With an increasing desire to take part in the labour market, women are postponing pregnancy and having fewer children and this ultimately has a good impact on child survival in terms of birth spacing, parity and maternal age.

Marital status also plays a significant role on childhood mortality, as this partnership may ensure another adult's presence in the household (Heaton and Amoateng, 2007), an adult who can provide physical, emotional as well as economic assistance for the child. Fathers play a significant role in child rearing as they are usually able to provide time as well as financial resources which will help take better care of the child and increase their chances of survival, which may be lacking in single parent homes (Heaton and Amoateng, 2007).

Fathers make a significant contribution in the household, which may assist with the burden of child rearing when the mother has to leave the child for work. Despite female participation in the work force, males are still dominant in the labour market and this may explain how mothers who are not working are able to ensure childhood survival better than mothers who work. Unemployed mothers have the benefit of being able to personally monitor and care for their child and their partners assist with the financial support.

Fathers may also assist in bridging the gap caused if the mother's absence in situations where the availability of next of kin to assist in child rearing is unavailable or not preferred. Blakey and others (2001) confirm that children who reside in one parent families experience a higher rate of mortality than those with two parents. Unwed mothers often experience low birth weight, which carries a higher risk of neonatal mortality (Frisbie, 2004). These studies reiterate the significance of inadequate material resource and inadequate parenting time experienced in single parent households, which may result in the depreciation of childhood chances of survival. This is not exclusive to single-parent homes only, as time and resources are not solely dependent on marital or relationship status.

A child's survival is also highly influenced by the socioeconomic position of the mother; which includes demographic factors such as residential area as well as household characteristics. A study by Garrib and others (2006) shows that childhood mortality is substantially higher in rural areas than in urban areas. This is because urban areas are more associated with better access to health care, better transport, employment, education as well as higher contraceptive usage (Heaton and Amoateng, 2007).

Therefore high socioeconomic status is associated with significantly higher chances of infant and child survival. An evident inverse relationship between infant mortality and family income levels exists as reports reveal that there are more deaths amongst households which are within a lower socioeconomic bracket (Stockwell et al. 2005 and Edwards et al. 2006).

This is not a surprising outcome as income plays a vital role in survival of both adults and children, as survival is highly associated with material possessions and resources.

Blakey and others (2003) state that families where no adult is employed report higher rates of childhood mortality in all age groups of children under the age of five. Low socioeconomic households often lack hygiene, food, experience overcrowding, and bad housing conditions, which leaves room for negligence and disease amongst those who are economically disadvantaged (Mosley and Chen, 1984). A study by Omariba and others (2007) done in Kenya shows that mortality is higher for children living in bad household conditions, where poor sanitation is elevated. Inability to afford good living conditions has a detrimental effect on childhood mortality.

According to Frisbie (2004), the importance of breastfeeding to decrease childhood mortality is evident, as women who breastfed their children during infancy report lower rates of childhood mortality. This highlights the fact that mothers who work during the first few months of their child's lives are more inclined to experience a higher rate of childhood mortality. On the 23rd August 2011, the Health minister of South Africa announced that South Africa "will move to an exclusive breastfeeding strategy and discontinue the practice of providing formula feed through hospitals and clinics" (The Star, 2011, 6). The minister confirms that this is an effort to curb the increase in childhood mortality in South Africa. Breastfeeding is encouraged because a number of studies, including that of Frisbie (2004), have shown a positive association with long-term breastfeeding and how it helps child growth and survival.

Articles reviewed in this chapter highlight the importance of maternal employment as a serious determinant of childhood mortality as maternal autonomy has implications for various aspects of a woman's life, including factors which influence the child. Maternal employment has portrayed a negative impact on child survival in the majority of the studies reviewed but what is highlighted is that it is not necessarily the act of employment which is the problem but more the time reduced in childrearing activities by the mother due to work commitments. A mother's dedication and intensity to child care will not be matched to the same degree when someone else is left to take over her responsibilities.

From the literature provided, it can be said that a mother's absence plays a significant role on the impact of childhood mortality as this absence requires others to take over the care-giving responsibilities. What is noted is that some mothers genuinely cannot afford to employ

someone to attend to her children while at work but at the same time cannot afford not to be employed. Despite the adverse impact mentioned, there is also evidence that shows maternal employment in favour of good childhood outcome. This is because a larger chunk of resources is allocated to the child when the mother has the autonomy to do so. This study will show if there is a link between childhood mortality and mother's employment and whether there is a positive or negative relationship between these two factors.

Other maternal factors such as maternal education, reproductive behaviour, and socioeconomic status go hand in hand with the ability to go into the work force as well as how successful one can be. These proximate determinants are emphasised as contributing factors of childhood mortality and they too will be explored throughout the study.

2.6. Mosley and Chen's theoretical framework:

Mosley and Chen (1984) developed a framework based on the principle that childhood mortality and morbidity are determined by social, economic and biological factors. This analytical framework works on the assumption that the proximate determinants identified (such as mother's education, food, and sanitary conditions) dictate the chances of survival for children under the age of five. What was fundamental and classical about this framework was the integration of both medical factors and social factors and how these variables work together as determinants of childhood mortality.

Five categories were highlighted by Mosley and Chen (1984), namely: maternal factors, environmental contamination, nutritional deficiency, injury and personal illness control. Mosley and Chen (1984) stress the importance of maternal characteristics which dictate pregnancy outcomes as well as the mother's overall health. The environmental conditions dictate the spread of diseases in the air as well as contamination of foods and water. Nutritional foods are also valued as an important source which impacts on childhood survival. Susceptibility to injury is a serious concern as this compromises childhood survival. Preventative measures such as vaccinations as well as access to medical treatment also have a bearing on childhood survival outcomes. The model follows a causal chain which allows for the variables to follow a positive outcome for the child (healthy) or a negative outcome leading to mortality.

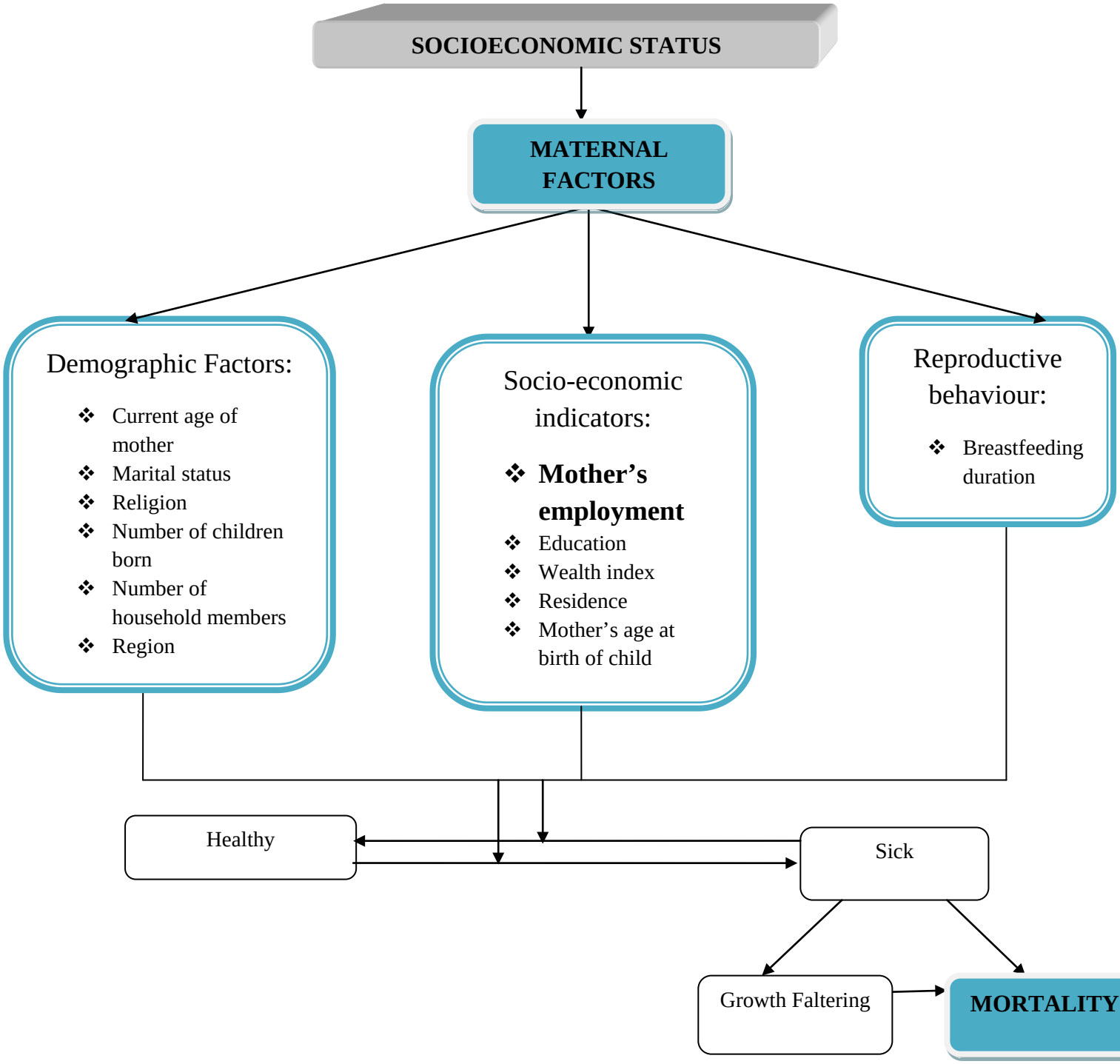
2.7. Conceptual Framework:

The conceptual framework for this study is an adaptation of the Mosley and Chen's (1984) analytical framework which was designed and based on the situation in developing countries. This is relevant as this study is based on a developing country (Swaziland) and aims to explore factors influencing specifically the deaths of children below the age of five, as did the Mosley and Chen (1984) framework.

Using this framework as a guide for this particular study, focus is on maternal characteristics, categorised in three groups. The three categories comprise of the mother's demographic factors, socioeconomic, and reproductive behaviour. Proximate determinants under demographic characteristics are the mother's current age, marital status, religion, the number of children she had in the 5 years, number of household members as well as the region. The socioeconomic indicators are the mother's employment (main predictor variable), mother's education, wealth index, place of residence and the mother's age at birth of her child. The reproductive characteristic is the duration of breastfeeding. This variable considers the importance of breastfeeding for at least six months. What is unique and significant about this particular conceptual framework is the inclusion of maternal employment as an important predictor variable.

The variables have a direct impact on the child's health. For the purpose of the study, health seeking behaviours will not be operationalised and therefore not controlled for in the conceptual framework.

Figure 1. *The operation of three groups of maternal proximate determinants on the outcome of child health*



CHAPTER THREE: Methodology

3.1. Introduction

This section of the paper looks at the dataset as well as the study design considered for the study. Discussion on selection and creation of the dependent and independent variables is put forward and discussed in detail pertaining to the relevance of these factors in the study. The methodology section lays down the plan on how the study was conducted and explains in detail how the paper came to itsconclusions. The different stages of analysis are outlined along with the hypothesised result for the study.

3.1.1. Data sources

According to the SDHS report (2008), the SDHS is a national-level sample survey designed in a way which would record a variety of demographic as well as maternal and child health factors in Swaziland. At the appeal of the Ministry of Health and Social Welfare (MOHSW) of Swaziland, the SDHS was put into place and implemented by the Central Statistics Office (CSO) over a period of two years; 2006 and 2007. The major cost for the survey's implementation was covered by Swaziland's government. There were several other institutions which provided support, one of which was Macro International Inc. (Macro), which provided technical support for the operation as part of the USAID funded MEASURE DHS programme; a worldwide initiative (SDHS report, 2008).

3.1.2. Study design:

The SDHS report (2008) states that this was the first ever national survey conducted in Swaziland under the umbrella of the Demographic and Health Surveys programme. The SDHS is a nationally representative survey which included 4,843 households, 4,987 women who were between ages 15-49 and 4,156 men aged 15-49. Interviews were also conducted with boys and girls who were 12-14 and adults who were 50 years and above.

3.1.3. Sample design and sample size:

The survey was designed to give estimates of the population's demographic and health indicators. Rural and urban residents were included as well as residents of all four regions in Swaziland, namely; Manzini, Hhohho, Lubombo and Shiselweni. For a DHS survey, the standard sampling policy suggests a minimum of 1,000 to 1,200 be included in every major domain and this was the case for Swaziland (SDHS report, 2008).

The survey clusters sample points chosen from an existing list of enumeration areas (EAs), were selected and defined in the 1997 Swaziland Population and Housing Census. A total of 275 clusters were selected from the 1997 census sample frame, from the urban area 111 were drawn and 164 from the rural areas. From this sample frame, the CSO personnel carried out a strategy to list the households in each cluster area, both rural and urban, during August and September of 2005. From these lists provided, an organised sample of households in Swaziland was drawn up; 5,500 households were included.

According to the SDHS report (2008), all the men and women who were selected or lived in these selected households were also suitable for the individual interview. A sub-sample, drawn at random, was selected where half of the households which were selected in the main sample would be used for the questionnaires involving girls and boys between 12 and 14 as well as the adults older than 50 years. This questionnaire was selected to have participants in 2,750 households.

The total sample size after the completion of survey interviews and collection of the data included 4,843 households, 4,987 women between ages 15 to 49 and 4,156 men in the same age intervals as the women. 459 girls between ages 12 and 14 were interviewed as well as 411 boys of the same ages were included in the interview. There were 456 men and women included in the survey who are the age of 50 and above (SDHS 2006/7).

For the purpose of this paper, the research objectives are only interested in the impact which maternal employment has on childhood survival. This means the sample of interest should only include women who have had children over a specified period (in this study, 5 years) and therefore omit the information of the women who had no children in the five years preceding the 2006/7 SDHS. Using the command on STATA 11 to omit all women with zero births in the five years preceding the survey resulted in all information of women who didn't give birth to children within those five years removed from the dataset. Following this procedure, the total sample size was reduced from 4,987 women to a total sample size of 2,136 mothers in Swaziland used for the study.

3.2. Variable definitions

Table 1. *Demographic, socioeconomic and reproductive behaviour characteristic of mothers in Swaziland aged 15 to 49 who had at least one child 5 years preceding the 2006/7 SDHS interviews*

Variable	Variable definition	Variable type
Dependent variable: Child mortality	0 alive 1 dead	Binary
Independent variable: Current age of mother	1 15-19 2 20-24 3 25-29 4 30-34 5 35-39 6 40-44 7 45-49	Categorical
Control Variables: Marital status	0 never married 1 married and living together 2 married and not living together 3 formerly married	Categorical
Number of children born	1= 1 child 2= 2 children 3= 3 children	Continuous
Religion	1 Zionist 2 Other [Traditional, Charismatic, Protestant, Roman Catholic, Pentecostal, Apostolic, Islam and other] 3 None	Categorical
Number of household members	1 1-4 members 2 5-8 members 3 9-12 members 4 13-16 members	Categorical
Region	1 Hhohho 2 Manzini 3 Shiselweni 4 Lubombo	Categorical
Maternal employment	0 not working 1 working	Binary

Highest education level	0 no education 1 primary 2 secondary 3 higher	Categorical
Wealth index	1 poorest 2 middle 3 rich	Categorical
Mother's age at birth of child (MAB)	1 10-19 (adolescent) 2 20-35 3 36 and above	Categorical
Type of place of residence	1 urban 2 rural	Binary
Breastfeeding duration	0 no breastfeeding 1 breastfed less than 6 months 2 breastfed more than 6 months 3 still breastfeeding	Categorical

3.2.1. Dependent variable:

For this study, there is only one outcome variable. C**hildhood mortality** is used to examine the impact which the selected independent variables have on the survival of children in Swaziland. Childhood mortality is the tool which measures the extent of mother's employment as well as other extraneous variables on child survival.

After omitting the information of women who did not have children within the five years from the dataset, only mothers who had one or more children during this time are left. This verifies that these children are within the interval of 59 months preceding the survey.

Of the 2,136 mothers included in the study, 429 experienced childhood deaths. Because the DHS records the information of the individual in this survey (women) and not the children's individual information singularly, the exact number of children who have died is not taken into consideration. In reality, a woman could have

experienced more than one childhood death. With 2,136 mothers accounted for in the study these women could have more than one child but only their individual information is considered and 2,136 children are therefore accounted for in the study.

3.2.2. Independent variables:

Independent variables are used in the analysis as factors which have been proven in previous studies to have an impact on childhood survival. These variables are also referred to as extraneous variables, which are important to consider in the analysis to gain a more precise and unbiased estimate of the true relationship between childhood survival and maternal employment in Swaziland. These variables aid the revelation of the true impact that the main predictor variable **maternal employment** has on childhood mortality through the combined regression model.

These variables described in table 1 have an intermediate effect on maternal employment. They have a statistical impact on both the main predictor variable as well as childhood mortality. These variables can be considered as confounders, effect modifiers as well as mediators of the outcome.

A confounding variable is associated with the main independent variable, which also affects the outcome variable. A mediating variable is associated with both the independent and dependent variable but unlike a confounding variable, this variable is actually part of the causal chain. A variable which has an effect modifying ability is one which its impact varies in different groups (regression models).

- In order to create an accurate demographic profile for these mothers, the current age of the respondent should be taken into consideration. Current age is important to consider in terms of the impact which maternal age has on child survival. Past studies show that childhood survival is better for children who have mothers that are deemed older by social standards. More often than not, with age comes social stability, possible marriage and financial independence as well as opportunity to have obtained higher education.

  The variable current age of the respondent is a continuous variable which is categorised into 5 year age intervals. The **current age** of mothers is separated into

categories 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49. For the purpose of the logistic regression models only, maternal age is considered in single ages and not categories. The normal probability plot, histogram and the normal quantile plot show the variable as single ages is not normally distributed. Log transformation is performed for the logistic regression model in order to ensure that a normal distribution is obtained.

- **Marital status** helps to assess the significance of having a paternal figure, especially living in the household on childhood mortality. Being married does not necessarily mean that the couple lives together, hence the creation of a composite variable which merged the variable 'current marital status' and whether 'husband lives in house' variable. The new marital status variable has intervals; never married, currently married and living together, currently married and not living together and formerly married. Literature has stipulated that households where partners are absent experience a higher childhood mortality rate than households where both the parents are living together (Blakey et al. 2001).

- The **total children born** variable is inclusive of all the children born to mothers during the five years before the study was conducted. The maximum number of children any woman reported having was 4, and this was reported by two mothers. These two observations were seen on the box and whiskers plot to be extreme outliers of the variable, which would in turn affect the results of the study. With this observation in mind, the decision to drop these two observations was made in an effort to avoid distorted results. The total number of children born five years preceding the interviews, therefore, has a range of one through to three. With a skewed distribution displayed in the histogram, log transformation is applied to the number of children born to ensure normality in its use in the regression model.

- **Religion** plays a significant role in the reproductive behaviour of mothers; as strict rules prohibiting contraceptive use may result in high fertility or even short birth intervals or lax rules may condone the use of modern contraceptive use which reduces fertility. In Swaziland amongst the mothers included in the sample, the most popular religion is the Zionist church. There are also a significant number of mothers who are not affiliated to any religion. With the use of the religion variable provided in the dataset, a new variable is created which has categories 'Zionist', 'Other' and

combines: Traditional, Charismatic, Protestant, Roman Catholic, Pentecostal, Apostolic, Islam and other and 'None', that is is mothers with no religious affiliation.

- The variable **number of household members** is provided in the SDHS dataset as a continuous variable. This variable includes the number of people who are usually present in the household as well as those who had slept over the night before and included in the household schedule. The number of household residents range from 1 person to 34 persons living in the residence. With the use of the box and whiskers plot, observations in the interval 13 to 34 were noted to be extreme outliers and these few observations were dropped from the variable. After dropping these observations, the histogram showed an almost normally distributed set of observations.

  For the regression analysis, the data is log transformed to ensure normally distributed data. After the completion of log transformation the histogram, normal quantile plot and symmetry plot showed an improvement in the normality distribution.

  This variable is categorised into four intervals for analysis in the univariate and bivariate sections: 1 to 4 members, 5 to 8 members, 9 to 12 members and 13 to 16 members.

- **Region** of residence of the respondent is provided in the dataset. The different regions are; Hhohho, Manzini, Shiselweni and Lubombo. Mbabane is the capital of Swaziland (SDHS report, 2006/7) and this falls within the Hhohho region.

- **Maternal employment** is an existing variable in the Swaziland 2006/7 dataset. Although literature emphasises the importance of maternal employment differentials such as whether the mother works at home or away from home as well as if the mother is employed all year or seasonal. For the specific objectives of the study, focus will only be on whether the mother works or does not work. The objectives of the study are more specific to the impact of maternal employment on childhood mortality; employed or unemployed. This original variable is 'respondents currently working'. There are two categories for the maternal employment variable: not working and working

- Level of mother's education is mentioned in the literature review as one of the most investigated determinant of childhood mortality. This characteristic not only has an

impact on childhood mortality but also on maternal employment. The level of education can determine employment opportunities. Mother's **highest education level** variable is present in the dataset for the use of the study. This variable in the analysis section will not be used to measure the role education plays on attainment of female employment but rather its influence on childhood survival. The original intervals are maintained as presented in the dataset and the variable is coded; no education, primary, secondary and higher education.

- The **wealth index** variable is an indicator of a household's socioeconomic status. This variable is based on the data which was obtained during the interviews surrounding various goods which were found to be present in the household where the respondent lives. With the use of characteristics such as the kind of drinking water available and the type of toilet facility the family uses, points were rewarded to each household. With reference to a standardised score or points system assigned for each item; a final assets score was tallied for each household, which is how the wealth index variable was created. These scores were divided into quantiles from the lowest (poorest) to the highest (richest) using the asset score totals. This variable is important as child mortality has proven to occur more prominently amongst poor families (Stockwell et al. 2005: Edwards et al. 2006).

  For the purpose of the analysis, the categories poorest and poorer are made to be one interval 'poor', average remains 'middle' and richer and richest are grouped into a 'rich' category.

- The variable which describes the mother's age at the time of birth of her child does not exist in the dataset and one is created for the study. This variable is important because studies have showed that mothers who give birth at higher and low reproductive age intervals are more prone to infant and under-five mortalities. With the use of the 'birth of child' variable and the 'respondent's year of birth' variable, a composite variable is generated and referred to as **mother's age at birth of child**. This results in the formation of a continuous variable, and so the variable is grouped into: adolescent mothers 11-19 years, 20-35 years, 36 years and above. These categories will only be considered in univariate and bivariate sections. For the logistic

regression model data transformation is applied to the numeric values to improve normality. Even with the data transformed perfect normality is still not achieved for this variable.

- The **type of place of residence** variable is provided in the SDHS dataset and is denoted by rural and urban areas. 1 is urban area and 2 is rural area. These distinctions help to differentiate childhood mortality by location. Studies note that in most countries, childhood mortality is more prevalent amongst rural residents, often associated with lack of health facilitates and technological advancements which enhance childhood survival (Garrib et al, 2006).

- Reproductive behaviour of a woman is very important for childhood survival and in this case, breastfeeding is an important predictor of childhood mortality. The variable 'duration of breastfeeding' is in numeric form (continuous). The **Breastfeeding duration** variable is created from the original 'duration of breastfeeding' variable with the numerical values categorised into: no breastfeeding, breastfed for less than 6 months, breastfed for more than 6 months and still breastfeeding. Studies including that done by Frisbie (2007) show that children who are breastfed for more than six months have a higher prevalence of childhood survival than those who were not breastfed. This is the motivation behind the categories which will help distinguish the differences which exist between being breastfed and not being breastfed as well as the effect of the duration of breastfeeding.

  This study does not explore the impact of exclusive breastfeeding on childhood mortality but rather the impact of the duration of breastfeeding. According to Arifeen and others (2001), exclusive breastfeeding is relevant for infants who are breastfed only breastmilk, predominant breastfeeding is infantsfed breastmilk and other liquids such as sugar water, honey and other products which do not have milk contents, and the last category is partially breastfeeding which are infants who are fed breastmilk, and other substances including those with milk contents.

All these variables play an important role in facilitating the outcome of childhood mortality.

3.3.Research Hypothesis:

Null Hypothesis:

H_0: there is no statistical difference in childhood mortality among employed and unemployed women in Swaziland

Alternate Hypothesis:

H_A: there is a statistical difference in childhood mortality amongst employed and unemployed women in Swaziland. Employed mothers experience statistically higher mortality than unemployed mothers.

If the alternative hypothesis is found to be true, then serious consideration of the impact of working mothers should be made; interventions such as day care centres and provision of extended maternity leave with job reservation should be initiated in Swaziland.

3.4.Ethical consideration:

This study is an analysis of secondary data and uses SDHS data which does not record respondents' names. This data was requested from the Demographic and Health Survey website and the dataset with respondents' information only identifiable by a number was provided. This, therefore, confirms the anonymity of the respondents involved. Anonymity and confidentiality is guaranteed.

3.5. Data Analysis:

There are three stages of analysis which are followed for this study. In the first part of the analysis, relevant frequency and percentages are used to describe the population of the women who participated in the 2006/7 SDHS. Descriptive statistics are employed to give a full description of the characteristics which these mothers present as well as their demographic details. Univariate analysis also allows for the production of a summary of all the variables included in the framework. These explain the maternal characteristics, reproductive and social behaviour, demographic factors, as well as household and socioeconomic (SES) factors.

The second phase of the analysis includes an exploration of the association between the independent variables and the dependent variable 'childhood mortality'. The relationship between the variables and their individual impact on the outcome variable are explored with

the use of a cross tabulation method, which produces chi-square results and p-values. Association is measured with this method and relevance of the relationship is verified with a significant p-value.

Variables which are deemed significant in the bivariate analysis are considered for inclusion in the multivariate analysis. At this last stage, multivariate logistic regression models are performed to assess the change in the relationship between maternal employment and child mortality when potentially confounding factors are considered. There is the use of an adjusted and unadjusted model. With the inclusion of statistically significant variables in the logistic regression models, odds ratios explain the degree of the relationship. Exploration of whether a positive or negative relationship exists between the main predictor variable (maternal employment), confounders (other independent variables) and the outcome variable (child mortality) is emphasised.

Note: the unadjusted logistic regression model is a bivariate analysis but will be considered with the adjusted model which is a multivariate analysis.

3.6. Binary Logistic Regression model equation

This is an illustration of the basic equation of a logistic regression model:

$$y=a+B_1X_1+B_2X_2+ \ldots +B_qX_q + E$$

y= Y' intercept, the expected value of y when all values of X are set to 0

a = constant

B_q = regression coefficient

X_q= predictor variables

E = error of prediction

A logistic regression equation is used in the case where the outcome is a categorical dichotomous variable (Dayton, 1992). For this study the variable is a categorical dichotomous outcome (dead or alive) hence the use of a logistic regression model. According to Dayton (1992), for simplicity's sake the logistic regression model assumes the outcome variable (Y)

takes on the values 1 and 0. It can be assumed that 1 is the positive outcome or the 'successful' values, while 0 are the negative values or what can be called the 'failures'.

For the success of a logistic regression model, theoretical proportions are allocated for both the 1 and 0 and that there are a selected set of variables X_1 through to X_q . These variables are related to Y and provide information which assist in the prediction of the outcome which is the Y (Dayton, 1992). What happens here is that the X independent variables are used as predictors of the outcome variable Y. Ultimately, the logistic regression model is based on the odds in favour of Y = 1. Therefore the odds are based on the ability for the independent variables to predict the outcome.

CHAPTER FOUR: Results: Demographic and Socioeconomic Characteristics of the Respondents

4.1.Univatiate analysis:

4.1.1. Introduction:

Univariate analysis is carried out in this section of the chapter. This provides a profile for the characteristics of the mothers sampled in the population. Demographic, socioeconomic and reproductive behaviour are all taken into consideration for this part of the analysis. The use of frequency and percentages allow for a thorough demonstration of the data patterns and its distribution.

4.1.2. Results

Table 2. *Frequency and percentage distribution of all mothers aged 15 to 49 included in the 2006/7 SDHS interviews and had given birth to at least one child preceding the survey*

Characteristics	Frequency distribution	Percentage distribution
Outcome variable		
Childhood mortality		
Alive	1,707	79.92
Dead	429	20.08
Independent variables		
Demographic		
Mother's current age		
15-19	234	10.96
20-24	647	30.29
25-29	483	22.61
30-34	370	17.32
35-39	250	11.70
40-44	124	5.81
45-49	28	1.31
Marital status		
Never married	823	38.66
Currently married living together	727	34.15
Currently married not living together	460	21.61
Formerly married	119	5.59

Number of children born		
1= 1 child	1,519	71.18
2= 2 children	560	26.24
3=3 children	55	2.58
Religion		
Zionist	918	43.00
Other [Traditional, Charismatic, Protestant, Roman Catholic, Pentecostal, Apostolic, Islam and other]	1,116	52.27
None	101	4.73
Number of household members		
1 to 4 members	573	27.30
5 to 8 members	882	42.02
9 to 12 members	471	22.44
13 to 16 members	173	8.24
Region		
Hhohho	538	25.19
Manzini	591	27.67
Shiselweni	481	22.52
Lubombo	526	24.63
Socioeconomic		
Maternal employment		
Not working	1,256	58.88
Working	877	41.12
Level of education		
No education	182	8.52
Primary	741	34.69
Secondary	1,066	49.91
Higher	147	6.88
Wealth index		
Poor	824	38.58
Middle	410	19.19
Rich	902	42.23
Maternal age at birth of child		
10-19 years	421	19.71
20-35 years	1,465	68.59
36 and above	250	11.70
Total n=	**2,136**	**100.00**
Residence		
Urban	584	27.34
Rural	1,552	72.66

Reproductive behaviour		
Breastfeeding duration		
No breastfeeding	123	5.83
Breastfed less than 6 months	220	10.43
Breastfed more than 6 months	1,004	47.61
Still breastfeeding	762	36.13

The results show that 20 percent of mothers had already experienced one or more childhood deaths by the time of the surveys. The statement is phrased in this manner as the survey and study are cross sectional and an update on whether other mothers experienced the same fate cannot be assessed. It can be assumed that more mothers experienced childhood deaths before their children passed the five year mark and this contributed to the childhood mortality rate.

Generally, the figures on the above table show that amongst the demographic characteristics included in the analysis, the majority of the mothers in the study are in their 20s. This may be an indication of the age structure in Swaziland as having a young population. The majority of these mothers only gave birth to one child during these 5 years preceding the survey interviews. Most of the mothers are also married. It is important to note that a substantially high number of these mothers are Zionist and this faith is dependent on African medicine.

The socioeconomic characteristics of these mothers are generally as expected. Maternal employment is relatively low in Swaziland and this is what is generally experienced in other African countries. What is also not surprising is that not even a tenth of these mothers have achieved higher education. A slightly higher percentage of the respondents are in the rich category followed by those who are poor. A large majority of these mothers reside in rural areas and this is an indication of the social and economic advancements Swaziland has made, which is very little. The table also showed that the majority of mothers in Swaziland were breastfeeding, and breastfeeding past the minimum six months recommended for childhood survival.

4.2.Bivariate analysis:

4.2.1. **Introduction**

Bivariate analysis is used to show the association between the individual independent variables and the outcome variable of childhood mortality. For the bivariate analysis, Pearson's chi-square tests are employed to measure the significance of the association between each independent variable and the dependent variable. The significance of the association between the variable and its impact on the outcome is judged according to the p-value. Traditionally, the significance level used to judge p-values is 0.05, meaning that p-values should not exceed this limit. Only p-values less than 0.05 will be considered as significant and relevant for the regression models.

4.2.2. **Results**

Table 3. *Contingency table displaying results of Pearson Chi-square and p-values measuring the association between selected demographic, socioeconomic and reproductive behaviour characteristics and childhood mortality in Swaziland amongst women aged 15 to 49*

Characteristics					
Current age of mother	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				77.4511	0.000
15-19 %	216 92.31	18 7.69	**234** **100.00**		
20-24 %	551 85.16	96 14.84	**647** **100.00**		
25-29 %	372 77.02	111 22.98	**483** **100.00**		
30-34 %	293 79.19	77 20.81	**370** **100.00**		
35-39 %	182 72.80	68 27.20	**250** **100.00**		
40-44 %	75 60.48	49 39.52	**124** **100.00**		
45-49 %	18 64.29	10 35.71	**28** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Marital status	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**

				46.0352	0.000
Never married %	702 85.30	121 14.70	**823** **100.00**		
Married and living together %	575 79.09	152 20.91	**727** **100.00**		
Married and not living together %	353 76.74	107 23.26	**460** **100.00**		
Formerly married %	72 60.50	47 39.50	**119** **100.00**		
Total (N)	**1,702**	**427**	**2,129**		
Total (%)	**79.94**	**20.06**	**100.00**		
Number of children born	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				57.0961	0.000
1=1 child %	1,269 83.54	250 16.46	**1,519** **100.00**		
2=2 children %	410 73.21	150 26.79	**560** **100.00**		
3=3 children %	28 50.91	27 49.09	**55** **100.00**		
Total (N)	**1,707**	**427**	**2,134**		
Total (%)	**79.99**	**20.01**	**100.00**		
Religion	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				14.6442	0.001
Zionist %	699 76.14	219 23.86	**918** **100.00**		
Other [Traditional, Charismatic, Protestant, Roman Catholic, Pentecostal, Apostolic, Islam and other] %	926 82.97	190 17.03	**1,116** **100.00**		
None %	81 80.20	20 19.80	**101** **100.00**		
Total (N)	**1,706**	**429**	**2,135**		
Total (%)	**79.91**	**20.09**	**100.00**		
Number of household	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**

members					
				9.1435	0.027
1 to 4 members %	440 76.79	133 23.21	**573** **100.00**		
5 to 8 members %	702 79.59	180 20.41	**882** **100.00**		
9 to 12 members %	391 83.01	80 16.99	**471** **100.00**		
13 to 16 members %	147 84.97	26 15.03	**173** **100.00**		
Total (N)	**1,680**	**419**	**2,099**		
Total (%)	**80.04**	**19.96**	**100.00**		
Region	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				5.9806	0.113
Hhohho %	446 82.90	92 17.10	**538** **100.00**		
Manzini %	469 79.36	122 20.64	**591** **100.00**		
Shiselweni %	387 80.46	94 19.54	**481** **100.00**		
Lubombo %	405 77.00	121 23.00	**526** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Maternal employment	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				9.4817	0.002
Not working %	1,032 82.17	224 17.83	**1,256** **100.00**		
Working %	673 76.74	204 23.26	**877** **100.00**		
Total (N)	**1,256**	**877**	**2,133**		
Total (%)	**100.00**	**100.00**	**100.00**		
Highest education level	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				43.1584	0.000
No education %	118 64.84	64 35.16	**182** **100.00**		
Primary %	574 77.46	167 22.54	**741** **100.00**		
Secondary %	883 82.83	183 17.17	**1,066** **100.00**		

Higher %	132 89.80	15 10.20	**147** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Wealth index	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				2.5909	0.274
Poor %	644 78.16	180 21.84	**824** **100.00**		
Middle %	332 80.98	78 19.02	**410** **100.00**		
Rich %	731 81.04	171 18.96	**902** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Mothers age at birth of child	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				58.3238	0.000
10 to 19 years %	381 90.50	40 9.50	**421** **100.00**		
20 to 35 years %	1,160 79.18	305 20.82	**1,465** **100.00**		
36 above %	166 66.40	84 33.60	**250** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Type of place of residence	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				0.1077	0.743
Urban %	464 79.45	120 20.55	**584** **100.00**		
Rural %	1,243 80.09	309 19.91	**1,552** **100.00**		
Total (N)	**1,707**	**429**	**2,136**		
Total (%)	**79.92**	**20.08**	**100.00**		
Breastfeeding	**Alive**	**Dead**	**Total**	**Pearson's chi2**	**Pr**
				156.8287	0.000
No breastfeeding %	62 50.41	61 49.59	**123** **100.00**		

Breastfed less than 6 months %	133 60.45	87 39.55	**220** **100.00**		
Breastfed more than 6 months %	831 82.77	173 17.23	**1,004** **100.00**		
Still breastfeeding %	670 87.93	92 12.07	**762** **100.00**		
Total (N)	**1,696**	**413**	**2,109**		
Total (%)	**80.42**	**19.58**	**100.00**		

The two-way contingency results portrayed in table 3 demonstrate the association between maternal background characteristics and childhood mortality. As the main predictor variable, interest in the association between maternal employment and childhood mortality is significant.

What is striking about the results presented above is that mothers who do not work experienced the least childhood mortality (17.83%). The results show that mothers who are working experienced 23.26 percent childhood mortality, which is higher than the childhood mortality experienced by mothers who are unemployed.

The univariate results showed that only less than a tenth of the mothers had obtained higher education, and the results above show that these mothers with higher education experience the least childhood mortality. Childhood mortality is seen to increase with the increase of the number of children born within the five years preceding the survey. Childhood mortality is also demonstrated to increase with maternal age.

The mother's age at birth of a child also reiterates the fact that the older the mother the more chances of experiencing dire childhood mortality. What is interesting is that not the same reality is observed for younger mothers in Swaziland as literature reiterates the danger for those mothers who are too young and too old. Another interesting observation is that of the number of household members. The more members in the household the less childhood mortality experienced.

Region, wealth index and residence produced p-values which are above the 0.05 level of significance. Contrary to previous studies' findings, the results prove that these characteristics do not have a significant association with childhood mortality. These three will not be used in the regression models.

CHAPTER FIVE:

Multivariate Results: Determinants of Childhood Mortality in Swaziland

5.1. Multivariate analysis

5.1.1. Introduction

This section focuses primarily on how demographic, socioeconomic, and reproductive behaviour characteristics included in the study impact childhood mortality in Swaziland. Here, at a multivariate level, focus is on the extent of the relationship between the independent variables and the outcome. Due to the outcome variable being dichotomous (dead or alive), binary logistic regression models are used and odds ratios produced.

The first model looks as the relationship between childhood mortality and socioeconomic, demographic as well as reproductive behaviour. This model is referred to as the unadjusted estimates of the relationship which exists between independent determinants and the outcome. This model is a bivariate analysis as it observes the relationship of one indicator with the outcome at a time. The second model is adjusted, which assesses the joint impact which all these characteristics have on childhood mortality. This means the test considers all these characteristics at the same time and the relationship on the outcome.

Careful evaluation of statistical significance of each variable is of paramount importance. Statistical significance of a characteristic must be concluded with analysis of the confidence intervals. Confidence intervals measure the precision and accuracy of the test statistic provided, and in this case, the odd ratios. Confidence intervals provide information about statistical significance of a test. When evaluating odds ratios, they are only statistically significant if the confidence interval does not overlap 1.00.

After careful consideration of the confidence intervals, the significant predictors of childhood mortality are not only significant because of their p-values, but also through evidence provided by the confidence intervals. The majority of the confidence intervals in the results displayed in the two logistic regression models are narrow and this shows precision of the sample statistic, which is the odds ratios. The narrower the confidence intervals the more precise and accurate the results.

5.1.2. Results

Table 4. *Odds ratios (and 95% confidence intervals) from binary logistic regression analysis to determine the relationship between selected characteristics and childhood mortality in Swaziland*

Characteristics	**Model 1 O.R.**	**Pr**	**Confidence Intervals (95%)**	**Model 2 O.R.**	**Pr**	**Confidence Intervals (95%)**
Current age of mother						
	5.82***	0.000	3.78; 8.94	0.13	0.194	0.00; 2.84
Marital status(R.C: Never married)						
Married and living together	1.53***	0.001	1.17; 1.99	0.95	0.763	0.69; 1.30
Married and not living together	1.76***	0.000	1.31; 2.34	1.07	0.708	0.75; 1.52
Formerly married	3.79***	0.000	2.50; 5.73	2.00***	0.006	1.22; 3.27
Number of children born						
	2.84***	0.000	2.11; 3.81	3.20***	0.000	2.19; 4.66
Religion (R.C: Zionist)						
Other [Traditional, Charismatic, Protestant, Roman Catholic, Pentecostal, Apostolic, Islam and other]	0.65***	0.000	0.52; 0.81	0.67***	0.003	0.51; 0.87
None	0.79	0.362	0.47; 1.31	0.81	0.463	0.45; 1.43
Number of household members						
	0.69***	0.000	0.57; 0.82	0.65***	0.000	0.52; 0.81
Maternal employment (R.C: Not working)						
Working	1.24	0.189	0.90; 1.69	1.38***	0.013	1.06; 1.78
Highest education level (R.C: No education)						
Primary	0.54***	0.000	0.37; 0.76	0.56***	0.003	0.37; 0.82

Secondary	0.38***	0.000	0.27; 0.53	0.34***	0.000	0.06; 0.24
Tertiary	0.21***	0.000	0.11; 0.38	0.12***	0.000	0.06; 0.24
Mothers age at birth of child						
	6.03***	0.000	3.95; 9.19	34.72***	0.02	1.75; 728.96
Breastfeeding (R.C: No breastfeeding)						
Breastfed less than 6 months	0.66	0.072	0.42; 1.03	0.63***	0.074	0.38; 1.04
Breastfed more than 6 months	0.21***	0.000	0.14; 0.31	0.17****	0.000	0.11; 0.28
Still breastfeeding	0.14***	0.000	0.09; 0.21	0.08***	0.000	0.04; 0.13

R.C = Reference Category, p>0.05*; O.R. = Odds Ratios**

Since maternal employment is the main predictor variable it is imperative to highlight the results for this characteristic. Generally, the above table shows that maternal employment has a hazardous relationship with childhood mortality. The results show in the adjusted model increased odds for this relationship. Unlike the results displayed in the unadjusted model, the adjusted model shows that maternal employment and childhood mortality have a statistically significant relationship. Compared to mothers who are not working, mothers who work have a 38 percent increased likelihood of experiencing childhood mortality in Swaziland.

In the table, other significant relationships in both adjusted and unadjusted models displayed include childhood mortality with maternal education, number of children born, number of household members, mother's age at birth of child as well as breastfeeding. The results show that likelihood of childhood mortality is decreased when mothers have higher education. What was expected is that the more children a mother had the higher her chances of experiencing childhood mortality, which is seen to be the case in Swaziland.

The odds ratio displayed for mothers at the birth of the child characteristic in the adjusted model has a suspiciously large odds ratio. Looking at the confidence interval, they are extremely wide, which shows that the results are not precise and should possibly be disregarded. What continues to be significant and contradictory to popular studies which assert large families are a hindrance to child survival is number of household members.

Consistently, this characteristic has displayed significant results, which demonstrate that the more household members the lower the chances of childhood mortality. Contrary to Heaton and Amoateng's (2007) study, marital status did not prove to be a strong predictor of childhood mortality in Swaziland.

5.1.3. Conclusion:

What can be deduced from this analysis is that all the extraneous variables included in the model play a significant role to the extent which maternal employment has on childhood mortality. This means that maternal employment does not impact on childhood survival alone but is affected by other environmental, household and social characteristics. What is important for the study is that maternal employment has proven, via the results obtained, to be a significant predictor of childhood mortality

CHAPTER SIX: Discussion, Conclusion and Recommendation

6.1. Discussion

The outcome variable demonstrated in table 2 shows that 20.08 percent of mothers included in the study had experienced a childhood death in Swaziland. What is important to note is that the childhood mortality rate was not calculated for this study but rather the proportion of childhood mortality amongst these mothers.

The frequency distribution figures clearly showed severely high unemployment amongst the women in Swaziland. Female unemployment is rife, as close to 60 percent of the respondents are unemployed (59.05%). This is a big concern as studies such as those performed by Glick and Sahn (1998) confirm that specifically the mother's income has the greatest benefit towards good child health outcomes. From this result the assumption can be made that employment opportunities for women in Swaziland may be scarce.

Compared to mothers who work, mothers who are not working demonstrate the least childhood mortality (17.83%). The results show that mothers who are working experienced 23.26 percent childhood mortality, which is significantly higher than the childhood mortality experienced by mothers who are unemployed. The fact that working mothers experience higher childhood mortality is a very important observation which will assist in answering the main research question and hypothesis which states that there is no statistical difference in childhood mortality between employed and unemployed mothers in Swaziland. The adjusted logistic regression model shows the likelihood of experiencing childhood mortality by working mothers is 38 percent more likely when compared to non-working mothers.

A small number of these mothers have no education (8.52%) but also an even smaller number have obtained a higher education (6.88%). This is a matter for concern as studies such as those conducted by Eswaran (2002) have indicated that the higher the education obtained by a mother the more it increases the chances of her child's survival. Primary education was obtained by 34.69 percent of mothers while 49.91 percent attended secondary schooling.

Childhood mortality has a significant relationship with the level of the mother's education. Results displayed show mothers with no education experienced the most mortality (35.16%) compared to mothers who obtained primary, secondary and tertiary education. As would be expected after consideration of previous studies, women with higher education experienced the least childhood mortality (10.20%) followed by mothers with secondary education

(17.17%) and primary educated mothers (22.54%). This indicates the significance of maternal education for childhood survival, the more educated the mother the lesser the chances of childhood mortality. The logistic regression results also emphasise that childhood mortality is decreased as maternal education increases. The adjusted model shows that chances of childhood mortality are lowered by 88 percent for mothers with higher education.

With such a high unemployment rate, it is worrying that women who are in their prime ages do not have vast employment opportunities. Employment is one of the most important ways in which women gain independence and autonomy, which allows them to better their child's chances of survival and avoid childhood mortality (Eswaran, 2002).

What is also worrying is that with so many of these mothers already in their twenties, chances are they will not be returning to continue primary to secondary levels to obtain higher education. With such opportunities being left behind this reduces these mother's chances of employment as well as occupation of high ranking positions.

The majority of mothers' current ages are in the intervals 20 to 29 years. What was surprising about the results on table 3 is that mothers between the ages of 15 to 19 experience the least childhood mortality. What is evident is that the higher the age group the more childhood deaths these mothers experience. The unadjusted logistic regression model also shows that as age increases the odds of childhood mortality are increased by almost 6 folds (UOR. 5.82). This makes the mother's age a significant predictor of childhood mortality.

With age comes opportunity for marriage and the data shows that a high 55.76 percent of these mothers were married at the time of the survey. Of the married mothers, 34.15 percent of them live together with their husbands while the rest do not share the same households as their spouse (21.61%). Only a small percentage (5.59%) of mothers are separated or divorced from their husbands and a substantial number have never been married before (38.66%). The assumption may be made of a country which is as traditionalist as Swaziland, that the expectation would be marriage for these mothers and the results prove it.

The majority of mothers who experienced the most childhood mortality for this sample are those who are formerly married (39.50%). The mothers who have never been married experienced the least (14.70%). Of the two categories of mothers who are married, those who are married and are not living with their partners experienced more childhood mortality (23.26%) than mothers who are married and living with their spouse (20.91%). This may

demonstrate the benefits of having another adult in the household for both financial and parental needs of the child. The adjusted logistic regression model shows that childhood mortality is significantly higher for married and formerly married mothers when compared to mothers who have never been married. Higher odds are also experienced by mothers who are married and not living with their partners than those who live with their spouse.

The results also show that mothers who are Zionist in religious affiliation experience the most childhood mortality (23.86%). When compared to Zionist mothers, mothers who belong to other faiths or not affiliated with any faith display decreased odds of experiencing childhood mortality. This may be explained by the knowledge that Zionist churches are associated with the use of traditional medicines, and studies have indicated use of traditional medicines to have a detrimental impact on childhood mortality.

An important aspect of maternal characteristics is the number of children a woman had in the five years before the survey. This is also an important aspect of reproductive behaviour. The results show that 71 percent of the women in the study had only one child during this time. The remaining few had between 2 and 3 children. The bivariate results show that the mothers who had 1 child experienced 16.46 percent childhood mortality, those who had 2 experienced 26.79 percent, and those mothers who had 3 children experienced 49.09 percent childhood deaths in Swaziland. These results are further echoed by the adjusted logistic regression model which shows that for every one child increase there are 3 times more odds of experiencing a childhood death (AOR 3.20; $p<0.01$).

Child spacing as well as timing of birth is a crucial point for childhood survival as well as socioeconomic opportunities for the mother. The majority of mothers in the sample gave birth to their first children between ages 20 and 35 (68.59%) followed by 19.71 percent giving birth during their adolescent years (14 to 19 years).

What is prominent in these results is that only mothers deemed as old (33.60%) in terms of having children experienced extremely high childhood mortality and not those considered too young (9.50%). The regression models, more especially the unadjusted model, confirm the likelihood of childhood mortality as age increases. This means for every age increase the odds of experiencing childhood mortality are 6 times (UOR. 6.03) more.

Table 2 shows that the majority of households have an average of 5 to 12 members. This has shown to be beneficial as the bivariate results illustrate that childhood mortality decreases as

the number of household members increase. Those with 1 to 4 members (23.21%) experienced the highest childhood mortality and those with 13 to 16 household members experienced the least childhood mortality at 15.03 percent. These results are further corroborated by the unadjusted regression model which displays an odds ratio of 0.69, which means the more members in the household the less chances of childhood mortality.

Breastfeeding may need to be avoided by mothers returning to work or the duration may be significantly shorter than for those mothers who are not working. The results show that a higher percentage of mothers have breastfed their children for more than six months (47.61%) and this is seen in previous studies, such as those performed by Frisbie (2004), to improve childhood survival. Less than a tenth of mothers never breastfed (5.83%) at all and 10.43 percent breastfeed for less than the recommended six months.

To demonstrate the astounding impact of breastfeeding, the adjusted regression model shows that compared to mothers who never breastfed, mothers who breastfed for less than 6 months have a 37 percent (AOR 0.63) less likelihood of childhood mortality and those who breastfed for more than 6 months decrease their chances of childhood mortality by a high of 83 percent (AOR 0.17)

6.2. Main conclusions:

The main purpose and objective of the study was to examine the relationship between maternal employment and childhood mortality in Swaziland. The primary focus of the study was based on whether or not maternal employment can be seen to have an adverse impact on childhood mortality in sub-Saharan Africa, as observed in previous studies conducted in countries such as India and China (Basu and Basu, 1991 & Short et al. 2002). The results discussed in depth above have ultimately shown that employment status of a mother plays a vital role as a determinant of childhood mortality and that this characteristic has potential to put children at risk of childhood death.

From the results above it is evident that there is a high unemployment rate in Swaziland. This is not surprising as many men and women remain unemployed across sub-Saharan countries of Africa. What is evident though is the existence of gender discrimination and disparity in the labour market (Buvinic et al. 2009). This evident reality of high unemployment is detrimental for both mother and child as the mother's income is noted to be more readily

available for child welfare and household expenditure than when anyone else in the household is working (Basu and Basu, 1991).

Maternal employment amongst mothers in Swaziland matched up to what has been discussed in previous studies; that mothers who are working experience greater childhood mortality than mothers not working. The results show that the most childhood mortality is experienced by working mothers. This is in agreement with Sivakami's (1997) statement, which asserts mother's employment is incompatible with childrearing activities. Short and others (2002) explain the problem to be as a result of the amount of time spent away from the child and not that the mother is working.

According to Brewster and Padavic (2002), with the decline in availability of extended family members to take over child rearing this has left mothers vulnerable by relying on less skilled persons for childcare. Not being able to afford external services such as nannies and crèches increase the chances of childhood mortality for working mothers.

With the results discussed earlier in the chapter, there is enough evidence to conclude that maternal employment is a noteworthy predictor of childhood mortality. This means that childhood mortality and maternal employment have been found by this study to have a significant relationship.

According to Heaton and Amoateng (2007), family size plays an imperative role in childhood mortality. Risk of childhood deaths is increased in large households, especially in impoverished societies. It is postulated that a child's susceptibility to widespread disease, malnutrition as well as unsanitary conditions is increased with large family size (Heaton and Amoateng, 2007). The results obtained from this show the exact opposite. Contrary to previous findings, as household members increase so too do the chances of childhood survival in Swaziland. What can be said is that resources being shared amongst a large number of people may reduce the chances of childhood survival but also increase family income and therefore increase resources to the child's advantage.

There is a substantial difference in mortality experienced by the two categories of married mothers. Mothers who are married and living with their partners experienced less mortality than those whose partners live elsewhere. These results speak to the importance of having another adult in the household to bear the burden of child rearing especially if the mother has to also go to work, and even more especially for mothers who are unemployed. This explains

how mothers who are at home and unemployed have the advantage of low childhood mortality; they have the luxury to spend more time with the child as well as income provided by someone else. A partner's presence in the household is no doubt beneficial for childhood survival as extra physical, emotional and financial support is provided (Heaton and Amoateng, 2007).

For many years maternal education has been said to facilitate childhood mortality, which has been found to play a vital role in child health outcomes for the mothers in Swaziland (Heaton and Amoateng, 2007). What is revealed in the results is similar to what is observed in other studies, despite only a small percent of these mothers being highly educated; the higher the education the less likely the chances of bad health outcomes. It is said by Basu and Basu (1991) that education provides access to knowledge of better child caring practices.

This maternal characteristic is worth acknowledging as an important determinant of childhood mortality as the results were consistently statistically significant. Maternal education is important as this highlights the significance of women obtaining education, more especially higher education as this signifies economic opportunities and the personal ability to acquire knowledge to better their lives.

Reproductive behaviour is an important aspect of characteristics related to childhood mortality. This study revealed that a substantially high number of women in Swaziland have children between the ages of 20 and 35 which is a good age interval as these are non-threatening ages to have children. Omariba and others (2007) emphasised the danger of having children before the ages of 20 and after the age of 35. What is important with this observation is that having children before the age of 20 is shown not to be a biological hazard for childhood mortality but maternal survival may be compromised (but not assessed for this study).

An important demographic characteristic which is detrimental to child health outcomes is the number of children a mother gives birth to. This has a significant role to play in facilitating childhood mortality, as childhood mortality increased with number of births. This study provides evidence which agrees with the notion that when limited resources are shared there is an increased chance of childhood death. Birth spacing is important and this study has demonstrated just how much (Frisbie, 2004).

Even with a substantial number of mothers who breastfed there is still space for improvement to encourage more mothers to breastfeed their children in an effort to increase the child's nutritional status. The results showed that women who did not breastfeed experienced a very high 49.59 percent of childhood deaths followed by the 39.55 percent childhood deaths experienced by women who breastfed less than 6 months. This highlights the importance of reproductive behaviour and decisions women make around their pregnancies and child care practices.

The study has shown that childhood mortality continues to be rife in Swaziland, and has also demonstrated how childhood mortality continues to be a problem which plagues sub-Saharan countries, and that initiatives need to target particular characteristics which are known to have an adverse impact on childhood mortality. What is important to note is that childhood mortality can be reduced and with the results displayed it is evident where the issues lie; and these need to be improved.

6.3. Recommendations

This study has exposed issues which are still prevalent in Swaziland, as Swaziland is no exception to the high under-five mortality still experienced in sub-Saharan Africa. This means there is need for interventions which could make a valuable difference in reducing childhood mortality. The study did point out the significance of maternal employment and how it impacts on childhood mortality. Children born to mothers who are employed suffer the most mortality, and as suggested, this is because of the time mothers spend away from their children.

The study showed that childhood mortality in Swaziland is still high. The reason why most mothers leave their children after giving birth is because the job market does not reserve employment for women who do not show commitment and return to work after their months of maternity leave are exhausted. In an effort to alleviate mothers from neglecting their children in favour of returning to work following the few weeks of maternity leave, the government should enforce a policy which will compel employers to secure a woman's position for a maximum of three years after giving birth. This extended leave will not be paid for but the relief from pressure of losing one's position will encourage women to take child care as their main priority over their jobs.

Swaziland has proven to have a very low female employment rate, and after many years of encouraging women to enter the employment sector, employment amongst women is still poor. More jobs need to be actively reserved for women in Swaziland in an effort to increase the number of women employed. This will be beneficial towards increasing childhood survival in Swaziland as it has been emphasised that the mother's income readily improves child nutrition. With financial independence comes increased autonomy.

One important aspect which the government needs to implement is provision of day care centres for children of mothers who work. This will be very favourable for mothers who are poor and are forced to leave their children alone or in the hands of unskilled individuals. Good child care is important and if mothers are unable to provide it because of job demands then it is important for the government to provide these amenities which will help reduce child neglect and therefore reduce childhood mortality in Swaziland. These day care facilities will also improve child nutrition as the food the child receives at the centre may be the only meal they will receive for the day.

Mobile clinics to provide obstetric care to isolated parts of Swaziland should be encouraged. The study has shown that the majority of women reside in rural areas. Rural areas are often associated with lack of medical facilities as well as financial inability to access the medical care usually found in more urbanised settings. These mobile clinics providing obstetric care need to be free and emergency visits to women in need are required to be available. Clinics which provide vaccines and drugs targeted at common medical problems children experience should be invested in Swaziland. This is to avoid the deaths of children who are infected with curable diseases.

Another initiative which can be implemented in Swaziland is to encourage more mothers to breastfeed. The study clearly demonstrated the advantages of breastfeeding as seen to play a vital role in reducing childhood mortality. This means that women should be encouraged to breastfeed for more than six months. The benefits of breastfeeding need to be promoted through the media, both print and radio. A full campaign may be implemented where buses are employed to collect women around the communities and hold workshops at community centres promoting the benefits of breastfeeding their children. These recommended initiatives show that government needs to make an impact at a societal level as this will benefit childhood survival for children in Swaziland.

Future studies looking into assessing the relationship between childhood mortality and maternal employment need to consider calculating the number of hours women spend in both work and child rearing activities. This is important as it will reduce bias in results obtained from simply grouping women into categories of employed and not employed. Calculating the number of hours mothers invest in child rearing will help solidify and provide a clearer explanation of the relationship which exists between maternal employment and childhood mortality.

Investigating whether there is a significant difference in childhood mortality experienced by mothers who work at home or away from home could be beneficial for the study. This is because mothers who are working at home may be in lower paying jobs and fall into the low income bracket. Working from home may also mean that this work is of an unstable nature. Mothers who work away from home may therefore constitute mothers who are employed full time and this may affect their time spent with their children. This may show that mothers who are working away from home may be away from the child but have an advantage of earning a significant amount of money throughout the year.

This means wage income may also be a link between child nutrition improvements and mothers working. How much the mother earns could make a difference to whether or not this is enough to make a significant contribution in the child's chances of survival. Future studies should therefore consider exploring maternal employment occupation categories as well as the amount of income these women receive. Future studies also need to consider the extent of female autonomy (decision making powers) in the household. Despite the employment status of a woman, the decision making powers on how money is spent is a very important element.

6.4. Study limitations

6.4.1. *Temporality*: certain difficulties emerge with the use of a cross-sectional study. Difficulty to infer causality because a cross-sectional study as the DHS survey data only observes the individuals position at a particular point and time in their lives. There is no way to confirm if the child died before or after the mother was employed, as employment is measured at that time. This limitation is as a result of the questions covered during the interviews, therefore there is uncertainty as to whether the child had died before mother was employed or employment preceded the death of a child.

6.4.2. *Causality:* employment cannot be attributed as the cause of childhood mortality. Maternal employment is a predictor which has been found to have a negative impact on childhood survival. It cannot be said that the act of employment is what caused the mortality as the study asserts it iis the time mothers spend away from their children and not the act of employment. What is also hazardous is the influence of other factors which were seen to play a significant role in contributing to childhood mortality in Swaziland.

6.4.3 Employment is an unstable variable as employment status over the full period of these women's lives cannot be measured. Employment is measured at that point in time when the interview was conducted; a prolonged history of the mother's employment cannot be calculated with the data available from the survey interview. This aggravates uncertainty around the duration of mother's employment before and after childhood mortality.

6.4.4. What is also limiting the study is that information about who was taking care of the child when the mother was at work, as well as if the child was removed from the household during the day to be cared for by someone outside the home is not obtainable. What is unknown is if the child was even living in the same house as the mother when they died or if they were being taken care of by someone else.

6.4.5. The amount of time the mother spends with the child is an important factor which was unable to be measured due to the limitation of data provided in the SDHS. Hours spent doing child care practices is not covered in the SDHS and this therefore means that further data collection will be necessary to address this limitation.

6.4.6. Inability to measure the amount of time the child spends in the household in the care of the father or someone else is important to acknowledge. In contemporary society, fathers play a prominent role in child rearing and in other households fathers may even be the primary care-giver and not the biological mother.

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Appendix

A*: Univariate tables for all demographic, socioeconomic and reproductive behavior indicators*

age 5-year groups	Freq.	Percent	Cum.
15-19	234	10.96	10.96
20-24	647	30.29	41.25
25-29	483	22.61	63.86
30-34	370	17.32	81.18
35-39	250	11.70	92.88
40-44	124	5.81	98.69
45-49	28	1.31	100.00
Total	2,136	100.00	

marital_status	Freq.	Percent	Cum.
never married	823	38.66	38.66
currently married, living together	727	34.15	72.80
currently married, not living together	460	21.61	94.41
formerly married	119	5.59	100.00
Total	2,129	100.00	

religion	Freq.	Percent	Cum.
Zionist	918	43.00	43.00
Other	1,116	52.27	95.27
None	101	4.73	100.00
Total	2,135	100.00	

number_of_children	Freq.	Percent	Cum.
1	1,519	71.18	71.18
2	560	26.24	97.42
3	55	2.58	100.00
Total	2,134	100.00	

household_members	Freq.	Percent	Cum.
1 t0 4 members	573	27.30	27.30
5 to 8 members	882	42.02	69.32
9 to 12	471	22.44	91.76
13 to 16	173	8.24	100.00
Total	2,099	100.00	

region	Freq.	Percent	Cum.
hhohho	538	25.19	25.19
manzini	591	27.67	52.86
shiselweni	481	22.52	75.37
lubombo	526	24.63	100.00
Total	2,136	100.00	

maternal_employment	Freq.	Percent	Cum.
not working	1,256	58.88	58.88
working	877	41.12	100.00
Total	2,133	100.00	

highest educational level	Freq.	Percent	Cum.
no education	182	8.52	8.52
primary	741	34.69	43.21
secondary	1,066	49.91	93.12
higher	147	6.88	100.00
Total	2,136	100.00	

wealth_index	Freq.	Percent	Cum.
poor	824	38.58	38.58
middle	410	19.19	57.77
rich	902	42.23	100.00
Total	2,136	100.00	

type of place of residence	Freq.	Percent	Cum.
urban	584	27.34	27.34
rural	1,552	72.66	100.00
Total	2,136	100.00	

mothers_age_at_birth	Freq.	Percent	Cum.
10-19 years	421	19.71	19.71
20-35 years	1,465	68.59	88.30
36 and above	250	11.70	100.00
Total	2,136	100.00	

B: Bivariate tables indicating association between maternal characteristics and childhood mortality

Key

frequency
column percentage

child_mortality1	age 5-year groups							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
alive	216	551	372	293	182	75	18	1,707
	92.31	85.16	77.02	79.19	72.80	60.48	64.29	79.92
dead	18	96	111	77	68	49	10	429
	7.69	14.84	22.98	20.81	27.20	39.52	35.71	20.08
Total	234	647	483	370	250	124	28	2,136
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Pearson chi2(6) = 77.4511 Pr = 0.000

Key

frequency
column percentage

child_mortality1	marital_status				
	never mar	currently	currently	formerly	Total
alive	702	575	353	72	1,702
	85.30	79.09	76.74	60.50	79.94
dead	121	152	107	47	427
	14.70	20.91	23.26	39.50	20.06
Total	823	727	460	119	2,129
	100.00	100.00	100.00	100.00	100.00

Pearson chi2(3) = 46.0352 Pr = 0.000

Key

frequency
column percentage

child_mortality1	religion			
	Zionist	Other	None	Total
alive	699	926	81	1,706
	76.14	82.97	80.20	79.91
dead	219	190	20	429
	23.86	17.03	19.80	20.09
Total	918	1,116	101	2,135
	100.00	100.00	100.00	100.00

Pearson chi2(2) = 14.6442 Pr = 0.001

Key

frequency
column percentage

child_mortality1	number_of_children 1	2	3	Total
alive	1,269 83.54	410 73.21	28 50.91	1,707 79.99
dead	250 16.46	150 26.79	27 49.09	427 20.01
Total	1,519 100.00	560 100.00	55 100.00	2,134 100.00

Pearson chi2(2) = 57.0961 Pr = 0.000

child_mortality1	household_members 1 t0 4 me	5 to 8 me	9 to 12	13 to 16	Total
alive	440 76.79	702 79.59	391 83.01	147 84.97	1,680 80.04
dead	133 23.21	180 20.41	80 16.99	26 15.03	419 19.96
Total	573 100.00	882 100.00	471 100.00	173 100.00	2,099 100.00

Pearson chi2(3) = 9.1435 Pr = 0.027

Key

frequency
column percentage

child_mortality1	region hhohho	manzini	shiselwen	lubombo	Total
alive	446 82.90	469 79.36	387 80.46	405 77.00	1,707 79.92
dead	92 17.10	122 20.64	94 19.54	121 23.00	429 20.08
Total	538 100.00	591 100.00	481 100.00	526 100.00	2,136 100.00

Pearson chi2(3) = 5.9806 Pr = 0.113

Key

frequency
column percentage

child_mortality1	maternal_employment not worki	working	Total
alive	1,032 82.17	673 76.74	1,705 79.93
dead	224 17.83	204 23.26	428 20.07
Total	1,256 100.00	877 100.00	2,133 100.00

Pearson chi2(1) = 9.4817 Pr = 0.002

Key

frequency
column percentage

child_mortality1	highest educational level no educat	primary	secondary	higher	Total
alive	118 64.84	574 77.46	883 82.83	132 89.80	1,707 79.92
dead	64 35.16	167 22.54	183 17.17	15 10.20	429 20.08
Total	182 100.00	741 100.00	1,066 100.00	147 100.00	2,136 100.00

Pearson chi2(3) = 43.1584 Pr = 0.000

Key

frequency
column percentage

child_mortality1	wealth_index: poor	middle	rich	Total
alive	644 78.16	332 80.98	731 81.04	1,707 79.92
dead	180 21.84	78 19.02	171 18.96	429 20.08
Total	824 100.00	410 100.00	902 100.00	2,136 100.00

Pearson chi2(2) = 2.5909 Pr = 0.274

Key

frequency
column percentage

child_mortality1	mothers_age_at_birth: 10-19 yea	20-35 yea	36 and ab	Total
alive	381 90.50	1,160 79.18	166 66.40	1,707 79.92
dead	40 9.50	305 20.82	84 33.60	429 20.08
Total	421 100.00	1,465 100.00	250 100.00	2,136 100.00

Pearson chi2(2) = 58.3238 Pr = 0.000

Key

frequency
column percentage

child_mortality1	type of place of residence: urban	rural	Total
alive	464 79.45	1,243 80.09	1,707 79.92
dead	120 20.55	309 19.91	429 20.08
Total	584 100.00	1,552 100.00	2,136 100.00

Pearson chi2(1) = 0.1077 Pr = 0.743

Key

frequency
column percentage

child_mortality1	breastfeeding: no breast	breastfed	breastfed	3	Total
alive	62 50.41	133 60.45	831 82.77	670 87.93	1,696 80.42
dead	61 49.59	87 39.55	173 17.23	92 12.07	413 19.58
Total	123 100.00	220 100.00	1,004 100.00	762 100.00	2,109 100.00

Pearson chi2(3) = 156.8287 Pr = 0.000

C: *Multivariate tables indicating the relationship between selected maternal characteristics and childhood mortality for model one and two*

C.1.1. logistic regression tables for model one

```
Logistic regression                               Number of obs   =       2136
                                                  LR chi2(1)      =      67.13
                                                  Prob > chi2     =     0.0000
Log likelihood = -1037.7869                       Pseudo R2       =     0.0313

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lage |   5.820309   1.274593     8.04   0.000     3.789142    8.940282
------------------------------------------------------------------------------
```

```
i.marital_sta~s   _Imarital_s_0-3     (naturally coded; _Imarital_s_0 omitted)

Logistic regression                               Number of obs   =       2129
                                                  LR chi2(3)      =      42.61
                                                  Prob > chi2     =     0.0000
Log likelihood = -1045.7151                       Pseudo R2       =     0.0200

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Imarital_~1 |   1.533654   .2058016     3.19   0.001     1.178975    1.995035
_Imarital_~2 |   1.758575   .2600528     3.82   0.000     1.316096    2.349817
_Imarital_~3 |    3.78719    .802084     6.29   0.000     2.500589    5.735773
------------------------------------------------------------------------------
```

```
i.religion        _Ireligion_1-3      (naturally coded; _Ireligion_1 omitted)

Logistic regression                               Number of obs   =       2135
                                                  LR chi2(2)      =      14.57
                                                  Prob > chi2     =     0.0007
Log likelihood = -1063.8395                       Pseudo R2       =     0.0068

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Ireligion_2 |    .654901   .0727497    -3.81   0.000     .5267686    .8142007
_Ireligion_3 |    .788094   .2060267    -0.91   0.362     .4721212    1.315535
------------------------------------------------------------------------------
```

```
Logistic regression                               Number of obs   =       2134
                                                  LR chi2(1)      =      46.86
                                                  Prob > chi2     =     0.0000
Log likelihood =  -1044.705                       Pseudo R2       =     0.0219

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lchildren_~n |   2.840668   .4265669     6.95   0.000     2.116413    3.812769
------------------------------------------------------------------------------
```

```
Logistic regression                               Number of obs   =       2099
                                                  LR chi2(1)      =      16.27
                                                  Prob > chi2     =     0.0001
Log likelihood = -1041.1017                       Pseudo R2       =     0.0078

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  lhousehold |    .687064   .0634205    -4.07   0.000     .5733578    .8233201
------------------------------------------------------------------------------
```

```
i.maternal_em~t   _Imaternal__0-1     (naturally coded; _Imaternal__0 omitted)

Logistic regression                               Number of obs   =       2133
                                                  LR chi2(1)      =       9.39
                                                  Prob > chi2     =     0.0022
Log likelihood = -1064.6001                       Pseudo R2       =     0.0044

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Imaternal~1 |   1.396519   .1518365     3.07   0.002     1.128496    1.728199
------------------------------------------------------------------------------
```

```
i.v106            _Iv106_0-3          (naturally coded; _Iv106_0 omitted)

Logistic regression                               Number of obs   =       2136
                                                  LR chi2(3)      =      41.37
                                                  Prob > chi2     =     0.0000
Log likelihood = -1050.6637                       Pseudo R2       =     0.0193

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     _Iv106_1 |    .536422   .0957025    -3.49   0.000      .378133    .7609719
     _Iv106_2 |   .3821135   .0669479    -5.49   0.000     .2710555    .5386748
     _Iv106_3 |    .209517   .0657036    -4.98   0.000     .1133148    .3873933
------------------------------------------------------------------------------
```

```
Logistic regression                               Number of obs   =       2136
                                                  LR chi2(1)      =      72.12
                                                  Prob > chi2     =     0.0000
Log likelihood =  -1035.292                       Pseudo R2       =     0.0337

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 lageatbirth |   6.027558   1.299612     8.33   0.000     3.950139    9.197513
------------------------------------------------------------------------------
```

```
i.breastfeeding   _Ibreastfee_0-3     (naturally coded; _Ibreastfee_0 omitted)

Logistic regression                               Number of obs   =       2109
                                                  LR chi2(3)      =     136.11
                                                  Prob > chi2     =     0.0000
Log likelihood =  -974.9808                       Pseudo R2       =     0.0652

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Ibreastfe~1 |   .6648589   .1509325    -1.80   0.072     .4260833    1.037443
_Ibreastfe~2 |   .2115957   .0420571    -7.81   0.000     .1433246    .3123871
_Ibreastfe~3 |   .1395645   .0295681    -9.29   0.000     .0921381    .2114026
------------------------------------------------------------------------------
```

C.1.2. logistic regression table for model two

```
i.marital_sta~s   _Imarital_s_0-3     (naturally coded; _Imarital_s_0 omitted)
i.religion        _Ireligion_1-3      (naturally coded; _Ireligion_1 omitted)
i.maternal_em~t   _Imaternal__0-1     (naturally coded; _Imaternal__0 omitted)
i.v106            _Iv106_0-3          (naturally coded; _Iv106_0 omitted)
i.breastfeeding   _Ibreastfee_0-3     (naturally coded; _Ibreastfee_0 omitted)

Logistic regression                               Number of obs   =       2062
                                                  LR chi2(16)     =     355.07
                                                  Prob > chi2     =     0.0000
Log likelihood = -836.86757                       Pseudo R2       =     0.1750

------------------------------------------------------------------------------
child_mort~1 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lage |   .1279145   .2023839    -1.30   0.194     .0057566    2.842336
_Imarital_~1 |   .9522328    .154414    -0.30   0.763     .6929668      1.3085
_Imarital_~2 |   1.070394   .1941626     0.38   0.708     .7501384    1.527377
_Imarital_~3 |   2.003431   .5033408     2.77   0.006     1.224388    3.278157
lchildren_~n |   3.197019    .615183     6.04   0.000     2.192571    4.661619
_Ireligion_2 |   .6736691   .0910261    -2.92   0.003     .5169307    .8779321
_Ireligion_3 |   .8071288   .2355551    -0.73   0.463     .4555388     1.43008
   lhousehold |   .6512583   .0725722    -3.85   0.000     .5234807    .8102255
_Imaternal~1 |   1.380087   .1793908     2.48   0.013     1.069702    1.780533
     _Iv106_1 |   .5579515   .1113833    -2.92   0.003     .3772871    .8251274
     _Iv106_2 |   .3447333    .070761    -5.19   0.000     .2305489      .51547
     _Iv106_3 |   .1221036   .0434726    -5.91   0.000      .060768    .2453477
  lageatbirth |   35.71724   54.9617     2.32   0.020     1.750043    728.9656
_Ibreastfe~1 |   .6312245   .1625708    -1.79   0.074     .3810292    1.045705
_Ibreastfe~2 |   .1788316   .0429368    -7.17   0.000     .1117053    .2862956
_Ibreastfe~3 |   .0811615   .0202618   -10.06   0.000     .0497565    .1323886
------------------------------------------------------------------------------
```