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PROJECT TITLE: THE EFFECT OF MATERNAL HEALTH-SEEKING BEHAVIOUR ON UNDER-FIVE MORTALITY IN ZIMBABWE

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF SOCIAL SIENCE, UNIVERSITY OF WITWATERSRAND, JOHANNESBURG, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN THE FIELD OF DEMOGRAPHY AND POPULATION STUDIES

AUGUST 2011

DECLARATION

I **Nyasha Chadoka;** declare that this research report is my own work. It is submitted for the degree of Master of Arts in Demography and Population Studies at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

……. [Signature of candidate]

…… day of ……., 20….

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Finally, my warm and heartfelt thanks go to my family for their support, love and encouragement throughout my studies.

Dedication

To my husband Tapiwa Cephas Mutanda and my son Aripoishe Mutanda

ABBREVIATIONS

AIDS **:** Acquired Immune Deficiency Syndrome

ANC : Antenatal Care

AOR : Adjusted Odds Ratio

BCG : Bacille Calmette- Guerin

CI : Confidence Interval

DPT : Diphtheria, Pertussis (whooping cough) and Tetanus

HIV : Human Immunodeficiency Virus

MIMS : Multiple Indicators Monitoring Survey

MOHCW : Ministry of Health and Child Welfare, Zimbabwe

PNC : Postnatal Care

UMR : Under-five Mortality Rate

UN : United Nations

UNICEF : United Nations Children's Fund

UOR : Unadjusted Odds Ratio

WHO : World Health Organisation

ZEPI : Zimbabwe Expanded Programme on Immunisation

ZDHS : Zimbabwe Demographic and Health Survey

Abstract

Background: This study examines the relationship between maternal health-seeking behaviour (during and after pregnancy) and under-five mortality in Zimbabwe. Maternal health-seeking behaviour affects both the mother's and child's health and has been identified as a correlate of under-five mortality. This study therefore aims to determine the extent to which maternal health-seeking behaviour prior, during and post delivery may influence the likelihood of under-five survival among Zimbabwean children.

Methods: This study is a secondary data analysis of the 2005-06 Zimbabwe Demographic and Health Survey (ZDHS) dataset of children under five years old and women who had given birth in the five years preceding the survey. A multivariate logistic regression was used to examine the relationship between maternal health-seeking behaviour and under-five mortality.

Results: The results show that poor maternal health-seeking behaviour as indicated by not receiving the tetanus vaccine during pregnancy is significantly associated with under-five mortality. That is, not receiving the tetanus vaccine during pregnancy is significantly associated with increased risk of under-five mortality (p= 0.013 CI=1.11-2.53). The results also show that there is no significant association between under-five mortality and other indicators of maternal health-seeking behaviour such as antenatal care, place of delivery and assistance at delivery. However, having a preceding birth interval greater than 2 years was also found to be significantly associated with under-five mortality implying that under-five mortality declines as the length of birth interval increases.

Conclusion: Maternal health-seeking behaviour during pregnancy as reflected by maternal tetanus immunisation during pregnancy associate with under-five mortality. However, contrary to other studies that have been done elsewhere; antenatal care, place of delivery and assistance at delivery do not seem to associate with under-five mortality in Zimbabwe according to this study. The preceding birth interval is also a good predictor of under-five mortality in Zimbabwe.

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Chapter 1

Introduction and Statement of the Problem

1.1 Introduction

Ever since 1960, under-five mortality has been decreasing worldwide (UNICEF, 2008). For the period between 1990 and 2006 the deaths of children under five years of age declined from 93 to 72 deaths per 1000 live births worldwide which was a 60 percent drop of the under-five mortality rate since 1960 (UNICEF, 2008). The rate at which under-five mortality has been declining has however not been uniform across and within regions or countries; rather it has been uneven and inconsistent. This has resulted in large under-five mortality disparities between regions and countries as well as between sub-groups within countries (Hill and Pebley, 1989:680; DFID, 2007 report). For example the pace of under-five mortality decline in the Sub-Saharan region has been slower compared to Asia, America and the Middle East (Hill and Pebley, 1989: 680; UNICEF, 2008) and also insufficient in terms of reducing under-five mortality by two thirds by 2015 (UNICEF, 2008). Under-five mortality differences also exist within countries between sub-groups where for example, deaths of children under five are still high in the rural areas than urban areas and among uneducated mothers than educated mothers (UNICEF, 2008; ZDHS, 2006).

In the Sub-Saharan Africa region under-five mortality is still a major health challenge in most of the countries in that region. It is estimated that 4.4 million children die every year in the Sub-Saharan Africa region, of which 1,208,000 babies die before they reach one month of age and 3,192,000 children die before their fifth birthday (UNICEF, 2009). Neonatal conditions such as infections, preterm birth complications and birth asphyxia are the major causes of newborn deaths whilst diseases like pneumonia, diarrhoea, measles and malaria are the major causes of under-five mortality (UNICEF, 2009). All these causes of death can be prevented and treated. It is estimated that about three quarters of these childhood deaths can prevented by ensuring that women are adequately nourished and receive appropriate care during pregnancy, childbirth and postnatal period (UNICEF, 2007). The availability of services is however not enough, utilisation of these services by women also matters and this depends on various factors like education and culture that tend to shape their attitudes and behaviours towards the available services.

1.2 Problem Statement:

Under-five mortality is recognised as one of the major developmental challenges that need to be addressed worldwide. To show the urgency of the matter the global community has endorsed the reduction of childhood mortality as one of the Millennium Developmental Goals, goal number four that has to be achieved by every country.

Under-five mortality in Zimbabwe has been on the rise for the past years. In 2009 UNICEF reported a 20% increase in under-five mortality for the period between 2005 and 2009 and an under-five mortality rate of 94 deaths per 1000 live births for the year 2009 (UNICEF, 2009). This rate is high and it shows that the country is not making any progress in reducing childhood deaths and is far from the targeted 42 deaths per thousand live births by 2015. The major causes of death during the neonatal period in Zimbabwe are preterm birth, intrapartum asphyxia and trauma, and unexplained intrauterine death and these accounts to about 78% of all perinatal deaths (Ministry of Health and Child Welfare, Zimbabwe [MOHCW], 2009). In addition to neonatal conditions some of the major causes of under-five mortality in Zimbabwe are acute respiratory infections, malaria, tuberculosis, diarrhoea, malnutrition and AIDS (Zimbabwe National Health Profile and Analysis, 2006; UNCEF, 2009). All these diseases can be prevented and treated.

It is also important to note that since the under-five mortality rate is a sensitive indicator of the level of socioeconomic development of a country the increase in childhood deaths over the years in Zimbabwe can also be said to be a reflection of the country's years of economic crisis, political instability and reduction in development aid which has crippled the health delivery system and the social well-being of people especially women and children (UNICEF, 2008; MOHCW, 2009).

Most studies that have been done in Zimbabwe on under-five mortality have focused mainly on examining mortality differentials by socio-demographic and environmental factors both at individual and national level. This trend of research has been noted in many developing countries (Martin et al, 1983). The Zimbabwe Demographic and Health Survey in 2005/6 found a high under-five mortality rate of 72 deaths per 1000 live births in rural areas compared to 64 deaths per 1000 live births that of urban areas (ZDHS, 2007:113). It was also found that children born to educated mothers experienced lower mortality than those children born to uneducated mothers (ZDHS, 2007:113). Factors like short birth intervals and mother's age at birth especially greater than 34 years were found to be the factors increasing

mortality risk among under-five children (ZDHS, 2007:116). According to the results of a multivariate hazard analysis on the ZDHS 2005/06 data; birth order, preceding birth interval, maternal age and type of birth are the major determinants of infant mortality in Zimbabwe while maternal and paternal education affects child mortality (Kembo and Van Ginneken, 2009). The issue of the effect of maternal health-seeking behaviour on under-five mortality has not been explored in Zimbabwe.

Maternal health-seeking behaviour is a major determinant of child survival. It has been noted that the health care that a mother receives during pregnancy, at the time of delivery and soon after delivery is essential for the survival and well-being of both the mother and her child. Studies that have been done in various settings on maternal health-seeking behaviour have however focused mainly on the determinants of maternal health-seeking behaviour such as physical, socioeconomic, cultural and political factors. The issue of the relationship between maternal health-seeking behaviour and under-five mortality has received little attention in the study of childhood deaths and in Zimbabwe no study has been done with regards to that relationship. This is an important issue because some studies that have been done in Asia have shown that maternal health-seeking behaviour particularly during prenatal, natal and postnatal period is major determinant of child survival (Zahid, 1996; Howlader and Bhuiyan, 1999). So having identified that under-five mortality is a problem in Zimbabwe and the gap in literature concerning the relationship between maternal health-seeking behaviour and under-five mortality this study therefore aims at examining the relationship between maternal health-seeking behaviour and under-five mortality.

1.3 Research question:

Does maternal health-seeking behaviour prior, during and post delivery associate with under-five mortality in Zimbabwe?

1.4 Research Objectives:

1.4.1 General objective:

To examine the extent to which maternal health-seeking behaviour prior, during and post delivery may influence the likelihood of under-five survival among Zimbabwean children.

1.4.2 Specific objectives:

- To examine the patterns of maternal health-seeking behaviour (antenatal, natal and post natal care received before, during and after delivery) in Zimbabwe.
- To examine the relationship between various maternal health-seeking behaviour factors and under-five mortality in Zimbabwe.
- To examine the role of the selected maternal health-seeking behaviour variables (antenatal care, tetanus injection during pregnancy, place of delivery, delivery assistants and ever breastfed) in determining under-five mortality; while taking other selected risk factors into consideration.

1.5 Hypothesis

- The research expects to find under-five mortality to be high among children born to mothers who received antenatal care from traditional providers during pregnancy compared to children born to mothers who received antenatal care from a doctor/nurse/midwife during pregnancy.
- The research also expects to find under-five mortality to be high among children born to mothers who did not receive the tetanus vaccine during pregnancy compared to those children born to mothers who received the tetanus vaccine during pregnancy
- The research also expects to find under-five mortality to be high among children who were delivered at home compared to those children who were delivered at hospital/clinic.
- Finally, this research also expects to find under-five mortality to be high among children whose mothers were attended to by unskilled delivery assistants during birth delivery than those children whose mothers were attended to by skilled delivery assistants during birth delivery.

1.6 Justification of the study:

Under-five mortality is high in Zimbabwe at an estimated rate of about 94 deaths per 1000 live births (UNICEF, 2009). This shows that the country is off-track from reaching the target of the millennium goal number four of 42 deaths per 1000 live births by 2015. The results of the Zimbabwe Demographic and Health Survey 2006 showed that most childhood deaths occur during the first year of life (Infant Mortality Rate 60 deaths per 1000 live births) with neonatal deaths of about 24 deaths per 1000 live births and post-neonatal deaths of about 36 deaths per 1000 live births (ZDHS, 2006). The most common known causes of neonatal

deaths for example are; preterm delivery, tetanus and low birth weight and these can be prevented (UNCEF, 2009). A study done by Luther (1998) in India showed that mother's tetanus immunisation is associated with both lower neonatal mortality and early childhood mortality implying that deaths due to tetanus can be prevented if the mother of the child received tetanus immunisation during pregnancy.

The results from the 2005-6 Zimbabwe Demographic and Health Survey also showed that 45% of the mothers did not receive a post natal check up and of the 55% who received Post Natal Care (PNC) only 30% received PNC within the critical 48 hours after delivery (ZDHS, 2006). This shows that a significant proportion of mothers and babies do not receive the care and support that is needed for the first 7 days after birth for the prevention of maternal and neonatal deaths. The under utilisation of PNC services also reflects the existence of poor maternal health-seeking behaviour and this affects both the health of the mother and the child. In a study done by Hove et al (1999) on the Prevalence and Associated Factors for Non-Utilization of Postnatal Care Services in Zimbabwe a prevalence of non utilization of PNC of 10.1% was found and this was statistically significant (7.4 12.8). Religion was found to be one of the major determinants of the non utilization of PNC (Hove et al, 1999). The ZDHS 2006 results also showed a decline from 73% in 1999 to 69% in 2006 in skilled attendance at delivery and in 2009 the Multiple Indicator Monitoring Survey in Zimbabwe (MIMS) reported a further decline to 60%. Institutional deliveries also declined from 72% in 1999 to 68% in 2006 (ZDHS, 2006) and in 2009 MIMS reported a 7% decline to 61%.

Child health in Zimbabwe has also been deteriorating ever since 1999 (WHO, 2006). In 2009 the Ministry of Health and Child Welfare of Zimbabwe highlighted that there was an increase in the underutilisation of the health care system especially the public health sector which happens to be the major supplier of health care (MOHCW, 2009). Chimhete in 2003 had reported that many people were being forced to seek traditional care due to high staff turnover, high hospital costs and shortages of essential drugs at most clinics and hospitals. This shows that a new pattern of health-seeking behaviour has emerged where people are opting for traditional and other care rather medical care and this can affect children's health.

So having identified that under-five mortality in Zimbabwe is high and increasing, a prevalence of non utilization of health services for child delivery and post natal care, underutilisation of the health delivery system and new patterns of health seeking behaviour that have emerged it is therefore worthy to study the relationship between under-five

mortality and maternal health-seeking behaviour as this has been a neglected area in the study of childhood deaths in Zimbabwe. This study therefore aims at filling the gap in research of the relationship between under-five mortality and maternal health-seeking behaviour and in doing so it will contribute to the existing literature on under-five mortality. Therefore this study intends to examine the patterns of maternal health-seeking behaviour (during and after delivery), to examine the relationship between various maternal health-seeking behaviour factors and under-five mortality in Zimbabwe and then finally to examine the role of the selected maternal health-seeking behaviour variables (antenatal care, tetanus injection during pregnancy, place of delivery, delivery assistants and ever breastfed) in determining under-five mortality; while taking other selected risk factors into consideration.

1.7 Limitations

Underestimation of Under-five mortality

The study only included information of children whose mothers where alive and present to answer the questionnaire at the time of the survey thereby excluding those children whose mothers were dead or absent at the time of survey. This is a limitation to the study as this can result in under-five mortality being underestimated. This is also a concern considering the fact that adult mortality is high in Zimbabwe due to HIV/AIDS and women are reported to be the most vulnerable group.

Recall Lapse

The most common reported error of using retrospective data is that of recall lapse especially among older women. This affects the birth history of the children that they have given birth to especially their date of birth and age at deaths and moreover information on the utilisation of health facilities both during and after pregnancy. This could be a limitation to this study because recall lapse can result in either underestimation or overestimation of under-five mortality and also utilisation of health facilities especially among old women and uneducated women.

Usefulness of other Information

Another limitation for this study is that the ZDHS data does not include information about perceptions and attitudes that shape certain behaviours and this kind of information is usually obtained from focus groups and individual interviews about their view concerning certain health behaviours. Data of this nature would have enabled the researcher to have a deeper

understanding of why some mothers practice poor health-seeking behaviour and others practice good health-seeking behaviour and how this is linked to under-five mortality.

Information Available in the dataset

The survey collected information on maternal health care (antenatal, natal and postnatal care) for the most recent live birth only, so if a woman had more than one child below five years the information on maternal health care refers to the last birth. This is a limitation to this study because maternal health-seeking behaviour may be different for each live birth so assuming that the health-seeking behaviour of the mother for all her children was constant may result in under/over estimation of the use of maternal health care services.

1.8 Definition of terms:

1.8.1 Maternal health-seeking behaviour:

- Maternal health-seeking behaviour in this study is defined as the actions that a mother takes to promote her own and the child's wellness during and after pregnancy. It includes consulting during prenatal (mother's immunisation against tetanus), natal (place of delivery and help at delivery) and postnatal (breastfeeding) period.
- Good health-seeking behaviour - utilisation of health care services during and after pregnancy as well as breastfeeding
- Poor health-seeking behaviour – under/non utilisation of health care services during and after pregnancy and also not breastfeeding

1.8.2 Under-five mortality

- Under-five mortality refers to all deaths occurring before the age of five.
- Child mortality refers to all deaths occurring between 1 year and 4 years.
- Infant mortality refers to all deaths occurring between birth and the first birthday.
- Neonatal mortality refers to all deaths occurring within the first month of life.

Chapter 2

Literature Review and Conceptual Framework

2.1 Literature Review

2.1.1 Under-five Mortality

Under-five mortality remains a major health challenge in most developing countries especially those in the Sub-Saharan region even though the deaths of children under-five years of age have been declining worldwide (UNICEF, 2008). It is estimated that a child born in developing countries is 13 times more likely to die before the age of five than a child born in developed countries (UN, 2008). About half of all these childhood deaths in developing countries occur in the Sub-Saharan Africa region (UN, 2008). A study in Brazil done by Souza et al (2000) showed that about 70% of childhood deaths are caused by poor and delayed health-seeking behaviours. According to the United Nations Children's Fund half of all these childhood deaths in developing countries can be prevented through health practices that promote better child health care decision making (UNICEF, 2007).

It has also been noted that the decline in under-five mortality in some countries in the Sub-Saharan Africa region has slowed down and in some countries is increasing. According to Rutstein (2000) changes in fertility behaviour, nutritional status and infant feeding, use of health services by mothers and for children, environmental conditions and socio-economic status overtime are the main explanatory factors that have been associated with trends in infant and child mortality in developing countries during the 1990s (Rutstein, 2000). Fertility behaviour and breastfeeding are said to have changed less than other factors during the 1990s and therefore they did not contribute much to the explanation of the observed mortality trends (Rutstein, 2000:1267). The decline in the percentage of children who were malnourished and those living in poor environmental conditions where found in the study to be the two important factors explaining under-five mortality decline during the 1990s in developing countries (Rutstein, 2000:1268). Medical care during pregnancy, at birth, and for children suffering from diarrhoea were the next most important factors in explaining the decline of under-five mortality in the 1990s in developing countries (Rustein, 2000).

The existence of a strong relationship between medical prenatal care and medical attendance at birth and under five mortality trends was also found in the study (Rutstein, 2000:1263). An

increase in the use of maternal services, use of health services for sick children and vaccination explained the large decline of under-five mortality in some areas (Rutstein, 2000:1263). The deterioration in seeking medical care for sick children with fever was found to be one of the factors that explained the increase in childhood deaths in some areas (Rutstein, 2000:1263). Generally the study confirms that changes in factors such as use of health services by mothers and for children, environmental conditions and socio-economic status overtime has affected infant and child mortality trends in developing countries. The direction of change either positive or negative determines whether the level of mortality is going to decline or increase.

2.1.2 Under-five Mortality in Zimbabwe:

Zimbabwe is one of the countries in the Sub-Saharan Africa region where under-five mortality is still a problem. The country's under-five mortality and infant mortality trend pattern suggests that childhood mortality declined in the first half of the 1980s and then was stable up to early 1990s and then began to rise in the latter half of the 1990s (ZDHS, 2006:111). The under-five mortality levels across the three successive five year periods suggests that under-five mortality rose from 58 deaths per 1000 live births during the early 1990s to 82 deaths per 1000 live births by the turn of the millennium (ZDHS, 2006:111). However, when comparing under-five mortality for the five year period before the 2005-06 ZDHS and that of the five year period before the 1999 ZDHS under-five mortality has fallen from 102 to 82 deaths per 1000 live births (ZDHS, 2006:111). According to UNICEF (2005) under-five mortality has increased by 50% since 1990 due to the country's high prevalence of HIV/AIDS among other factors. In 2009 UNICEF reported under-five mortality to be 94 deaths per 1000 live births in Zimbabwe (UNICEF, 2009).

It has been noted that most of the childhood deaths tend to occur during the first year of life (ZDHS, 2006; WHO, 2006). The 2005-6 ZDHS reported an infant mortality rate of 60 deaths per 1000 live births. The most common known causes of deaths during the first year of life are poor delivery process, preterm delivery, tetanus and low birth weight (WHO, 2006) and these deaths can be prevented through good health practices during and after pregnancy such as use of antenatal care services and post natal care services (UNICEF, 2007). Among the many factors that have been identified in various studies as determinants of under-five mortality in Zimbabwe mother's education (McMurray, 1997) and environmental factors like source of drinking water and sanitation (WHO, 2006) tend to be the dominating factors. Children born to educated mothers have lower mortality than children born to uneducated

mothers and also mothers with more than secondary education are almost 3 times more likely to use proper health facilities compared to uneducated mothers both during and after pregnancy (ZDHS, 2006). The effect of maternal health-seeking behaviour on under-five mortality has not yet been explored.

2.1.3 Under-five Mortality Policies and Initiatives:

Under-five mortality is a problem that has received policymakers' attention worldwide. Quite a number of conferences and summits have been held aimed at coming up with policies and initiatives that can help to reduce mortality especially among children. In recognition of the urgency of the matter the Zimbabwean government has adopted international agreements aimed at reducing maternal and childhood mortality by becoming a signatory of these legal instruments (MOHCW, 2007).

The Zimbabwean government is a signatory to the International Conference on Population and Development Programme of Action (1994), The Millennium Declaration (2000), Abuja Declaration (2000) and Maputo Plan of Action (2006) (MOHCW, 2009). All these put emphasis on the promotion of good health for the population and reduction of mortality. It is because of these conferences that the government of Zimbabwe has come up with policies like the National Health Policy and the Reproductive Health Policy 2003 and programmes like the Zimbabwe Expanded Programme on Immunisation (ZEPI), Breastfeeding Campaign Programmes and the Zimbabwe Maternal and Neonatal Health Road Map which are built upon the various agreements and objectives of the international conferences and summits aimed at reducing mortality (MOHCW, 2007).

The Zimbabwe Maternal and Neonatal Health Road Map is a national framework for planned activities aimed at significantly improving maternal and newborn health services at institutional and programme levels (MOHCW, 2007). The objectives of this framework are to provide skilled attendance during pregnancy, child birth and postnatal period at all levels of the health care delivery system and to strengthen the capacity of individuals, families, communities, civil society and the government to improve maternal and newborn health (MOHCW, 2007). In this framework reduction of childhood mortality is given high priority. From this it can be noted that it is the role of the government to provide the needed maternal and neonatal health services.

2.1.4 The Expected Maternal Health-Seeking Behaviour and its Importance

It is the responsibility of the government to ensure that maternal and neonatal health services are available and accessible to people. In return it expects people to respond positively or make use of these services. Where maternal and neonatal health services are available the society and the government expect women to visit these services and receive antenatal care during pregnancy, skilled attendance during delivery and postnatal care after child birth as part of promoting good health and preserving life for themselves and their children.

Antenatal Care

Antenatal care is the care that every woman is expected to receive during pregnancy. Proper antenatal care from a doctor/nurse/midwife during pregnancy is essential for both the health of the mother and the child. The World Health Organisation recommends that women should have at least four antenatal visits throughout pregnancy (WHO, 1994). It is during these antenatal care visits that a pregnant woman is examined for any pregnancy complications and also receives the tetanus toxoid vaccine and iron tablets. Studies have shown that antenatal care attendance reduces infant and child mortality (Forste, 1994:511).

Of importance to this study is the relationship between antenatal care provider and under-five mortality and also the relationship between tetanus injection received during pregnancy and under-five mortality. Tetanus toxoid injections are given to women during pregnancy to prevent neonatal tetanus which is a major cause of early infant deaths in many developing countries. Studies have shown that there is a relationship between mother's tetanus immunisation and neonatal mortality (Bhatia, 1989; Luther, 1998; Zahid, 1996). Children whose mothers received tetanus injections during pregnancy are more likely to survive childhood compared to those children whose mothers did not receive the injection. A study done by Luther (1998) in India showed that mother's tetanus immunisation is not only associated with neonatal mortality but also with lower early childhood mortality. In Pakistan, Zahid (1996) also found out that having antenatal care during pregnancy increases the child's chances of survival (Zahid, 1996). Children whose mothers did not received a tetanus injection during pregnancy in the study where 2.03 times more likely to die than those whose mothers received the tetanus injection during pregnancy (Zahid, 1996:726). Maternal tetanus immunisation status is therefore a good indicator of the health-seeking behaviour of the mother.

Place of delivery and Attendance at delivery

Upon delivery women are expected to receive skilled attendance during delivery usually in a health institution. This is because proper medical attention and hygienic conditions during delivery reduces the risks of complications and infections that can cause morbidity and mortality to either the mother or the baby. Skilled childbirth care is part of the continuum care for women, newborns and children that can significantly reduce maternal and childhood deaths in many countries (Countdown to 2015 Decade Report (2000-2010). About two million preventable maternal deaths, stillbirths and newborn deaths each year are a result of lack of skilled attendants during birth delivery. (Countdown to 2015 Decade Report (2000-2010).

The place of birth has been found to be associated with child survival (Zahid, 1996:724). According to the study done by Zahid (1996) children who were born in a hospital were more likely to survive childhood than those who were not born in a hospital (Zahid, 1996:724). A study done by Howlader and Bhuiyan (1999) in Bangladesh also found the place of delivery to be related to child survival status. Contrary to many studies neonatal mortality was high for mothers who delivered their babies at a health facility in the study (Howlader and Bhuiyan, 1999). The authors argued that the reason why the neonatal mortality rate was higher for those mothers who delivered in a hospital than those who delivered at home could be that 'those women who delivered at a health facility may have been high risk mothers who felt the health facility would be better equipped to take care of complications than midwives and relatives at home' (Howlader and Bhuiyan, 1999). Although it is argued that the place of delivery relate to child survival status a study done by Forste (1994) in Bolivia showed that birthplace and attended at birth have no effect on child survival (Forste, 1994: 507). The existence of an association between place of delivery and child survival implies that the place of delivery can be used as an indicator of maternal-health seeking behaviour.

Postnatal Care

Postnatal care is the care that both the mother and the child are expected to receive after childbirth. This care is important because this is when the physical health of both the mother and the child is assessed and treated for any complications arising from birth delivery thereby preventing maternal and neonatal deaths. Mothers are also given important information on how to care for themselves and their children during postnatal care for example; information on vaccinations, hygiene and breastfeeding. It is recommended that all women should receive

post natal care within 48 hours after delivery. This is important because it is during these 48 hours after birth when most of maternal and neonatal deaths occur. The World Health Organisation (1998) recommends that PNC for newborn babies should include immediate and exclusive breastfeeding, warming of the infant, hygienic care of the umbilical cord, and timely identification of life threatening complications so that they can be treated timely (WHO, 1998). All these are essential for the survival of the child for example; hygienic care of the umbilical code prevents neonatal deaths due to tetanus.

After child birth the mother remains with the responsibility of caring after the child throughout the most vulnerable stages of life from zero up to 5 years. During this period of 0-5 years the mother of the child is for example, expected to take the child to the weight surveillance programme monthly and for immunisation. The weight surveillance programme is there to monitor the growth and development of the child, detect and treat child illness, promote healthy behaviours (breastfeeding) and also to vaccinate children. All this is essential for the survival of the child.

A child is considered fully vaccinated if he or she has received one dose of BCG vaccine, three doses of DPT vaccines, three doses of polio vaccines and one dose of measles vaccine during the first five years of life (ZDHS, 2006). These vaccines are important for the survival of the child as they prevent vaccine preventable infectious diseases. BCG vaccine for example, protects against tuberculosis and DPT protects against diphtheria, pertusis and tetanus. Research has shown that immunisation associate with under-five mortality (Zahid, 1996; Howlader and Bhuiyan, 1999). Children who are not immunised tend to experience higher mortality than those who are immunised (Zahid, 1996; Howlader and Bhuiyan, 1999). However, the relationship between immunisation and under-five mortality could not be examined in this study because the 2005-06 ZDHS collected information on immunisation for those children who were alive at the time of survey only and no information on immunisation was collected for those children who were dead at the time of the survey. According to the 2005-06 ZDHS report about 53% of children 12-23 months old had received all the vaccinations and 47% of these children were not fully immunised (ZDHS 2006:138).

2.1.5 Socio-economic Determinants of Maternal Health-Seeking Behaviour:

Maternal health-seeking behaviour is defined as the actions that a mother takes to promote her own health and the child's health during and after pregnancy in this study. This includes consulting during prenatal (mother's immunisation against tetanus), natal (place of delivery

and help at delivery) and postnatal (baby check up, breast-feeding). Good maternal health-seeking behaviour is therefore the behaviour that promotes good health for both the mother and the child such as utilisation of child health care services and breastfeeding whilst poor maternal health-seeking behaviour is that behaviour that deteriorates or put the health of the mother and the child at risk like delivering at home and not breastfeeding.

The health-seeking behaviour of the mother on behalf of the child is determined by various factors. According to research physical, socio-economic (level of education and wealth), cultural (beliefs and practices, status of women) and political factors are the major determinants of health-seeking behaviour (Kroeger, 1983). This shows that maternal health-seeking behaviour is influenced by individual characteristics of the mother, demographic characteristics of the household, community and the policy environment.

Maternal education and Health-Seeking behaviour

Maternal education has an influence on the health-seeking behaviour of the mother. Studies that have been done in India have shown a strong positive relationship between maternal schooling and her health-seeking behaviour and health practices for her child like immunisation and management of child illness (Govindsamy and Romesh, 1997). The analysis of the study showed that health seeking behaviour by the mother for child health care increases by 62% with each level of maternal education (Govindsamy and Romesh, 1997). In Pakistan poor health-seeking behaviour was found to be common among uneducated mothers and good health-seeking behaviour among educated mothers (Zahid, 1996). Educated mothers were found to be more likely to use health facilities and feed their children better than uneducated mothers (Zahid, 1996). Caldwell's (1979) explanation to this scenario is that educated mothers usually practice good health-seeking behaviour because education tends to change their behaviours and attitudes towards health. Educated mothers are more likely to be proactive mothers, willing to go against traditional norms which are harmful to the health of their children and access modern health care thereby increasing child survival chances (Caldwell, 1979). In agreement to this explanation Mosley and Chen (1984) pointed out that education tend to increase the mother's skills in health care practices related to contraception, nutrition, hygiene, preventative care and disease treatment and these skills are essential for child survival (Mosley and Chen, 1984).

Socio-economic Status and Health-Seeking Behaviour

Socioeconomic status tends to have a strong influence on maternal health-seeking behaviour that influences child survival. In many studies wealth, income, education and occupation have been used to measure socio-economic status. It has been found that women in higher socioeconomic groups tend practice good health-seeking behaviours which promote child survival such as frequent use of maternal health services than those women in lower socioeconomic groups (Addai, 2000). This is because women in higher socioeconomic groups tend to have the money to spend on nutritional food, warm clothing, medicine and health care services and these are essential for child health and survival than those in the lower socioeconomic groups.

In a study done by Amin et al 2010 in Bangladesh on socioeconomic factors differentiating maternal and child health-seeking behaviour, it was found that household socioeconomic status as reflected by wealth is a major determinant of health-seeking behaviour. Mothers in the upper wealth quintile were more likely to use modern trained providers for antenatal care, birth attendance, post natal care and child health care than those in the lowest wealth quintile ($p < 0.01$) (Amin et al 2010). Mothers from the highest wealth quintile were 7.6 times more likely to seek ANC from a trained provider and 11 times more likely to have a trained provider at child birth compared to those in the lowest wealth quintile ($p< 0.01$) (Amin et al 2010:6). Wealth quintile was also found to be associated with seeking PNC from a trained provider (Amin et al 2010:6). An association between wealth quintiles and care seeking was also found, with those in higher wealth quintiles more likely to seek child health care from a trained provider than those in the lowest quintile (Amin et al 2010:7). The desired behaviour at each stage (antenatal care, delivery, postnatal care) was found to be significantly associated with mother's years of schooling. This shows that socioeconomic factors are major determinants of maternal health-seeking behaviour.

In Zimbabwe according to the 2005-6 ZDHS report, socioeconomic factors tend to influence maternal health-seeking behaviour. Various socioeconomic factors were found to be significantly associated with antenatal, natal and postnatal care. The place of delivery was found to be associated with mother's education and wealth quintile. Mother's in the highest wealth quintile were twice more likely to give birth in a health facility compared to those in the lowest wealth quintile (95% compared to 46%). Also maternal education and wealth quintile were found to be strongly associated with skilled assistance during delivery. Women

with secondary and more education and those in the highest wealth quintile are more likely to seek assistance from a health professional during delivery compared to those with no education. With regards to postnatal check up urban residence, higher education, wealth quintiles were highly associated with receiving postnatal check up within 48 hours (ZDHS, 2006:126-129).

2.1.6 Maternal Health-Seeking Behaviour and Under-Five Mortality:

There is a link between maternal health and child health and it therefore because of this link that maternal health-seeking behaviour is essential for the survival of the child. In explaining the link between maternal health and child health, Mosley and Chen (1984) pointed out that the health of the mother and that of the child is linked in two ways. Firstly, there is a biological link between the mother and the child during pregnancy. Her diet and her actions during pregnancy determine the outcomes of the child for example; poor diet during pregnancy usually results in low birth weight (Mosley and Chen, 1984). The second link is related to the responsibility of the mother during the child's most vulnerable stages of life such as feeding practices, hygiene and taking the child for immunisation. This also determines the chances of survival for the child (Mosley and Chen, 1984).

With regards to the relationship between maternal health-seeking behaviour and under-five mortality studies that have been done in Pakistan (Zahid, 1996; D'souza, 2003) and Mali (Uchidi, 2001) have shown that there is an association between maternal health-seeking behaviour and childhood mortality. All these studies have shown that maternal health-seeking behaviour is a major determinant of child survival.

A study done by D'souza (2003) showed that good health-seeking behaviour such as use of effective medical services during illness of a child determines whether the child survives or dies. In this study poor health-seeking behaviour practices like changing of healers quickly when the child is ill and use of traditional healers or unqualified doctors were found to be significantly associated with childhood mortality (D'souza, 2003). In Mali a study done by Uchidi (2001) showed that the health-seeking behaviour of the mother was important in explaining the differences in infant and child mortality both in the rural areas and urban areas. Mothers who practiced good health seeking behaviour had lower child mortality levels compared to those who practiced poor health-seeking behaviour (Uchidi, 2001). The results of the study done by Howlader and Bhuiyan (1999) in Bangladesh also showed that utilization of maternal and child health care services during pregnancy, after delivery and

breastfeeding the child lowered infant and child mortality rates. Zahid (1996) however, pointed out that maternal education is related to good health behaviour practices since the education of the mother tend to contribute significantly to the reduction of childhood mortality.

2.2 Conceptual and Theoretical Framework

This study is based on the Mosley and Chen (1984) theoretical framework for child mortality. The Mosley and Chen (1984) framework integrates the social and biomedical scientific approaches in the study of childhood mortality. According to this framework the socio-economic factors at the community, household or individual level operate through proximate determinants of health to influence the levels of childhood mortality and morbidity in a society (Mosley and Chen, 1984). The authors of the framework therefore accept the fact that socioeconomic factors do not influence under-five mortality directly but rather indirectly through proximate determinates like maternal factors, person illness control and injury.

For purposes of this study maternal health-seeking behaviour will be treated as part of the variables that fall under personal illness control which is one of the proximate determinants of under-five mortality in the Mosley and Chen framework (see Figure 1). This is important for this study because under personal illness control, maternal health-seeking behaviour will be treated as a factor that directly influence the prevention and treatment of child illness or death through certain practices and quality of care during pregnancy, childbirth and after birth. The action that the mothers takes when the child is sick and child immunisation will however be assumed to be constant in this study. This study will only focus on antenatal, natal and post natal care received during and after pregnancy. The other four proximate determinants that have been identified in the Mosley and Chen Model such as maternal factors, environmental contamination, nutrient deficiency and injury will be assumed to be constant in this study.

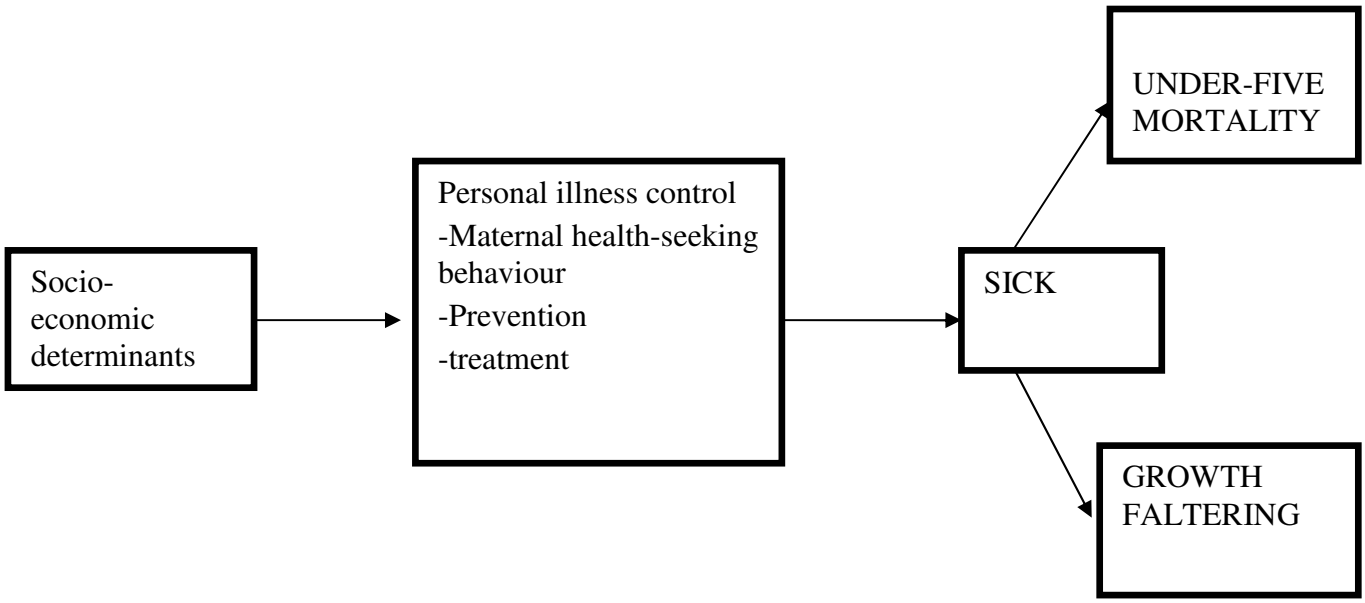


Figure 1: Adapted framework for the study of maternal health-seeking behaviour and under-five mortality: (Mosley and Chen, 1984)

Chapter 3

Methodology

3.1 Study Design:

This study is a secondary data analysis of the 2005-06 Zimbabwe Demographic and Health Survey (ZDHS) dataset of children under five years old and women who had given birth in the five years preceding the survey. The ZDHS has been chosen because it is a nationally representative survey.

3.1.1 The 2005-06 ZDHS

The data for this study was derived from the 2005-06 ZDHS. The 2005-06 ZDHS is the fourth Demographic and Health Survey to be conducted by the Central Statistical Office (CSO) in Zimbabwe as part of the Zimbabwe National Household Survey Capability Programme (ZNHSCP). The survey is also part of the worldwide Demographic and Health Surveys programme, which has been implemented in Africa, Asia, Latin America, and Europe.

The ZDHS is a nationally representative survey with a sample of 9,285 Zimbabwean Households including women between the ages of 15-49 and men between the ages of 15 and 54. The household response rate was 95 percent. Within these households 8,907 women and 7,175 men were successfully interviewed, yielding response rates of 90.2 percent and 81.9 percent respectively.

The 2002 Zimbabwe Master Sample (ZMS02) was used as the sampling frame for the 2005-06 ZDHS. This Master Sample was developed by CSO after the 2002 population census. Of the 10 provinces of Zimbabwe one urban stratum was formed each for Harare and Bulawayo and for the remaining 8 provinces each province was stratified into four strata according to land use (communal lands, large-scale commercial farming areas, urban and semi-urban areas, small scale commercial farming areas, and resettlement areas). In total there were 34 strata.

A two-stage cluster sampling technique was used to collect the data. In the first stage, one thousand two hundred enumeration areas (EAs) were selected with probability proportional to size. The selection of the EAs was a systematic one-stage operation which was carried out independently for each of the 34 strata. These EAs were then divided into three replicates of

400 EAs each and one of the replicates consisting of 400 EAs was used for the 2005-06 ZDHS. In the second stage, a fixed number of households were then randomly selected in each sample EA (Central Statistical Office [Zimbabwe] and Macro International Inc., 2007).

The survey collected information on fertility, family planning, breastfeeding practices; nutrition, early childhood mortality and maternal mortality; maternal and child health; and awareness, behaviour, and prevalence regarding HIV/AIDS and other sexually transmitted infections (STIs). While the 2005-06 ZDHS covers a wide variety of topical areas, this study focuses on the use of maternal health services and breastfeeding practices to examine the relationship between maternal health-seeking behaviour and under-five mortality.

3.2 The Study Population

For this study the population of interest is children under the age of five and the factors that affect their survival. This study concentrated on the health-seeking behaviour of the mother during and after pregnancy to see how it affects child survival. Maternal health-seeking behaviour has been chosen as an explanatory variable because women are the primary care givers of the young children and many studies have proven that there is a linked relationship between socioeconomic and demographic factors of the mother and child survival.

This study is therefore restricted to:

- All children who were born in the 5 years preceding the 2005-06 ZDHS; and
- Also included in the study population are the mothers of those children who participated in the interview. Hence the 2005-06 ZDHS only contains information on children whose mothers were alive and present at the time the survey was fielded.

Women who have never had a live birth and those who did not have at least one child under the age of five at the time the survey was fielded where excluded. This is because this study intends to examine the health-seeking behaviour of the mother during and after pregnancy to see how it affects the survival of children under the age of five.

3.2.1 Sample Size

This study analyzed responses from 5,246 women aged between 15 and 49 years who had given birth in the five years preceding the survey. These women had at least one child under age five at the time the survey was fielded. The 2005-06 ZDHS collected information on the utilization of antenatal care, delivery care, postnatal care and breastfeeding practices only for

the last birth of these women, this means that women who had two or more live births during the five-year period the data refers to the most recent birth.

3.2.2 Questionnaire Design

The 2005-06 ZDHS used three questionnaires namely the Household questionnaire, Women's questionnaire and the Men's questionnaire to collect specific information from eligible respondents.

The Household Questionnaire collected basic information on the characteristics of each person listed in each household such as age, sex, education and relationship to the head of the household. This information was then used to identify women and men who were eligible to answer the Women's and Men's Questionnaires. The Household Questionnaire also collected information on the characteristics of the household's dwelling unit such as the source of water, type of toilet facilities and materials used for the floor of the house.

The Women's Questionnaire was used to collect information from women aged between 15 and 49 which is basically the reproductive age range. Women were asked questions about their background characteristics (education, residential history, and media exposure), birth history and childhood mortality, antenatal, delivery and post natal care, vaccinations and childhood illnesses among other things.

This study mainly focused on specific questions that women were asked concerning their most recent pregnancy and live birth in the five years preceding the survey. In this survey women were asked 1). Whether they received antenatal care (ANC) during their pregnancy (whether they were checked by a trained professional that is a doctor, nurse or midwife at least once during pregnancy) if yes, they were then asked the timing and number of visits ; 2) about place of delivery (home/hospital/clinic) and whether they were attended by a health professional during their delivery; 3) whether they received postnatal care (PNC) from a health professional 6 weeks after delivery; and 4) whether the child is alive or dead. The answers for these questions enabled the relationship between maternal health-seeking behaviour and under-five mortality to be examined.

3.2.3 Training and Field Work

A three-day training of trainer's course was conducted for the 2005-06 ZDHS in April 2005. Participants for this course included CSO staff and specialists from government ministries, nongovernmental organisations and donor organisations. This was then followed by pre-test

training and fieldwork. The pre-test field work was conducted by 16 trained interviewers in Gweru and surrounding areas and it covered approximately 200 households. The results and feedback of the pre-test were used to modify the questionnaires in the debriefing sessions that followed the pre-test. The training of the field staff for the main survey was then conducted in July 2005 during which 130 field worker interviewer trainees were trained for 4 weeks on how to administer the questionnaire. Those who proved to be competent during the training course were then selected to be interviewers while the remainder were assigned to office operations duties. The final data collection for the 2005-06 ZDHS took place over a seven-month period from August 2005 to February 2006 and the fieldwork was carried out by fourteen interviewing teams (Central Statistical Office [Zimbabwe] and Macro International Inc., 2007).

3.2.4 ZDHS Data Processing

The data processing for the 2005-06 ZDHS consisted of office editing, coding of open-ended questions, data entry, and secondary editing of computer-identified errors. The secondary editing was basically the checking of computer identified errors and the resolving of inconsistencies in the data. This process was done on all the questionnaires that were returned to the CSO. The data was processed in two shifts by a team of 24 data entry clerks, 2 data editors and 2 data entry supervisors and administrators. The CSPro software package was used for data entry and editing. To maximise the quality of the data and reduce the secondary editing process there was 100% verification (re-entry) of all questionnaires (Central Statistical Office [Zimbabwe] and Macro International Inc., 2007).

3.3 Variables and Variable Definitions:

3.3.1 Outcome Variable:

The outcome variable of this study is under-five mortality. Under-five mortality refers to all deaths occurring before age five. The outcome variable (under-five mortality) has been categorised as alive or dead depending on whether or not the child survived the first five years of life. Alive is coded 0 and dead is coded 1. This means that those children who died within the period of 0-5 years were compared to those who survived the same period.

3.3.2 Independent variables:

The predictor variables have been divided into demographic, socioeconomic and health-seeking behaviour variables as shown in Table 1**.** The table also shows how the variables where recoded for the purposes of this study.

The main explanatory variables are the maternal health-seeking behaviour variables which are antenatal care received during pregnancy (ANC), tetanus injection in pregnancy, place of delivery, delivery assistants and breastfeeding.

The maternal demographic and socio-economic variables used in this study are maternal age at birth, type of residence, mother's level of education, source of drinking water and type of toilet facility. Variables related to the child are sex of the child, birth order and preceding birth interval.

Table 1: Variables used and their definitions

Variables:	**Definitions:**
Demographic	
Age at birth	< 20 years old
	20-24 years old
	25+ years old
Place of residence	Urban
	Rural
Sex of Child	Male
	Female
Birth order	1
	2
	3+
Preceding Birth interval	<=2 years
	3 years
	4+ years
Socio-economic:	
Education of mother	No education
	Primary
	Secondary+
Source of drinking water	Piped/public tap
	Spring/well
	Others
Type of toilet facilities	Flush
	Others
Health-seeking behaviour	
Antenatal Care	Doctor/nurse/midwife
	Traditional
Tetanus Injection in Pregnancy	Yes
	No
Place of Delivery	Home
	Health Facility
Delivery Assistants	Doctor/nurse/midwife
	Traditional
Ever Breastfed	Yes
	No

3.4 Ethical Considerations

The ZDHS dataset used in this study does not disclose names of respondents so privacy and confidentiality of respondents is guaranteed. A CASEID which is a case identification is used to uniquely identify each respondent not their personal details.

3.5 Data Management

The 2005-06 ZDHS data was downloaded in STATA format from the Demographic and Health Survey website. Out of the various forms of datasets that were available under the 2005-06 ZDHS the children's data subset was selected for this study.

The total number of observations in the children's dataset was 5 246 and this figure represented the total number of live births born to women in the 5 years preceding the 2005-06 ZDHS who participated in the interview. This study therefore analyzed a total of 5 246 live births out of which 371 deaths occurred during the first five years of life. This gave an under-five mortality rate of 70.7 deaths per 1000 live births.

With regards to completeness of information from the dataset some of the selected variables for this study had missing entries. These variables are antenatal care, tetanus injection during pregnancy, place of delivery and delivery assistants.

3.6 Data Processing

The data analysis for this study was done using Intercooled STATA 11.0 statistical software package.

The first stage of the data analysis was the recoding of some variables into categories that would make the analysis and interpretation of results more meaningful. Continuous variables like **maternal age at birth** were categorized into 3 groups that is; less than 20 years, 20 to 24 years and 25 years or more (maternal age at birth was computed as child's birth date in century months minus mother's birth date in century months). The **preceding birth interval** was also divided into 3 categories that is; less than/ equal to 2 years, 3 years and 4 years or more. **Birth order** was categorised into three groups namely; first order, second order and third order or more.

Categorical variables were also re-categorized by merging groups which were similar and had very few observations within them. For example, **mother's level of education** which initially had four categories (No education, primary education, secondary education and higher education) was recoded into 3 categories (No education, Primary education, Secondary or

more). The same procedure was applied to **source of drinking water** where piped and tap sources of water were merged into one group, springs and wells sources of water merged into one group and then other source sources of water merged into one group. For the type of **toilet facility** out of all the various types of toilet facilities that were available in the dataset two categories were formed. All the flushing toilets were merged into one group and all the non flushing toilets were merged into one group.

For the **delivery assistants'** variable, 'doctor, nurse/midwife, auxiliary midwife and trained birth attendant' were merged into one group while traditional birth attendant (TBA), relatives/friends, other and none were merged into one group. This resulted in two categories for delivery assistants being formed namely doctor/nurse/midwife and traditional. For the **place of delivery** variable the respondent's home and others' home were merged into one group 'Home' while government/private hospitals, clinics and other health centres were merged into one group 'health facility'. For the **antenatal care** variable, 'doctor, nurse/midwife, auxiliary midwife and trained birth attendant' were merged into one group while traditional birth attendant (TBA), relatives/friends, other and none were merged into one group. This resulted in two categories for antenatal care being formed namely doctor/nurse/midwife and traditional.

3.7 Data Analysis:

As mentioned before STATA Software version 11 was used to perform all the data analysis and all tests were done at 95% confidence interval and 5% level of significance. The data analysis was done as follows;

In the first stage of the analysis, descriptive statistics were used to examine the distribution of the study participants in relation to the selected variables for this study. For this analysis frequency tables were used to summarize the study participants' characteristics and proportion of live births across selected variable categories.

The formula that was used for calculating the under-five mortality rate was as follows;

$$UMR = \frac{\text{All deaths occurring before age 5}}{\text{Total number of live births}} \times 1000$$

For the levels and differentials of under-five mortality by selected variables the formula was as follows;

$$UMR = \frac{\text{All deaths occurring before age 5in each category of the independent variable}}{\text{Total number of live births in each category of the independent variable}} X\ 1000$$

The second stage of the analysis was the bivariate analysis. This was done to examine the relationship between each variable of interest and the outcome variable (under-five mortality). The outcome variable was coded 0 if the child survived and 1 if the child died before age five. This relationship was examined by running a bivariate logistic regression of under-five mortality over each of the variables of interest one after the other. The results were then presented in a single table.

Finally, the final stage involved the use of stepwise multiple regression modelling. This approach was used because it is useful in assessing the effect of the main explanatory factors (maternal health-seeking variables) on under-five mortality, having controlled for the significant socioeconomic and demographic maternal factors.

For the multivariate analysis, variables which were significantly associated with under-five mortality after the bivariate analysis were then fitted into the final multiple logistic regression model. The equation that was used for the multiple logistic regression model was:

$$In\left(\frac{P_i}{1-P_i}\right) = a + \beta_1 x_1 + \beta_2 x_2 .... \beta_i x_i$$

Where P= the probability of a child dying before the age of five; x_1 to x_i are the explanatory variables which were fitted into the model; α is the intercept term (constant) and $\beta_1 \ldots . \beta_i$ represent the regression coefficient related to the explanatory variables.

In the final model, variables that were insignificant at the 5% level of significance were dropped from the final model containing all the explanatory variables (stepwise backward selection). The final model therefore included the following variables which were significant

at 5% level of significance; antenatal care, tetanus injection during pregnancy, place of delivery, delivery assistants and preceding birth interval. It should be noted that ever-breastfed was dropped from the model even though it was significant at 5% because of the few cases of those who indicated 'No' to ever-breastfed as this may cause results from the multivariate analysis to be unreliable.

Chapter 4

Results

4.1 Characteristics of Respondents

There were 5 246 live births that occurred in the five years preceding the survey, out of which 371 children died before the age of five. This gave an under-five mortality rate of 70.7 deaths per 1000 live births (see formula in section 3.6).

Table 2 summarises the demographic, socioeconomic and health-seeking behaviour characteristics of the respondents (mothers of the children) and also demographic characteristics of the children born to these mothers. From Table 2 the results show that 21.2% of the respondents reported age at birth to be less than 20 years, while 32.4% reported age at birth to be 20-24 years and 46.4% reported age at birth to be 25 years or more. Most of the respondents resided in the rural areas (74.5%) compared to urban areas (25.5%). With regards to demographic characteristics of the respondents' children the results show that female live births (50.2%) were slightly higher than male live births (49.8%). Also, most of these live births were higher order births (44%). About 59.2% of the live births had a preceding birth interval of 4 years plus and 12.4% had the shortest birth interval of less than/equal to 2 years.

Table 2 also shows that 57.5% of the respondents had secondary or more education while 38.6% had primary and 3.9% had no education. Springs and wells (56.8%) were reported to be the most common sources of drinking water. Non flushing toilets were also reported to be the most common type of toilet facilities (75.2%).

With regards to maternal health-seeking behaviour variables Table 2 shows that most the respondents received antenatal care from a doctor/nurse/midwife (72.9%) whilst about 4.6% of the respondents received antenatal care from traditional providers. About 61.9% of the respondents received tetanus injection during pregnancy. Most of the respondents delivered at a health facility (67.3%). Also, most of the birth deliveries were attended by a doctor/nurse/midwife (78.9%) while about 21% were attended by traditional birth attendants (friend, relatives, untrained birth attendants). Most of the respondents reported that they had breastfed their children (96.9%).

Table 2: Distribution of live births by selected explanatory variables (ZDHS, 2005-06)

Variable	Category	Frequency	(%)
Demographic:			
Mother's age at birth	< 20 years old	1,113	(21.22)
	20-24 years old	1,698	(32.37)
	25+ years old	2,435	(46.42)
	Total	**5,246**	**100**
Place of residence	Urban	1,340	(25.54)
	Rural	3,906	(74.46)
	Total	**5,246**	**100**
Sex of child	Male	2,636	(50.25)
	Female	2,610	(49,75)
	Total	**5,246**	**100**
Birth order	1	1,621	(30.90)
	2	1,318	(25.12)
	3+	2,307	(43.98)
	Total	**5,246**	**100**
Preceding birth interval**	<=2 years	448	(12.40)
	3 years	1,027	(28.43)
	4+ years	2,138	(59.18)
	Total	**3,613**	**100**
Socioeconomic:			
Mother's education level	No education	206	(3.93)
	Primary	2,026	(38.62)
	Secondary+	3,014	(57.45)
	Total	**5,246**	**100**
Source of water	Piped/public tap	1,591	(30.33)
	Spring/well	2,978	(56.77)
	Others	677	(12.91)
	Total	**5,246**	**100**
Toilet facility*	Flush	1,300	(24.82)
	Others	3,938	(75.18)
	Total	**5,238**	**100**
Health-seeking behaviour:			
Antenatal care*	Doctor/nurse/midwife	3,829	(72.99)
	Traditional	241	(4.59)
	Missing	1,176	(22.42)
	Total	**5,246**	**100**

Tetanus injection *	Yes	3,234	(61.65)
	No	755	(14.39)
	Missing	1,257	(23.96)
	Total	**5,246**	**100**
Place of delivery*	Home	1,712	(32.70)
	Health facility	3,524	(67.30)
	Total	**5,236**	**100**
Delivery assistants*	Doctor/nurse/midwife	4,134	(78.98)
	Traditional	1.100	(21.02)
	Total	**5,234**	**100**
Ever breastfed	Yes	5,084	(96.91)
	No	162	(3.09)
	Total	**5,246**	**100**

***some respondents did not provide answers*

****Preceding birth interval includes all births except the first birth and its twins*

4.2 Levels and Differentials of Under-five Mortality

Table 3 shows the levels and differentials of under-five mortality by selected health-seeking, demographic and socioeconomic variables.

With regards to maternal health-seeking behaviour variables, under-five mortality (UMR) is higher for mothers who received antenatal care from traditional providers compared to those who received care from doctor/nurse/midwife (95.4 deaths per 1000 compared to 47.7 deaths per 1000). Mothers who did not receive tetanus injections during pregnancy also have a higher UMR compared to those who received tetanus injections during pregnancy (75.5 versus 45.1 deaths per 1000). Home deliveries have a higher UMR compared to deliveries that occurred at a health facility (84.7 versus 63.0 deaths per 1000). Birth deliveries that were assisted by skilled assistants (doctor/nurse/midwife) show a low level of UMR compared to those deliveries that were assisted by traditional birth assistants. UMR is also high for children who were not breastfed compared to those who were breastfed.

The results also show that under-five mortality is high among children born to teen mothers (<20years). UMR is very high when the preceding birth interval is less than/equal to 2 years compared to that of 3 years and 4 plus years. UMR is also high for higher order births (3+). Male children have a higher under-five mortality rate compared to female children (74.3 versus 67.0 deaths per 1000).

The results for the socioeconomic factors show that under-five mortality decreases as maternal education increases. Children born to mothers with secondary/higher and primary education have a lower mortality rate of 67.4 deaths per 1000 and 74 deaths per 1000 respectively compared to the mortality rate of 82.5 deaths per 1000 of those born to none educated mothers (no education). Under-five mortality is higher in rural areas than in urban areas (74.2 versus 60.4 deaths per 1000). Under-five mortality is lower among children whose mother's household uses piped water than those whose mother's household uses water from other sources of drinking water. Also, children from households that use non flushing toilets have higher mortality compared to children from households that use flushing toilets.

Table 3: Levels and differentials of under-five mortality by selected explanatory variables

Variable	Category	*UMR (per 1000)
Health-seeking		
Antenatal Care	Doctor/nurse/midwife	47.7
	Traditional	**95.4**
Tetanus injection	Yes	45.1
	No	**75.5**
Place of Delivery	Home	**84.7**
	Health Facility	63.0
Delivery Assistants	Doctor/nurse/midwife	66.0
	Traditional	**86.4**
Ever breastfed	Yes	56.1
	No	**530.9**
Demographic		
Mother's age at birth	<20 years	**73.7**
	20-24 years	70.7
	25+ years	69.4
Place of Residence	Urban	60.4
	Rural	**74.2**
Sex of Child	Male	**74.3**
	Female	67.0
Birth Order	1	62.9
	2	69.8
	3+	**76.7**
Birth Interval	<=2 years	**140.6**
	3 years	69.1
	4+ years	61.7
Socioeconomic:		
Education of Mother	No Education	**82.5**
	Primary	74.0
	Secondary+	67.7
Source of Water	Piped	64.1
	Spring/Well	73.2
	Others	**75.3**
Toilet Facility	Flush	63.1
	Others	**73.1**
Total		70.7

UMR=Under-five Mortality Rate

4.3 Bivariate Analysis

This study also tested for the association of each of the selected variables and under-five mortality. A logistic regression of under-five mortality was run over each variable of interest separately and the results were then presented in a single table (Table 4). Table 4 shows the unadjusted odds ratios (UOR), confidence intervals and p-values.

According to the results in Table 4 factors that were found to be significantly associated with **increased risk** of under-five mortality were receiving antenatal care from a traditional provider (UOR=2.10), not receiving tetanus injection during pregnancy (UOR=1.73), receiving assistance from traditional birth attendants during birth delivery (UOR=1.34) and not breastfeeding (UOR=19.05). On the other hand factors like delivering at a health facility (UOR=0.73) and a preceding birth interval greater than 2 years (UOR=0.45, UOR=0.40) were found to be significantly associated with **decreased risk** (protective effect) of under-five mortality.

The results in Table 4 also show that maternal age at birth, place of residence, sex of the child, birth order, mother's education, type of toilet facility and source of drinking water factors were not significantly associated with under-five mortality.

Table 4: Results of the Bivariate logistic regression of under-five mortality and selected explanatory variables (ZDHS 05-06)

Variable	Category	UOR	95%CI	P-value
Health-seeking				
Antenatal Care	Doctor/nurse/midwife	1	-	**-**
	Traditional	2.10	1.33 - 3.31	**0.001****
Tetanus injection	Yes	1	-	**-**
	No	1.73	1.26 - 2.37	**0.001****
Place of Delivery	Home	1	-	**-**
	Health Facility	0.73	0.58 - 0.90	**0.004****
Delivery Assistants	Doctor/nurse/midwife	1	-	**-**
	Traditional	1.34	1.05 - 1.71	**0.02***
Ever breastfed	Yes	1	-	**-**
	No	19.05	13.69 - 26.53	**0.000*****
Demographic				
Mother's age at birth	<20 years	1	-	-
	20-24 years	0.96	0.71 - 1.28	0.76
	25+ years	0.94	0.71 - 1.23	0.64
Place of Residence	Urban	1	-	-
	Rural	1.24	0.97 - 1.61	0.090
Sex of Child	Male	1	-	-
	Female	0.89	0.72 - 1.10	0.302
Birth Order	1	1	-	-
	2	1.12	0.83 - 1.49	0.455
	3+	1.23	0.96 - 1.59	0.098
Birth Interval	<=2 years	1	-	-
	3 years	0.45	0.31 - 0.65	**0.000*****
	4+ years	0.40	0.29 - 0.55	**0.000*****
Socioeconomic:				
Education of Mother	No Education	1	-	-
	Primary	0.89	0.53 - 1.50	0.659
	Secondary+	0.81	0.48 - 1.35	0.416
Source of Water	Piped	1	-	-
	Spring/Well	1.15	0.90 - 1.47	0.252
	Others	1.19	0.83 - 1.68	0.330
Toilet Facility	Flush	1	-	-
	Others	1.17	0.91 - 1.51	0.220

*Note: Significant level *<0.05 ** < 0.01***<0.001*

4.4 Multivariate Analysis

The specific objective of this study was to examine the association between each of the selected maternal health-seeking behaviour variables (antenatal care, tetanus injection during pregnancy, place of delivery, delivery assistants and breastfeeding) and under-five mortality. Furthermore to also determine the extent to which the selected maternal health-seeking behaviour variables predict under-five mortality. Table 5 shows the results of the multivariate logistic regression model that was fitted for under-five mortality in Zimbabwe. The model only included variables that were found to be significantly associated with under-five mortality at 5% level of significance (stepwise backward selection). Therefore the variables that were selected for the model were antenatal care, tetanus injection during pregnancy, place of delivery, delivery assistants and preceding birth interval. The adjusted odds ratios (AOR), 95% confidence interval (CI) and p-value for each factor fitted into the model are shown in Table 5.

According to the results in Table 5 maternal tetanus immunisation during pregnancy and preceding birth interval are good predictors of under-five mortality in Zimbabwe as shown by their p-values which are less than 0.05 and confidence interval which excludes 1 according to this study. Children born to mothers who did not receive the tetanus toxoid vaccine during pregnancy are 1.68 times [p=0.013 CI=1.11–2.53] more likely to die during childhood compared to those children born to mothers who received the tetanus toxoid vaccine during pregnancy. Under-five mortality is less likely to occur when the preceding birth interval is greater than 2 years. Children whose preceding birth interval was 3 years [p=0.011] and 4 years plus [p=0.004] were 0.43 and 0.39 times respectively less likely to die compared to children whose preceding birth interval was less than/equal to 2 years which is the reference category.

The results (Table 5) also show that there is no significant relationship between antenatal care, place of delivery, delivery assistants; and under-five mortality. Children whose mothers received antenatal care from a traditional provider during pregnancy are 1.44 times more likely to die during childhood compared to children whose mothers received antenatal care from a doctor/nurse/midwife. However, the relationship between antenatal care and under-five mortality is highly insignificant (p=0.250) and the 95% confidence interval includes 1. Therefore, we can say that there is no association between antenatal care and under-five deaths among Zimbabwean children according to this study.

Interestingly, Table 5 also show that children delivered at a heath facility are 1.28 times more likely to die compared to those delivered at home. However, this is highly insignificant [p=0.318 CI=0.79 - 2.09]. Therefore, we can say place of delivery does not seem to associate with under-five mortality in this study. Also, children whose mothers received assistance from a traditional birth attendant during delivery are 0.90 less likely to die compared to the reference category (delivery assistants' doctor/nurse/midwife). This relationship is also highly insignificant at 5% level of significance [p=0.727 CI=0.52 -1.59].

Table 5: Results of multivariate analysis for factors found to be associated with under-five mortality, ZDHS 2005-06

Variable	Category	AOR	95%CI	P-value
Antenatal Care	Doctor/nurse/midwife	1	-	**-**
	Traditional	1.44	0.77 - 2.67	0.250
Tetanus injection	Yes	1	-	-
	No	1.68	1.11 - 2.53	**0.013****
Place of Delivery	Home	1	-	-
	Health Facility	1.28	0.79- 2.09	0.318
Delivery Assistants	Doctor/nurse/midwife	1	-	-
	Traditional	0.90	0.52- 1.59	0.727
Birth Interval	<=2years	1	-	**-**
	3 years	0.43	0.22 - 0.82	**0.011****
	4+ years	0.39	0.21- 0.74	**0.004****

** Significant (p<0.05)

Chapter 5

Discussion of Results

The main objective of this study was to examine the extent to which maternal health-seeking behaviour prior, during and post delivery may impact the likelihood of under-five survival among Zimbabwean children. Specifically, the study intended to examine the patterns of maternal health-seeking behaviour in Zimbabwe, to examine the relationship of each of the selected variables with under-five mortality and finally to examine the role of the selected maternal health-seeking behaviour variables (antenatal care, tetanus injection during pregnancy, place of delivery and assistance at delivery) in determining under-five mortality; while taking other selected risk factors into consideration.

The results showed that most of the women received antenatal care from a doctor/nurse/midwife (72.9%) compared to traditional providers**.** About 61.9% of the women received tetanus injection during pregnancy**.** Also, about 67.3% of the women delivered at a health facility and most of the birth deliveries were attended by a doctor/nurse/midwife (78.9%). Most of the women also reported that they had breastfed their children (96.9%).

With regards to the levels and differentials of under-five mortality indicators of poor maternal health-seeking behaviour showed higher levels of under-five mortality compared to indicators of good maternal health-seeking behaviour. Under-five mortality was found to be higher for children whose mothers received antenatal care from traditional providers than those children whose mothers received antenatal care from a doctor/nurse/midwife. This is expected because traditional providers lack the skills and resources needed for proper antenatal care compared to doctors/nurses/midwives that are trained to provide appropriate antenatal care which is essential for the survival of both the mother and the child. Also, children whose mothers did not receive the tetanus toxoid vaccine during pregnancy had a higher UMR compared to those children who were born to mothers who received the tetanus vaccine during pregnancy. This is because children who were born to mothers who did not receive the tetanus injection were not protected against tetanus and tetanus is recognised as one of the major causes of death during childhood. The results also show that UMR is lower among children that were delivered at a health facility compared to those children that were delivered at home. The explanation to this scenario is that mothers who deliver at a health facility tend to receive

proper medical attention from the skilled birth attendants that is essential for the survival of the child and the mother during and after birth compared to those that deliver at home unattended or with the help of untrained birth attendants. Birth deliveries that were assisted by a doctor/nurse/midwife have lower UMR than those birth deliveries that were assisted by traditional birth attendants. This is expected as a doctor/nurse/midwife is trained to handle birth deliveries and complications arising during birth delivery compared to traditional birth attendants. Children who were not breastfed have higher levels of UMR than those who were breastfed. This is consistent with many studies and the explanation to this is that breast milk is rich in anti-bodies that provide immunity to several communicable diseases and it is nutritionally balanced so this increases the survival chances of those children that were breastfed compared to those children that were not breastfed.

Furthermore, when the relationship of each of the maternal health-seeking behaviour variables and under-five mortality was examined the bivariate analysis suggested a strong and significant association between each of the selected variables for maternal health-seeking behaviour (antenatal care, tetanus injection, place of delivery, delivery assistants and ever breastfed) and under-five mortality. According to the bivariate analysis results (Table 4), indicators of poor maternal health-seeking behaviour were found to be significantly associated with increased risk of under-five mortality. That is, children who were born to mothers who received antenatal care from untrained traditional providers, who did not receive the tetanus vaccine during pregnancy, who delivered at home and who did not breastfeed had a higher risk of dying before the age of five compared to children who were born to mothers who seek proper medical care during and after pregnancy and who also breastfeed. On the other hand indicators of good maternal health-seeking behaviour such as delivering at a health facility were found to be significantly associated with lower risk of under-five mortality. That is, children whose mothers delivered at a health facility were less likely to die during childhood compared to those children who were delivered at home. These findings are consistent with what has been found in other studies were factors such as antenatal care, place of delivery and assistance at delivery have been found to have an influence on childhood mortality (Howlader and Bhuiyan 1999; Uchidi, 2001; Zahid, 1996).

Finally, having adjusted for all the explanatory variables in the multivariate analysis, out of all the selected variables for maternal health-seeking behaviour; tetanus immunization during pregnancy is the only variable that remained significantly associated with under-five

mortality in Zimbabwe. Antenatal care, place of delivery and assistance at delivery factors were found not to be significantly associated with under-five mortality.

The findings from both the bivariate and multivariate analyses models suggested a strong association between mother's tetanus immunisation during pregnancy and under-five mortality in this study. Not receiving the tetanus vaccine during pregnancy was found to be significantly associated with increased risk of under-five mortality. This association has also been found in many studies (Howlader and Bhuiyan, 1999; Luther, 1998; Uchidi, 2001 Zahid, 1996). The main argument according to literature is that maternal tetanus immunization is associated with lower neonatal mortality because the tetanus vaccine provides an almost certain protection against tetanus in both the mother and the child. On the other hand not receiving the tetanus vaccine during pregnancy is said to be associated with increased risk of neonatal mortality due to lack of protection against tetanus. A study done by Luther (1998) in India further elaborated the influence of maternal tetanus immunization on under-five mortality by showing that maternal tetanus immunisation is not only associated with lower neonatal mortality but also with early childhood mortality (Luther, 1998). We therefore according to the results of this study reject the null hypothesis that the risk of under-five mortality is the same whether the mother of the child was immunized for tetanus during pregnancy or not and accept the alternative hypothesis that is the risk of under-five mortality differs with maternal tetanus immunisation in Zimbabwe.

On the other hand the existence of an insignificant association between under-five mortality and; antenatal care, place of delivery and delivery assistants after adjusting for all the explanatory variables is inconsistent with other studies. Many studies have found these variables to be good predictors of under-five mortality (Howlader and Bhuiyan 1999; Uchidi, 2001; Zahid, 1996) implying that a significant relationship between these variables and under-five mortality was found in these studies. One possible explanation for the lack of association of these variables and under-five mortality at the multivariate analysis stage in this study could be that of the effect of uncontrolled confounding factors. However, even though most studies suggest that the place of delivery and help at delivery relate to child survival status a study done by Forste (1994) in Bolivia showed that birthplace and attended at birth have no effect on child survival (Forste, 1994: 507) and this agrees with the results of this study. We therefore fail to reject the null hypothesis according to this study. That is, the risk of under-five mortality is the same regardless of who provided antenatal care during pregnancy, where the child was delivered and who assisted the birth delivery in Zimbabwe.

Other variables

- Preceding Birth interval

Out of all the socio-economic and demographic variables that were selected for this study as part of the explanatory variables only one variable that is the preceding birth interval variable was found to be significantly associated with under-five mortality at both the bivariate analysis level and multivariate analysis level. A preceding birth interval of more than 2 years lowers the risk of dying during childhood. The risk of dying during childhood declines as the preceding birth interval increases. These results are consistent with findings from other studies (Rutstein 2002, Da Vanzo et al 2004) that have shown that longer birth intervals increases child's chance of survival. The ZDHS 2007 report also supports these findings (Zimbabwe Demographic and Health Survey, 2007: 114).

Chapter 6

Conclusion and Recommendations

8.1 Conclusion

The main objective of this study was to examine the extent to which maternal health-seeking behaviour prior, during and post delivery may impact the likelihood of under-five survival among Zimbabwean children. The results from the fitted logistic model showed that out of all the selected maternal health-seeking behaviour variables maternal tetanus immunisation during pregnancy is the only factor that was found to be significantly associated with under-five mortality in Zimbabwe. This shows that maternal health-seeking behaviour during pregnancy as reflected by the maternal tetanus immunisation during pregnancy associate with under-five mortality in Zimbabwe according to this study. Usually mothers who receive the tetanus vaccine during pregnancy are the ones that visit health facilities to receive antenatal care from a doctor/nurse/midwife so it can also be suggested that the association between maternal tetanus immunisation and under-five mortality shows that maternal health-seeking behaviour during pregnancy has an influence on under-five mortality among Zimbabwean children. The results however, showed a lack of association between under-five mortality; and other indicators of maternal health-seeking behaviour such as antenatal care, place of delivery and delivery assistants. The preceding birth interval variable which was part of the selected demographic variables was also found to be significantly associated with under-five mortality.

In summary, maternal health-seeking behaviour during pregnancy as reflected by maternal tetanus immunisation during pregnancy associate with under-five mortality according to this study. However, indicators of maternal health-seeking behaviour such as antenatal care, place of delivery and delivery assistants seem not to associate with under-five mortality in Zimbabwe. The preceding birth intervals also associate with under-five mortality according to this study.

8.2 Recommendations

- The Ministry of Health and other stakeholders should continue promoting the importance of utilizing the maternal health care services during and after pregnancy because it is during those antenatal care visits that pregnant women are immunised against tetanus. Also, there is need for the stakeholders to investigate further on other health-seeking behaviours that characterize women who are not immunised against tetanus and take action by coming up with programmes that carter for those behaviours.
- Further research is required to further investigate the role of maternal health-seeking behaviour in determining under-five mortality in Zimbabwe. Considering the various limitations of this study possibly a different study design and/or data of higher quality may yield results that are consistent with other studies. For example, data with information on immunisation for both children who are alive and those who died is essential when investigating the causes of under-five mortality.
- Qualitative studies can also be of importance in the investigation of the role of maternal health-seeking behaviour in determining under-five mortality. These studies will provide information of what shapes maternal health-seeking behaviour for example the reason why some women still prefer to deliver at home.
- The Zimbabwean government should also continue to invest more in the health delivery system especially in terms of quality, availability and accessibility. This is important because it motivates people to utilize health services thereby reducing under-five mortality.
- The Ministry of Health and other stakeholders should continue promoting the importance of longer birth interval through public awareness campaigns as this is still one of the major causes of under-five mortality.

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