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FACTORS AFFECTING MATERNAL MORTALITY IN BHUTAN

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การตายของมารดา เป็นหนึ่งในประเด็นท้าทายทางการสาธารณสุขของประเทศกำลัง พัฒนาอย่างประเทศภูฏาน ซึ่งอันที่จริงแล้วสามารถป้องกันไม่ให้เกิดความสูญเสียหรือการเสียชีวิต ของสตรีในช่วงวัยเจริญพันธุ์ การศึกษานี้ มุ่งศึกษาปัจจัยกำหนดการตายของมารดา และพิจารณา ความแตกต่างด้านการตายของมารดาของประเทศภูฏานระดับจังหวัด(ดงคัก) จำนวน 20 จังหวัด ใน 3 ภูมิภาค และใช้ข้อมูลสำมะโนประชากรและเคหะปี 2549 ในการวิเคราะห์ข้อมูล โดยในปี สำมะโนประชากรมีสตรีเสียชีวิตจำนวน 55 คน ด้วยสาเหตุเกี่ยวกับการตั้งครรภ์ จากจังหวัด(ดง คัก)ที่มีรายงานการตายของมารดาจำนวน 18 จังหวัด

ผลการศึกษาด้วยสถิติพรรณนาและสถิติอนุมาน พบว่า อาชีพและเขตที่อยู่อาศัยเป็น ปัจจัยสำคัญที่กำหนดการตายของมารดา ส่วนเขตที่อยู่อาศัยนั้น ไม่มีความแตกต่างระหว่างเขต เมืองกันเขตชนบท ซึ่งอาจจะเป็นผลของความเท่าเทียมของการพัฒนาเกี่ยวกับการบริการด้าน สาธารณสุข และผู้ให้บริการด้านสาธารณสุข สำหรับภาคตะวันตกรายงานจำนวนการตายของ มารดาต่ำกว่าภาคตะวันออก โดยจังหวัดที่มีระดับการพัฒนาน้อย อาทิ จังหวัดกาซา ทราชวิยังซี เซมกัง มีอัตราการตายของมารดาค่อนข้างสูงโดยเปรียบเทียบกับจังหวัดที่มีระดับการพัฒนาสูง อาทิ ทิมพู ปาโร เป็นต้น ในส่วนของข้อเสนอแนะสำหรับภาครัฐ ควรจัดหาบริการด้านสาธารณสุข ที่มีประสิทธิภาพ โดยเฉพาะประเด็นความครอบคลุมด้านพื้นที่และความสะดวกรวดเร็วในการ เดินทางไปรับบริการ เพื่อลดความเสี่ยงจากการตายของมารดา

สาขาวิชา   ประชากรศาสตร์   ลายมือชื่อนิสิต ....

ปีการศึกษา 2556   ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก ....

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Maternal mortality is one of the public health challenges of the developing countries like Bhutan which is indeed preventable from the loss of life of women in reproductive age. This study intends to investigate the factors affecting maternal death, and further examine the deferential in death across three regions under 20 Dzongkhags (districts) of the country. Based on the first ever nation-wide Population and Housing Census of Bhutan conducted in 2005, a total of 55 deaths related to pregnancy in the last one year-period were reported. For only 18 Dzongkhags the respondents had reported the maternal death cases.

The findings showed significant association between the occupation and residence at $p < 0.025$ while the region had odds of 0.64 and 0.21 being in eastern and central regions.The study reveals that there was significantly no difference in pregnancy death between the regions. Perhaps, indicating comparatively equal development in providing health care services, including availability and accomplishments of health providers. Overwhelmingly, the western region reported relatively high number of pregnancy related death and the lowest in the eastern region. However, the less developed Dzongkhags such as Gasa, Trashiyangtse, Zhemgang show more deaths as compared to developed dzongkhags like Thimphu and Paro.

It was concluded that government or policy makers should give a thought on establishing better health care facility. This could prevent our mothers from the risk of maternal death and enable them to access health timely and acquire greater awareness easily on the importance of seriousness of the pregnancy related complications.

Field of Study: Demography   Student's Signature ....

Academic Year: 2013   Advisor's Signature ....

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CONTENTS

ACRONYMS

AHB	Annual Health Bulletin
ANC	Antenatal Care
ASRH	Adolescent Sexual and Reproductive Health
BHU	Basic Health Unit
BLSS	Bhutan Living Standard Survey
BMIS	Bhutan Multiple Indicators Survey
CPS	College of Population Studies
Dzongkhag	District
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MMR	Maternal Mortality Ratio
MMRate	Maternal Mortality Rate
MoH	Ministry of Health, Bhutan
NSB	National Statistics Bureau of Bhutan
PHCB	Population and Housing Census of Bhutan 2005
PNC	Postnatal Care
PPH	Post-Partum Haemorrhage
RGoB	Royal Government of Bhutan
SPSS	Statistical Package for the Social Sciences
TFR	Total Fertility Rate
TICA	Thailand International Development Cooperation Agency
UNFPA	United Nations Population Fund
UNICEF	United Nations Children and Educational Fund
WHO	World Health Organization

CHAPTER I

INTRODUCTION

1.1 Background of the Study

The literature review demonstrates that 99 percent of maternal death occurs in the developing countries with the some countries in Sub-Saharan Africa and South Asia leading by about 85 percent of the total maternal death despite the reductions in absolute figures (U. WHO, UNICEF, The World Bank, 2012). While the developed countries contribute 1 percent of the maternal mortality globally, majority of developing countries are gearing up to reduce maternal mortality since 1990 to meet the target set by the international commitment by 2015.

Maternal health care in many developing countries is of utmost concern owing to high risk of maternal death over the years of occurrence and continue occurring despite the advancement in modern medical care and the efforts of various health and medical communities. The maternal mortality is relatively very high in the developing countries because of various reasons as well as factors. In terms of distribution, about 80 percent takes place in Sub-Saharan Africa and South Asia with more than half in Sub Saharan Africa (U. WHO, UNICEF, The World Bank, 2012) and the estimate and record of various organizations such as WHO under the United Nations.

In order to understand and estimate the trend and level of maternal mortality globally and most countries various measures are commonly used such as maternal mortality ratio, maternal mortality rate, maternal risk, etc. The most commonly used one is the maternal mortality ratio and maternal mortality rate to find out the number of maternal death per 100,000 live births and females of child bearing ages (15 – 49) respectively. According to ICD – IX category of death by WHO, the maternal mortality rate (MMRate) is a widely used measure of cause-specific mortality rate in representing roughly the risk of dying as a result of pregnancy related complications including childbirth and post-partum period.

Reportedly the number of maternal deaths was alarming in several parts of the least developed and developing world, the United Nations, particularly the WHO launched a global policy to improve maternal health care by reducing the maternal mortality by three fourth towards end of 2015 as the fifth Millennium Development Goal, endorsed in 2000 AD. Still there are several countries in the developing world where the maternal outcome needed attention and focus of development with many making it to the MDG target already and several countries likely to achieve by 2015.

Safe Motherhood was one of the strategies to reduce not only maternal death but improve reproductive health of women and girls especially in areas where the maternal health system are poor. This approach provided access to information on reproductive health, service delivery, preventing unwanted pregnancy, skilled medical care; reduce barriers faced by women; and strengthen capacity of health system. According to studies from Sub -Saharan Africa and South Asia reflect that only 15 – 30% of women receive skilled care at delivery with wide variation between rural and urban areas.

Bhutan is a small Himalayan kingdom in south Asia with an area of 38, 394 km^2 sandwiched between the two most populous countries in the world - China in the north and India in the south. It had a resident population of 634,982 as per the Population and Housing Census of Bhutan (PHCB) 2005 (Commissioner, 2006). Of which, 157, 872 were women in the reproductive age group of 15-49 years, comprising 23.4 percent of the total population (Commissioner, 2006). Majority of people reside in rural areas in the twenty districts and small proportion of them in the urban areas. Because of which many of women folk engaged in farming and allied activities who also marry at younger age due to low education and social roles to take up household responsibilities. Furthermore, they also face the burden of pregnancy and related complications attributable by several factors.

A series of surveys carried in the recent past revealed that the level of maternal mortality in Bhutan is not as alarming as in other developing countries owing to its small population size and low record of deaths. However, the current

situation elicits that maternal health particularly the maternal death is far from being very low as expected of country which is on track to achieve the MDG commitment by 2015.

Amongst a host of tasks, mainly gender-based in developing milieu, women have to fulfill the reproductive role once in union, importantly the child bearing. Depending upon the status of women in the family, her level of education and other ascribed roles women have to undergo maternal processes of pregnancy and then motherhood. It is not for granted safe to bear child or children in her life time. These are mired by health complications if necessary preventive as well as curative measures are not followed. There will be one or more causal factors to attain motherhood or if not may result in life threaten situation for women.

The reproductive health outcome leading to maternal death both medical and other factors including socio economic and demographic ones play very important roles in averting the health complications associated with pregnancy and childbirth. Mortality particularly the maternal mortality is one of the global concerns which is why many women still face and not being prevented from the death.

There has been reduction in maternal mortality across the world, there are countries in sub-Saharan Africa and South Asia where the maternal deaths are still relatively high. While there have been several factors for such disparities among the developing countries. In the developed countries, the proportion of maternal mortality is very low and some of the developing countries have attained that low level of maternal death.

The maternal death in Bhutan was reported of 6 in 2000 (MoH, 2000) and 55 within last one year period caused by pregnancy related complications or death while pregnant as reported in the PHCB 2005. Although geographically Bhutan is located in south Asia – where the region has second highest maternal mortality estimated by WHO after Sub –Saharan Africa as of 2010, its maternal death relatively quite low in comparison to other countries.

The countries like India and Nigeria have one of highest maternal death occurrences together accounted for one third of death worldwide in 2008 (UNICEF,

2008) and other countries like USA also had interestingly quite high maternal mortality as being one of the most developed nations in the globe. Life time risk of maternal death to proportion of population in reproductive age women is also high for these countries. There are several other countries in Africa as well as a few of them in Asia still face the burden of about 85 percent of the world's maternal mortality according to WHO factsheet 2012. One of the reasons cited in earlier studies found that around 80 percent of maternal death is preventable if women have access to maternal health services available (WHO, 2012).

According to the National Health Survey 2000 Report, Bhutan had high maternal mortality ratio of 770 per 100,000 live birth in 1984 and decreased to 255 in 2000 (MoH, 2000). Since then the government of Bhutan has set the target to meet the MDG Goal 5 before 2015 by scaling down the maternal mortality to 140 per 100,000 live births (MoH, 2012);(Tashi, 2012).

The reports from the Ministry of Health and UNICEF since 2000 AD show that there has been decline but at slower pace despite the universal free primary health including maternal and child health care system in Bhutan (MoH, 2000). Reproductive health is one of the important components of health care delivery since the country has accorded high priority in the 1970s under the Maternal and Child Care (MCH) programme and family planning. However, due to poor record and limited studies done to determine the factors associated with mortality and disparity across different regions or areas in the country pertaining to maternal health risk posed by untimely or non –health care seeking behavior of some women in remote and far flung areas coupled by geographical terrains.

The WHO South East Asia Regional office which looks after 11 countries declared that Bhutan is likely to meet the MDG goal 5 by 2015 in reduction of maternal mortality as the case achieved by other countries like Thailand, Sri Lanka, Bangladesh, etc. However, the drastic reduction in maternal death would be quite challenging because of rather slow pace of institutional delivery and birth attendance by skilled health personnel in Bhutan as there are some women still prefer home

delivery to health care facility birth – which might pose problem to achieve task for the health service providers in Bhutan.

As far as the current situation on maternal death is concerned Bhutan is 'on track' category as per the WHO classification of countries on fulfillment of the MDG Goal 5 (U. WHO, UNICEF, The World Bank, 2012) on or before the deadline of 2015 as per the assessment of the public health service, particularly on maternal health. One of the indicators to focus at is cent percent institutional deliveries attended by skilled health personnel and avert risky home delivery. Furthermore, increase in ANC coverage even in remote areas by posting more health workers especially females to enable women avail the health care services conveniently (MoH, 2012). The maternal death reported from the health facilities from 2007 to 2012 given in the table – 1.1 below based on the annual reporting of maternal death from across the country mainly from the health care facilities.

Table 1: Number of Maternal mortality from various causes from 2007 - 2012

Year	No. of Maternal Death
2007	8
2008	8
2009	9
2010	10
2011	7
2012	2
Total	44

Source: Annual Health Bulletin, 2012 & 2013

The above table 1 shows that there are 10 maternal deaths occurred in 2010 and only 2 in 2012. There is increasing trend of unsafe abortion performed in the neighboring areas in India has been contributing towards higher maternal mortality over the last several years (MoH, 2010) especially associated with unwanted pregnancy out of wedlock. In addition, there were 10 maternal death caused by the indirect causes of complications related to pregnancy in Bhutan from 2007 to 2011

and 3 maternal death due to unsafe abortion complications during the same period (MoH, 2011). The other details show that more maternal death were attributed to direct causes of obstetric complications, mostly in the health facility (MoH, 2011)

As the case in many developing countries today Bhutan faces the shortage of health personnel mostly doctors, nursing personnel, midwives and others. It has acute shortage of doctors especially the obstetricians and trained midwives and nurses, albeit the recruitment of doctors from Myanmar and a few from India in the recent past. Not all health care facilities have sufficient doctors and trained nurses especially in the rural areas (MoH, 2011) and the Basic Health Units. Therefore providing quality ANC and PNC is challenging; underutilization of Basic Health Units (BHUs) for birthing. Furthermore, those people who afford seek better quality care albeit limited resources – both in terms of health personnel and specialized facilities for severe complications as per the Ministry of Health annual report (MoH, 2012).

The reports of NHS (2000) reveals that MMR in Bhutan is to be approached with caution due to small number of reported maternal deaths for standard error association with predicting MMR is very large and thus cannot be used to predict trend on a year to year basis (MoH, 2000). In Bhutan the total birth reported was 20,000 while the maternal death reported was just 6, the issue therefore is not to focus on assessing the MMR indicator but view it as process indicator related to MCH health programs and put in place surveillance system for maternal death (MoH, 2000) to enable regular audit of maternal death and also apply suitable intervention.

The launch of the Save Motherhood Initiative in SM conference in 1987 in Kenya was to reduce maternal mortality by 50 percent by 2000 as one of the objectives. Furthermore, it also raised global action on the impact of maternal mortality and morbidity (UNFPA, 2005). Then another conference was held known as International Conference on Population Development (ICPD) in 1994 in Egypt which mandated UNFPA to have Program of Action as to identify maternal program and set targets of its reduction. Again this was followed by World Summit, perhaps largest gathering of the Heads of States and Governments to launch the special program known as Millennium Development Goals (MDG) in 2000 with set of eight major goals

and Goal no. 5 was specified as 'Improve Maternal Health' with the target of the reduction of Maternal Mortality Ratio by three quarters by 2015 with base year as 1990 for all the countries where the MMR was high (Nations, 2005). The target of the MDG goal 5 is to increase institutional deliveries by the countries. To monitor the progress of MDG in various countries that have committed, various indicators are being used. On this, Bhutan to great extent has fulfilled the target on the maternal mortality outcome. Furthermore, Bhutan has been placed in the category of 'medium human development countries' in terms of HDI (UNDP, 2013) and also the progress has been 'within the national development planning and policy framework' to enable meet the MDG goal 5 .

1.2 Problem Statement

Ever since the launch of planned socioeconomic development in Bhutan, there has been marked improvement in health care services with the creation of health facilities. Unlike many countries in the world, health care is provided free of cost. There have been impressive improvements in education and other areas, albeit some women avail less opportunities due to various reasons and factors. Because of the history of high birth and prevalence of marriage at young age they do face various constraints and one of them is early start of child bearing. It exposes women to health risks when adequate care is not sought and results in complications and disability or even the death. Especially those women who reside in rural areas far from the modern facilities tend to face more difficulties at times of pregnancy, child birth and the postpartum period. The risk of dying from maternal cause in Bhutan was 1 in 55 (UNICEF, 2008).

Although women on an average in Bhutan enjoy equal rights with no gender discrimination as such, they take up host of responsibilities in the family including the child bearing, care of other members and so on. In fact most of the time they spend on physical work and thus less time available for rest and health care in many cases. She also has limited knowledge of birth control and sometimes not able to take effective decision about her health and associated problems, particularly the reproductive roles.

Although much awareness and greater access to health care services provided in the country, some are unable to avail it due to long distance to health facility especially in the villages and scattered nature of settlements in rural areas; the attitude of women to seek the health care especially the antenatal care. They only visit health facility when they develop severe complications. They still prefer home delivery to institutional delivery as to prevent the pregnancy related complications associated with maternal and child casualties. With different health seeking behaviour of adolescence and young people, the unsafe abortion practice to terminate unwanted pregnancies are performed in clinics and health facilities near the southern bordering towns of India – increasing post abortion complications towards reproductive health challenges for the government.

Moreover, there is a disparity in health care services and facilities in rural and urban areas despite the fact that primary health coverage of over 90 percent with much focus on reproductive and maternal health care. There is shortage of health providers and personnel, inadequate doctors and obstetricians in the country. Like in many other developing countries there is relatively low skilled birth attendants and not all health facilities in far flung areas are adequately equipped with obstetric facilities and skilled health personnel. In addition, there are other factors including the socio economic status and cultural beliefs (not the focus of this study) of Bhutanese people, especially women are quite shy to disclose their pregnancies and seek medical care including the teenagers, adolescents and women in rural areas.

Furthermore, given the past trend of marriage at younger age added to the increased risk of teenage pregnancy as well as adolescence fertility (M. o. Health, WHO, UNICEF & UNFPA, 2011) due partly to low awareness, illiteracy, and poverty, amongst other. Again there are women who are unable to decide their place of birth and quite often the husbands or the family members in households are never told about the ailments associated with pregnancy until onset of severe complications - perhaps are some concerns of maternal health outcome mainly mortality scenario in other developing countries. Apart from making the maternal health accessible to all needy women and children, recording and investigating death following home

delivery is a major challenge to be tackled for the Ministry of Health (M. O. Health, 2011a). Similar problems also exist in many developing states especially in Africa and Asia.

1.3 Problem Justification

With the expansion of health infrastructure and increase number of trained medical personnel since 1970s in the health sector, more women are today seeking and availing the health care services even in remote parts of the country. However, the major expansion came in light in the 1980s with the universal free health care system in place based on the primary health care approach following the Alma Ata Declaration in 1978 (Commission, 2002). Since then a relevant and cost effective health care delivery system based on primary health care approach was adopted to effectively deliver health service to all people in the Kingdom.

Health care services are delivered through four tiered health network with the Basic Health Units (BHUs) and Out-Reach Clinics (ORCs) at the Gewog (county) and village level; district hospitals and regional referral hospitals catering to referrals from the districts and one national referral hospital. The national referral hospital in the Capital city serves as tertiary health centre as well as teaching hospital for the array of health personnel in the country. When the cases are serious and beyond treatment within the country, referrals are made outside the country at the government expenses.

In view of the reproductive and maternal health services, health care programs are geared to make pregnancy and birth safer by increasing the access to skilled care and safe delivery. Furthermore, there are other factors like nutritional and diseases aspects causing to poor nutrition, anaemia and other life style ailments in women predisposing pregnant mothers to complications and thus delays in utilization of emergency obstetric care services.

Having identified the disparity in public health, the reproductive and child health care are scaling up which likely to bring down maternal mortality. The current transport system in the form of road connectivity and telecommunication network to facilitate the preventable deaths and maternal morbidity have been improved in the

last five years or so, resulting in to increased access to the health care services in most of the districts. An initiative to further improve the quality of the primary health service, the Ministry of Health had initiated the establishment of the Sub-Post for hard-to-reach villages with population of 30-300, manned by Health Assistant and equipped with appropriate medical supplies and are usually housed in the Out-Reach Clinics (Thinley, 2011). Despite all these, Bhutan is 'on track' to achieve the MDG Goal 5 by 2015 along with other 14 reviewed by the WHO as per Reproductive Health, Bhutan 2011. Based on the achievement of MDG achievement, Bhutan is one of the 10 countries that had achieved the set goal in 2010 (as cited under 'trends in maternal mortality 1990-2010:27 (U. WHO, UNICEF, The World Bank, 2012).

Similar to practice elsewhere in the developing countries, the practice of maternal and child care is provided through an integrated approach at the BHU level in the villages, district level and even the tertiary hospitals. Furthermore, the Village Health Workers (VHWs) mainly in the remote areas play key roles in encouraging pregnant women to seek antenatal care. In addition, they become bridge between the local BHUs and the pregnant women (MoH, 2011). The global standard practice of health and medical services are followed in Bhutan. For example, the 2006-2008 maternal mortality review report reveals that the analysing the maternal death pursued in accordance with the WHO three Delays recommendations as reported in the Annual Health Bulletin 2011 (MoH, 2011).

1.4 Study Objectives

Maternal mortality is one of the key indicators of population dynamics in demography that greatly influenced socio-economic and health status of a country. Therefore, this study attempts to investigate the factors affecting the maternal mortality based on the 'illness of death' mortality from the PHCB 2005 data source based on census method.

The specific objectives of this study are :

- To examine differentials of maternal mortality by regions of the country that predisposed women

- To analyze the factors that seem to have more effect on maternal mortality in Bhutan

- To provide possible recommendations on improvement of maternal health program in order to further reduce the maternal mortality.

However, there are several factors affecting the maternal mortality as revealed from the review of relevant literature such as socio-economic status, demographic factors and health related factors that directly or indirectly contributing to higher maternal deaths especially in the developing countries like Bhutan.

1.5 Organization of the Study

This study is presented in contributing toward the body of existing knowledge on reproductive and maternal health from the demographic perspective for a small country like Bhutan. It consists of five chapters excluding the appendices at the end. Chapter I deal with general background of the study including the introduction, statement of problem, justification of problem and the objectives. Likewise the Chapter II is the literature review of the research. Chapter III presents the research methodology including the definition and measurement of variables in brief. Chapter IV provides the results of the data analysis and discussion on overall findings. Finally, Chapter V is the last chapter summarizing the thesis with conclusion and contains the recommendations based on the findings and current situation in Bhutan

CHAPTER II

LITERATURE REVIEW

This chapter reviews literature from a host of sources based on the earlier research findings published on maternal mortality and the materials published by UN Agencies like WHO, UNFPA, UNICEF, etc. Other sources and electronic journal databases of academic papers and theses from JSTOR, NCBL, CSIS, NCBI, PubMed Health, POPLINE, Google Scholar and several reports from annual health reviews from the study country. Most of the literature available on maternal mortality primarily focused on the reduction of maternal mortality in the developing and countries in transition where the scourge of maternal death is relatively high. However a few studies explained the factors affecting maternal mortality in a developing country like Bhutan. A cautious mention is made here that there has been no extensive materials on the topic as is limited due to obvious reasons associated with many developing countries. Studies done by WHO, UNICEF, UNFPA, the World Bank and individual researchers, especially from the developed world reveal that maternal mortality is heightened focus of public health problem and emphasis laid on reduction of maternal deaths through reproductive health uptake wherever the burden of maternal death remains still high and requirement to meet the international commitments of MDG goal of reduction by substantial proportion by the year 2015.

As regards the number of health personnel in Bhutan, there is still a shortage of doctors, nurses and others health care workers including the obstetricians and midwives – to cater to health care and maternal health uptake. The table 2 below shows the distribution of medical personnel and health facilities in Bhutan as of 2012.

Table 2 : Health Personnel and Facilities in Bhutan as of 2012

Health Personnel Category	Quantity
Doctors (including specialists/obstetricians)	194
Nurses	736
Clinical health workers (ACO, HA, BHW)	617
Indigenous Physicians and workers	98
Lab technologists, Technicians and Paramedics	828
Health Facility	Quantity
Hospitals (including referral hospitals)	32
Basic Health Units (BHUs)	192
Out Reach Clinics (ORCs)	550

Source: Annual Health Bulletin, 2013

The table 2 above shows that there is shortage of doctors in Bhutan especially in the hospitals in far off districts. There were 11 gynaecologists/obstetricians in 2012 including 4 from Myanmar to deal with maternal cases and about 50 percent of doctors were stationed in Thimphu at the national referral hospital (Pelden, 2012) despite the previous government's policy of having three doctors in each Dzongkhag (districts) hospitals. However, the shortage of doctors and nurses are quite a common feature of medical human resources elsewhere too.

2.1 General Overview

Globally there is a wide existence of disparity between the developed and developing countries when it comes to maternal mortality amongst other causes of mortality. Women in their reproductive role bear the brunt of yet preventable event, for it is estimated to be unacceptably very high of over half a million women dying of maternity as well as pregnancy related health complications in the world (WHO, 2005).

A study from Reproductive Health Review, Bhutan (2011) revealed that many rural women stay at home for labour risking maternal complications and death as outcome. In this regard, home delivery is a major concern in Bhutan especially in regard to reporting and investigation of maternal death – a challenge (MoH, 2011). Likewise previous studies show that in many rural areas in Africa and other parts of south Asia are grappling with the similar problems to a greater extent.

Although between 1990 and 2010, the maternal mortality globally reduced by around 47 percent from 546,000 to 287,000 (Fleischman, 2012) there is still a burden in many developing countries where many lives of women lost to pregnancy and child birth or postpartum period. In many of the developing countries there are several huddles to avail quality health care facility. Furthermore it is of paramount importance for the developing countries to build community based health system to cater to maximum people in their communities including the women in the reproductive age groups.

Even in the developed countries like the USA, maternal mortality risk ratio is 1 in 2,500 – one of the highest in the developed nations. Of which the rate among African-American is even 4 times that surpassed some of the developing countries where they achieved low maternal mortality.

Globally over 300 million women live with pregnancy and child birth related ailments each year. Within developed countries inequality is massive because of income differential and cost of health care services. Interestingly, it is the socio-economic inequalities not the lack of medical solutions that determine health outcome for women. For example, factors that increase risk of maternal death relates to delays in seeking care and partly reaching the health facility.

Likewise it is worth noting that in some countries cultural issue prevails to get permission from men; there is of lack of transportation so men have to accompany her. Again not enough staff, inadequate facilities and accessible and community based health attention; so one has to rely on great deal of support from community. With the global mandate for the countries to meet the MDG 5 by 2015, most nations

have been paying increasing attention to women's reproductive health care besides making the primary health care accessible to all. Maternal death exerts a devastating effect on the family, leaving behind motherless live children. Therefore, women of reproductive age should have access to women friendly health care during and even after the pregnancy in order to minimize the risk of complications resulting in preventable outcome.

2.2 Definition of Maternal Mortality

The Tenth International Classification of Disease (ICD – 10) defines as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes"(U. WHO, UNICEF, The World Bank, 2012). Owing to problem associated with 'weak health information system in reporting according to Maternal Mortality Network, the definition to some extent depends upon the context. In concordance with ICD-10 definition, pregnancy related death or death while pregnant in this study is used as working definition of maternal death as given in the PHCB 2005 data source. Also it reduces misclassification of only women who were pregnant or delivered and does not link between cause of death and pregnancy (Ganatra, 1998).

2.3 Causes of Maternal Deaths

The maternal death can be classified into health factors, medical factors, reproductive factors, socio- economic factors (Mojekwu, 2012). Pregnancy and childbirth related causes are among the top ten reasons for death of women of reproductive age in many developing countries (Winikoff, 1987); (Suwal, 2008).

The existing literature on maternal health and obstetric complications classified the causes of maternal death into direct and indirect causes. WHO factsheet (2012) indicates that about 85 percent of maternal deaths are globally due to the following: Haemorrhage - 24.8%; Sepsis/Infection – 14.9%; Eclampsia – 12.9% ; Obstructed Labour – 6.9% ; Unsafe Abortion – 12.9% ;Other direct causes – 7.9%;

Indirect causes – 19.8%. In *Bhutan* direct causes of maternal death is largely by post-partum haemorrhage (30%) as the leading cause as of 2009, followed by sepsis (15%), obstructed labour (8%). On the other hand, the indirect causes of maternal death comprised of around 23 percent mainly due to pre-existing health complications of the pregnancy (Mortality Review, 2001-2009; Bhutan Ministry of Health, 2011). In addition, there are other socio - demographic and economic factors such as the difficult geographical terrain, poor knowledge and practices, poverty due to disparity of income and health related factors such as anaemia and low quality of ANC, were some of the causal factors of maternal death *(Reproductive health Review,* Bhutan 2011:14; (M. o. Health, WHO, UNICEF & UNFPA, 2011). Similar factors were also found in Nepal causing high mortality as per the study done by Shrestha et al (Shrestha, 2012).

Nevertheless the maternal health outcome is better in many of the developing countries, yet for obvious reasons of delay or ignorant of seeking timely health care service, the mortality estimated to be higher across the developing countries. This has been explained with a model called Three Delay Model proposed by McCarthy and Maine (1994) that explains the factors that contribute to maternal Mortality in various stages.

It is because of delays in seeking maternal or obstetric care; the pregnancy related complications are never treated properly leading to death or disability. There has been marked improvement in the reproductive health system in Bhutan, albeit a few challenges related to the accessibility, quality of midwives and utilization of obstetric in the desired manner. The delays in seeking maternal health care are on decline gradually with improvement in transport across the country.

It is also not accurate due to cultural factors like a reluctance of respondents to report abortion related deaths, error committed with poor memory recall and sometimes lack of medical report. These pose as hindrances to actually get the information and investigate the causes or factors responsible for maternal death or health complications.

2.4 Determinants of Maternal Mortality

The development stage of a country and its health care system determine the maternal and child health care. Since there are medical risks involved in child bearing, the women of the reproductive age have to bear the burden of pregnancy. It also depends upon the changing demographic profile of women across the world. Winikoff & Sullivan (1986) explain that there are several factors including the socio economic and demographic determinants that result in risk of pregnancy and associated complication within the cohort of women at times leading to maternal morbidity and mortality.

Many studies on maternal mortality have 'primarily focused on causes of maternal death, on age and parity as risk factors' (Camphell, 1996). Although the most immediate determinants of maternal death are medical cause, maternal health goes beyond medical issues. There are categorically other determinants of risk of death identified to play an important role as suggested by Campbell and Graham (Camphell, 1996).

i)   Health service factors – quality of care, accessibility, and availability of preventive and curative health services;

ii)   Reproductive factors – women's genetic, parity, general health status, age;

iii)   Socio-economic factors – urban /rural residence, education, income, women's status and cultural factors.

For instance, in India, the socio cultural factors to greater extent determine the maternal care and correlation exists between social equity and the maternal and child health care due to the fact that the females are in unfavourable position because of son preference culture and culturally ascribed roles (WHO, 2005). However in Bhutan there is no such culturally ascribed role as many are liberal and also women enjoy greater degree of freedom in the family and community.

2.5 Factors Affecting Maternal Mortality

The most common factors as identified in the existing literature from the global studies are mainly categorized as demographic, socioeconomic and health

related factors for which Thaddeus and Maine (1994) provide great deal of insights (Thaddeus and Maine, 1994). Most of the factors are basically categorized into the direct and indirect causes of maternal death largely focusing on the developing countries since the burden of death is deplorably high. Several studies done in various countries and the ones done by WHO, UNICEF, UNFPA, World Bank and several agencies have found that most studies done maternal mortality mainly in the developing countries.

A study done from previous studies of the developing countries found that the age and parity are one of the key factors in determining maternal death (Pulpinyo, 1980). The risk of maternal morbidity and mortality are high for women below the age of 20 and also for those women above 35 years. Similarly for those mothers who have already given births to three children or more are at greater risk with increase parity and close birth spacing between children. The factors mention in this study are both in the category of proximate and distal depending upon their effect and direct impact on the issue. In the light of the study, demographic and socio economic factors which indirectly if not the leading causes responsible for the pregnancy complications in the developing countries such as marriage at young age, low economic status of women, lack of or poor access to maternal health service and so on. Some of them are outlined in this section in order to explain the key factors determining the maternal mortality in the developing countries like Bhutan.

2.5.1 Age

Age is one of the key attributes of reproductive health as well as mortality determining maternal outcome for women aged 15 to 49 years. The age as key factor significantly determines the health status of a woman while pregnant, during child birth or postpartum period. Medically it has proven that women who enter into child bearing early or quite late may face risk of pregnancy and associated complications during their reproductive life span unless adequate care or healthy habit are sought. When there is no control on one's own fertility, one may experience repeated pregnancies often face risk of unexpected maternal health outcomes.

The age of pregnant women is one of the key determinants of maternal mortality. Age itself is a biological and social factor in affecting maternal death from pregnancy related causes. The onset of fertility of women to a large extent determined by age at first marriage, if early, and exposes women to longer period of child bearing and associated risk of maternal death or morbidity. Age is a characteristic which determine the maternal health in course of reproductive lifespan. According to Winikoff and Sullivan (1986) the age factor also poses the risk of pregnancy and mortality amongst women. The high risk women groups are younger mothers, older mothers, women with no children and women having first pregnancies. But the risk is lower for those women between 20 - 34 years with one or two children (McCarthy and Maine, 1992).

According to McCarthy and Maine (1992) very young age of women is associated with complications or maternal disability resulting from pregnancy, childbirth or induced abortion. On the other hand, woman's age and parity would influence women's confidence and use of services (Camphell, 1996) like maternal health care.

Furthermore, there are factors such as marital status, educational attainment, employment status provide greater insights in to the circumstances as to how women die due to maternal causes as evident from previous studies. They are highlighted below since the data for this study does not elucidate on these factors.

2.5.2 Marital Status

In demography, marital status is one of the key factors to determine the women's reproductive events especially in many of developing countries they marry at younger age or face the burden maternal outcome quite often. Previous studies reveal that there is a positive correlation between the age and the marriage in the sense that if a girl enters in to union at younger or teenage age, she is likely to bear children early and is likely chances of maternal morbidity and death if appropriate health care is not sought timely. In Bhutan the mean age reported in 2005 was 20 years for marriage for women (Commissioner, 2006). The legal age of marriage is 18 years and above.

2.5.3 Literacy

Literacy is the basic knowledge that a person acquired either by learning in a formal setting or on one's own interest – able to read, write and understand in a language of his or her or any other language. In other words, it serves a purpose of functional learning.

Education attainment of a country greatly affects the maternal or reproductive health outcome and health seeking behaviour of people without any exception. Education is one of the social determinants of health. It is education of women that improve her decision making ability and control fertility as per the earlier studies. The coverage of primary and secondary education have strong impact on girls and the number of years girls spend in schools strongly determine women's roles in society as reviewed from relevant literature.

2.5.4 Employment

It is an important to note that employment status of women largely affect the maternal health – depends upon whether a woman is employed gainfully or not. The burden of early and repeated pregnancy could be prevented if and when women are employed or engaged in economic activities. In Bhutan the proportion of female employment is increasing over the years and it is likely that more women bear children at later age and face the risk of maternal deaths. Several studies manifest that women will have more financial stability than non-employed women; it helps her to exercise autonomy and also seek maternal health care to prevent from the risk of dying (Campbell and Graham, 1990).

2.5.5 Occupation

This factor will study the work status of the respondents who provided information to type of work they do. The nature and sector of occupation prevent women from repeated pregnancies and face the risk of bad maternal outcome. The occupational status also induced women to seek better health care and prevent from the likely burden of reproductive complications.

2.5.6 Place of Residence

In the developing countries majority of women reside in the rural areas mostly far away from the health facility or with limited access to maternal health care. Previous studies remarked that there are disparities in the urban areas with by better health and education facilities while the rural areas are with inadequate facilities with lack of equipment, medicine, training supervision, procurement and supply system. As a result, the women have limited access to maternal care and get treated for their ailment or complications.

As compared to urban areas, the fertility is higher and as a result women bear the burden of several pregnancies. There is also low prevalence of contraception use to avoid unwanted pregnancies and prevent the associated risk. While in urban areas the women are more conscious of seeking the maternal care services and also control the parity.

As regards the distribution of health facilities, there is inequitable distribution of health facilities between urban and rural population in both developed and developing countries (Swedo, 2012). For accessing maternal health care urban women are in advantages position than rural women. In another study of evaluation of maternal health indicator in Mali found that where there is limited access, poor care showed urban – rural disparity (Swedo, 2012).

Most of the maternal deaths occurred in far flung villages in the past as per the record (AHB, 2011). Several studies reveal that there are differences of maternal health care services between and within developing countries and also differentials in rural and urban areas (Baral, 2012). Furthermore, Baral et al (2012) states that urban and wealthy women are more likely to deliver with the aid of skilled birth attendants than their rural peers in their study of Nepal.

2.5.7 Distance

It is mainly the physical accessibility of heath seekers, the pregnant women to and from the health facility largely determines the health outcome amongst other things. A study of maternal mortality in western Maharashtra in India by Ganatra et al (1998) found that complication would be greater when there is lack of readily

available emergency transport in the rural are as likely to increase the risk of dying. Further, the study found that distance from health centre, road or nearest town was significantly associated with maternal death.

Likewise in Bhutan, the road condition is not good and many health service centres are not connected by road network. The monsoon season sometimes block the existing village road that adds delays to the health seekers contributing to poor maternal health outcome, among others. Geographical terrain and distance acts as a barrier especially in uptake of skilled birth attendants in Nepal (Baral, 2012).

Despite the free provision of maternal health care in Bhutan, women and their family members are sometimes unable to access or avail maternal health care that some areas get cut – off from referral in winter and also during the monsoon period (in summer) which add vulnerability in the event of obstetric emergency. Also basic obstetric care facilities are not available in every Basic Health Units (BHUs).

2.5.8 Health Personnel Attendance

It is whether the women seek the service of trained health personnel or not. In Bhutan the health care is sought as and when complications arise especially in the far remote areas. As a result the health workers motivate women to avail ANC and other health care services to reduce the risk of maternal complications and morbidity.

2.5.9 Region

The countries or states are placed under different regions depending upon a host of factors and determinants. In the case of Bhutan it is divided into three regions that geographically run in north–south directions and at different level of development stage and areas. There are differences in health care facilities and health personnel in each region. Previous studies show that general mortality varies according to the location and level of development of regions, provide strong correlation and found that regions with higher overall mortality had higher level of

maternal mortality and the latter trend follows the former (Boerma, 1987). Globally, the burden of maternal mortality is largely prevalent in sub Saharan Africa and South Asia and followed by Latin America. The other regions contribute very low around 1 percent to the overall maternal tragedy across developed regions.

2.5.10 Maternal and reproductive Health

This variable was not captured in the data set used in this study. One of the aims of the Safe Motherhood programs are to increase the women seeking antenatal care (ANC) during their pregnancy and after child birth in order to prevent from severe complications and maternal outcome. It is one of the indicators of successful maternal and child health programme for a country. It encourages women to reduce risk of home delivery and increase use of skilled birth attendants. The ANC visits also help women to recognize at least two or more danger signs of pregnancy (NSB, 2010) in BMIS 2010).

Globally South Asia has lowest proportion of women who are attended at least once during pregnancy by health professional and similarly lowest proportion attended by skilled health workers at birth. The first ever multiple indicator survey found that ANC coverage was 97.3 percent for at least one visit and 77 percent for record of four visits in 2009 (BMIS 2010, NSB, 2011). However, the region wise coverage, Eastern Bhutan had lower ANC coverage at 71 percent, albeit laudable target achieved in the south Asia region. Furthermore, there is disparity in urban – rural coverage of around 3 percent in Bhutan as per the findings of the BMIS 2010 (NSB, 2011). Tetanus immunization is also given during the pregnancy to prevent from the risk of both mother and child infection or sepsis (BMIS 2010). However, the uptake of ANC would be enhanced by sensitizing the pregnant women in Bhutan as reflected in the NHS reports of 2000 (NHS, 2000).

2.6 Theories and Models related to maternal mortality

This section shall present the relevance of theories and models used to study and examine the maternal mortality situation in the developing regions and countries across the globe. The theories reviewed by Chen and Williamson (1999)

shall be elaborated; and for the models, Three Delays Models proposed by McCarthy and Maine (1992) are outlined in this study.

2.6.1 Theoretical Perspective linked to Maternal Mortality

Modernization Theory: It is mainly based on economic theory wherein the demographic transition that explains the mortality trend, particularly the maternal mortality is preventable events grappling the developing countries. Chen and Williamson (1999) state that this theory basically explains the fertility and mortality patterns with economic development of countries that leads to higher standard of living and availability of advanced medical technology which in turn contribute to reduction in both fertility and mortality (Shen, 1999). In other words, the maternal mortality as an indicator of health status should decrease as the level of economic development advances. However, it is not the same case as expected in all the countries especially the developing and those in transition today.

In addition, indicators commonly used by researchers in the past included country's GDP as for economic growth, urbanization, education and health care service (Shen, 1999), among others. But the very fact that this theory has been criticize today as the effects of economic prosperity has resulted in the grappling situation of inequality within societies and class groups, ignoring the different level of development and political dimension in the international arena

Gender Stratification Theory: It attempts to explain the gender linked differences in terms of status and power in society taking into account the dimension of inequalities based on social and economic set ups. This theory could be also used to argue on the different status of women and autonomy in the societies where the maternal mortality will be higher or lower. In other words, it advocates the enhancing of women's status and increase access to health services, control over any resources, etc that would ensure to prevent if not substantially lower the maternal mortality.

Many studies revealed that relationship between women's status and health access are not parallel to our dismay that to improve the health of women, one need to consider the intricacies of the socio cultural aspects jeopardizing the women in many societies especially in the developing counties (Lyons, 1985). Furthermore, many women are unable to access reproductive health due to socio economic and cultural reasons and in turn are vulnerable to health risks of pregnancy related death and if not morbidity and malnutrition. In addition to this there is host of problems or deprivations faced by women during their reproductive age and in many some cases their whole life mainly to lower status and social norms.

Economic Dependency Theory: This theory is based on the premise that with globalization of economies, there is division of labour which tends to distort the domestic economies of many developing countries, thereby reduces economic growth rates, increase income inequality and also affects the wellbeing of some section of people (Shen, 1999). It argues that the free trade does not help to raise or equalize the income within or between nations. In other words, such scenario aggravates the gap between rich and poor, contributing to instability in an economy. As a result, raising revenue is weakened which gravely affects the sustainability of health and social service programs including maternal and reproductive health care. This shall impede the decline in maternal mortality in the developing countries according to Miller, amongst other.

In this thesis, all the aforementioned theoretical perspectives will not be tested or applied due to insufficient data availability and given the scope of the study. For a country like Bhutan, some aspects of the theories in part would be relevant in terms of its dependency for financial and technical supports, particularly for medical and health care from the neighbouring countries and several international agencies including UNDP, WHO, UNICEF, UNFPA, the World Bank and others since a few decades ago.

2.6.2 Three Delays Model

This is a conceptual framework outlining the barriers to timely medical treatment on the part of pregnant woman in handling complications either by herself or her family. The three Delays as proposed by Thaddeus and Maine (1994) is also viewed as three phases which have been used by WHO and several other researchers to study the maternal mortality as well as design intervention to uptake maternal health care the world-wide. Therefore, the three delays model has been widely used as a strategy to systematically address or prevent 'a neglected tragedy' (Rosenfield, 1985) around the world, predominantly in the developing countries over the years.

The three delays are briefly described as follow:

1) *Delay in seeking care* - this starts at home or dwelling where a pregnant woman reside in deciding to seek medical care. There are various factors at the individual or the family level or both contributing to delay. They are woman's status, decision making, severity of illness, distance, financial and opportunity costs, previous experience and perception on quality of care so on are identified as barriers.

2) *Delay in reaching an appropriate health care unit* – not all health care facilities are located near to patients on one hand and a pregnant women or her family members do not make it on time or before a complication or illness becomes severe. Sometimes in rural areas in developing countries women reach the health care facility very late due in part to distance and lack of readily available transport service or trail to cover between her home and health care facility.

3) *Delay in receiving adequate quality health care and timely referral* – Delay which occur in a health facility after the pregnant woman or complications associated with pregnancy or childbirth quite often poses risk due to availability of obstetric facilities, drugs, equipment and most importantly the competency of the health care providers. It is also responsible for preventable maternal outcome when the proper and timely referrals not followed in one health facility to the higher facility owing to various reasons. In short, the quality and adequacy of health care service related to maternal complications or treatment is the leading cause of the third delay risking

the life of women especially in the developing countries according to the model and it its reality.

2.7 Benefits of this study

This study is one of the first of kinds undertaken from the demographic perspective and expected to open up farther study or research with more robust data and meet the need of public health administration in the Kingdom in future. Furthermore, it is intended to encourage more studies in understanding reproductive health analysis in the context of maternal mortality.

CHAPTER III

RESEARCH METHODOLOGY

This chapter highlights on the research methodology used for factors determining or rather affecting the maternal mortality. The data set used for operationalization and dimension of the complete variables and the technique of analysis.

3.1 Conceptual Framework

The maternal and child health system reflects the reproductive health situation of any developing country today as the maternal mortality is relatively high with variation among such countries. It is therefore of paramount importance to outline the conceptual framework as to analyse the issue in this study.

Based on the relevant literature review and the indicators used in capturing maternal related data from the Population and Housing Census of Bhutan 2005 (PHCB) the following conceptual framework under independent and dependent variables is outlined with a set of variables mentioned hereunder:

Figure 1: Conceptual Framework of the study

Independent variables (Cause)   *Dependent variable (Effect)*

Socio- economic Characteristics
- Income Source
- Occupation
- Health Personnel

Demographic Characteristics
- Age
- Residence
- Region
- Dzongkhag

Maternal Mortality
(Pregnant Related Death)
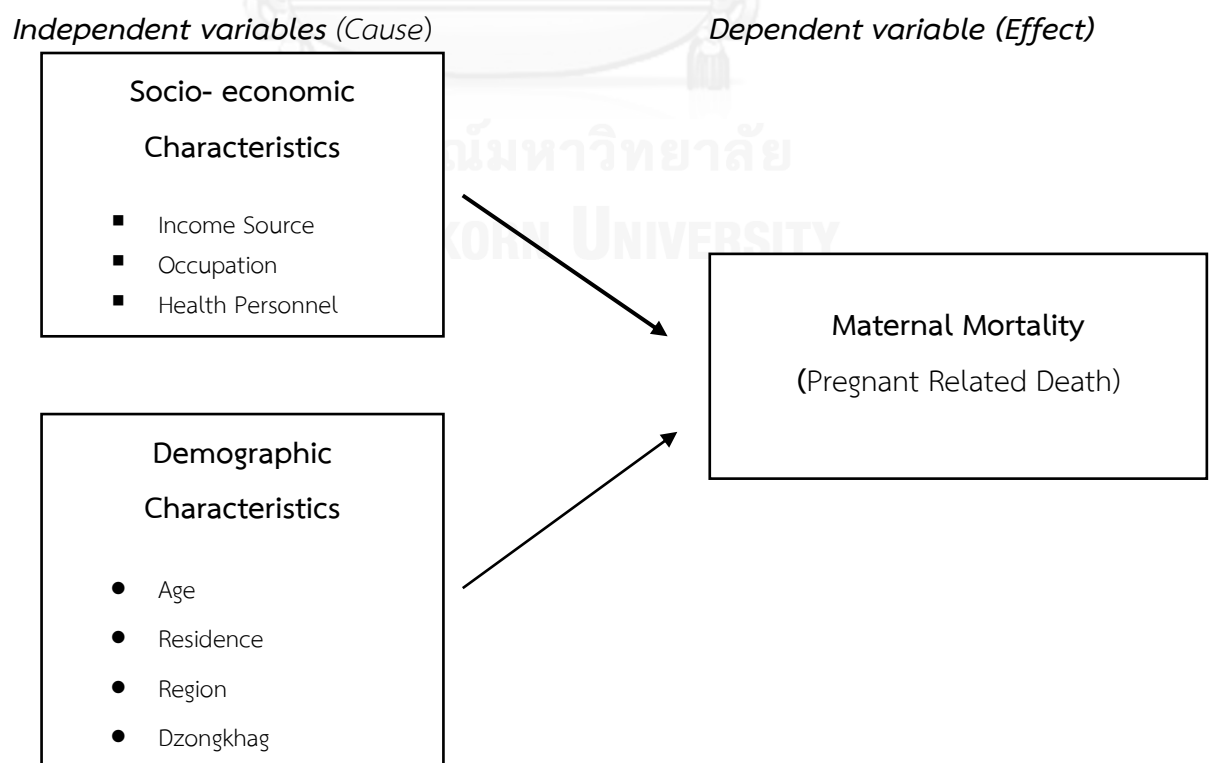
Moreover, the conceptual and analytical framework above is derived in this research based on the data generated by the first ever conducted population and housing census in the month of May 2005. They are also used National Health Survey (2000), PHCB (2005) and Bhutan Multiple Indicator Survey 2010 (NSB, 2010). The study data is nationally representative as it was obtained from the households on the causes of death and one of the causes included the responses provided by respondents on women between the ages of 15 – 49 which served the purpose of this research.

3.2 Data Source

The present study acquired data from the secondary source, the first Population and Housing Census of Bhutan (PHCB) conducted in the year 2005 for simultaneously two days on 30th and 31st May throughout the country under the overall supervision of the Office of the Census Commissioner with the financial assistance and technical support from the UNFPA. The Census count exercise found the total population of 634,982 with slightly higher number of males. There were 157, 872 women in the reproductive age group of 15 - 49 years alive that comprised of 23.4 percent of the total population and overall mortality of 4,498 including 55 pregnancy deaths reported.

The rural area consists of 69.1 percent of the total population, whereas only 30.9 percent are in the urban. The census also provided baseline data on the dynamics of population changes mainly on fertility, mortality and migration, health, education and other socio economic characteristics, amongst others.

As a result, the data collected in accord with de facto principle of enumeration during the Population and Housing Census of Bhutan will be the indicators in this study, as it provides the reliable sampling frames. A subset of data on health under the causes of mortality is used in this study. On a whole, the PHCB 2005 nationally represented and covered all the 20 Dzongkhags (districts), 205 Gewogs (blocks as lowest administrative units) and all the 20 district towns including

the capital city, Thimphu. In terms of the pregnancy related mortality, Ha and Sarpang Dzongkhags did not report any death so they are excluded in this study.

The data set used in this study is the recoded or subset of PHCB 2005 based on the information gleaned from three sets of questionnaire on the socio - demographic and economic details of household and its members, including on the mortality. Information on the number of pregnancy related death in the past 12 months was captured via the questions for selected variables in this present study are indicated in table 3 below.

Table 3: Selected Variables and Questions from the PHCB, 2005

Characteristics	Questions
Death of member	Was there any death in the household in the past 12 months?
Name of deceased	If yes, What is the full name of the deceased?
Age at Death	What was the age at the time of death?
Sex	What is the sex of the deceased?
Occupation	What was the occupation at the time of death?
Pregnancy related death	Nature of illness or accident that caused the death?

Source: Population and Housing Census of Bhutan, 2005.

3.3 Dependent Variable

In this section, the study shall define the dependable variable and the identified independent variables as explanatory variables as captured in the data source in order to analyse the factors affecting maternal mortality.

Pregnancy related death as the maternal mortality is being studied. Maternal mortality is categorized in the data set as pregnancy related death along with other

illness of death for women of reproductive age 15 to 49 years. The outcome as pregnancy induced death collected in the study data on whether the women died while pregnant, during child birth or within 42 days of pregnancy termination.

Maternal mortality is a health indicators closely link to a rare event exclusively for the women of reproductive age, predispose to the risk of maternal death during pregnancy or childbirth. In view of a health issue, particularly the reproductive health concerning girls and women, the ICD -10 definition as recommended by WHO (U. WHO, UNICEF, The World Bank, 2012) is interchangeably used for pregnancy related death since the data obtained is from the household level generated under the causes of death.

However in this study, it is grouped as binary variable under pregnancy related and non-pregnancy death. The variable is coded as 1 for pregnancy related and 0 for others.

3.4 Independent variables

The following the socio- economic and demographic variables used as explanatory variables. It is obvious that several factors affect the maternal mortality as revealed from the studies carried out on the topic. Only a few important factors as captured by the PHCB 2005 will be elaborated given the little focus of the data set. All these variables were used during the survey and census through the questionnaire on the respondents to obtain the pregnancy related deaths as maternal mortality in the form of 'death while pregnant' and the contributing factors are described below.

Age: Based on the age of deceased women of reproductive age provided by the respondents at the time of census was classified into three groups from the five year age group (15-24; 25-34; 35-49). Only the women as well as girls who died of pregnancy related complications between aged 15 and 49 are included.

Residence: Whether the respondent place of residence location during the census enumeration time was in urban or rural place.

Region: For this study the entire 18 Dzongkhags excluding 2 are grouped in to three regions, namely Western, Central and Eastern based on the geographical location and number of maternal death reported.

Dzongkhag: A Dzongkhag is the local administrative unit or sub national entity, comprising of 20 districts – which in reality combined to form regions in Bhutan

Distance: Distance is the time taken in terms of hours to reach one's residence or health facility from an approach road.

Income Source: the various sources of income earned by the household or its members based on the knowledge of the respondents.

Occupation: The main activity a person or a household as well as the deceased engaged in before the Census.

Health Personnel Attendance: Asked to respondents which category of health personnel attended the deceased before the death.

3.5 Methods

To examine the variables from the data, both descriptive and inferential statistics was worked out by using the IBM Software Program for Social Science (SPSS), version 20. The unit of analysis of the variables is the district and further differentials will be obtained at the regional level consisted of six to seven districts. The descriptive analysis was performed to examine the background characteristics of the respondents and frequency distribution. Moreover to determine the significant association and relationship between the independent variables and the maternal mortality, the data analysis has been carried out for bivariate analysis through the application of the cross-tabulation with Pearson chi-square. The significance level of chi-square will be tested /observed at $p < 0.05$.

In terms of the methods of analysis, differences of maternal mortality as the indicator by each category of the independent variables. In order to test the significance of the observed differences in percent in the maternal mortality across each category of independent variables, the binary logistic regression was being conducted. The purpose of analysing with a bivariate logistic exercise for each independent variable with the dependent variable is to discern which of the independent variables are significantly associated with the maternal outcome.

Multivariate analysis is also performed to identify which of the explanatory variable have significant effects or predict on maternal death holding constant the effects of other variables. So the same binary logistic regression model was used although the strength and magnitude are to some extent met by the odds ratios.

Table 4: Summary on variable description and measurement scale

Variable	Description	Measurement Scale
Dependent variable		
Maternal Mortality	Number of pregnancy related death during pregnancy, childbirth and within 42 days of childbirth	Ordinal 1 = Pregnancy related 0 = Non Pregnancy related
Independent variables		
Age	Age at death of woman given by the respondents in completed years by five year age group in data	Ordinal 0 = 15 - 24 1 = 25–34; 2 = 35 - 49
Residence	Categorized as urban or rural settings	0 = Urban 1 = Rural
Region	Division into three regions from the 20 districts	0 = Western 1 = Central; 2=Eastern
Distance	Approximate time to reach health facility from a nearest road point	0 = < 30 min 1 = >30 min
Income Source	The sources of Income of the respondents	1 = Salary/Wage 2 = Other Sources
Occupation	The type of work or sector woman was engaged	0 = Farming 1 = Non Farming
Health Attended	Women who died were attended by the category of health personnel	1 = Attended 0 = Not attended

Source: Calculated by author.

3.5.1 Descriptive Statistics

In order to first find the distribution and association of the various characteristics of maternal mortality from the data, descriptive statistic was used. Out of the sample size of 55 cases, 39 are pregnancy related death and other 26 are categorized as non- pregnancy death for other causes in this study. The percentage are used to find out the distributions by districts, regions, place of residence (whether urban or rural), by employment, by occupation, marital status under demographic and socio economic characteristics. Furthermore, health characteristics also used such as health personnel attended or not.

3.5.2 Correlation

In order to examine the strength of relationship between the variables correlation was performed to check the strength and direction of variables used in this study. In view of small sample size of data obtained from the Census as subset of data under the mortality, the correlation matrix show that there was either weak positive correlation or negative correlation as explained further in the succeeding chapter.

3.5.3 Econometric Model

In order to estimate the effect of explanatory variables on the outcome that is maternal mortality denoted by pregnancy death in this study and also explains the significant level, the following econometric model based on the conceptual framework used in the subsequent chapter. Logistic regression is used to run this model.

Maternal Death (Y) $= b_0 + b_1^{AGE} + b_2^{RESIDENCE} + b_3^{REGION} + b_4^{DISTANCE} + b_5^{MARITALSTAT} + b_6^{RELIGION} + b_7^{Language\ Spoken} + b_8^{LITERACY} + b_9^{INCOME\ SOURCE} + b_{10}^{OCCUPATION} + b_{11}^{HEALTH\ ATTENDED} + \mu$

CHAPTER IV

RESULTS AND DISCUSSION

This chapter presents findings from the data analysis/results of the study of factors affecting maternal mortality in Bhutan. The data used to analyse the results of this research is drawn from the Population and Housing Census of Bhutan undertaken in May 2005 by the Office of Census Commissioner for the whole country with reference to death of women aged 15 – 49 years under the subtitle 'illness of death' ([Commissioner, 2006](#)). The dependent variable used is the pregnancy related death dichotomized using the bivariate analysis of '1' for pregnancy related death and '0' for non - pregnancy death. Both descriptive and multivariate regression methods of analysis conducted to measure the effects of socio-economic and demographic factors as included in the census exercise in Bhutan, precisely on May 30th and 31st 2005.

The Census reported the maternal mortality from the pregnancy related causes of 55, of which formed 70.9 per cent of pregnancy related death of women in the sub population (15 -49 years) as depicted in the table 5 below.

Table 5: Percentage of maternal cause of death of women (15 -49 years)

Variable	Number	Percentage
Pregnancy Death	39	70.9
Non Pregnancy Death	16	29.1
Total (N)	**55**	**100**

Source: PHCB 2005.

4.1 Descriptive Statistics

In order to examine the associations and effects on the internal factors, close association or impact of variables was carried out. The literature on maternal mortality in the developing countries primarily provides a platform to examine the factors affecting maternal mortality vary from country to country. For instance, the region wise distribution of the maternal death reported by the respondents in the

PHCB 2005 is given in the table 6 below. Western region reported the highest number of maternal death at 53.7 percent (29) quite inconsistent with the level of development and health care facilities. Probably there are more educated people who had reported the death event fairly correctly and also with relatively larger population size.

4.1.1 Demographic Characteristics

Age of woman is the age at death reported by the respondents categorized into three groups ranging from ten to fifteen year intervals. There was highest of 34.5 percent of women death in the 15 - 29 age categories; followed by 43.6 percent for the women of 25 – 34 years and 21.8 percent for aged 35 – 49 category.

Residence kept as dichotomous variable as urban and rural in this study consistent with the data source. In contrast to real situation, three fourth of the pregnancy death reported from the rural areas with 78.2 % while the urban areas had 21.8 percent pregnancy related deaths. This could be due to several reasons like poor use of health facility, etc.

The pregnancy death by marital status was grouped into two category with those died married was 56.4 percent and all other together comprised of 43.6 percent. Likewise the categories of maternal death by religion was predominantly Buddhist, consistent with the size of entire population, was 78.2 percent as oppose to 21.8 percent for other religious groups in the country.

4.1.2 Socio economic Characteristics

Socio economic factors are used as proxies to explain the dependent variable. There are three socioeconomic variables used in this study and are briefly described hereunder their distribution within the categories.

In terms of literacy level of the pregnancy deaths, the literate comprised of 41.8 percent while the illiterate or no education category was 58.2 percent as elicited in the table 6 below.

Income source is used as an indicator whether women were had command over financial resource at an individual or family level prior to the census in 2005 before their death from the respondents. As such, 32.7 percent said the income sources were salary and wages while 67.2 percent found to have from other sources other than the salary income in this study.

Occupation is another variable used to describe engagement in either farm work or non-farm works categorized as farming and non-farming in this study. It was found that 58.2 percent were in agriculture sector and other 41.8 percent (23) were engaged in various non-agriculture occupations prior to the death of women due to pregnancy related cause.

Health personnel attended is also dichotomized as 'yes' or 'no' responses in this study as gleaned the data source. The respondent upon reporting about the death of a member was asked whether women had died after health personnel attended her. To this this study found that 72.2 percent said seen and 27.8 percent said not at all attended by any health personnel.

4.1.3 Region and Areas

Region is the geographical division of country's 20 districts into three regions namely western, central and eastern. Among the region, western region reported highest maternal mortality of 52.7 per cent followed by central region with 25.5 percent and to one's much surprise the eastern region reported 21.8 percent (12) maternal death. This could be due to underreporting and other factors since maternal death is a rare event. In this study both central and eastern region were combined and altered as two regions. The combination of central and eastern region was found to be 47.3 percent.

Distance is the physical factor from the approach road, used as the time elapsed to reach a health facility from one's home. It implies the access to health care facility as well as the health care seeking behaviour among people, particularly women. In this study time in hours less than 30 minutes and more than 30 minutes categorized into two groups are used. It was found that 58.2 percent took <30

minutes to reach a health facility or to a nearest road and 41.8 percent reported more than 30 minutes.

Table 6: Percentage Distribution of Maternal Mortality by the last 12 months preceding the Census, 2005 by demographic and socio economic characteristic background

Characteristics	Categories	Percent
Demographic Characteristics		
Age		
	15-24	34.5
	25-34	43.6
	35-49	21.8
Residence		
	Urban	21.8
	Rural	78.2
Region		
	Western	52.7
	Central	21.8
	Eastern	25.5
Distance		
	> 30 minutes	41.8
	< 30 minutes	58.2
Marital Status		
	Married	56.4
	Other	43.6
Socioeconomic Characteristics		
Religion		
	Buddhist	78.2
	Other	21.8
Language Spoken		
	Dzongkha	21.8
	Other	78.2

		Condt.
Characteristics	Categories	Percent
Literacy		
	Literate	41.8
	Illiterate	58.2
Income Source		
	Salary/Wage	32.7
	Other	67.3
Occupation		
	Farming	58.2
	Non Farming	41.8
Health Personnel Attended		
	Yes	70.9
	No	29.1
Total	55	100

Source: PHCB 2005.

Dzongkhag wise distribution of pregnancy related deaths

In order to explore the distribution of pregnancy death of women of child bearing age, it was reported that Samtse Dzongkhag had highest pregnancy related death in 2005. The distribution showed that Samtse had 23.1 percent (9) deaths, followed by Thimphu (10.3%). Bumthang and Pemagatshel Dzongkhags interestingly did not report the pregnancy related deaths as per frequency distribution for each Dzongkhag.

Table 7: Dzongkhag wise calculation of MM Rate based on Pregnancy related death in 2005 by women of reproductive age (15 – 49) per 100,000 women.

Dzongkhag	MM Rate
Bumthang	-
Ha	-
Pemagatshel	-
Sarpang	-
Samdrup jongkhar	10
Paro	11
Thimphu	15
Trashigang	16
Chhukha	17
Tsirang	21
Monggar	22
Wangdue	27
Lhuentse	28
Punakha	44
Dagana	45
Zhemgang	46
Samtse	59
Trongsa	63
Trashi yangtse	71
Gasa	284

Source: Calculated by author.

To explain further the maternal death, the figure 2 depicts the disparity between the Dzongkhags in all the three regions. It was found that Gasa Dzongkhag in the Western region had the highest maternal mortality rate (MMRate), followed by Trashiyangtse in the East. The four Dzongkhags had no MMRate since no maternal deaths were reported in the data. The MMRate is high in Gasa Dzongkhag due to less population of women in child bearing age in particular and overall low population. While Samtse and Thimphu Dzongkhags had low MMRate due to relatively large population size and larger share of women in the reproductive age found in

particular. Furthermore, Samgrup jongkhar and Paro Dzongkhags had the lowest MMRate as shown in figure 3 below.

Figure 2: Maternal Mortality Rate (MMRate) by Dzongkhag
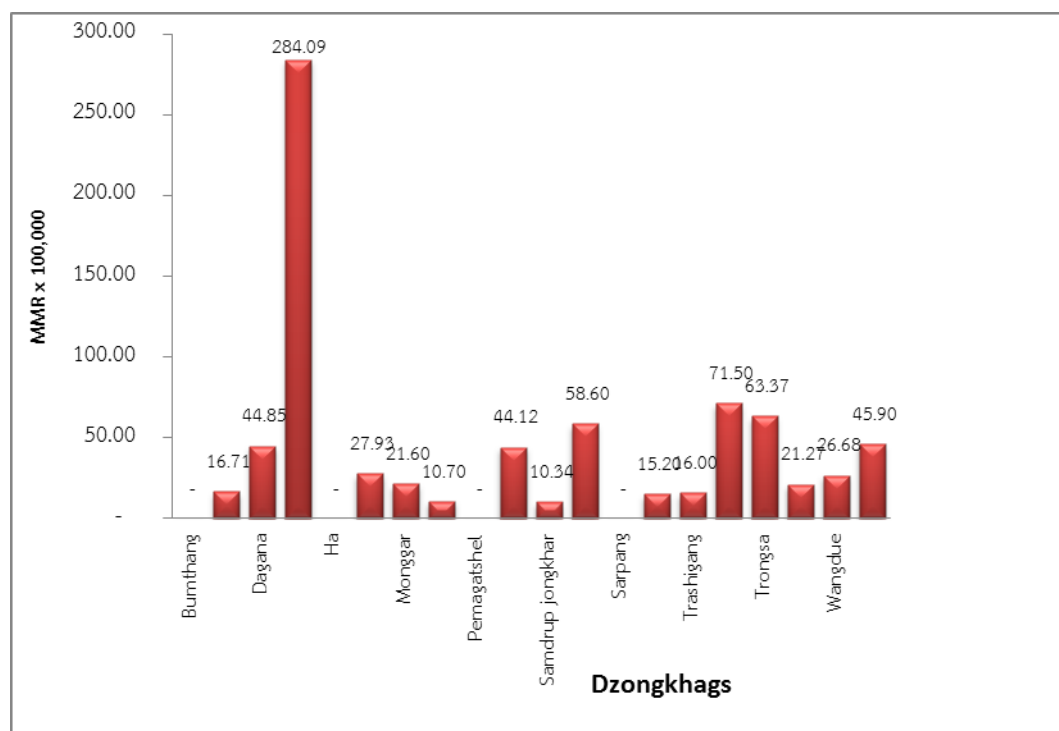
There has been disparity among the districts and even the two regions in terms of the health personnel attending to the patients especially the pregnant women and resulted in to maternal death. From the results, it was found that 30.8 percent (12) did not attend the health facility while 69.2 percent (27) had attended the health facility in their respective areas as reported in the census. Among those died were majority attended by the doctors.

As far as the number of health personnel and health care facilities were concerned, there were 145 doctors, 524 nurses, 210 Health Assistants and 171 Basic Health workers among others and there were 29 hospitals, 176 BHUs during the census period (MoH, 2006). The following indicators are to be used to further relate the situation prior to 2005 as far as the maternal health is concerned in Bhutan which is illustrated by the table 8 below.

Table 8: Health Indicator in 2005

Indicator	Coverage/description
Antenatal care	70 %
Home delivery	48%
Place of death	Hospital 59% and Home 41%
Age wise death	63 % between aged 20 – 29
Total Deliveries	13,302

Source: Annual Health Bulletin, 2006.

4.1.4 Region wise distribution of maternal death

The figure 3 below shows the distribution of pregnancy related death in the three regions of the country in 2005. As reported the maximum pregnancy death in a few western districts, the western region to contrary depicted the highest death while both Central and Eastern Bhutan reported lesser deaths.

Figure 3: Regional distribution of maternal death in percentage
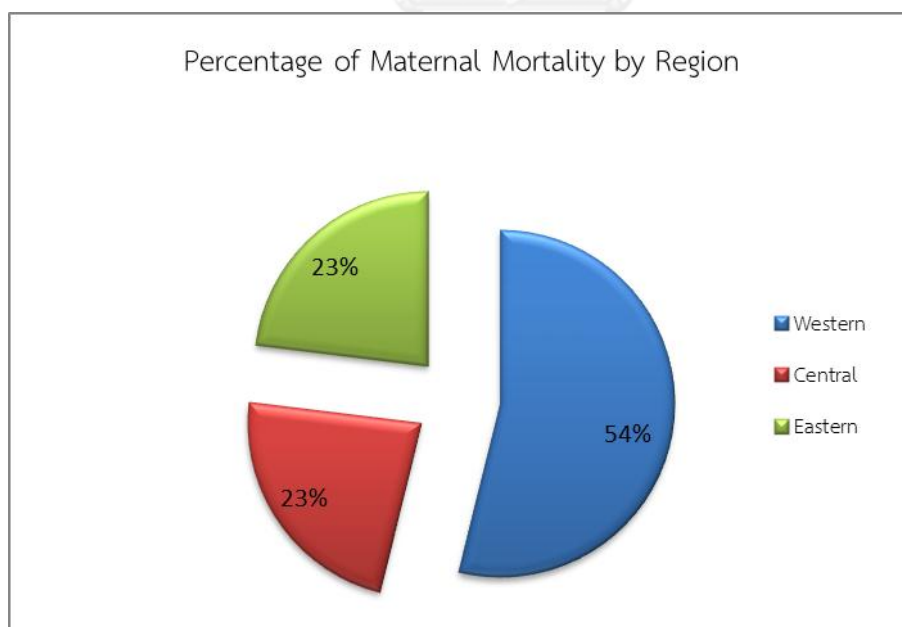
Maternal death by Approach Road

As shown in the table 9 below, the pregnancy death was more in the distance from the approach road less than 30 minutes (62.5 percent) as compared to 82.6 percent for the distance more than 30 minutes from the approach road point.

Table 9: Distribution of Pregnancy deaths by distance from the approach road

Variable	Non Pregnancy	Pregnancy death
Distance		
> 30 minutes	17.4%	82.6%
< 30 minutes	37.5%	62.5%
Chi =2.623 ; p = 0.105		

Source: Calculated by author.

4.1.5 Differences between Groups in the variables

Cross tabulation and Chi – square test for the variables performed to check the association between the dependent and explanatory variables in this study. The relationship is to be significant at 0.001; 0.01 and 0.05 level which is shown in the table 10 below their association with the pregnancy related deaths.

Except the Income source, literacy and occupation which were significantly associated with the maternal mortality in this study at p-value 0.05. Other demographic and socio economic variable were found not statistically significant in contributing to the maternal mortality since the alpha values are above the standard level. It is likely that the women with sources of income other than salary have died more from the maternal cause. Those women who were found to be illiterate and engaged in agricultural related occupation had died primarily of pregnancy related cause. Therefore, there are differences in the pregnancy deaths considering the three factors which several studies done earlier confirmed too.

Table 10: Percentage distribution of pregnancy death and Association (N= 55)

Dependent Variable	Pregnancy related death	
	Non Pregnancy	Pregnancy
Demographic Characteristics		
Age		
15-24	36.8%	63.2%
25-34	25.0%	75.0%
35-49	25.0%	75.0%
X^2 = .845; p. 0.655		
Residence		
Urban	41.7%	58.3%
Rural	25.6%	74.4%
X^2 = 1,177; p. 0.278		
Region		
Western	27.6%	72.4%
Central	25.0%	75.0%
Eastern	35.7%	64.3%
Chi = .427 ; p = 0.808		
Distance		
> 30 minutes	17.4%	82.6%
< 30 minutes	37.5%	62.5%
Chi =2.623 ; p = 0.105		
Marital Status		
Married	29.0%	71.0%
Other	29.2%	70.8%
Chi = .000 ; p = 0.991		
Socioeconomic Characteristics		
Religion		
Buddhist	32.6%	67.4%
Other	16.7%	83.3%
Chi = 1.149 ; p = 0.284		
Language Spoken		
Dzongkha	25.0%	75.0%
Other	30.2%	69.8%
Chi = 0.125 ; p = 0.724		

Condt.

Dependent Variable	Pregnancy related death	
	Non Pregnancy	Pregnancy
Literacy		
Literate	43.5%	56.5%
Illiterate	18.8%	81.2%
Chi = 3.967 ; p = 0.046		
Income Source		
Salary/Wage	50.0%	50.0%
Other	18.9%	81.1%
Chi = 5.671 ; p = 0.017		
Occupation		
Farming	15.6%	84.4%
Non Farming	47.8%	52.2%
Chi = 6.727 ; p = 0.009		
Health Personnel Attended		
Yes	30.8%	69.2%
No	25.0%	75.0%
Chi = .183 ; p = 0.669		
Total	55	

Source: Calculated by author.

4.2 Correlation

The findings show that occupation and employment show some strength of association and/or weak correlation. In the correlation matrix same variables across the diagonal are perfectly correlated as shown in the table below. There is weak correlation between and among the variables and several factors are negatively correlated and the multicollinearity effect is found to be the minimum.

Table 11: Correlation

	Pregnancy Death	Age	Residence	Region	Distance	Marital S	Religion	Spoken L	Literacy	Occupation	Income
Pregnancy Death	1	.106	.146	-.065	-.218	.001	-.145	.048	-.269*	.350**	-.321*
Age		1	.147	.353**	-.046	-.151	.088	-.088	.096	.103	-.037
Residence			1	.038	-.448**	.068	-.172	.066	-.266*	.445**	-.570**
Region				1	.120	.151	.352**	-.090	.187	-.056	.134
Distance					1	-.077	-.002	-.088	.270*	-.345**	.434**
Marital S						1	.157	.110	.077	-.003	-.089
Religion							1	.279*	.180	-.002	.275*
Spoken L								1	.177	-.088	.194
Literacy									1	-.327*	.508**
Occupation										1	-.430**
Income											1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Calculated by author.

4.3 Econometric Analysis

This section presents the binary logistic regression results as shown in table 12 demonstrates that significant association of the explanatory factors with the maternal mortality. The model shall be based on the significance of the variables. The model summary has pseudo R^2 of 17.6 and R^2 value with 25.4 per cent as it indicated the amount of variance in the dependent variable. In other words, the values are .176 and .256 suggesting less than 30 percent variability.

The result from table 12 revealed that the majority of demographic as well as socioeconomic variables are not statistically significantly associated with the maternal mortality even at p-value 0.05.

Age as one of the key factors of maternal mortality and mortality pattern in general was found to be insignificant from the results. The odds ratio for those women in age bracket 25 – 34 found to be 1. 23 more exposed to pregnancy related death since this age group women are in the peak of child bearing and endure greater pregnancy related complications or risks. It further showed positive beta of 0.20. On the other hand, those women in the older reproductive age have reflected the decreasing trend of negative beta of -1.53 that they are less likely to die.

The odds of residing for women of reproductive age in rural areas were 11.16 times likelihood of dying of maternal cause than those in urban areas keeping other factors constant. This holds the findings from the previous studies consistent. Further, the result shows that the being in rural area or villages there is positive of 2.4 times or greater chances of maternal death in comparison to being in urban area since women in Bhutan and elsewhere in the developing countries face poor access to health care in rural areas.

Occupation is one of the factors found to be significantly affecting the maternal mortality. The odds of being in non-farming occupation are 0.11 times less likely to face risk of maternal death than those in the farming occupation if all other factors are controlled. The beta has shown decreasing trend that those women in farming are facing the risk of maternal death relatively less and statistically significant that there was differences between pregnancy-related death of women in farming and non- farming occupations.

The findings from the table 12 show that the region is not statistically significant perhaps due to less variation in the occurrence of pregnancy related death or women disposed to risk of pregnancy related complications. There were decreasing pattern of risk of maternal death in central and eastern region as compared to the western region since the odds of being any of these regions is less likely with 0.27 and 0.66 respectively. This was perhaps due to reporting of more pregnancy related death in the PHCB 2005 data.

But in reality, however, there are disparities in terms of health care facilities and health providers in the regions that cater to maternal health care and manage pregnancy and child birth emergencies.

Table 12: Logistic Regression Analysis of factors affecting maternal mortality (PHCB 2005)

Variable	Log Coefficient	Odds Ratio (OR)	P - value
Demographic Characteristics			
Age			
15-24 ®			
25-34	0.208	1.232	0.838
35-49	-1.536	0.215	0.212
Residence			
Urban ®			
Rural	2.413	11.164	0.064
Region			
Western ®			
Central	-1.548	0.213	0.273
Eastern	-0.442	0.643	0.663
Distance			
> 30 minutes	0.976	2.655	0.333
< 30 minutes ®			
Marital Status			
Married	-0.347	0.707	0.679
Other ®			
Socioeconomic Characteristics			
Religion			
Buddhist	2.464	11.746	0.097
Other ®			
Language Spoken			
Dzongkha	-1.921	0.146	0.067
Other ®			
Literacy			
Literate	0.706	2.027	0.393
Illiterate ®			

Variable	Log Coefficient	Odds Ratio (OR)	Condt. P - value
Income Source			
Salary/Wage	0.81	2.247	0.474
Other ®			
Occupation			
Farming	-2.153	0.116	0.025
Non Farming ®			
Health Personnel Attended			
Yes	-0.565	0.568	0.524
No ®			
Total	55		

Note: * p <0.10; p<0.05; p<0.001. R^2 = 36.3%;   -2log likelihood = 50.181

Source: Calculated by author.

4.4 Discussion

Although there has been reduction in maternal death and substantial improvement in maternal health care, still the maternal mortality is relatively high in Bhutan vis -a -vis levels in other countries in south Asia and other developing countries owing to its small size population and free primary health care system, maternal death could be lowered substantially. The health care facilities are to be properly utilized by the women concerned through their reproductive stage.

It was reaffirmed that the only way to improve maternal mortality is by putting in place and strengthening the comprehensive approach that take into account cross-cutting issues of gender equality, raising women's status, women and girl education, alleviating poverty, elimination of teenage or early marriage and improving access and availability of maternal health care services and facilities.

Age as reflected from the results and also the previous studies found that more maternal death occurred to women aged 24 – 34 years. This is because of peak child bearing period and likely risk of complications and death.

The detail from table 10 reveals that more women from rural areas had experienced maternal death than the urban counterparts. However, the results show that greater number of women had died in rural areas. Further the statistical analysis shows there is no statistically significant association between the place of residence and maternal death (X^2 =1,177; p: 0.278). However on average majority maternal death reported by the respondents were from rural areas.

The table 10 indicates that there is more or less same distribution by region. However, there were more death reported from the western region mainly due to large respondents' base and also some death could have occurred in the health facilities upon referrals from other regions/areas before the Census. For example, Samtse and Chhukha dzongkhags reported more deaths.

The findings from the descriptive statistic reveal that pregnancy related death is higher in Western region while the Eastern region reported the lowest in contrary to the mortality pattern there. The possible explanation could be because of education and development levels. In Western region people are relative more educated than the other regions. Hence, the respondents might have reported accurately (Dorji, 2011).

Health care visit is indeed important in determining the health status of women in any reproductive age. The respondents who reported the number of women who died of pregnancy attended by health personnel is maximum for the doctors by actual count. This was perhaps the women reported for care at severe stage of complications or there was lack of equipment to manage the complication of pregnancy in the health facilities.

On an average those women who were attended or treated by 'other' category such as home delivery, TBAs, relatives revealed have died as per the respondents. This is due to the fact that more women had either not attended ANCs or never reported to health facility. Previous studies show that unless there is pregnancy related complications, a woman in developing countries in poor and marginalized societies hardly show up for the ANC visits.

Nevertheless, the social economic factors play key role in the life of pregnant women and then followed by other factors. Most concerns are on the causes rather

than on factors associated with the maternal death – very much preventable in view of the advancement in medical sciences and improvement in public health care today. It's just matter of commitment on the part of policy makers and support on the part of community concerned.

As far as the current situation of the health facilities and health personnel in Bhutan as reflected from the diagram below, the maternal mortality along with reproductive health and that of children would be better in future. There have been increase in the number of doctors, nurses and other medical personnel in the last 7 years as compared to the situation in 2005 or before.

In order to focus on the lowering or maternal mortality in a small country like Bhutan, the government and the donor agencies mainly from the UN systems have been assisting the health sector in promotion of institutional delivery; child birth to be attended by skilled birth attendants or midwives; and increase in emergency obstetric care (EmOC) services (Bhutan Millennium Development Goal Report, 2010). The strategies adopted are to decline maternal and child mortality toward MDG Commitment are promote institutional delivery, increase access to family planning service including the contraceptive uses, intensify information and education on reproductive and maternal health; and undertake reproductive health related research or studies (Bhutan MDG Report 2010) for to fill the gap of available literature.

Figure 4: The distribution of Health Personnel as of 2012 in Bhutan.
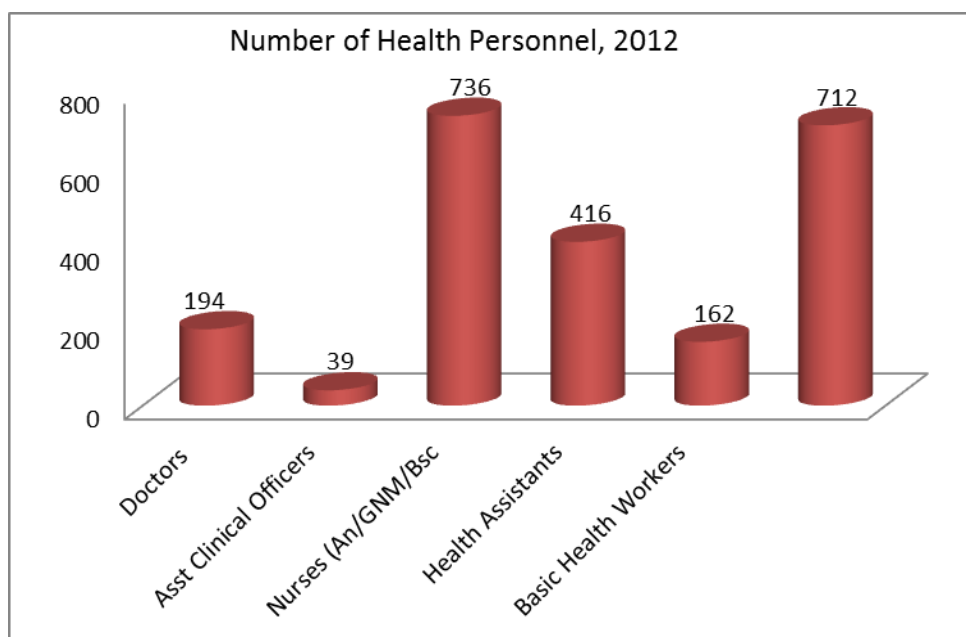
Source: Annual Health Bulletin, MoH, 2013

4.5 Limitation of the Study

This study has left gap for further research owing to limitation posed by the retrospective data gathered in the year 2005 as some important determinants are not captured in the data set to measure or estimate the key effects of causal factors on maternal mortality. Because of weak or unavailability of recent data and surveys focusing on the maternal deaths as well as related issues in the country for this study, key variables could not be included in this thesis and it would be worthwhile to take up both quantitative and qualitative studies in future to capture more details on maternal deaths and factors of reduction. Furthermore, the conduct of second round of decennial Population and Housing Census probably in 2015 as a follow up to the last PHCB 2005.

In addition, the maternal mortality data have been segregated from the causes of death along with other causes of death during one year period preceding the PHCB 2005 based on the knowledge of the respondents on the recall of events associated with the demise of members from his or her household or neighbourhood. So we cannot solely confirmed that the death cases reported under the 'causes of illness' be maternal in nature since many enumerators were from

non-medical or health backgrounds. The number of maternal death reported is relatively small vis – a vis other causes of death for the general population and also analyzes the maternal health outcome. However, there is limitation to use of pregnancy related death as determinants of maternal death owing to sensitive issue, especially correct identification of maternal death, which is fraught with significant underreporting of early pregnancy in several health or DHS surveys (Camphell, 1996).

In a way census data used in this study may not be consistent between the "objective indicators of health and subjective reporting of health" by respondents at household level as it leaves a gap of understanding of illnesses and biomedical categories of pregnancy related death in this case (see Lamb and Siegel, 2004). However, the discrepancy between objective and subjective information poses problem for reproductive health including the maternal death (Lamb and Siegel, 2004). There is also dearth of quantitative data to analyse the trend or levels of maternal mortality in Bhutan. Therefore, qualitative surveys as well as studies need to be carried out to gather the realities of maternal health status in the mountain kingdom of about 700,000 people.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In this research maternal mortality is one of the pressing issues in the developing countries despite interventions mechanisms put in by various countries in order to reduce the maternal deaths ever since the launch of Safe Motherhood Initiatives in 1987 and subsequent global platforms. The factors which affect or determine are being studied despite the limitations posed by the data set available in Bhutan for the present study. Indeed, the situation in Bhutan is not as alarming as elsewhere owing to the size and magnitude of the problem, the role of the health care and institution play a paramount role. In depth study if taken in collaboration with medical and health providers would help to draw insights as to whether the maternal health is viewed as a 'public health issue' and also considered as a 'medical problem' to be handled at the individual level (Camphell, 1996).

The scenario in Bhutan is impressive in a sense that almost universal free health services and education system – provided by the state since the launch of five year development plan (FYP) in the early 1960s. The Total fertility rate (TFR) was quite high prior to the 1990s has declined drastically from 6.5 in 1991 to 2.6 in 2005 in accord to PHCB 2005, it is likely attributed to delayed marriage and higher age at first birth and to some extent, an increase use of modern contraceptive methods as per BMIS 2010 (NSB, 2010).

They suggest two types of strategies as solution to prevent or reduce the maternal deaths: Medical care and family planning services.

It is worth mentioning that a small country like Bhutan relatively in better position to tackle the maternal health care could conveniently avert maternal death with increase advocacy and emphasis on antenatal care and timely management of pregnancy related complications. Previous studies demonstrate that the women

residing in the rural areas are at greater risk of inadequate ANC as compared with their urban counterparts in many developing countries. The institutional birth in health facility be further strengthened to reduce mortality of women in the reproductive age.

A study done by Suwal in Nepal mention that 80 percent of women still give birth at home in Nepal (Suwal, 2008). Likewise in Bhutan the Health Ministry provide that the far flung and women in rural areas prefer home delivery – which is one of the serious causes of maternal mortality. Suwal (2008) citing (Hieu, 1999) found from a study in Vietnam that even with good health care system, there shall be 'no blood available' or incorrect diagnosis of complications that would result in maternal death. To put the health system in place, there must be service delivery intervention and strengthen health network through proper human and financial resource distribution gearing to community driven services. Health system must be designed and implemented to meet the needs of most marginalized people and their participation. In Bhutan the maternal health is managed under the Reproductive Health Program of the Ministry of Health (NSB, 2009).

Age of women also matters. Previous studies suggest that maternal mortality is primarily associated with young age of women (Suwal, 2008). As the social norms in many parts of the world, marry early means conceiving early without realizing the risk of pregnancy related complication likely to result in loss of lives or maternal death as an outcome. So the solution is to marry late which also delay bearing children early and prevent from the risk of dying or even maternal disability or morbidity. One way to prevent the girls marrying early is to make education accessible and community or nation should promote the drive so that early becoming of motherhood be postponed. A similar study found that educated girls tend to marry late in Nepal (Suwal, 2008).

Challenges to reduce maternal mortality in Bhutan – although the country is on track to achieve its national and the MDG commitment pertaining to improvement in reproductive health, particularly the target set to bring down maternal mortality ratio by 75 percent, there are a few constraints to be overcome

as follow: shortage of skilled health personnel; lack of adequate obstetric equipment and facilities; dispersed settlement and difficult terrain; and lack of accessibility to health units, particularly in far-flung or remote areas, etc. (Bhutan Human Development Report 2002). However, a few of the challenges would be overcome with the construction of access and farm roads in many parts of the country to some extent. In addition, the country is facing problem of increasing youth and teenage population challenges pertaining to risky sexual behaviour and adolescent issues such as early marriage, teenage pregnancy, low use of contraception, sexually transmitted diseases including HIV/AIDS reported to be increasing among the adolescents. Furthermore, adolescent fertility is quite high as mentioned above due to teenage pregnancy, which was around 11 percent in 2005 (Commissioner, 2006). Women's death also affects the female labour force participation that she permanently withdraws from the labour market as well as household obligatio*n including the care of* her child or children. So at times it is a big loss for a family.

5.2 Recommendations

The maternal mortality relatively low in comparison to other developing countries of the world, the finding from this study in general provides platform to make a few recommendations in view of the factors found significantly influencing maternal mortality in the mountain country. It is in a way help the relevant agency of the government as well as community at large to strengthen and initiate possible policy or programmatic intervention or measures given the limitation of the data used. Many important factors not included in this study might be contributing to higher maternal morbidity or outcome which could capture the realities in Bhutan. A few of them are based on the significant findings hereunder.

Reduction of regional disparity in death from maternal cause: The regional differences are not very prominent in terms of the pregnancy death reporting. However, the rural areas in eastern Bhutan which are relatively less developed predispose more women of child bearing age to maternal complications. So women

and the communities need to support any women in such areas to prevent from the pregnancy outcome leading to death.

Strengthen Skilled Maternal and Child Health care: As far the reproductive health issue is concerned, remarkable progress have been made over the years. However, there are some areas not adequate to attain impressive achievement like safe motherhood, family planning, care for new born, prevention and management of abortion related complications, among other (M. o. Health, 2011b). The policy mechanism set out need to be further strengthened to improve maternal child health. The policy statement are as follows: "enhance access to equitable, quality and basic reproductive health and family planning information and services; improve provision of reproductive health services to the far flung or unreached population; promote participation and involvement of communities in providing RH and family planning services as done; and intensify providing comprehensive and quality maternal and child services" throughout the country.

As per the socio economic and health surveys such as BMIS 2010, the Adolescent Sexual and Reproductive Health (ASRH) is posing challenge to the govt. so govt need to address by strengthen youth and adolescent friendly RH services in order to minimize or prevent risky behaviour related unwanted pregnancies, spread of STD and HIV/AIDS and other associated problems. Awareness should be created to curtail the widespread in future.

Adoption of Strategy for reduction of maternal mortality: Although the maternal mortality as estimated to be 770 per 100,000 live birth in 1984 had been brought down to 255 in 2000 and less in 2010, it is considered as high in the context of public health indicators for a country like Bhutan. Moreover, Bhutan is on track to achieve the MDG Goal by 2015, there are avenues that the risk of maternal death could be further brought down to less than 100 per 100,000 live births as the case attained by several other developing countries over the years.

Family planning need to be made more people friendly by providing choice for accepting various contraceptive methods. The survey findings conducted in the recent past revealed that the contraceptive prevalence rate or CPR is quite

impressive with 69.9 percent (NSB, 2010) as cited in BMIS 2010. This shall at least reduce the unwanted and early pregnancies while helping young people to prevent from acquiring or contracting disease like STDs and HIV/AIDS towards reduction of maternal health problem ultimately associated with avoidable maternal risk of pregnancy related complications.

As far as the reproductive health policy based on the 10th Five year Plan (2008 – 2013) is concerned there were broad objectives outlined to reduce maternal and newborn mortality in the country: "to achieve the millennium development goals, mainly to improve the quality and accessibility of health services, develop adequate and competent human resource and enhance institutional delivery" among other (M. O. Health, 2011a).

Process indicators of maternal mortality - percentage of skilled birth attendance for delivery and rate of Caesarean Section: Based on the recommendation of the WHO, these two process indicators to be used as proxy to maternal mortality in absence of appropriate measurement of maternal mortality in the country.

Strengthen adequate health personnel and placement in rural areas: All the health centres need to be manned by skilled health care personnel including those with midwifery skills and more females. This is likely to increase the uptake of antenatal care and higher institutional deliveries.

Improve health service Quality: Finally the government and the community should strengthen the supply side of health care in the rural areas not only to narrow the disparity but also create more access to women and other people living in far flung areas. More trained health workers should be motivated to serve the rural and out of reach areas like Lunana in Gasa district to mention a few.

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APPENDIX

Appendix 1 :

BINARY LOGISTIC REGRESSION TABLE

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age1(1)	.208	1.020	.042	1	.838	1.232	.167	9.091
Age2(1)	-1.536	1.232	1.555	1	.212	.215	.019	2.407
Residence(1)	2.413	1.305	3.418	1	.064	11.164	.865	144.078
Region1(1)	-1.548	1.412	1.202	1	.273	.213	.013	3.386
REGION2(1)	-.442	1.016	.190	1	.663	.643	.088	4.706
Distance 2G(1)	.976	1.008	.937	1	.333	2.655	.368	19.160
Marital S(1)	-.347	.840	.171	1	.679	.707	.136	3.667
Religion2(1)	2.464	1.486	2.749	1	.097	11.746	.639	216.029
Spoken Language(1)	-1.921	1.048	3.359	1	.067	.146	.019	1.143
Literacy2(1)	.706	.828	.728	1	.393	2.027	.400	10.265
Income2(1)	.810	1.131	.513	1	.474	2.247	.245	20.604
Occupation2(1)	-2.153	.961	5.017	1	.025	.116	.018	.764
Health At(1)	-.565	.887	.406	1	.524	.568	.100	3.231
Constant	4.194	2.273	3.405	1	.065	66.260		

a. Variable(s) entered on step 1: Age1, Age2, Residence, Region1, REGION2, Distance2G, Marital S, Religion2, Spoken Language, Literacy2, Income2, Occupation2, Health At.

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Appendix 2 :

POPULATION AND HOUSING CENSUS OF BHUTAN 2005 QUESTIONAIRE

FORM PHCB-2D: HOUSEHOLD INFORMATION

Use the following type of numeric characters in writing:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

PART B: PARTICULARS OF THE DECEASED IN PAST 12 MONTHS | NOTE: PART B: Need not be filled in for institutional households and transient population)

SL. NO.	NAME OF DECEASED	SEX	RELATIONSHIP	AGE AT DEATH	OCCUPATION		ILLNESS AT DEATH	FOR WOMEN 15-49 WHO DIED	
Write serial number	Write the full name of the deceased	[1] Male [2] Female	Relationship of the deceased to the household head (Use code)	Write the age at time of death in completed years/months/days.	Write the Occupation at time of death	CODE For office use	Nature of illness or accident that caused the death (Enter code from the list below)	Did the woman die while pregnant, during delivery or within 42 days after giving birth? [1] YES [2] NO	If "Yes" in col. 9, mention the health professional who attended her before death? (Enter code from the list below)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

CODES FOR COLUMN 8: NATURE OF ILLNESSES AND ACCIDENTS

[01] Fever [02] Diarrhoea [03] Heart Disease [04] Stomach related [05] Measles [06] Pneumonia [07] Cancer

[08] Pregnancy related [09] Malaria [10] Road accident [11] Drowning [12] Accident at work [13] Natural calamity

[14] Animal/insect bite [15] Suicide [16] Other accidents [17] Violence [18] Others (specify)

CODES FOR COLUMN 10: HEALTH PROFESSIONAL

[1] Doctor [2] Nurse [3] Midwife [4] Others [5] None

VITA

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Stream: Arts

Year of Completion: 1995

Degree: Bachelor of Arts (Geography Honours)

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Year of Study: June 1996 – May 1999 (3 years)

Diploma: Post Graduate Certificate in Education (PGCE)

Samtse College of Education

Samtse, Bhutan

Year of Completion: 2000

Job Status

Current Position: Sr. District Electoral Officer

Office Attached: Gasa Election Office

Year of joining : 2006