Underlying Factors for Neonatal Mortality in Nepal

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Nepal

50th International Courses in Health Development
September 16, 2013 – September 5, 2014

KIT (ROYAL TROPICAL INSTITUTE)
Development Policy & Practice/
Vrije Universiteit Amsterdam

Underlying Factors for Neonatal Mortality in Nepal

A thesis submitted in partial fulfillment of the requirement for the degree of Master of Public Health

By

Indra kala Tamang

Nepal

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

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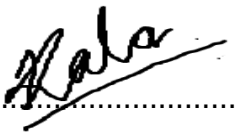
Signature:  .....

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Amsterdam, The Netherlands

September 2014

Organized by:
KIT (Royal Tropical Institute), Development Policy & Practice
Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/ Free University of Amsterdam (VU)
Amsterdam, The Netherlands

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ACKNOWLEDGEMENT

I would like to express my cordial gratitude to Dutch Government for granting me the Nuffic Fellowship for International Course in Health Development / Master in Public Health (ICHD/MPH) that helped me to update my existing knowledge and skills in public health.

I am indeed grateful to KIT (Royal Tropical Institute) and family for their constant support, guidance, encouragement and inspiration throughout the year and providing the learning opportunity. I would like to thank the Course secretary, Rinia Sahebdin for helping me in every delicate situation and her excellent coordination.

I am equally grateful to all my classmates, 50th batch ICHD/MPH for their support, sharing and caring attitude in entire the year.

I am thankful to the UNICEF WASH officer Mr. Siddhi Shrestha for accompanying me all the way for getting the Nuffic Fellowship, to UNICEF Health & Nutrition Officer Mr. Gyan Bahadur Bhujel for his encouragement and inspiration to upgrade my professional knowledge and skills and to Vision Dolpo Project Coordinator Mr. Kedar Binod Pandey for his valuable help and support.

I express my thanks to my husband, Mr. Ishwor Raj Dangol and family for their unconditional love, support and encouragement.

My special thanks and appreciation goes to my thesis advisor and back-stopper for their valuable generous support and guidance for successful completion of this dissertation.

Finally, I would like to thank my mother "Mother love is the fuel that enables a normal human being to do the impossible."

ABSTRACT

Background Neonatal mortality is a global public health issue, it accounts for about 41% of all under-five child deaths. The neonatal mortality rate in Nepal is 33 per 1,000 live births and this is stagnated from 2006 and 2011. There are several underlying factors that contribute to newborn death.

Objectives of this study are to analyze the underlying factors for neonatal mortality, and identify challenges and practical and cost effective initiatives to reduce the neonatal mortality in Nepal.

Study method of this study is literature review, searching electronic databases and relevant websites.

Findings concerned to underlying causes of newborn death in Nepal are socio-economic factors which include low education, harmful cultural practices, low socio-economic status, low nutritional status of women, maternal age, parity, accessibility of quality maternal and newborn health services, place of delivery and delivery conducted by skilled birth attendant, prematurity, low birth weight, hygiene, and health care seeking practice and other direct causes of newborn death such as infection, birth asphyxia, and hypothermia which were explored through underlying factors.

Conclusion Given the underlying factors for neonatal death; maternal age, birth spacing, deeply rooted cultural practice in newborn care, and maternal education are found to have significant association with neonatal death in Nepal. Even though the Nepal Government, Ministry of Health and Population have national neonatal health strategy and implemented several initiatives and programs recognizing existing newborn issues and trying to solve problems associated with neonatal health, Nepal is not able to bring desirable improvement. Therefore it is crucial to address the underlying causes of neonatal death through multiple interventions by multisectoral collaboration. The continuum of care of women thorough out their lifecycle and home based specific neonatal care are very important to improve the newborns' health and survival.

Keywords: Neonatal mortality, survival, maternal and newborn health, underlying factors, practices, childbirth, postnatal care, Nepal.

Word count: 13, 186

ABBREVIATIONS

ANC	Antenatal Care
BCC	Behavioral Change Communication
BEOC	Basic Emergency Obstetric Care
BF	Breast Feeding
BPP	Birth Preparedness Package
CB-IMCI	Community Based-Integrated Management of Childhood Illness
CB-MNH	Community Based-Maternal and Neonatal Health
CB-NCP	Community Based Newborn Care Package
CBS	Central Bureau of Statistics
CEOC	Comprehensive Emergency Obstetric Care
CS	Cesarean Section
DoHS	Department of Health Survey
EOC	Emergency Obstetric Care
EPI	Expanded Program on Immunization
FCHV	Female Community Health Volunteer
FP	Family Planning
GDP	Gross Domestic Product
GoN	Government of Nepal

HDI	Human Development Index
HF	Health Facility
HP	Health Post
HW	Health Worker
IEC/BCC	Information Education Communication
IUGR	Intrauterine Growth Retardation
KMC	Kangaroo Mother Care
LBW	Low Birth Weight
MDG	Millennium Development Goal
MNH	Maternal and Child Health
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic Health Survey
NGO	Non-Governmental Organization
NHP	National Health Policy
NHSP-IP	Nepal Health Sector Support Program- Implementation Plan
NMR	Neonatal Mortality Rate
NNHS	National Neonatal Health Strategy
NPC	National Planning Commission
NPHC	National Planning Health Commission
NVAP	National Vitamin-A program
PHC	Primary Health Care
PNC	Postnatal Care
RDS	Respiratory Distress Syndrome

SBA	Skilled Birth Attendant
SDIP	Safe Delivery Incentive Package
SES	Socio Economic Status
SGA	Small for Gestational Age
SHP	Sub Health Post
SLC	School Leaving Certificate
SLTHP	Second Long Term Health Plan
TBA	Traditional Birth Attendant
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VDC	Village Development Committee
WHO	World Health Organization

INTRODUCTION

I am Indra kala Tamang from Nepal, a student of the International course in Health Development / Master in Public Health (ICHD/MPH) at Royal Tropical Institute (KIT), Netherlands.

Professionally I am a nurse; I completed my bachelor in nursing with midwifery major in Nepal. I worked in a local Non-Governmental Organization (NGO) as a health officer in remote (Upper Dolpo) Nepal and also I worked as a maternal and neonatal Health (MNH) consultant in UNICEF in remote (Darchula) Nepal.

In my experience, women prefer to deliver at home rather than in an institution. There are various reasons for this such as geographical difficulties, distance, unavailability of service, unavailability of skilled service providers, lack of money, traditional belief, etc. Compared to institutional delivery, home delivery is unhygienic and more often conducted by unskilled attendants.

There is a lack of essential newborn care at home delivery such as clean delivery, early initiation of breast feeding, exclusive breast feeding, eye care, umbilical care, maintaining warmth, care during illness, and immunization, etc. Mothers and family members are unable to identify potential danger signs. I also observed high risk practices around new born care such as immediate bathing, the cord being cut with a sickle, household knife with a non-boiled blade, and application of breast milk, ghee, oil, wheat flour, turmeric, etc. on umbilical stump. Newborns were fed honey, animal milk, and or ghee before initiation of breast milk. This practice can indirectly result in newborn morbidity and mortality.

I witnessed several newborn deaths within one month in my working area and it is not only the issue of community also the issue of nation and global because we are losing 60 newborns every day in Nepal and 450 newborns every hour globally due to preventable causes. In this study I would like to explore the underlying cause of neonatal death in Nepal.

CHAPTER 1: BACKGROUND INFORMATION OF NEPAL

1.1 Geography and population

Nepal is small developing landlocked country in south Asia bordered by two large countries, China to the north and India to the east, west and south. The area of the country is 147,181 square kilometres. Topographically it is divided into three distinct regions, namely mountainous which covers 15%, hilly, covering 68% and plain (Terai) covering 17% of the land area of the country. According to world population review 2014, the estimated population is 28 million. More than 80% reside in rural areas. The population growth rate is 1.35% annually and the total fertility rate is 2.6 per woman according to Nepal Demographic Health Survey (NDHS) 2011. An estimated 9.18% of the population is under the age of five (CBS 2011).

1.2 Socio-culture

Nepal is a multicultural country with there a variety of religions, castes and languages. More than 80% of the population is Hindu and the rest are Buddhist, Kirat, Muslim, Christian and others. There are 126 recognized ethnic groups/castes recorded by the 2011 census. The caste system is basically rooted in Hindu religion. Nepal is a multilingual country but the official language is Nepali (CBS 2011).

Nepal has a patriarchal society and high gender inequality leading to low women's empowerment in terms of poor decision making power and negotiation skills regarding access to health services, information resources, education and household resource mobilization. These further result in domestic sexual violence against women, deprivation from education, and poor utilization of health care services by themselves and their children. Involvement of women in decision making at the household and higher levels is limited in Nepal.

1.3 Economy

Nepal is one of the poorest country in the world with a low Human Development Index (HDI) value of 0.540 and in 145th position in HDI rank out of 187 countries according to the Human Development Reports UNDP 2014. Gross Domestic Product (GDP) per capita is 750.0 US Dollars. GDP

growth rate is declined to 3.6% from 4.8% in 2013 (World Bank 2014). Most of the people rely on agriculture as 76% of households are involved in agricultural activities. Remittance is second major income source of Nepal, with 55.8% of households receiving some sort of remittance. More than 25% of the population lives under the poverty line (NPC 2012).

1.4 Political situation

Nepal has suffered from political upheaval and armed conflict for almost two decades. The Nepal communist party started an insurgency in 1996 against the government with demands that included inclusion of marginalized people and establishment of a republican constitution assembly. The long armed conflict ended in 2006 with processes including rehabilitation, reconciliation by integrating of armies to maintain piece, sharing of power among major parties and developing a new constitution. The constitution's lead to restructuring of Nepal into a federal state but the assembly failed to deliver the new constitution to the Nepali people within the given timeframe. After election of the constituency assembly in 2008 the 240 year long monarchy was abolished and the independent democratic republic nation of Nepal was announced. Nepal is now in a transition phase.

The armed conflict affected both public health and the health system of Nepal. Many people were killed, injured and displaced at that time and there were increases of infectious disease. More than 1,000 rural health facilities were destroyed, with many health workers killed, kidnapped, harassed, threatened, or prosecuted by the warring factions. Health workers were restricted from moving from one place to another by Maoists. Conflict hindered the health program implemented by government and NGOs (Devkota, B. and Teijlingen, E.R. 2010).

1.5 Education

The literacy rate of Nepali people is 65.9%, varying from 86.3% in the capital, Kathmandu, to 47.8% in the remote district of Humla. The male literacy rate, at 74.1%, is much higher than the female rate, at which is 57.4% (NPHC 2011).

1.6 Health system

Nepal has a comprehensive framework in regards to health policy, plan and strategies such as the National Health Policy, Second Long Term Health Plan

1997-2017 (SLTHP), and 20 year perspective plan which includes strategies to improve the efficiency and effectiveness of the public health care system (MoHP, 2014). The National Health Sector Program - Implementation Plan 2004-2010 (NHSP-IP) provides operational guidelines to implement health strategy. Similarly, second Nepal Health Sector Program-Implementation Plan 2010-2015, focuses on the improved health and nutritional status of socially marginalized Nepali people (NHSSP, 2012).

The Ministry of Health and Population (MoHP) developed National Health Policy (NHP) in 1991. The major objective of NHP was to improve health status of the rural population by extending basic primary health services and focusing on health infrastructure, multisectorial coordination, local resource mobilization and decentralized planning and implementation. Nepal was committed to providing basic health care by adopting Primary Health Care (PHC) approach in line with the Alma Ata Declaration, 1978 to which Nepal was a signatory. Priority was given to preventive, promotive and curative health services to decrease infant and child mortality. The Department of Health Services (DoHS) is responsible for delivering these services which is under the Ministry of Health and Population. The current organizational structure of DoHS includes seven division and five national centers. Volunteer cadres; Female Community Health Volunteers (FCHVs) are working at the grass roots level. Sub Health Posts (SHP) at the village Development (VDC) level are the first contact point for health services. The network of health services goes from SHP to health post (HP) to primary Health Care Centre (PHCc) to district, zonal, regional and tertiary hospitals (DoHS, 2013).

It is very difficult to deliver health services to all due to geographical difficulties. Only 52% of the population are within 30 minutes walking distance of health facilities in Nepal. In the Mountain Region, 4 of 10 individual have to travel 1-4 hours to reach the nearest health facility. Similarly, in Hill Region 3 of 10 individuals have to travel 1-4 hours to seek health services from Sub-Health Posts or Health Posts (NHSP-IP, 2010).

Expenditure in health remains 5.3% of GDP and per capita annual health expenditure is $18.09. More than 55% of total health expenditure is financed by out of pocket payments (NHSP-IP, 2010).

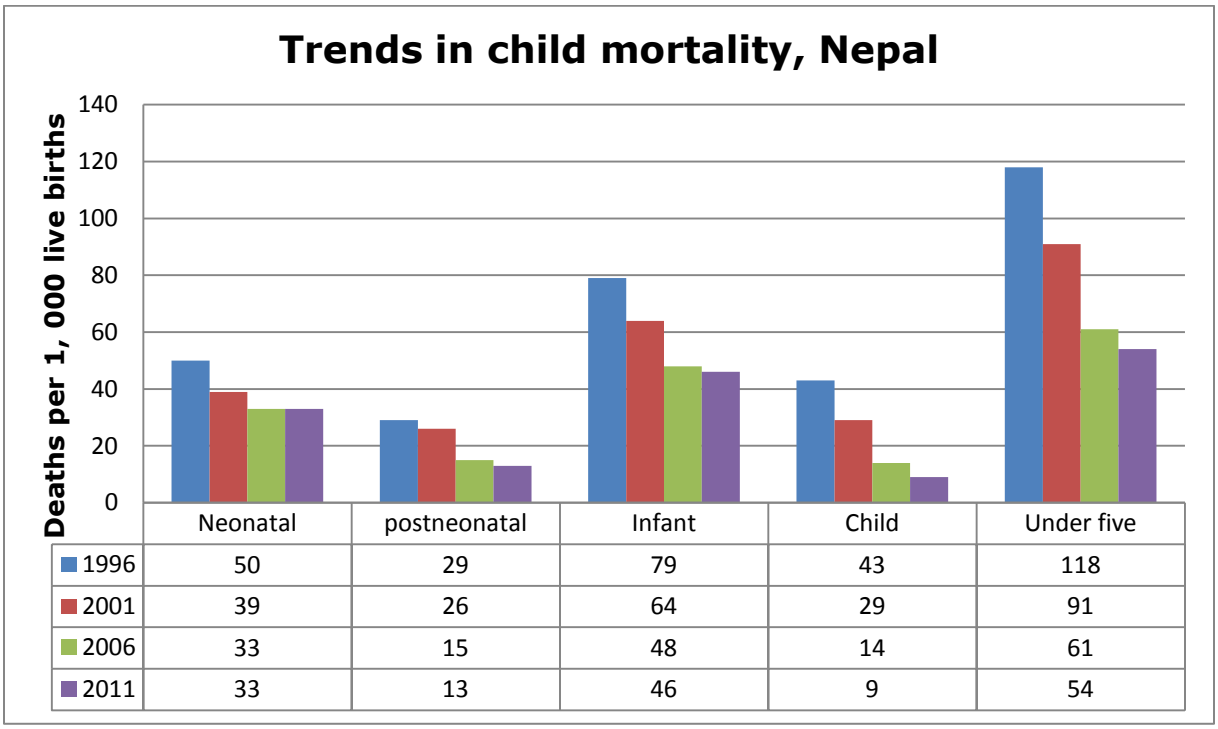
CHAPTER 2: PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES AND METHODOLOGY

The term neonate refers to a live birth new born baby from birth to 28 completed days of age. The neonatal mortality rate (NMR) is the number of live birth babies who die in the first 28 days after birth per 1,000 live births (WHO 2009). Worldwide 8.2 million children die annually before reaching their fifth birthday, around 2 million die within 24 hours, 3 million within 7 days and 3.3 million within 28 days after birth. Globally 450 neonates die every hour. It is a global public health issue and highly concentrated in developing countries; around 99% of newborn death occurs in low and middle income countries. The highest number of newborn deaths occurs in South Asia and Sub-Saharan Africa (Lawn, Cousen & Zupan 2005). Globally, three major causes account for neonatal death; infection (36%), prematurity (28%) and birth asphyxia (23%) (WHO 2011).

Nepal is on target to meet the Millennium Development Goal (MDG) for maternal and child health in spite of high level of poverty, poor infrastructure and political instability. Mortality rates such as neonatal, infant and under-five are important indicators for a nation's socioeconomic development as well health status. Approximately 35,000 under five children die in Nepal every year, with almost two third of these deaths occurring in the neonatal period (Y. Pradhan et. al 2012).

According to the Nepal Demographic Health Survey (NDHS) 2011, the neonatal mortality rate is 33/1,000 live births. The under-five child mortality rate fell over 15 years (from 1996 to 2011) from 118 to 54 per 1,000 live births. Infant mortality declined by 42% (from 79 to 46 per 1,000 live births) over the same period. Neonatal mortality is decreased by 34 % (33 from 50/1,000 live births) in this period and so shows a slower reduction compared to infant and under five mortality.

Figure 1: Trends of child mortality in Nepal.



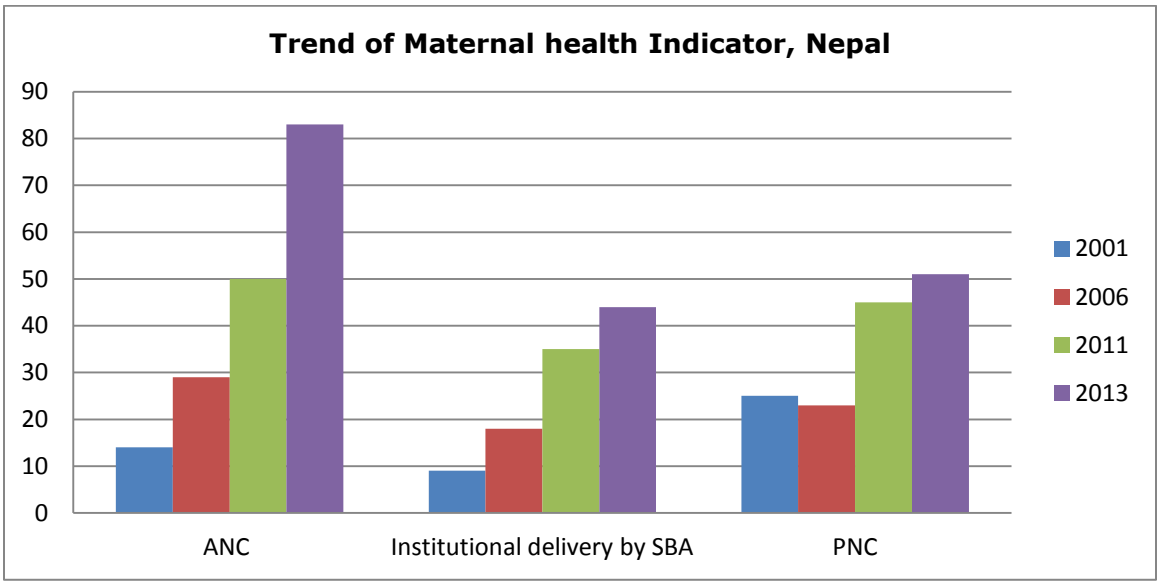
	Neonatal	postneonatal	Infant	Child	Under five
1996	50	29	79	43	118
2001	39	26	64	29	91
2006	33	15	48	14	61
2011	33	13	46	9	54

Source: NDHS, 2011

Nepal is moving in the right track to achieve millennium development goal 4 based on progress seen in under five mortality rates. Neonatal mortality had been stagnated at 33/1,000 live births from 2006 and 2011. Although impressive gain in under-five child mortality, it is challenging to meet the target of neonatal mortality rate at 16/1,000 live births by 2015.

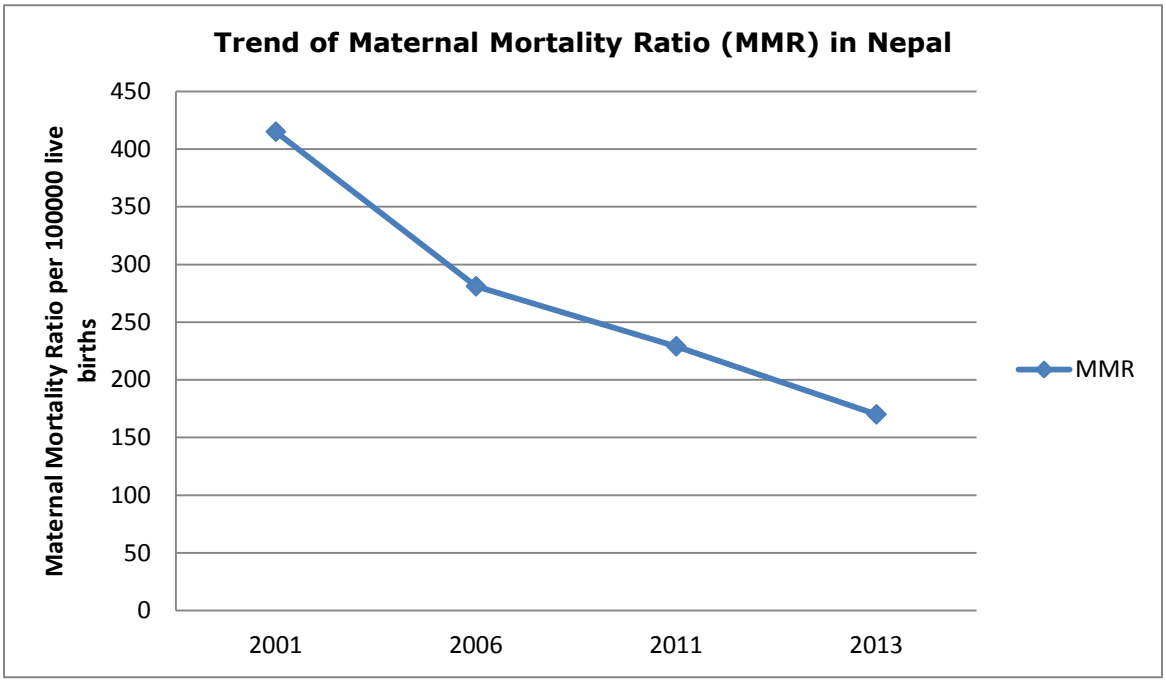
The Department of Health services (DoHS) 2013 showed that there had been a significant reduction in maternal death compared to the Nepal Family Health Services 1996 (reduced to 170 in 2013 from 539/100,000 live births in 1996). Despite the improving trend in maternal health indicators; antenatal care, institutional delivery by Skilled Birth Attendants (SBA), maternal death and postnatal care, and the Neonatal Mortality Rate (NMR) have remained stagnant over the past five years. Therefore I would like to choose this topic to explore the underlying causes of newborn death and analyze the challenges to improving the newborn health and to identify priority approach to improve newborn survival.

Figure 2: Trend of Maternal Health Indicators in Nepal.



Source: DHS, Nepal 2001, 2006, 2011, DoHS 2013

Figure 3: Trend of Maternal Mortality Ratio in Nepal



Source: DHS, Nepal 2001, 2006, 2011, DoHS 2013

2.2 General Objective

The main objective of this paper is to explore the underlying factors for neonatal mortality and to review the major challenges in improving the health of neonate of Nepal as well as to investigate possible initiatives.

2.3 Specific Objective

- To identify the underlying factors for neonatal mortality in Nepal.
- To identify initiatives in improving the neonatal health in Nepal.
- To review the existing challenges in improving the neonatal health in Nepal.
- To provide recommendations to policy makers in order to improve the survival of neonates in Nepal.

2.4 Methodology

The method of this study is descriptive. A literature review included scientific articles, documents, books, research articles and on-line publications related to the topic. Various electronic databases searched such as Pub Med, Google scholar, and Medline by using key words reflected in the theoretical framework. The data and information were obtained from NDHS 2011, DoHS 2012, country progress and review reports, survey data, and reports from websites of Nepal government ministries, WHO, UNICEF, UNFPA, Save the Children, etc. were visited to find new articles and evidence based practices.

The literature review was done to analyze the major factors of newborn death, and to identify the challenges in improving the survival of newborns in Nepal. After describing the factors, I studied interventions already performed in other countries in order to identify the applicable best practices for improved health status of newborns in Nepal.

Key words used to search include: neonatal mortality, neonatal morbidity, newborn survival, newborn care, hypothermia, birth asphyxia, breast feeding, infection, sex of neonates, gestational age at birth, birth weight, birth spacing/order, place of delivery, type/mode of delivery, skilled birth attendant (SBA), birth complications, postnatal surveillance, hygiene, care seeking practice, maternal emancipation, nutritional status of mother, maternal occupation, maternal age, birth spacing, household structure, health system factors, quality of neonatal health services, human resource, instrument, equipment, supplies and medicines, competence of service

provider, socioeconomic determinants such as ethnicity/culture, religion/conceptions, education/skills and economy/wealth, Nepal.

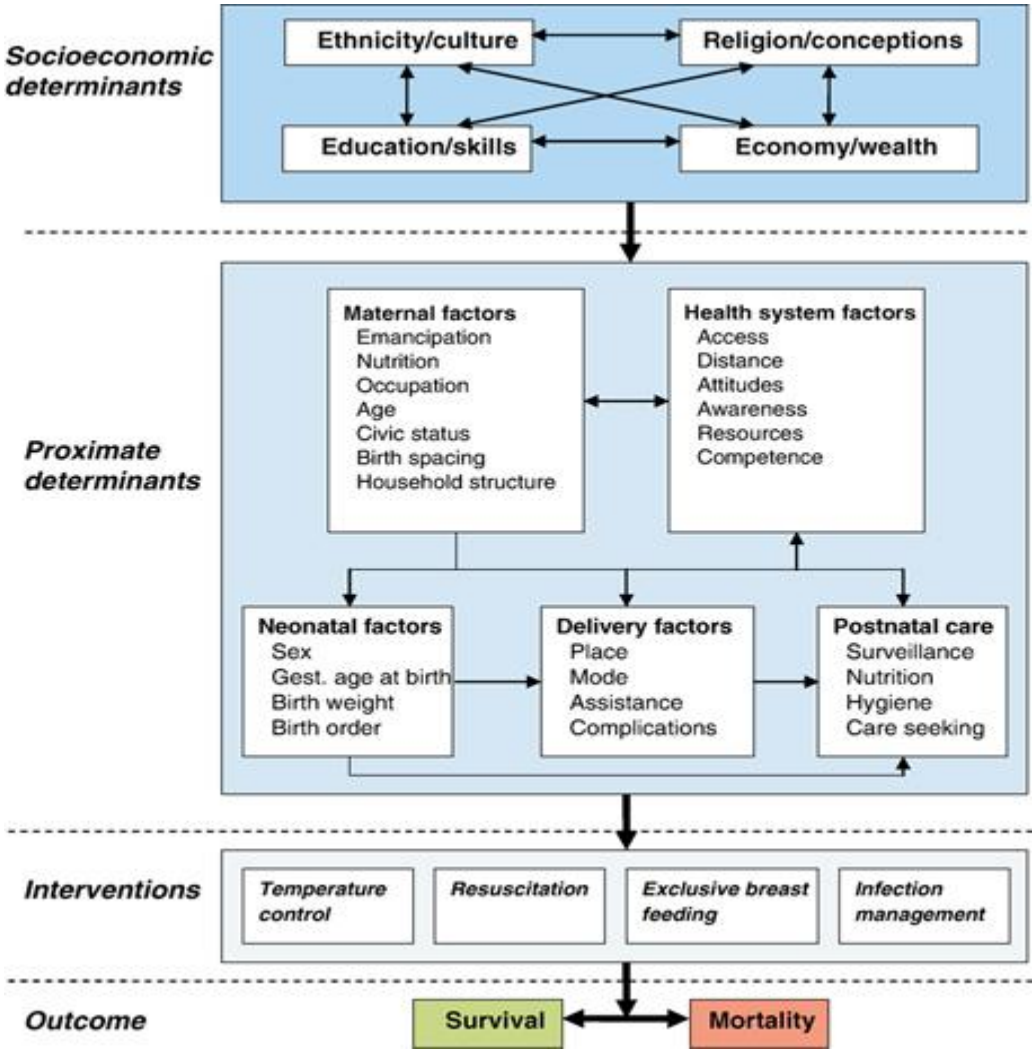
2.5 Conceptual Framework

There are many conceptual frameworks used in public health such as a framework developed by UNICEF that explains various interrelated causes of maternal and neonatal morbidity and mortality. Some frameworks articulate multiple aspects of maternal mortality, and factors influencing child mortality which may or may not focus on neonatal mortality. However, there are few conceptual frameworks that have illustrated underlying factors contributing neonatal morbidity and mortality.

To analyze the contributing factors for neonatal death, Mosley and Chen's (1984) conceptual framework was used in this study. This framework was originally developed for the study of the determinants of child survival in developing countries and grouped into socio-economic determinants and the proximate determinants creating hierarchy in a single framework. Later model has been adapted by several authors to analyze causes of maternal mortality, and neonatal mortality. The framework adopted for this thesis (figure 1) was further adapted by Malqvist, M. (2011) for the analysis of factors influencing neonatal mortality in Vietnam.

Malqvist modified some terms in the socio-economic determinants subset, and adapted the religion/conceptions to show the effects on newborn survival and also showed the interrelation of each factors in this section to make it more suitable for study. Similarly, he added health system factors in proximate determinants and the environmental factors proposed by Mosley and Chen represented by neonatal factors, delivery factors and postnatal care factors which could be very important factors affecting neonatal mortality. The adapted model is used in this study to explore the underlying factors of neonatal mortality and to provide recommendations to improve the situation of neonatal health in Nepal.

Figure 4: Conceptual framework for factors influencing neonatal mortality.



Source: Malqvist, M., 2011, adapted from Mosley and Chen, 1984.

The socioeconomic determinants in the model are ethnicity/culture, religion/conceptions, education skills and economy/wealth. All factors are interrelated and affect each other. For instance, level of education affects wealth generation and at the same time good financial status of household increases the possibilities of better education. Educated individuals are more likely to be engaged in paid work. They may have a better socioeconomic level which could positively impact child care and survival (Vishnu K., et al 2013). Religious belief also affects the neonatal health and chances of survival.

Since looking at given proximal factors; maternal and neonatal factors such as nutritional status, child bearing age, education, occupation of mother and

prematurity, low birth weight, congenital malformation, birth spacing, and sex of new born affect the outcome of newborns health. Similarly health facility factors, such as quality of maternal and neonatal service including availability of resources, competency of health workers, responsiveness, geographical location, and cost required for health service utilization affect the provision of newborn health service. Factors related to delivery such as place, assistance from Skilled Birth Attendants (SBA), complication management such as resuscitation for birth asphyxia, management of hypothermia, infection prevention and postnatal care including breast feeding practice affect neonatal morbidity and mortality.

CHAPTER 3: FINDINGS AND ANALYSIS OF UNDERLYING FACTORS OF NEONATAL MORTALITY IN NEPAL

Under this chapter, findings regarding intervention, proximate determinants and socioeconomic determinants of neonatal death will be described and analyzed with the framework.

3.1 Intervention

Direct causes of neonatal death are influenced by proximate determinants which will be explained in the next chapter. Death and survival of neonate depends upon the care and response provided to newborn's need and threats to health. In this framework, all factors; temperature control, resuscitation, exclusive breast feeding and infection management under intervention will not explained and analyzed in detail but will be explored as underlying causes through proximate and socioeconomic determinants. Initiatives adopted by Nepal to improve newborn survival and other successful evidence based initiatives from other countries will be presented in chapter four. The main direct causes of neonatal death worldwide as prioritized by WHO are hypothermia, birth asphyxia, infection, prematurity/LBW (WHO, 2011b). These factors are unavoidable with neonatal death and survival.

Most of the intervention do not require advanced or costly technology since they are uncomplicated. Some very simple and effective interventions such are breast feeding within an hour of birth, exclusive breast feeding, wiping, drying and wrapping immediately after birth, and "kangaroo mother care (KMC)" where the mother or care taker carries the newborn against her skin. It is an effective and safe alternative to conventional neonatal care for LBW; birth weight less than 2,500 grams regardless of gestational age to prevent hypothermia, and sepsis in an under resourced setting (WHO 2011d).

The Nepal Demographic Health Survey 2011, showed that 59% newborns were wiped, 62% wrapped with clothes, 45% breast feed within one hour after birth, 70% of children under six months are exclusively breastfeed, and only 10% are placed on mother's belly or breast immediately after birth in Nepal. Although KMC has several advantages, it is not widely used by health

facilities in Nepal. It might be due to lack of training to service providers and low enforcement of guidelines by MoHP, Nepal.

3.2 proximate determinants

The proximate determinants in the framework are divided into five groups. In this model, maternal factors and health system factors are placed above the other factors because these two factors have significant impact on the other three groups as well as on newborn survival. For instance, women's autonomy, decision making and negotiation skills have significant effects on the place of delivery, health care seeking during delivery and postnatal period from skilled health service provider in Asian countries (Fotso J.C., et al., 2009). Similarly, the health system characteristics such as quality of care, availability of services, accessibility in terms of distance and user's fees and attitudes of service provider influence place of delivery and postnatal care for newborns (Waiswa P. et al., 2009).

3.2.1 Maternal Factors

Maternal factors may have great impact on neonatal mortality. Maternal age, occupation, nutritional status, household structure, and birth spacing are crucial demographic factors that influence newborn survival.

3.2.1.1 Emancipation

The level of women's emancipation plays an important role in deciding the place of delivery and the person who is assisting the delivery (Malqvist, M. 2011).

There is gender imbalance in Nepali society and women are less empowered and their involvement in decision making activities is very low (Joshi, R. 2013). Women cannot take decision to utilize domestic resources; they have to take permission from their husbands or mothers in law even to seek health care for themselves and their newborns. This is more common in rural areas and the mid-and far-west region than in urban and eastern regions of Nepal.

Women can't freely move and do negotiate with family members which leads to low access to health information and utilization of health services. When the mother is empowered, her children will benefit in terms of nutritional outcome and preventive health behavior (UNICEF, 2011).

3.2.1.2 Nutrition

Nutrition plays an important role in both maternal and child health. Maternal nutritional status during and before pregnancy helps to define the health condition and survival of mother and her baby during delivery and beyond. Maternal nutritional status and birth outcome may be influenced by socioeconomic factors. Poor socioeconomic status that influences quality of dietary intake can result in chronic malnutrition as well as multiple rather than single nutrient deficiencies.

Short stature (height below 145 cm) and low body mass index indicates the nutritional status of women. Short stature reflects poor nutritional status during childhood. Short stature is associated with narrow pelvic size so it is a risk factor for obstetric complications and poor birth outcomes (Abu-Saad, k. and Fraser, D.2010).

More than 50% of pregnant women and 30% of non-pregnant women suffer from anemia globally (WHO 2011). For example, single nutrient iron deficiency anemia which increase the risk of excessive bleeding during or after child birth which contributes to 20% maternal death. Poor Nutritional status of the mother also increases the probability of low birth weight (LBW), prematurity, and neonatal death.

In Nepal, 18% of pregnant women are undernourished and 14% are overweight. Women from the lowest wealth quintile, mountainous region, western and far western regions, illiterates and adolescents are vulnerable groups for malnutrition in Nepal (NDHS 2011).

3.2.1.3 Occupation

Occupation, economic status of the household, and education of mother are interrelated and affect the newborn survival. The income of employed mothers may have a positive impact on child mortality as they are likely to spend more money for care of their children. At the same time, social status gained through jobs may affect child survival as women and children may be treated in a respectful manner by family members and such women also become empowered. Similarly working outside from home provides opportunities to get information, interact with different people or up to dated information through different media regarding health and child survival topics.

On the other hand, an employed mother can't stay longer time at home, consequently poor breast feeding, poor mother and child bonding and less care to their child would have adverse effects. It is also associated with the nature of occupation which is mostly depends upon the qualification of women.

In the context of Nepal, 41% women don't have formal education and only 5% have more than secondary school education (NDHS 2011) and it is difficult to enter the labor market for a paid job without proper qualifications. The agricultural sector is major employer; 75% women are engaged in agriculture in Nepal (NDHS 2011). Agricultural activities are quiet strenuous compared to formal jobs. Strenuous physical activities affect fetal development during pregnancy by not allowing adequate fetal circulation which diverts to other parts of the body mostly involved in excess movement. It may result in premature birth and LBW which pushes newborns to greater risk of death.

3.2.1.4 Age

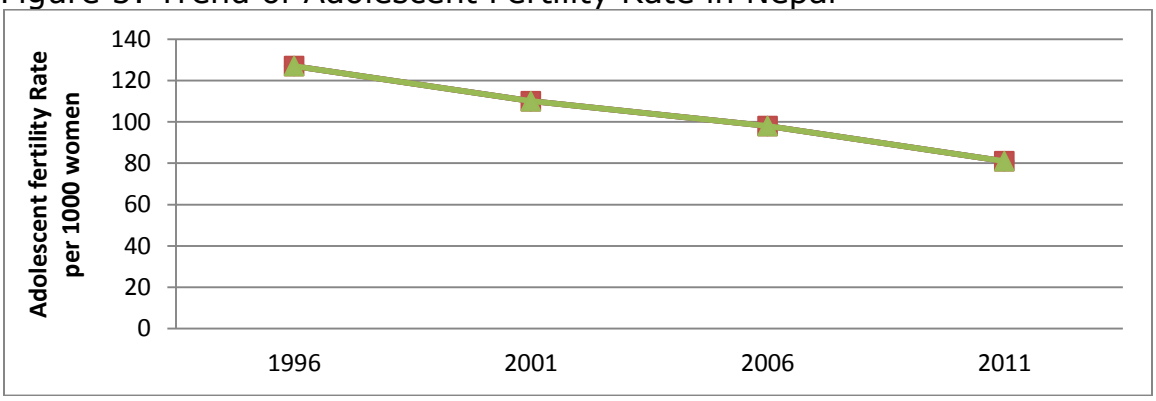
Too early and too late first pregnancy have poor pregnancy and childbirth outcomes including child care practices (March of dimes, 2012). Adolescence is the time for pubertal changes and growth spurts; 45% of adult weight and 15% of height is attained during this period. Since adolescent (aged 11-19 years) mothers are more likely to be poor physical growth and development including reproductive system, less educated, poor, less social support during antenatal and postnatal period and they are more prone to consume alcohol and smoke than matured women (Sharma, v. et al., 2008).

Early marriage leads to early pregnancy, and has several adverse effects on mothers and their newborns. Newborns from adolescent mothers are at 50% higher risk of death compared to newborns from matured mothers (WHO 2008). It was found in India that the proportion of LBW among teenage pregnancies and mothers aged over 30 years was higher compared to others (Kaushal, et al., 2012). A baby born from a teenage mother is two times as likely to have LBW and has three times the risk of newborn death in Nepal (Dangal, 2004).

Globally, 34% of young women aged 20-24 were married before 18 years of age, 46% in South Asia and 37% in Sub-Sahara Africa were reported in 2010. It is different between countries; 75% in Niger, 66% in Bangladesh, and 29% in Latin America (UNFPA, 2012). In Nepal, 41% women aged 20-24 years were married before their 18th birthday (NDHS, 2011). The

Adolescent fertility rate is also high in Nepal which is decreasing but only slowly pace.

Figure 5: Trend of Adolescent Fertility Rate in Nepal



Source: NDHS, 2011

Globally 13% of maternal death is attributed by adolescent pregnancy (WHO 2008). Similarly, in Nepal, the adolescent pregnancy rate is 81 births per 1,000 women (NDHS 2011). Adolescent pregnancy and childbirth contribute to 18.9% of maternal deaths (WHO 2007). Only 13% of adolescents from rural areas delivered at HF compared to 70% for urban adolescents (WHO 2007). This may be due to low awareness, lack of information, inaccessibility of health service by SBA, low SES, under-valued adolescent pregnancy and childbirth by households and communities. Pregnancy of still growing girls requires more nutrition for both mother and fetus which places teenage mother greater risk of being malnourished, with pregnancy and child birth complications.

In Nepal, although the legal age for marriage is 18 years for both sexes with parental consent and 20 years without parental consent, marriage occurs at early ages. The trend of marriage is influenced by numerous factors in Nepal such as ethnicity; the mean age for marriage among Brahmin girls is 13.5 years and 17.5 years is the average age among Tamang girls (Kafle, P.P. et al., 2010). The median age for marriage among women is 17.5 years in Nepal (NDHS 2011).

A study done by Ojule J.D and colleagues in Nigeria in 2011 reported that there is an association between advanced maternal age and childbirth outcome. 10.8% of advanced aged primigravida women gave premature birth compared to 5.1% of young primigravida women.

First pregnancy at 35 years and above is a risk indicator for pregnancy and child birth complications such as miscarriage, ectopic pregnancy, twin pregnancy, chromosomal abnormalities, and hypertensive disorder during pregnancy, prolonged labour, obstructed labour, antepartum and intrapartum fetal demise, LBW and neonatal mortality.

A study done by Neupane S. and Doku, D.T in 2014, in Nepal showed that babies born to older women had a higher risk of newborn death. On the contrary, a previous study done by Adhikary and Sawangdee in 2011, in Nepal showed that babies from mature women are less likely to die. I would support that babies who are born to early aged mothers are greater risk of death as concluded in Adhikary and Sawangdee's study because they used a different age categorization. Looking at the findings first pregnancy in adolescent age and above 35 years is risk for newborns.

3.2.1.5 Civic status

Infants born to unmarried mothers face higher risk of poor outcomes than those born to married mothers. Women who give birth outside the marriage tend to be more disadvantaged than their married counterparts before and after births (Child Trend Data Bank, 2013). Unmarried mothers generally have low education, poor economic status and are less valued by society. Married women are more likely to get adequate antenatal care, health care during child birth and postnatal period from family members and are less likely to consume alcohol and smoke (Child Trend Data Bank, 2013). A study showed that children born to unmarried mothers are more likely to have preterm birth, LBW, small for gestational Age (SGA) (Cenegy, L.F. and Brewer, M. 2013). The possible explanation of these results may be that pregnancy out of marriage is not acceptable in society. That unmarried pregnant women have less access to health care during pregnancy and childbirth may be due to stigmatization and discrimination. The Child Trend Data Bank, 2014, shows that 17% of unmarried childbirth is shared by Asia and adolescents are more likely to have unmarried pregnancy compared to older women worldwide. For instance, 99% of unmarried births from under age 15, 89% for 15 to 19 years old and 21% and 24% unmarried birth for their thirties and forties respectively. Newborns born to teenage mothers are at a higher risk of mortality as discussed in the chapter 3.2.1.4 age factor.

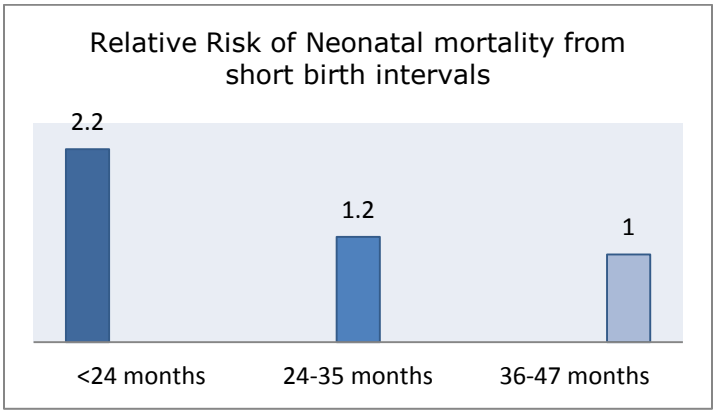
In Nepali society, widows, divorced women and unmarried mothers are known as single women and they are gossiped about and criticized by

society and stigmatized at by households and communities. For instance, widows are assumed to be witches and blamed for the death of their husband (Basnet. S. 2009).These factors affect their likelihood to take care and seek health care for themselves and their newborn.

3.2.1.6 Birth spacing

Newborn health and survival is affected by frequency and timing of pregnancy. Women who space their pregnancies too closely place themselves and their newborns at higher risks of complication (Tinker, A. and Ransom, E. 2002). Newborns that are born too soon are more likely to be too small for gestational age and have LBW.

Figure 6: Neonatal death and short birth interval



Source: Data from Demographic and Health Surveys from 17 countries (excluding Nepal), calculated by Shea Rutstein, MACRO International, Inc.

Mothers and newborns can both benefit from birth spacing. Children born to three to four years after the previous birth are 1.5 times more likely to survive their first week of life and 2.2 times more likely to survive their first month of life than children born less than two years after the previous birth (Population Reports 2002). Birth spacing not only improves newborn survival but also improves maternal health. A study done by the Latin American Center for Perinatology and Human Development found that women who give birth with a 27 to 30 month birth interval are 1.3 times more likely to avoid anemia, 1.7 times more likely to avoid heavy vaginal bleeding during and after birth and have a 2.5 times higher chance of survival during childbirth (Population Reports 2002).

Babies born to women who have had more children are more likely to die than those born to women who have had only one child (Adhikay, R. and

Sawangdee, Y., 2011). A shorter birth interval may not allow the mother's reproductive system to revert back to the pre state or normal condition as well as to restore nutritional reserves that provides adequate fetal nutrition and growth, which may lead to premature birth, LBW and greater risk of neonatal death.

3.2.1.7 Household structure

The household is usually known as a group of people who provide the fundamental needs; food, shelter and other essential arrangements (Bongraats, J. 2001).

The average household size is 4.4 persons and total fertility rate is 2.6 births per women in Nepal (NDHS 2011). Household size is directly related to total fertility rate which is an important impact on neonatal and maternal health. It is also associated with degree and frequency of malnutrition among children and factors influencing health seeking behavior. Household financial status reflects the fulfillment of basic household needs and directly affects health of newborns through exposure to cold, pollution and infection (Ergo, A. et al., 2011).

3.2.2 Health system Factors

Under this chapter, the relation between health system factors and survival of newborn will be explored and discussed. The health system factors like distance to health facilities, accessibility of services, responsiveness, health worker competency and availability of equipment affects newborn survival. Maternal characteristics greatly impact the outcome of LBW and health care seeking. The level of maternal emancipation has a significant impact in the selection of delivery place and service provider as well obtaining updated information regarding quality health care services.

3.2.2.1 Access / distance

In developing countries, half of all mothers and newborns do not obtain quality and skilled health services during and after birth. Most of the delivery and neonatal death takes place at home and up to two thirds of newborn deaths are preventable by effective health measure during and after child birth (WHO 2012).

Financial and physical accessibility is crucial for utilization of health care services. Financial accessibility in terms of transportation cost, cost for investigation, drugs, admission charges, and diagnostic procedures are barriers to utilization of health services since health service for newborn is not free in Nepal. The out of pocket expenditure for health service is up to 35% of annual household expenditure (Joshi, R., Sharma, S. and Teijlingen, E. 2013).

Additionally, informal payments, indirect costs such as father loss to follow up of his job or mother loss her household's activities due to hospitalization of their sick child. These become an extra barrier and also gradually pushes the family in financial impoverishment in Nepal (Joshi, R., Sharma, S. and Teijlingen, E. 2013).

Geographical factors like distance, road quality, seasonal flooding, landslides, temporary road blocks and household location influence the choice of delivery place, health care seeking and utilization. As well these delay reaching to HF and whether families decide to seek health care (Malqvist, M. 2013).

Women who have to walk more than an hour to reach the HF in their pregnant state for institutional delivery or with carrying newborn during their postnatal period to seek health care services for their newborns from an SBA may not do so (Joshi, R., Sharma, S. and Teijlingen E. 2013). A cross-sectional study done by Chaulagain, B. and colleagues in 2013 in rural and remote districts of Nepal reported that 68% of women had to travel more than half an hour to reach the nearest HF and the distance and transportation were identified the main cause of not utilizing SBA service during pregnancy, childbirth and post natal period. For example, 45% of women not utilized SBA services due to long distance to HF and 21% due to unavailability of transportation (Chaulagain, B. et al., 2013).

Although the MoHP has implemented a guideline of four focused ANC checkups during pregnancy and three postnatal checkups for both mother and newborn after childbirth, the indicator of these visits is low. In Nepal, the DoHS 2013 reported that the four time antenatal visit is 57%, Tetanus Toxoid vaccination during pregnancy is 38%, home delivery is 56% and first postnatal visit is 51%. These indicators help to reflect those the financial and geographical barriers to utilization of health

services in Nepal. NDHS 2011 shows that the first newborn postnatal check-up rate is three times lower in mountainous areas than in the terai/plain area. The mountainous area is also an additional barrier to Maternal and Neonatal Health (MNH) service utilization in Nepal.

3.2.2.2 Quality of care

Attitude: Positive or negative staff attitudes play an important role in health service utilization. Positive attitudes such as politeness, giving reassurance and encouragement during labor and listening to and respecting client's/patient's views encouraged use of SBAs. On the other hand, bad attitudes of staff like rudeness, refusal to assist, shouting during labor and lack of moral support to women during labor or her difficulties hinders use of SBA services (Baral, Y.R. et al., 2010).

Resource and competence: Human resource is an important factor for health care. Availability of adequate service providers, instruments and equipment, supplies and physical infrastructure encourage women to utilize health services. In Nepal, 4,000 SBAs are providing services but the Government of Nepal's (GoN) goal is to have 7,000 SBAs working by 2015 (KC, A. and Bajracharya, K., 2013). Due to this gap, the HFs of rural /remote areas of Nepal are not able to deliver quality service on time although availability of services. For example, the Maternal Morbidity Mortality Study (MMMS) done in 2008/2009 in Nepal showed that, an Emergency Obstetric Care service is available in a remote district, Jumla, but there is no adequate staff with updated knowledge and skills and no seniors to support them (Pradhan, A. et al., 2010).

> "… *She could have been saved if doctors had attended and treated her immediately when she was taken to the emergency ward. It's a shame that such a big hospital had no doctors in the emergency ward. My wife died of facility's negligence. I will never recommend anyone to go to the medical college again…"*
>
> *- Verbal autopsy respondent*

Source: Adopted from Maternal Morbidity and Mortality Study, Nepal 2008/2009.

Institutional problems such as poor quality service, unavailability of services, lack of medicine, deficient referral system, and lack of 24 hour water and electricity supply discourage women from utilizing health care services (Baral, Y.R. et al., 2010). For instance, the Nepal Maternal

Morbidity Mortality Study (MMMS) showed that only 60% of HF had magnesium sulphate, and only 50% had calcium gluconate at the time of survey.

> *"… She had obstructed labour, we arranged blood as advised by the doctor and she delivered a healthy baby by caesarean section. But she developed chest pain, restlessness and started taking out all the stitches which led to bleeding from the operation site. We could not get additional blood as there was no electricity and the generator was not working. The oxygen supply also did not work properly. We could manage blood only after about four hours. She could have been saved if blood transfusion was done on time…".*
>
> *-Verbal autopsy respondent*

Source: Adopted from Maternal Morbidity and Mortality Study, Nepal 2008/2009.

3.2.3 Neonatal factors

Neonatal factors such as newborn's sex, gestational age at birth and birth weight and their relation to newborn health and survival will be explained in this chapter.

3.2.3.1 Sex

Males are at greater risk of morbidity and mortality in the early neonatal period compared to female. Male's lung maturation is delayed by more than one week of gestational age. More male preterm birth is reported there is also a higher incidence of male newborn mortality due to birth injuries, Respiratory Distress Syndrome (RDS), sudden infant death syndrome, and other infectious diseases. These cause male newborns to be more vulnerable to morbidity and mortality (Wells J. 2000).

Around 55% of preterm births occur in males and males are associated with a greater risk of dying when compared to female born at a similar gestation age in Australia (Kent, A.L. et al., 2012). A randomized Study done by Katz J. et al in Sarlahi district, Nepal revealed that biologically, female newborns have a greater chance of survival at early age but later

environmental factors like feeding practice and child care have crucial role favoring male survival.

In Asian culture, there is high sex preference caused by uncertainty, the need of old age security. Usually a female child is undesirable and unwanted because the patriarchal society system makes them economically dependent on males. In Nepal, 54% of married women had no preference for either sex during their first pregnancy and 40% of women desired a son which is higher among Terai ethnic communities than the hill ethnic community group (UNFPA, 2007). It might be due to dowry system which is common in Terai communities.

3.2.3.2 Gestational age at birth and birth weight

Gestational age is the period between conception and birth, in this study it deals with premature birth and LBW. Premature birth - birth before 37 completed weeks of gestation is the leading cause of neonatal mortality worldwide (Liu, L. et al., 2012). Every year, 15 million births are premature causing 20% of newborn death globally and more than 60% occurs in Africa and South Asia (March of Dimes, et al., 2012).

LBW is defined as a birth weight less than 2500 gram and it can result from preterm birth and intrauterine growth retardation (IUGR). Globally, LBW is associated with perinatal morbidity and mortality. LBW contributes 40-80% of neonatal death and 98% occurs in developing countries (Abu-Saad, k. and Fraser, D. 2010).

In Nepal, 14% of births are preterm birth (WHO 2010) and 6% of newborns die due to preterm birth or LBW (Paudel D. et al., 2013). A study done by Shrestha S. and colleagues in Nepal medical college and Teaching hospital from 2007 to 2008 reported that out of total 22 perinatal deaths, 77.2% were LBW and 72.5% were preterm births. Similarly, out of 11 early neonatal deaths 100% were LBW and 82% were preterm births. The most common cause of death found was Respiratory Distress Syndrome due to prematurity during their study.

Small for gestational age at birth and LBW have negative effects on newborn survival. LBW arises through premature birth, intrauterine growth retardation (IUGR). Most of the causes of LBW and premature births are related to maternal factors such as nutritional status, age,

medical morbidities during pregnancy, multiple pregnancy and maternal habits like smoking, drinking, resting and exercising (UNICEF 2002).

Infant birth weights below the 10th percentile for their gestational age are classified as small for gestational age and research shows that even if they are born at term, these infant are at greater risk of neonatal death.

As a result of being born preterm, their major organs have not fully developed, leading to numerous health consequences. Although every premature baby has health risks, infants born before 32 weeks are more likely to have severe health risks (Hilhorst, J. 2010).

3.2.3.3 Birth order

Birth order also plays a role in child survival and it is affected by culture, ethnicity, religion, economic status of family, maternal age, education, nutritional status, health care utilization during pregnancy and child birth, sex of baby, place of delivery and assistance, household location, availability of health services and postnatal care, etc. A study done by Singh, R. and Tripathi, V. in India in 2013 reported that child mortality is higher for birth order 1 than 2 and which was mostly seen in farmer, uneducated, and anemic mothers. This finding is consistent with the Nepalese context; NDHS 2011 shows that neonatal mortality among first birth order is 44 and among birth order two is 30 per 1, 000 live births.

3.2.4 Delivery factors

Delivery factors; place and assistance, type of delivery, complication during child birth and it's relation to newborn health will be analyzed in this chapter.

3.2.4.1 Place of Delivery and skilled birth attendant

Place of delivery is very important aspect in regards to reproductive health. It determines the quality of health care received by newborn and mother and it is an important factor associated with differential risk of newborn morbidity and mortality. Newborns delivered at HFs are expected to have less risk of morbidity and mortality than those delivered at home (Sreeramareddy, C.T., et. al., 2006) and it is also estimated that 20-30% of neonatal death can be reduced by SBA package and HF based delivery (Neupane, S. and Doku, D.T 2014). It is considered that HF provides a more

sanitary birth environment including cord cutting practice and essential immediate newborn care by skilled health professionals.

Globally, only 56% of child births are assisted by SBAs with massive variation between countries. In sub-Saharan Africa, less than 40% and in South Asia less than 30% of women delivered with an assistance of SBA. DHS from various countries revealed that countries with high neonatal mortality rates have low rates of institutional delivery or delivery conducted by SBA (Lawn, J.E., Cousens, S. and Zupan J., 2005). Worldwide, more than 50% of newborn death occur at home (UNICEF 2012). A study done by Ajaari, J. and colleagues in 2012 in rural Tanzania revealed that women who delivered outside health institutions have 1.63 times higher odds of experiencing newborn death.

In Nepal, Only 44% women give birth at HFs with assistance of SBAs (DoHS 2013). There is an inequality in place of delivery within the country. For example, institutional delivery is lower in mountainous region than the plains; at 19% and 41% respectively. Similarly, it is higher among educated mothers (75%) than those with no education (19%), and higher among the highest wealth quintile (78%) than the lowest wealth quintile (11%) (NDHS 2011).

Deliveries assisted by SBAs at HF are supposed to be safe and provide immediate interventions or referrals to higher health facility if any complication arises to mother or newborn. However, the quality of care received at HF is affected by health system factors; availability of skilled HWs, equipment, infrastructure, etc. For instance, inconsistency in service provision at the HF leads to home delivery because expectant mothers are often reluctant to give childbirth at HFs (Paudel, D., et al., 2013). NDHS 2011 suggested that 62% women did not deliver at HF because they believed that it is normal and there is no need to go to health institution, 14% due to distance (HF is too far) and transportation problems and 10% due to deeply rooted cultural practices.

Newborns delivered at home are highly vulnerable to infection, hypothermia, and poor breast feeding. A study done by Sreeramareddy, C. T. et al., in 2006 in Nepal observed that cleanliness is not maintained, newborns were

not wiped and wrapped immediately after birth, rejection of coustrum, prelacteal feeding and not early initiation of BF, newborns being bathed within 24 hours, and application of harmful substances on umbilical cord. It shows that WHO recommended guidelines are mostly not carried out at home delivery.

GON, MoHP has encouraged HF based childbirth including continuum of four focused ANC visit and three postnatal visit to both mother and newborn by providing cash incentive for continuum of four focused ANC visit, free delivery service, transportation allowances to women seeking skilled delivery care at HF, and subsidies to health institution on the basis of deliveries conducted.

In Nepal, home delivery is usually assisted by traditional birth attendants (TBA), mothers in law, relatives and neighbors, and sometime even alone. Home delivery is associated with unskilled assistance and unhygienic practices placing newborns at high risk of morbidity and mortality (Suwal, J.V., 2001).

According to WHO definition, SBA is someone "trained to proficiency in the needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in identification, management and referral of complications in women and newborns"

3.2.4.2 Mode of delivery

Cesarean section delivery can result in respiratory distress syndrome due to anesthesia and can place newborn in greater risk of morbidity and mortality (Ramachandrappa, A. and Jain, L. 2009). In instrumental delivery (Vacuum and forceps) there is higher risk of birth asphyxia, birth trauma, meconium aspiration but the severity and newborn survival depends upon the place of delivery, skill of the birth assistant, availability of instruments, equipment, drugs and intervention and response provided to threats. No relevant publication concerning the mode of delivery association with neonatal death in Nepal was found.

3.2.4.3 Childbirth complication

Childbirth complications are identified as risk factors for neonatal deaths and intrapartum newborn death accounts for 9% of all under-five child mortality (Lawn et al., 2009). Some complications during intrapartum such as obstructed labour and malpresentation cause a higher risk of death than other complications like prolong labour, meconium staining and maternal sepsis (Lawn et al., 2005).

Lawn et al., (2009) demonstrated an inverse relationship between intrapartum complication and access to SBA. Where delivery is conducted by an SBA, there is low Neonatal Mortality Rate (NMR); whereas for low access to an SBA during the intrapartum period, NMR is high. 20% of newborns die due to intrapartum complications such as birth asphyxia and birth injury and this inverse association between NMR and SBA is applicable in Nepal (Lieu et al., 2012).

3.2.5 Postnatal care

The first six weeks after child birth is known as the post natal period which is critical to both mother and newborn for health and survival. The most vulnerable period is during the first 24 hours and then the days after birth. In this period both mother and newborn required health care and support to recognize danger signs and their treatment and management. Lack of care during this period may result in morbidity and mortality as well as the missed opportunity to promote healthy behaviors, affecting women and newborns. 75% of neonatal deaths occur during first week of life and 25-45% occurs within the first 24 hour (WHO 2012).

3.2.5.1 Surveillance

The aim of placing surveillance in this theoretical framework is to address the issue of unseen neonatal death. Most of the newborn deaths around the world are under-recorded and under-reported; these deaths are invisible (WHO 2011). The study done by Malqvist, M. in Vietnam in 2010 found variation between official recording of NMR and NeoKIP (Neonatal Health Knowledge into Practice) baseline result which was 4 and 16 per 1,000 live births respectively. This affects in policy making and resource allocation for persistent improvement in MNH. No relevant publication was found regarding this issue in the context of Nepal but it can be assumed that lots of early

neonatal deaths are under-reported where 56% deliveries takes place at home.

3.2.5.2 Hygiene

Home delivery is considered unhygienic and unsafe which is risk for infection (NDHS 2011). In regards to hygiene while child birth at home, cleanliness is crucial such as clean hands, a clean surface for delivery, clean perineal area, clean cord cutting instruments, clean thread to tie the cord, and keeping the umbilical stump clean and dry (Joshi et al., 2013). Clean delivery and newborn handling practices reduce newborn morbidity and mortality by preventing neonatal tetanus, sepsis or meningitis. Proper hand washing and clean practices around the time of child birth and the postnatal period are very important for preventing neonatal infection. It can avert 15-40% of neonatal death (Blencowe, H. and Cousens, S., 2013).

A cross sectional survey done in 2006 in western Nepal showed that 48.3% of birth attendants do not wash their hand before conducting a delivery. Similarly only 16.2% women used a Clean Home Delivery Kit (CHDK), 22.1% women applied mustard oil on the umbilical cord of newborns, 60% of newborns were massaged with mustard oil and 15.2% of newborns were given prelacteal feeding (Sreeramareddy, C.T. et al., 2006). All these practices placed newborns at greater risk of infection.

3.2.5.3 Postnatal Care Seeking

Post natal care of newborn includes promotion and support for early initiation of breast feeding, maintaining hygiene like hand washing, cord care, early identification of danger signs and their management, maintaining warmth, and immunization. Newborns with LBW and premature birth require extra postnatal care (PNC) for warmth, feeding and early identification of danger signs.

It is often assumed that babies born at HFs get PNC service but it is not always the case. Sometimes mothers and newborns are discharged after a couple of hours ensuring the wellness of both. After being discharged from the HF the mother and newborn will not come back again to the HF for PNC on recommended days due to financial, cultural, geographical and other barriers (WHO 2012). The Government of Nepal (GoN), MoHP recommends at least three postnatal checkups; the first checkup within 24 hours of birth

and the second and third on the third and seventh day followed by delivery. According to NDHS 2011, only 32% of newborns receive first PNC service. PNC service for newborns is closely related to health system factors, cultural factors and demographic factors which will be described in next chapter.

Newborn care practice is affected by several factors such as caste, ethnicity, culture, economic status, maternal emancipation, age, sex of newborn, etc. For example, 87.5% women from lower castes didn't wipe and dry newborns after birth compared to higher caste mothers in Baitadi district, Nepal because of lack of knowledge and proper information. Similarly, 87.3% of newborns were bathed within 24 hours after birth which is associated with caste, occupation, age of mother and sex of newborn. The practice of bathing male newborns earlier than females and similarly more female newborns were given colostrum in Baitadi district, Nepal (Devkota, M.D and Bhatt, M.R. 2011). This may be due to higher importance given to male babies culturally thinking that early bathing and avoiding colostrum is good for newborn survival.

3.3 socio-economic determinants

Socio-economic factors affect the survival of neonates. The distal factors (socio-economic determinants) are operated through the set of proximal determinants including maternal factors, health system factors, neonatal delivery and postnatal factors. There are four main distal factors; ethnicity/culture, religion/ conceptions, education/skills and economy/wealth and these are interrelated. For example, the educational level of an individual affects their economic status and at the same time better financial conditions provides the possibilities of better education. Economic status and educational level of the family further affects access to health care and causes neonatal mortality.

3.3.1 Ethnicity/culture

Different cultures have their own beliefs about taking care of newborns and seeking care. Nepali society is a complex in terms of caste and ethnicity. The ethnic groups range from traditional group like Brahmin, or Chhetri to highly liberal groups like Limbu, Rai, Tamang, Gurung, etc. The majority of people are Hindus and there is a hierarchy of caste and ethnicity in the Hindu religion. A group known as lower caste/untouchable is deprived of education and utilization of health services. They are discriminated in

education; discriminated by peers, teachers and management as well as in curriculum, leading to a low literacy rate (33.8%) as reported by the 2001 census. They cannot easily use affordable public health services due to caste based discrimination or untouched practice by higher caste health workers (Bhattachan, K. B. et al., 2009).

Cultural belief is deeply rooted in relation to take care of newborns in Bangladesh (Darmstadt, G.L., Syed, U. and Kabir, N. 2006). Cultural beliefs affect the essential newborn care so that after a baby's delivery, neither newborn's cord is cut nor is the newborn wrapped with warm clothes. The birth assistant just focuses on delivery of placenta because it is strongly believed that if the placenta is not delivered immediately it will move up to the throat and lead to the woman's death. In addition, they used contaminated cord cutting utensils like contaminated razor blades, or bamboo slices and the cord is often tied with dirty thread such as jute fiber, or quilt sewing thread. They applied potentially infectious substances like clay, ashes, lamp soot, dry cow-dung, vermilion, or oil on the umbilical stump and dirty clothes are given to mother and newborn because the delivery process is considered unclean in Bangladesh.

Initiation of breast feeding in Bangladesh is delayed up to three days after the birth of newborn due to process of holy state of the mother. Colostrum is rejected because it is considered as dirty, poisonous, or containing an evil spirit and it is believed that it is not digested by newborns which results abdominal pain, diarrhea, vomiting to the new born and fever illness in the mother if she feeds the colostrum to the baby. Honey, mustard oil, sugar water were introduced to newborns as prelacteal and supplementary feeding believing that it gives warmth to child and clears the throat, stomach, and blood and prevents jaundice (Darmstadt, G.L., Syed, U. and Kabir, N., 2006).

The practice of newborn care in Nepal is not very much different from Bangladesh. While birth takes at home, 68% women use new or boiled blades to cut the umbilical cord, 14% use a clean cord cutting instrument from delivery kit, 11% use a sickle and 4% use unsterile blades. For cord care, 41% babies had some substance like oil, turmeric, or ash on their umbilical stump and 55% of babies were not breastfeed within one hour of birth (NDHS 2011).

The study of infant death rates and animal-shed delivery in remote rural areas of Nepal done by Thapa, N. et al in 2000 showed that immediate bathing after birth, wrapping with thin, old, dirty cotton clothes and warming are done after complete care of the mother. The cord is usually cut with an unclean sickle which leads neonatal infection.

3.3.2 Religion/conceptions

Religion shapes the practice and behavior of taking care of newborns. A study done by Save the Children on inequality in child survival, looking at wealth and other socio-economic disparities in developing countries in 2010, shows that child mortality rate is higher among Hindus than Muslims, Sikhs and Christians in both rural and urban areas of India.

There is evidence of differentials in newborn survival rates associated with religion in Nepal. A study done by Suwal J.V. on the main determents of infant mortality in Nepal in 2001 reveals that Buddhist babies have a 30% greater survival probability than Hindu babies.

A possible explanation would be Hindu women are tend to marry in their earlier age in Nepal. Hinduism allows girls to marry before puberty. If a girl remains unmarried after reaching puberty parents are considered to have failed in their responsibility and will go to hell after death. Another possible reason for early marriage would be the practice of dowry. The parents of the bride have to give dowry in forms of cash or households items to groom and his family according to groom's status, education and qualification. In some cultures, it is practiced to control their daughter because it is considered that if the girl marries as a virgin her family's honor will be protected (Save the Children, Plan Nepal and World Vision 2010).

Early marriage leads to teenage pregnancy and high fertility and its consequences. In addition, cultural beliefs and practices lead to self-care, home remedy, or consultation with traditional healers which is common for Hindu women. These factors lead delay in seeking health care and greater risk of mortality (Adhikari, A. and Sawangdee, Y., 2011). Similarly, another study done by Bhalotra and colleagues in 2009, in India, explained that there is a higher degree of son preference among Hindus than Muslims which results in higher fertility rates and larger family sizes.

Religion alone doesn't affect neonatal death. There are many other factors such as place of residence, SES, educational status, availability of health

services, service from skilled workers, traditional beliefs and practice associated with newborn's survival.

3.3.3 Education/skills

Education plays a crucial role for the outcome of newborn survival. Maternal education is significantly associated with a reduction neonatal death. A study done by Singh A. and colleagues in 2007 to 2008 in India reported that infants born to mothers with more than ten years schooling were about 40% less likely to die than those born to illiterate mothers. Similarly, neonatal mortality reduced by 15% and 24% among children whose father had been schooled up to secondary and above secondary level respectively, compared to children whose fathers were illiterate.

Nepal, NDHS 2011 showed that under-five mortality among children born to illiterate mothers was 73 per 1,000 live births but only 32 per 1,000 live births for children born to literate mothers having a School Leaving Certificate (SLC) or higher educational level. Educational level was also strongly related to seeking health service from skilled health workers; women with SLC or higher education are two times as like to utilize health service from skilled worker than illiterate women.

Female literacy is very important because it indicates the women's status and early childhood development and survival. Good education provides opportunity to get paid jobs which make women economically independent. On the other hand, education also helps to reduce early marriage and pregnancy by engaging them at school and study which is an important issue for maternal and newborn survival. Educated women potentially have good status in the household and society thereby it is expected that they have better communication, decision making skills and involvement in negotiation, mobilization of household resources and seeking health care for themselves and their child. Higher educational attainment results in the greater utilization of maternal and newborn health services and awareness levels (Adhikari, R. and Sawangdee, Y. 2011).

Education provides more knowledge as well as make able to adopt new and useful information regarding newborn care. This results in higher accessibility to health information and increased understanding of preventive care. Therefore, educated mothers are supposed to be given information regarding health care and better practice in child caring or rearing because a

larger proportion of child's deaths are preventable due to simple measures like proper breast feeding, maintaining warmth and cleanliness, and prompt medical attention which tend to be strongly related to maternal education.

However education is very important but women are deprived from education due to several reasons in Nepal. For example, with the dowry system in the Terain region of Nepal if girl is well educated, she will marry an educated boy and he or his family will demand a high dowry. So the parents refuse their daughter's desire to get a higher education (Save the Children, Plan Nepal and World Vision 2010).

3.3.4 Wealth/economy

Economic factors affect access to health services and healthy living conditions. Giashuddin M.S. and Kabir M. concluded that the children of the poorest households suffered greater mortality than the children of rich households from their study on income inequality and child survival in Bangladesh. Due to existing socio-economic disparities in Bangladesh, the poor children are more vulnerable to die in their earlier age. Similarly, neonatal mortality is 2.6 times higher among the poor wealth quintile compared to rich in Bonke, South-West Ethiopia (Yaya Y., et al, 2014).

The findings regarding neonatal mortality in Nepal was found similar to above mentioned countries. It is higher among poor wealth quintile compared to rich wealth quintiles household (Paudel et al. 2013a). The NDHS 2011 reported that the risk of newborns dying decreases with the increasing wealth quintile of households. The survey also provides some information regarding the practice of newborn care by household wealth quintile in Nepal. Neonatal care practices are seen to be better among the highest wealth quintile households of women who delivered at home in Nepal. For example, more than 95% of mothers from the highest wealth quintile used a sterile cord cutting instrument such as a boiled or new blade, or an instrument from a Clean Home Delivery Kit (CHDK) while it was about 67% among lowest wealth quintile mothers. It might be due to low awareness, lack of money to buy new blade or CHDK, or lack of birth preparedness and inherited practice (Kaphle et al., 2013).

Similarly, drying and wrapping of the newborn soon after birth and before delivery of the placenta was more common among the women of highest

quintiles (97.1% drying and 97.8% wrapping) compared to women of lowest wealth quintiles (54.3% for drying and 57.6% for wrapping).

Improved income shapes the behavioral and structural factors such as food security, better living environments, access to health information, or health care, newborn care and feeding practice which influence the risk factors for neonatal mortality (WHO 2011). Indicators of Socio-Economic Status (SES) like wealth, educational level of household, distance between household and motorable road and factors related birth spacing are associated with neonatal mortality.

On the other hand, it may be assumed that maternal age also plays the role of confounding factor. For instance, poor families do marry off their early aged daughters with old aged men for the sake of money or to escape from poverty (Save the children, Plan Nepal and World vision 2010). This leads to child pregnancy and we can assume that those children are unable to take care of their newborn. Poverty is cross cutting issue for the wellbeing of newborn health, this affects in utilization of health care, nutritional status of women, living environments, etc. (Bhalotra, S. et al., 2009).

CHAPTER 4: INITIATIVES TO IMPROVE NEONATAL HEALTH

In this chapter, initiatives in order to improve the neonatal health carried out by the Government of Nepal (GoN), Ministry of Health and Population (MoHP) will be presented in the first section. In the second section, evidence based successful initiatives experienced by Nepal or other countries where newborn mortality is high, causes of death and setting in terms of culture or beliefs, practice and geography is similar to Nepal will reviewed and propose to improve newborn health in cost effective and need based manner.

4.1 initiatives adopted by Nepal to improve neonatal health

The Government of Nepal (GoN), MoHP has endorsed several events to reduce neonatal mortality in Nepal, which are presented in below table.

Table1: Key events regarding newborn survival in Nepal with political priority.

2000	The United Nations (UN) Millennium Declaration was adopted by countries around the world including Nepal with the common goal of reducing under-five child mortality by two thirds by 2015.
2001	The GoN implemented Saving Newborn Lives (SNL) with support of Save The Children and further prepared a comprehensive report regarding problems related to newborn survival in Nepal. This was launched by the Prime Minister declaring the problem of newborn survival and given high priority.
2001 and 2007	Demographic and health surveys showed decreasing trend of neonatal mortality, but increasing as a proportion of under-five child mortality.
2004	The Nepal Ministry of Health and Population, the GoN developed and launched its first national strategy for neonatal health.
2007	The Department of Health Services, the GoN and Save the Children published Newborn Health and Programs in Nepal: A Rapid Assessment of Newborn Health in Nepal.
2009	The Government of Nepal implemented a Community-based Newborn Care Package (CB-NCP) as a pilot program in ten districts with the support of international development partners. After evaluation of package, it is expanding in a phase-wise manner throughout the country by 2015.

2011	Nepal Government, Ministry of Health and Population (MOHP) endorsed and is scaling up the use of chlorhexidine for cord care as a part of essential newborn care through Chlorhexidine Navi care Program (CNCP).
2014	MOHP, Family Health Division introduced the Nyano Jhola (Warm Bag) program in Nepal. The bag consists of clothes including gloves, socks, cap, napkin, and diaper for the newborn and a gown for the mother. The main objective of this initiative is to reduce neonatal death due to hypothermia and encourage mother to use institutional delivery.

Source: Smith, S. L and Neupane, S. (2011)

GoN, MoHP, implemented the WHO guideline regarding maternal and newborn care such as ANC visit, safe and clean deliver practice, essential newborn care to improve the neonatal health, etc. Some evaluated (evidence of initiatives were not documented) initiatives are put in table 2 below.

Table 2: Community based Maternal and Neonatal Health programs and outcomes

Program	**Strategy**	**Achievements**
SUMATA Initiative [Maternal and Neonatal Health Program: Lalitpur and Baglung districts]	It focused on Birth preparedness, ANC, PNC and newborn care. FCHV were mobilized in community to deliver message using BPP flipchart. It included IEC/BCC activities.	Mothers were aware regarding MNH issues and primary information got from audio/visual aid. Increased birth preparation except financial preparation.
Saving Newborn Lives (SNL) initiatives in Kailali and Siraha district.	MoHP Nepal implemented SNL initiatives partnership with Save the Children to meet Millennium Development Goal (MDG) 4 by improving newborn survival. It enhances skills of FCHVs and strengthens the relation between health facility and community in order to improve mother's and newborn's life.	Positive change in household level, essential newborn care practice improved, birth preparedness improved, increased access to health service utilization for ANC, child birth and PNC including newborn care.
Bara Child Survival Project, Plan Nepal	Project focused on ANC including tetanus toxoid vaccination and other routine monitoring. To reach the target group a sub group of the mothers group was piloted in few a VDC and later scaled up to the district wide.	Maternal and newborn death found lower among member group compared to non-member group.
Morang Innovative Neonatal Intervention (MINI)	Established in 2004 to improve newborn health. FCHVs were trained to identify neonatal infection and management and treatment by cotrimoxazole and gentamycin. Home visit soon after delivery to all new borns done by FCHV in order to counsel for better newborn care practices and assess danger signs.	80% of expected possible severe bacterial infection cases were treated by FHHV in intervention area compared to 35% in control area. Service provided by community based cadre was acceptable by community.

Birth Preparedness Package (BPP) including newborn care National Program	With support of INGO/NGO, Family Health Division implemented BPP program nationwide. Under the national BPP program, FCHVs use BPP tools flip chart to communicate health messages to pregnant women and their family members through Interpersonal Communication.	The utilization of ANC, PNC and delivery services has increased. Families and communities have established functional emergency transport, blood donor and financing schemes, identification of health facility and SBA.

Source: CB-MNC summative report, 2007.

While looking at the interventions carried out by Nepal, all programs are focused on maternal and newborn health except Morang Innovative Neonatal Intervention (MINI). No program targeted only neonates, nutrition of the mother, or home based specific newborn care.

4.2 National and International evidence based initiatives

In this section, evidence based successful intervention regarding neonatal health carried out by India, Pakistan, Bangladesh including Nepal will be proposed to improve the newborn survival in Nepal. Although intervention adopted by Nepal regards maternal health, GoN, MoHP can apply to improve newborn health on the basis of its evidence.

4.2.1 Home based Neonatal care (HBNC), India

The HBNC field trial was conducted in rural Gadchiroli, India to test the feasibility and to evaluate its effect on newborn survival by mobilizing existing Village Health workers (VHWs). VHWs were assisted by health educators, traditional birth attendants and supervised by the team.

The package of interventions included education to pregnant women, mothers and family regarding ANC, care during and after childbirth and following better postnatal and newborn care practices, early recognition of danger signs, identification of birth asphyxia, sepsis, LBW, hypothermia and management and treatment of infection by antibiotics, early initiation and exclusive breast feeding, keeping newborn warmth and capacity enhancement to community based health service providers and frequent follow-up to the newborns. The Intervention was introduced for two years (1996-1998) and was subsequently continued till 2003 in 39 villages and compared to 47 control villages. The intervention effect revealed that the

HBNC related activities were accepted by the community, cost effective, feasible and able to avert nearly 50% neonatal of the mortality rate as well as decreasing LBW by 16% among poor, malnourished and semi-literate population (Bang et al. 2005).

4.2.2 Community based perinatal care in Pakistan:

A perinatal and newborn care intervention package developed and service was provided by Lady Health Workers (LHWs), Traditional Birth Attendants (Dais) and local community members in the rural Hala district of Sindh province, Pakistan. The package intervention trial was initiated by Agha Khan University in partnership with government of Pakistan, Save the Children and WHO in 2002.

The intervention package consists of three main components; home based newborn care training to LHWS, basic newborn care training to Dais and community organization, mobilization and group education sessions. Neither resuscitation equipment nor injectable antibiotics were provided at the community level but training was strengthened at primary and secondary health care facilities.

The intervention result showed that newborn mortality dropped by 28%, the proportion of deliveries conducted by SBAs at public HFs increased from 18% to 30% and the proportion of home deliveries declined from 79% to 65% in the intervention area (Bhutta et al. 2008).

4.2.3 Bangladesh Integrated Nutrition Program (BNIP)

The Government of Bangladesh initiated BINP with support of INGOs in 1995. The project's main aim was to reduce maternal and child malnutrition, later it was expanded to 23 project areas. It was reported that there was significant improvement in child bearing aged women's nutritional status after two years of project implementation. It helped to improve health and nutrition related behavior in project implemented areas (UNICEF 2004). The difference between project and control areas regarding health and nutrition related behaviors are shown in following table.

Table 3: Difference between project and control areas regarding health and nutrition related behavior.

Behavior	Project area (%)	Control area (%)
Early initiation of breast feeding (immediately after birth)	60	31
Fed colostrum to newborn	94	76
Ate additional food during pregnancy	56	22
Visited by health worker for antenatal advice	94	75
Received tetanus toxoid immunization (women 14-49 years)	84	69
Use of sanitary latrines	19	09

Source: BINP midterm evaluation (1999) INFS; Dhaka University

4.2.4 Safe Delivery Incentive Program (SDIP), Nepal

In 2005, GoN Nepal launched the Safe Delivery Incentive Program (SDIP); a conditional cash incentive scheme. The main aim was to reduce maternal death in Nepal. The program included free delivery service at HFs and cash incentives to eligible mothers. The criteria for eligibility were women with up to two living children and women with any number of complications; irrespective of parity. It was implemented only in selected low development districts. Then later in 2009, it was scaled up nationwide with further modification. Now the program is known as the Aama (Mother) Program and it includes universal free delivery service throughout the country and provides cash payment as a transportation allowance to all women who delivered at HFs according to their ecological region (Mountain NRS 1500, Hill NRS 1000 and Terain region NRS 500) and service provider on the basis of delivery conduction).

Evaluation of the SDIP program showed that 24% of women are more likely to deliver in an HF, 13% of women are more likely to have SBA at birth, and 5% are less likely have home delivery (Witter, S. et al., 2011). Nepal DHS trend also shows that there is an improvement in maternal health which is presented in chapter one. The Government of Nepal can apply this intervention in neonatal health in order to improve newborns health in Nepal.

4.2.5 Adolescent Reproductive and Sexual Health, India

India conducted a comprehensive program to prevent maternal death due to pregnancy and child birth complication among adolescents. India acknowledged that without preventing early age pregnancy, it is difficult to decrease the neonatal and infant mortality rate, so formulated the national Adolescent Reproductive and Sexual Health strategy. This included three measures:

- Reorientation of health services accessible for adolescents when needed.
- Strengthening communication to create demand among adolescents to utilize health services and obtain support from the community for program sustainability.
- Strengthening the health management information system to ensure recording and reporting of adolescent sexual and reproductive health related indicators for program effectiveness.

In order to make adolescent friendly health services national standards and guidelines were developed and provided training to health workers accordingly. They ensured quality of health services provided to adolescents by assigned trained health workers in specific service delivery points, providing sufficient materials, medicines, supplies, and operating regular special adolescents service once a week and maintaining disaggregated records (WHO 2008b), since too early pregnancy and childbirth has a negative impact on both mother and newborn as described under the section of age (3.2.1.4). India has similar norms, cultures, values and territory to Nepal. Therefore, Nepal can learn from India. If early pregnancy is prevented 50% risk of newborn dearth can be averted.

Looking at given successful initiatives in other countries including Nepal, home and community based newborn care program would be beneficial in order to improve newborn health in Nepal. Home and community based programs should be focused on early initiation and exclusive breast feeding, care of skin, cord and eyes, maintaining warmth and early diagnosis of danger signs including counseling/health teaching about harmful cultural practices regarding newborn care. For this program, Female Community Health Volunteers can be trained and mobilized. This program might be helpful to improve newborn health in Nepal.

CHAPTER 5: DISCUSSION/CHALLENGES IN IMPROVING NEONATAL HEALTH IN NEPAL

NDHS 2011 shows that there is improvement in maternal and child health, but no improvement in NMR over the past five years. It suggests that reaching the neonatal mortality target 16/1,000 live births by 2015 is becoming challenging (Devkota, B. and E.R. van Teijlingen, 2010). The framework used in this study helped to explore the underlying causes of neonatal death. The given factors in the framework such as culture, SES, education, maternal age, quality of health services, prematurity and LBW are significant predictors for newborn death in Nepal. Apart from the given factors, I found that paternal occupation also plays an important role in improving newborn health. A survey done by Titaley C.R and colleagues in Indonesia in 2008 revealed that paternal employment would improve the economic status of household and have positive effect on neonatal health. Paternal unemployment and maternal participation in employment away from home hinder caring of newborns including poor breastfeeding. Therefore paternal occupation can be included in wealth/economy under socioeconomic determinants. Similarly, under maternal factors, the habit of drinking alcohol smoking, rest and exercise also not included in the framework although adolescent mothers are more prone to consume alcohol and smoking compared to matured women in Nepal (Sharma, v. et al., 2008) and rest/exercise also associated with newborn outcomes.

Low women's empowerment: women's status is in Nepali society is low. Girls are not allowed to go against their parent's decisions and social norms result in early marriage and teenage pregnancy results in early dropout from school, and pregnancy and child birth complications like prematurity, and LBW (Joshi, R. et al., 2013). 43% of females are still illiterate in Nepal according to Nepal Planning Health Commission 2011 (NPHC). Educational status of women directly and indirectly affects newborn survival. SES, nutritional status of women, maternal emancipation, occupation, utilization of MNH service by SBA, and the practice of taking care of newborns are all affected by the educational status of the mother. Educated women have the potential to have paid work resulting direct access to resources and decision making power through improved status within household and society.

Limited health infrastructure and trained health workers directly reflects the quality of MNH service contributing to high home delivery as well

as less health care utilization. HFs in rural and remote areas are less likely to have adequate instruments, equipment, supplies, and drugs such as incubators or radiant warmers, neonatal ventilation, laboratory facilities for routine antenatal screening, 24 hour running water and electricity and SBAs. Staff shortage is a common problem of public health in Nepal. Although GoN recruits health service providers to fulfill the shortage of staff on contract basis the health system suffers from sudden staff shortages after every fiscal year. In addition, there is uneven distribution of skilled health workers; they are more concentrated in urban area. Due to low payment, low opportunity for carrier development, poor infrastructure, poor road networks, poor communication and transportation, and environmental insecurity HWs tend to migrate from remote to urban, and urban to abroad for better quality of life and educational opportunities which contribute to shortages of trained health workers in Nepal (Dussault G., and Franceschini M., 2006).

Poverty there is huge discrepancy seen between poor and rich. More than 25% of the population is under the poverty line and most people rely on agriculture in Nepal. Economic status or wealth quintile has an association with utilization of health services and health care seeking from trained health workers. ANC and delivery service is free in Nepal and women get cash payment as transportation allowance according to ecological area through Safe Delivery Incentive Program (SDIP) but newborn health service is not free. Direct, indirect and opportunity costs push households into further financial catastrophe. Therefore, even if a family is has physically access to healthcare, money will become a great barrier to get quality health service to their newborns.

Cultural practice plays major role in improving newborn health. It is an inseparable issue because it is related to ANC, child birth, PNC, and newborn care seeking practices including immunization. For example, pregnancy and child birth is regarded as a normal event, requiring no medical assistant and treatment. Women are expected to bear all reproductive health related conditions silently and without complaint in Nepali culture. The "culture of silence" and shame about reproductive issues prevents them from seeking health care. Childbirth and the period afterwards is considered as ritual pollution, so women may not be allowed to stay inside the house and have to remain in the cowshed for some days in some rural communities of Nepal. Similarly, women's diet may also be restricted during pregnancy and

lactation period which may lead to serious nutritional consequences to both the mother and newborn's health.

Political instability; The ten year armed conflict between Government and Maoist Rebels described in chapter one under political situation of Nepal negatively impacted human's health and the entire health system. Despite the violent conflict Nepal was able to make progress in 16 out of 19 health indicators over the period of 1996-2006. But neonatal mortality and the prevalence of malnutrition stagnated. Even though the conflict is over, the country is still struggling with a barely functioning government. The interim parliament has not yet endorsed the democratic republic constitution. There is frequent turnover of ministries which affects the healthcare system. For example, frequently changing ministers creates a situation where little progress can be made because much time is devoted to convincing each new minister of the particular health program which leads to delay in delivering health services to the target population.

CHAPTER 6: CONCLUSION AND RECOMENDATION

6.1 Conclusion

Newborn death is high in Nepal and improvement is slow which also affects achieving MDG 4 by 2015. The main intension of this study was to identify underlying causes of neonatal death, challenges in improvement in newborn survival and propose possible intervention from other countries with similar setting to Nepal in order to improve neonatal health.

It was found that most newborn death is due to lack of infection management which accounts for 39% neonatal death, failing to maintain warmth, and a lack of health care by skilled service providers during pregnancy, child birth, and the postnatal period. Although most of the interventions do not require hi-tech and expensive technologies Nepal is lagging behind to save newborn's lives. Neonatal death was found to be determined socio-economic factors, maternal factors, health system factors, delivery, and newborn and postnatal care factors.

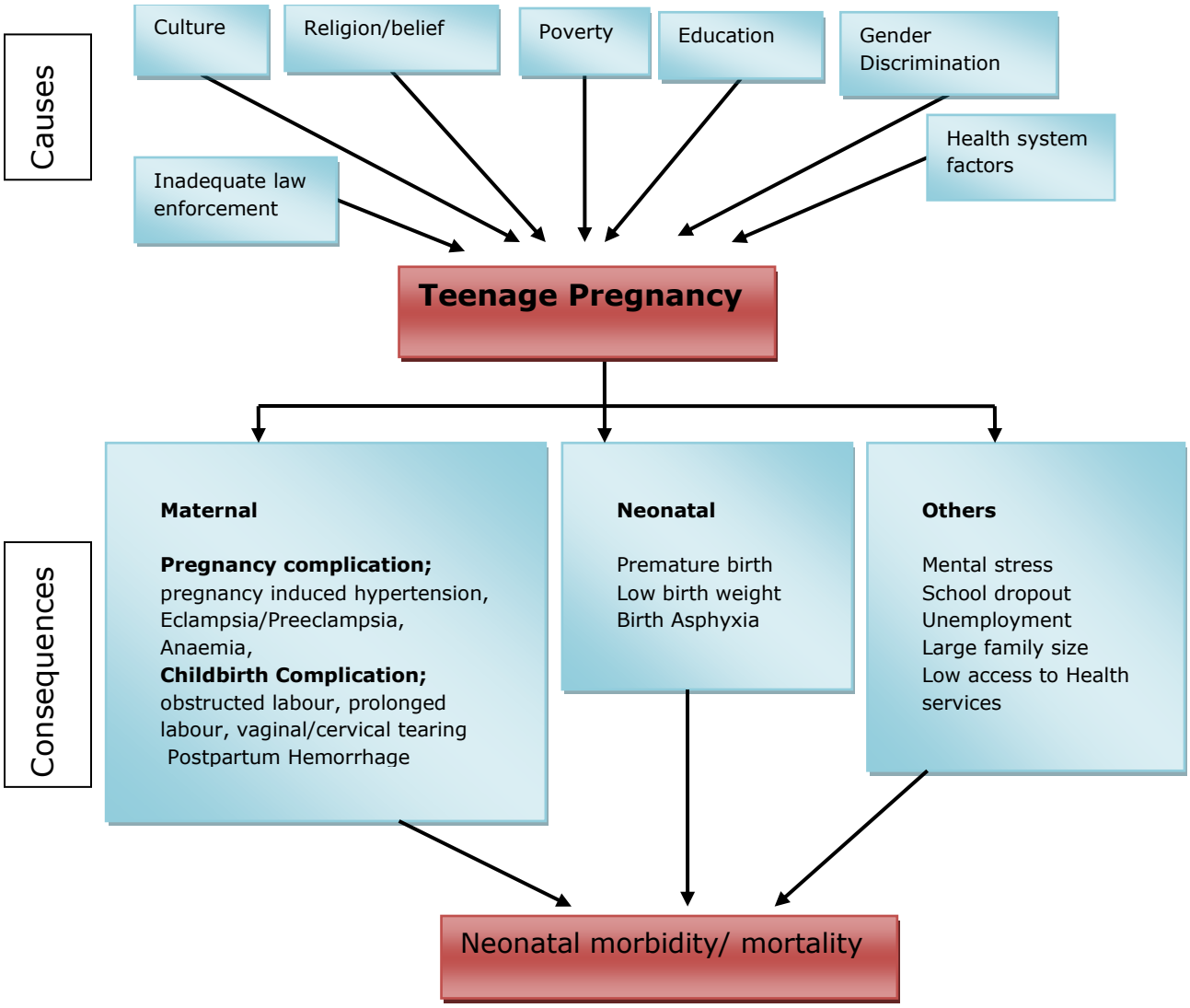
This study found that maternal age is significantly associated with newborn survival. Findings revealed that babies born from early age mother have twice the risk of LBW and three times the risk of newborn death. Similarly, education is significantly associated with neonatal death in Nepal. Findings showed that babies born to illiterate mothers are more likely to die than babies born to mothers with at least a primary level of education. Birth spacing and parity is another factor associated with newborn survival. Findings suggest that children born with less than two years of birth spacing have 2.2 times higher risk of death than children born with at least two years of birth spacing.

Nepal is a multiculturally diverse country. Care seeking practice varies according to culture, ethnicity, and religion. Some cultural practices are extremely harmful for mothers and newborn survival.

Continuum of care throughout the women's life cycle is important to establish long term newborn health and survival. MoHP alone is not enough to tackle all these challenges since issue of newborn survival is compounded by several factors. Therefore health and non-health related sectors like political leaders, religious leaders, community leaders, beneficiaries, faith based organizations, public and private health service providers, media, civil and professional organizations are significant stakeholders for the campaign of reducing neonatal mortality in Nepal.

Although underlying causes of neonatal mortality is complex there are several factors associated each other. After analyzing all predictors of neonatal death, I would say that maternal age or early pregnancy is the crucial contributor because it is associated with socio-economic factors and is prone to deliver premature/LBW babies. For instance, early pregnancy results from early marriage which is influenced by culture, religion, educational status of parent, gender discrimination, poverty, and weak enforcement of law, etc. Adolescents have low access to family planning services, health workers might fail to deal with adolescent's reproductive and sexual issues and as well their low decision making and negotiation skills with their partners results in early pregnancy. Early age pregnancy has several consequences on mother and newborn such as pregnancy and childbirth complications, premature birth and LBW. These are related to neonatal death. Other consequences such as large families, low access to health service during pregnancy, childbirth and postnatal period due to self-stigma, discrimination and low status in household and society have negative effects on newborn survival. Similarly, there is high rate of school dropout after early marriage or pregnancy leading low qualifications which forbid them to enter the labor market and acquire well paid jobs resulting in low SES. The SES is related with nutrition, living standard, access to quality MNH services, and health care seeking practice which have direct and indirect effects on newborn survival. The figures show the causes and consequences of early age pregnancy.

Figure 7: Cause and consequences of early age pregnancy



Source: Developed by author, 2014

6.2 Recommendation

The following recommendations are provided to policy makers and MoHP that may help to improve the neonatal health situation in Nepal.

- Multi-sectoral collaboration and coordination by MoHP, Child Health Division (CHD) with relevant ministries such as MoE, Ministry of Women's welfare to improve women's education including knowledge on sexual and reproductive health and women's status and with other stakeholder such as community leaders, political leaders, religious leaders, donor agencies and community mobilization and participation is very important to overcome harmful cultural practices in society, religious and traditional practices regarding maternal and neonatal heath.

- Child Health Division (CHD) has to emphasize community based program/activities regarding neonatal health, focused on home based care such as essential newborn care especial for home delivery by trained health worker and establish relationship between community and HF and strengthen referral system.

- Implement and strengthen Adolescent Reproductive and Sexual Health programs by MoHP nationwide including family planning services through trained health workers to address the issue of teenage and unwanted pregnancy.

- MoHP, CHD can adopt incentive programs for continuum of post neonatal visits according to WHO recommendation. In this program, cash transfers can be done to the mother if the baby is brought by herself to an HF for a neonatal check-up as per the recommended date. Initially it can be introduced as a pilot program in selected district of Nepal.

- Improve access for mothers in rural and remote areas by trained health workers by delivering health information regarding MNH issues by strengthening Information Education Communication/Behavioral Change Communication in an understandable way.

- MoHP should do a multiple year contract system of health service provider to overcome the shortage of Health Workers (HWs).

- It is very important to adopt staff retention strategies such as incentive, trainings, residential facilities etc by GoN, MoHP for

sustainable fulfillment of vacant posts in rural and remote area of Nepal.

- Further research is needed to better understand direct causes of neonatal death and the findings from such a study might be helpful to design policy and appropriate programs to improve newborn health in Nepal.

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