

# **CESAREAN SECTION DELIVERY IN NEPAL: A LITERATURE REVIEW ON TREND AND CONTRIBUTING FACTORS**

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**55<sup>th</sup> Master of Public Health/International Course in Health  
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# **CESAREAN SECTION DELIVERY IN NEPAL: A LITERATURE REVIEW ON TREND AND CONTRIBUTING FACTORS**

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

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Declaration:

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The thesis "**Cesarean Section Delivery in Nepal: A Literature Review on Trend and Contributing Factors**" is my own work.



Signature.....

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## LIST OF ABBREVIATIONS

ANC	Ante Natal Check-ups
CDs	Communicable Diseases
CI	Confidence Interval
CS	Cesarean Section
FCHVs	Female Community Health Volunteers
FHD	Family Health Division
FIGO	Federation of Gynecology and Obstetrics
FP	Family Planning
GDP	Gross Domestic Product
HDI	Human Development Index
HICs	High Income Countries
HRH	Human Resource for Health
KII	Key Informant Interview
LMICs	Low-and Middle-Income Countries
MMR	Maternal Mortality Ratio
MoHP	Ministry of Health and Population
NCDs	Non-Communicable Diseases
NDHS	National Demographic Health Survey
NVD	Normal Vaginal Delivery
OR	Odds Ratio
PHNs	Public Health Nurses
PNC	Post Natal Care
QoC	Quality of Care
SBAs	Skilled Birth Attendants
SMC	Safe Motherhood Committee
TFR	Total Fertility Rate
TPB	Theory of Planned Behavior
U5MR	Under Five Mortality Rate
VBAC	Vaginal Birth After Cesarean
WHO	World Health Organization

## GLOSSARY OF TERMS

- ✦ **Cesarean on demand** is the childbirth by cesarean on request of to-be-mother in absence of any medical complications or obstetrics (1).
  
- ✦ **Epidural analgesia** is a regional anesthesia used to reduce pain in the specific part of the body which creates lack of sensation in that particular region and is often used to assist painless vaginal delivery (2).
  
- ✦ **Individualism** is an aspect of social theory of planned behavior where an individual has freedom of action over other factors which tend to control (3).
  
- ✦ **Multiparous women** are the ones having more than one baby (4).
  
- ✦ **Nulliparous women** are the ones who have never given birth to a child (4).
  
- ✦ **Perceived behavior control** is a person's perception towards their own ability in performing certain activities/behavior (3).
  
- ✦ **Primiparous women** are the ones having baby for the first time (4).
  
- ✦ **Subjective norm** for a woman is the validation of society and pressure upon her to choose between vaginal delivery or cesarean during childbirth (3, 5).



## **ABSTRACT**

**Background:** Nepal has increasing cesarean trend since past years and rose from 1% in 2001 to 9% in 2016. Cesarean has been unnecessarily conducted without medical indications. Another worrisome scenario is inequity in cesarean use among Nepalese women depending upon different factors. This inequity and irrational use of cesarean had caused maternal and child morbidity and mortality and factors influencing this trend are still uncertain.

**Methods:** Literature review and adapted conceptual framework was used by combining Lancet series "Optimizing Cesarean Section Use 3" and "Intention for Cesarean Section Versus Vaginal Delivery Among Pregnant Women in Isfahan".

**Findings:** First, unnecessary cesarean in Nepal was largely driven by private health facilities and health professionals. Women from higher wealth quintile and good education demanded cesarean due to their decision-making power and accessibility of maternal services. Second, rural women had non-rational cesarean due to patriarchal dominance and lack of health resources. Third, interventions from different countries showed that regular supervision at private facilities from government helped in lowering unnecessary cesarean. The interventions for increasing underuse were not reviewed as enough Nepali literature already exist on this.

**Conclusion:** Irrational cesarean use can lower by auditing and regular monitoring of health facilities by government along with psycho-education program to support pregnant women and their spouse. The interventions should be designed carefully as there is inequity in cesarean use in Nepal due to overuse among some women and underuse among the others.

**Key Words:** Cesarean Section, Rational Use, Factors Influencing, Medical Indications, Nepal

**Word Count:** 12932

# INTRODUCTION

My name is Shristi Mainali and my background is public health professional where I had my bachelor's degree in public health. I had been working in the field of sexual and reproductive health of women and young girls in context of Nepal and maternal health has always been my topic of interest. I see myself working for maternal and child health in long-run in future. Thus, this thesis will help me to learn in-depth regarding one of the issues of Maternal and Child health which is the cesarean section (CS) and improve my professional skill. This thesis intends to identify the current situation and influential factors for Nepalese women to give birth by cesarean section. As a public health professional, I encountered many women who had to undergo CS with non-medical indications. Every other pregnant woman seems to be delivering by CS in Nepal these days. During past two years, six of my relatives gave birth through CS without medical needs which had left me very curious regarding its use. In fact, one of those deliveries were not successful as I lost my nephew when my sister-in-law went through CS without any medical need for the procedure. See my brother and sister-in-law go through the pain of losing their first child had left me stunned and in deep sorrow. Ever since I always wondered the factors influencing non-medically indicated CS in our society.

CS is the use of surgical process for medical reasons to deliver a baby along with placenta and placenta membranes through incision made on the abdominal muscles to the uterus which can be a life-saving procedure for a mother and child(6, 7). In 1985, International Healthcare Community with World Health Organization (WHO) recommended use of CS not more than 10% to 15% of total live births to ensure health benefits of mothers and neonates(7-9). However, in 2015, the study done by WHO showed that 10% above CS is not associated with the decrease in maternal mortality and morbidity among women. Thus, this percentage is no more referred but CS rate has been suggested by WHO to be observed in its rational use(7). The rate of CS is increasing worldwide and considering the urgent need to address issue of rapid, unpredictable and sustaining rise in CS, WHO developed an evidence-based guidance for non-clinical approaches targeting to decrease unnecessary CS(7).

Therefore, this study aims to identify different factors which are contributing to the trend of CS delivery in Nepalese context.

## ORGANIZATION OF THESIS

This thesis is divided into five different chapters. **Chapter I** introduces the thesis topic, overview of thesis content and key background information on Nepal. **Chapter II** consists of statement of the problem, justification along with objectives and methodology of the study. **Chapter III** provides findings of the study. **Chapter IV** presents interventions from different countries for rational use of CS, **Chapter** consists discussion of overall findings from literature review. Finally, **Chapter VI** draws conclusion based on previous chapters and extends possible recommendations to Ministry of Health and Population (MoHP), policy makers, health professionals and other relevant stakeholders.

# **CHAPTER I: BACKGROUND INFORMATION OF NEPAL**

This chapter will discuss about background information of Nepal based on its geographical demographic and political context along with socio-economic and cultural condition. This chapter will also highlight health system regarding equity, quality and existing health problems and maternal health situation.

## **1.1 GEOGRAPHICAL, DEMOGRAPHIC AND POLITICAL CONTEXT**

Nepal is small landlocked, South Asian, federal and secular republic country with China in north and India on south, east and west as neighboring countries. The total population of Nepal is 29 million and average annual population growth rate is 1.1%(10). Total population comprises of 40% youths between 15-40 years and sex ration is 95 males/100 females(10, 11). The significant rise in life expectancy of the population was seen from 67 years at birth in 2011(12) to 71 years in 2017(10). Nepal witnessed historic political transition and introduced new constitution on 2015 which divides country into three levels as federal, provincial and local level(13). Before new constitution there were five developmental regions in Nepal which are now divided as seven provinces with 77 districts and 263 municipalities(12). Municipalities are further divided as rural municipalities called *Gaonpalika* and urban municipalities called *Nagarpalika*(14). These municipalities are then divided into wards (14). More than half of the population of the country (60%) live in urban municipalities(14). Public health services including preventive, promotive and curative is looked after by the MoHP(15).

## **1.2 SOCIO-ECONOMIC AND CULTURAL CONTEXT**

In 2017, Human Development Index (HDI) of Nepal was 0.574 which made the country stand at 149<sup>th</sup> position in the world out of 188 countries(16). The population below poverty line is more than 24% and people with poverty have been rising since massive earthquake of 2015 and border blockade in the same year at Indian borders(10). According to the International Labor Organization, 70% of population between 18-60 years are working in informal areas and above 50% of Nepalese population is working in farming and agricultural field which has been providing to 25% of total Gross Domestic Product (GDP) of Nepal(17). However the employment structure has been very volatile over past few years and economically productive age group of Nepal are migrating internally as well as externally and remittance had been contributing to more than one third of total GDP(17). GDP of Nepal decreased by 2.1% from 4.8% in 2010 to 2.7% in 2016 as there was mega earthquake in 2015 but again in 2017 it rose to annual growth rate of 7.9% which currently amounts the national GDP to be US\$ 24.88 billion(10). Literacy rate of Nepal for above 15 years of age is 63.49% out of which 76.4% are males and 23.6% are females(18). Many Nepalese women are involved in self-employment like knitting, crafting and farming(12). Their maximum engagement is seen in the unpaid sector and domestic chores mainly due to low education level and patriarchal dominance(17). Nepal has 4 castes (*Brahmins* regarded as upper caste group, *Kshatriya* regarded warriors and upper caste group, *Vaishya* regarded as people involved in business from middle caste group and *Sudra/Dalits/Janajatis* regarded as lower caste

group) and 36 sub-castes(14). Significant differences had been observed among various caste and ethnic groups where *Dalits* and marginalized are less literate and belong to low-economic group causing inequities in accessing health care services(19, 20). Immunization coverage among children from *Dalit* group was found to be below national average of 83% and use of Family Planning (FP) services were found to be lowest among the *Dalits* and marginalized *Janajati* groups(21). The unmet need of FP among *Dalits* is 35.2% and marginalized *Janajatis* is 39.3% which is more than national average (27.5%)(21). Nepali is the national official language and 75% of people practice Hinduism followed by Buddhism, Islam, Christianity and Jainism(22).

### 1.3 HEALTH SYSTEM CONTEXT: EQUITY, QUALITY AND EXISTING HEALTH PROBLEMS

The changing shift has been seen from Communicable Diseases (CDs) to Non-Communicable Diseases (NCDs) in past years in Nepal and has double burden of diseases. Prevalence of NCDs was 60% in 2014 which rose to 65% in 2016 and 26% population aged 15-69 have high blood pressure(19). According to Global Burden of Disease, neonatal disorder is leading cause of premature death followed by ischemic heart disease(23).



Figure 1 Causes of Premature Deaths in Nepal; Source Global Burden of Diseases

Nepal has seen great achievements in health system goals in past few years. The under-five mortality rate (U5MR) was reduced from 54/1000 live births to 39/1000 live births between 2011 and 2016(19). However, inequity in health service utilization and health outcomes still exists depending upon socio-economic and geographical context(24). For instance, according to the Nepal Multiple Indicator Cluster Survey, rural areas had high (44/1000 live births) U5MR than the urban areas (34/1000 live births)(25). Only 62% population have reach to health facilities within 30 minutes from residence; 85.9% of total urban population and 59% of total rural population(26). Likewise, the likelihood of infant mortality rate was twice higher in the households from poorest quintile than the richest quintile(19).

People from low wealth quintile did not seek health services due to assumed financial catastrophic leading to further impoverishment(25). In Nepal, US\$ 42 is per capital expenditure on health care(27). Increasing private sector in health service delivery is one of the main reason for costly OOP payment contributing to 55% of health financing(27). The rapid growth of private services has ranged from large scale hospitals to small clinics and pharmacies which are concentrated in urban areas(28, 29). Remote areas rely on small pharmacy and practice of following traditional medicine and treatment is still prevalent in remote areas(30). Thus, strategic involvement of private entities and strengthening public facilities in healthcare has been the agenda of National Health Policy 2017(28).

Many national health programs are targeting only to expand maximum health services to rural regions which has somewhat diverted the attention from quality and are rather just focusing on aspect of quantity. Some of the hinderances in achieving quality health services in Nepal are inadequate skilled human resource for health, stock-out of medicine, lack of diagnostic and curative equipment/technologies, lack of their maintenance and lack of accountability(28). Quality of Care (QoC) is assumed to be low at the lower-level of health facilities and there is no gatekeeping system or proper referral system which has burdened the tertiary level with greater patient flow(31). The health care system of Nepal is as shown in the figure below:

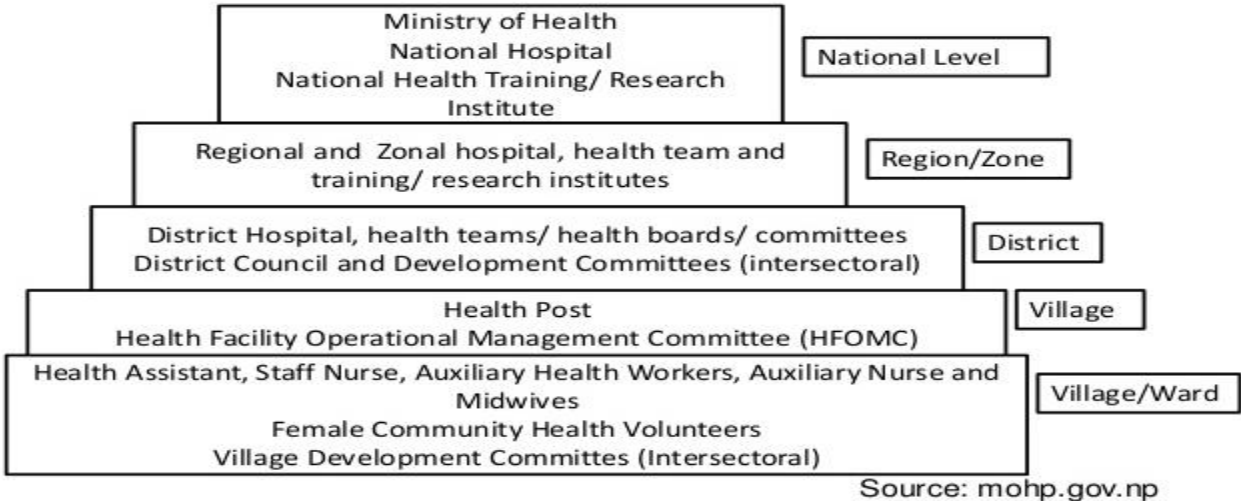


Figure 2 National Health Care System of Nepal

**1.4 MATERNAL HEALTH CONTEXT**

Nepal has made much progress in maternal health in past decade. Deliveries at health facilities increased from 35% to 57% and deliveries by Skilled Birth Attendants (SBAs) increased from 39% to 58% between 2011 and 2016(19, 32). This contributed largely in reducing Maternal Mortality Ratio (MMR) from 539 maternal deaths/100,000 live births in 1996 to 239 maternal deaths/100,000 live births in 2016(19, 32). Total Fertility Rate (TFR) decreased from 2.6 births/woman in 2010 to 2.1 births/woman in 2017(15). In 2016, out of total pregnancies, 81% were live births, 9% were miscarriages, 9% were induced abortions and 1% was still births(19). Out of total live births 9% delivery was done by CS in 2016(19). Nepal had sudden rise in the rate of CS from 5% in 2011 to 9% in 2016(19, 32, 33). 69% of Nepalese women had at least

four antenatal care visits and 91% of women took iron supplement(19). However, there is great discrepancies in utilization and access of maternal health care. For instance, delivery by SBA in urban area is 67% whereas only 46% in remote area(19). Also, 85% of women with at least secondary level education had institutional delivery whereas only 36% institutional delivery was observed among women with no education(19). The differences also existed among women belonging to different wealth quintiles where 90% from highest wealth quintile had institutional deliveries compared to only 34% from lowest wealth quintile(19). In January 2009, national free delivery policy was introduced by the government to mitigate financial hinderances for safe delivery and promote institutional deliveries(32). Regardless of this initiative, gender inequality and lack of decision making power within households has also been hindering women from accessing maternal health care services in many rural areas(34).

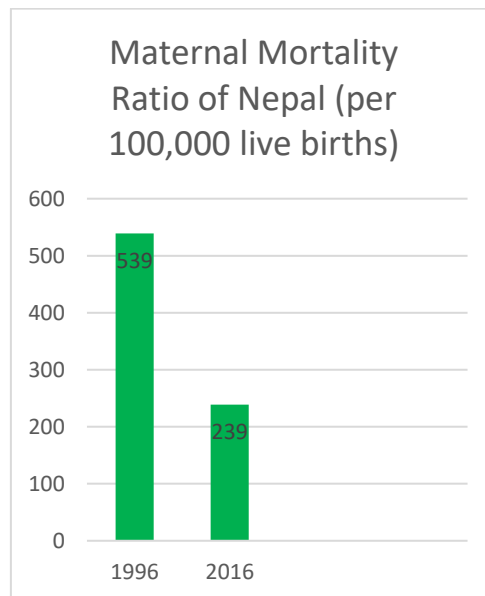
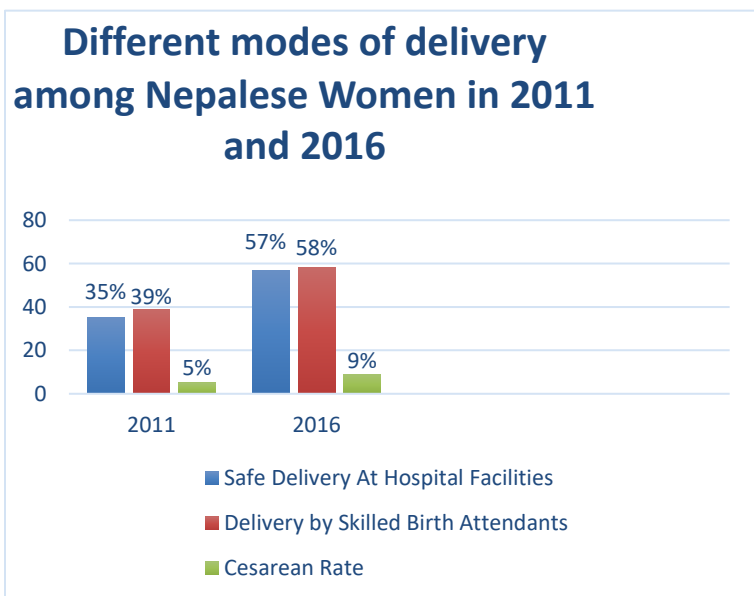


Figure 3 Different Modes of Delivery among Nepalese Women Figure 4 Maternal Mortality Ration of Nepal

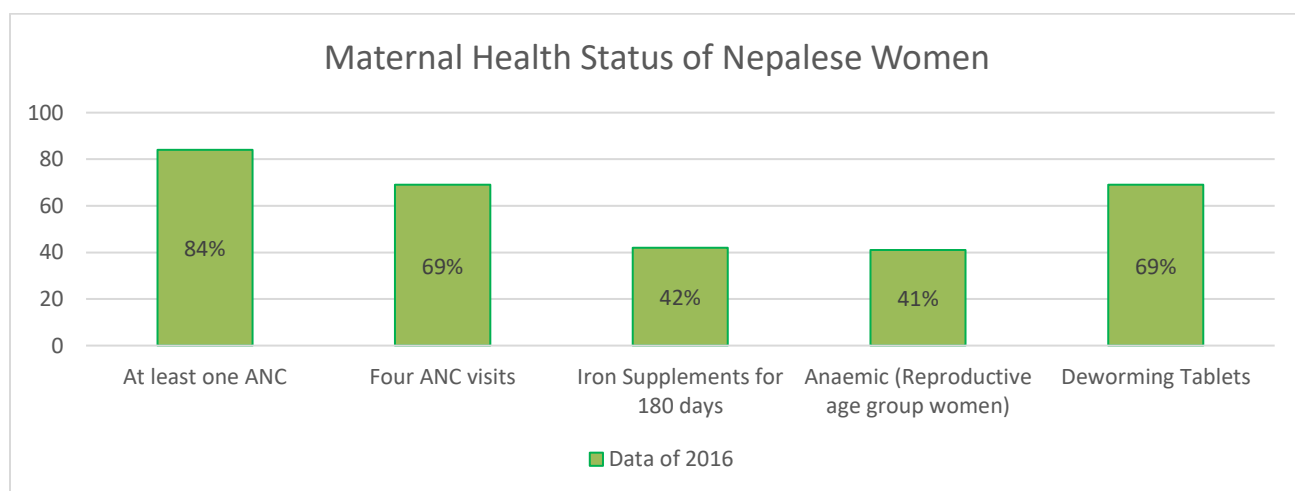


Figure 5 Maternal Health Status of Nepalese Women; Source of fig 3, 4 and 5 is NDHS report

## **CHAPTER II: PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES AND METHODOLOGY**

### **2.1 PROBLEM STATEMENT AND JUSTIFICATION**

CS is the mostly carried out surgical intervention throughout world and very important when there are complications like abnormal fetal position, fetal distress, antepartum hemorrhage and hypertensive diseases(4, 35). CS had been seen as an alternative when normal vaginal delivery could cause risk on mother or baby, but these days, CS has been performed even when non-medically indicated and is rapidly increasing worldwide(6, 36-38). According to estimates of World Health Organization (WHO), there has been large number of medically unexplainable and non-rational CS deliveries taking place across the globe causing thousands of maternal mortality every year(33, 39). Rational CS according to the definition of WHO, is the surgical procedure carried out during childbirth only for medically indicated reasons to save the lives of mothers and infants(7, 40). There were 18.5 million CS deliveries each year in 137 countries; and 5% was observed in 24% of those countries whereas more than 15% in 50% of those countries(33, 41). Many South Asian countries are also witnessing rapid increase in CS cases(42). In India, the CS rate increased from 3% in 1992 to 11% in 2006 and in Bangladesh from 2% in 2000 to 17% in 2011(42-44). The analysis of data from 26 countries in South Asia and Sub-Saharan Africa showed the unequal use of CS among the population of the country having highest use among rich population of urban area and lowest among poor people in rural areas(42). The prevalence of CS delivery in Nepal increased by four times between 2001 and 2011 from 1% to 5.4%(32, 33) and almost doubled in past 5 years to rate of 9% per number of live births in 2016(19). CS rate has been increasing drastically in Nepal without medical indications(45) and ranged from 46% to 81% in private facilities(46).

WHO stated, the rate of above 10% of CS are not linked in reducing maternal and newborn mortality rates(9). CS on demand is regarded as expensive and unjustifiable luxury leading to deterioration of national health resources(47). Moreover, Federation of Gynecology and Obstetrics (FIGO) 14 stated that CS on demand without medical need is ethically unjustifiable(47). Fetal and maternal injuries led by surgeries are very common in CS and studies found various medical risks among children and mothers who had CS(48) (Refer Annex I for detailed complications of non-medically indicated CS on health of mother and child). There is almost unanimous agreement that existing CS rate cannot be reasonable(49). CS in Nepalese context is of major concern due to its inequitable distribution between different regions and population group of the country(19). It has been exploited and used unnecessarily in urban society whereas underused in rural areas of Nepal due to inaccessibility issue(19, 32). The trend of CS in Nepal is unevenly distributed and shows situation of "Too Much Too Soon" in urban and "Too Little Too Late"(50) in rural areas causing maternal morbidity and mortality(51). Also, increasing misuse of health resources, creating unnecessary health expenditure (additional 28% by unnecessary medical procedures(52)) and health hazards(51).

Increase in numbers of CS has been observed both in public and private health facilities however the studies from Nepal, India and Bangladesh showed greater increase in private facilities(42). In 2016 9% of total deliveries were done by CS in Nepal, among which, 5% were decided to be

delivered by CS before the starting of labor pain(19). Public facilities witnessed 12% of CS and private facilities had 35% in Nepal(19). CS was more among women with higher education (20%) compared to women with no education (5%) and women in highest wealth quintiles had 30% CS compared to 5% among lowest quintile women (5%)(19). BPKHIS hospital of eastern Nepal, had 30% CS rate in 2016 and increased to 34% in 2018(33, 53). Mountainous region of the country, had just 2% CS in 2016 but urban cities had 17% CS in 2016(19).

The medically required situations for CS in Nepal include placenta previa, prolonged obstructed labor, breech position of the fetus, umbilical cord prolapse and fetus in distress(42). WHO has advised to use CS only when medically required but it has been used without these medical indications(19). Although studies have shown increasing trend in CS, the reasons for it remain unknown. While some studies purely focus on medical need for CS, some have shown the women's demand and desire for CS contributing to its rise(54). According to some of the studies, various influencing factors for women to choose CS instead of vaginal delivery are due to insecurity for their sexual relationship, less control over urinary bladder(49), fear of pain at labor and selection of desired auspicious date for the delivery(42). The service providers may offer CS to the patient during non-medical indications for profit motive(42). Despite the high rise in CS rate unnecessarily and inequity in its utilization in Nepal, there has not been much done about it by the government or healthcare providers(46).

Regardless of rampant CS use, the findings from this study are expected to identify potential influencing factors for non-rational CS use to support the government to strengthen policy and formulate interventions for rationale use of CS. The study focuses on the unnecessary increasing CS use when non-medically indicated because there are enough literatures on improving underuse of CS in rural Nepal/resource poor settings(55-58) and there is no evidence of medically indicated CS in rural settings too.

Research Question: What are the factors influencing non-rational use of CS in Nepal?

## **2.2 OBJECTIVES**

### **2.2.1 Overall Objective**

To explore and analyze factors contributing to the non-rational delivery by cesarean in Nepal in order to recommend MoHP and policy makers to strengthen safe and rationale Cesarean section program in the country.

### **2.2.2 Specific Objectives**

- To explore health system related factors (supply side) influencing non-rational CS use in Nepal
- To ascertain patient related factors (demand side) influencing non-rational CS use in Nepal
- To explore best interventions from other countries to influence rationale use of CS
- To provide recommendations to MoHP and policy makers for ensuring rationale use of CS



## **2.3 METHODOLOGY**

### **2.3.1 Conceptual Framework of the Research**

The conceptual framework of this research comprises of two different frameworks adapted from:

- 1) Schematic representation of factors related to women, society, health providers, and health-care organizations that affect the frequency of caesarean section use at the local level from recent Lancet series "Optimizing Cesarean Section Use 3" on "Interventions to Reduce Unnecessary Cesarean Sections in Healthy Women and Babies"(49)
- 2) The conceptual model on "Theory of Planned Behavior (TPB)" from the article "Intention for Cesarean Section Versus Vaginal Delivery Among Pregnant Women in Isfahan: Correlates and Determinants"(5)

The first framework on "Optimizing Cesarean Section Use 3" included complete perinatal classification including Robson 10-Group Classification which not only looked at women with the delivery by CS but covered "all women" who deliver at specific setting(59). This was very broad than the objective of this study and itemization of the influencing factors were too detailed in the Lancet paper. It also was not comprehensive as it did not incorporate socio-economic factors for influencing the decision of CS among women. The second framework of TPB looked after subjective norms, body image and attitude and perceived behavior control of women which would influence the decision making procedure(3). However, this theory has been only focusing on the rationale reasoning for influencing behavior but has neglected the unconscious or unanticipated factors which might cause certain behavioral outcome. Thus, considering these aspects both the above-mentioned frameworks have been combined to address the objectives of this research.

The framework was used to analyze various factors contributing in practice of CS. The economic and socio-cultural, organizational and national level factors under socio-environment level were explored. Whereas personal factors like number of CS experience/number of children, health professional's role, subjective norm, previous birth experience were analyzed. Further on the personal level, perceived behavior control, body image, attitude and individualism were explored in association with CS. The health professional related factors were further explored in context of physicians' training and education, doctor-patient-relationship, convenience of CS, financial awards and fear of blame when denied providing CS on demand. Health professional's role in relation to organizational level were also studies. One of the important constructs of this model, "subjective norm" analyzed the acceptance of CS among woman over Normal Vaginal Delivery (NVD) depending upon views and influence of the society. Perceived behavior control discussed the decision-making power of a woman. The individualism aspect looked at the willingness or level of fertility intention of women influencing intention for delivery method. These constructs influenced the decision of CS delivery in a woman ultimately leading to behavior of either choosing CS or vaginal delivery.

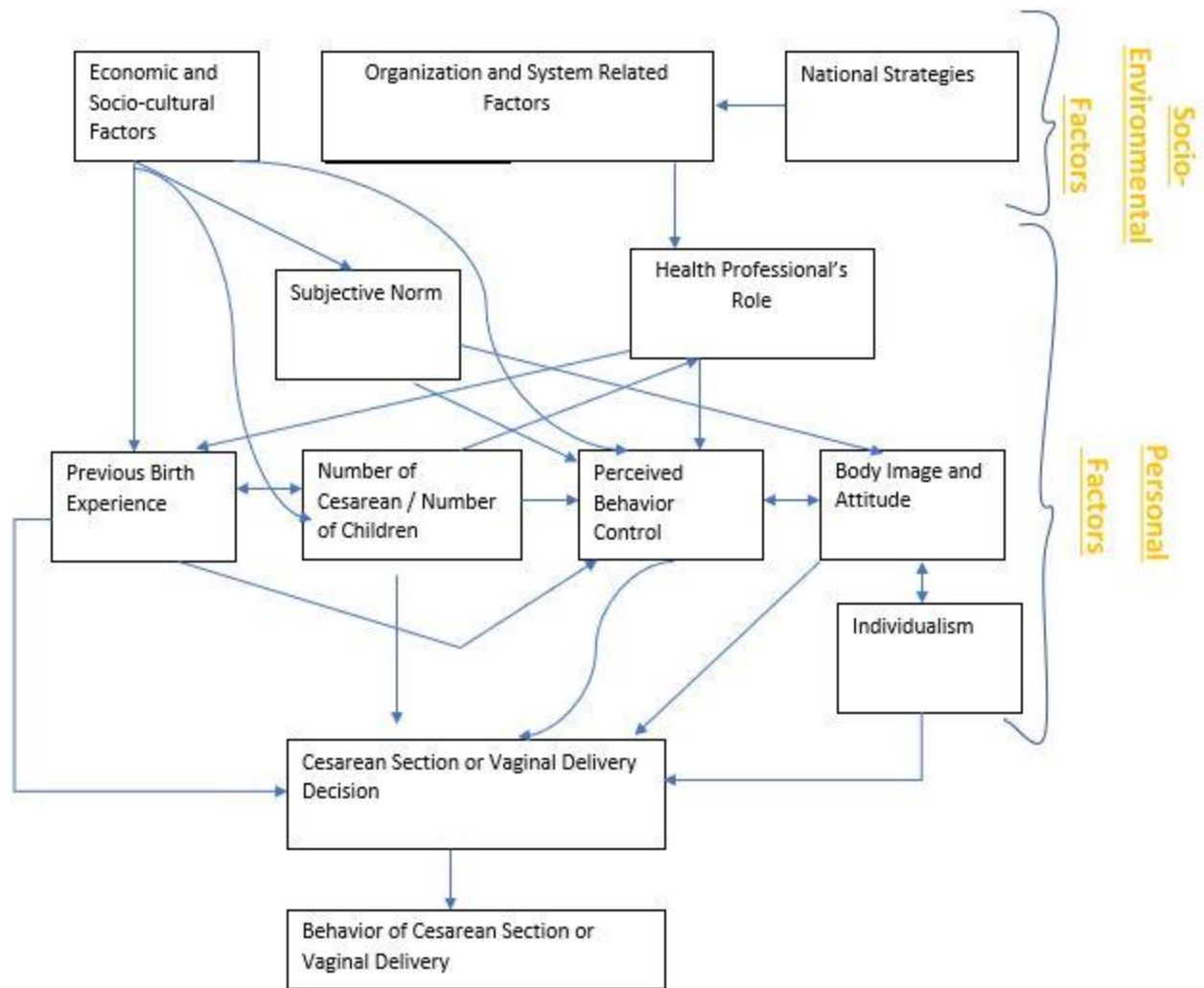


Figure 6 Conceptual Framework on Factors Affecting Use of Cesarean Section in Nepal and their Relationship

### 2.3.2 Methodology to Address Specific Objectives

To address specific objectives 1, 2 and 3 relevant national documents, national health policy and other relevant articles from different countries were reviewed. Firstly, Nepal's National Demographic Health Survey (NDHS) 2016 was accessed from website of MoHP. Secondly, websites of WHO and FIGO were explored to collect relevant documents. Then, the online database Pubmed, Vrije University library and Google scholar were used to gather further literature. Various Boolean operators (AND, OR and NOT) were combined with key search terms. Many key search terms were used with their synonyms too, to expand the possibility of gathering many articles. Truncation was used for some words such as 'culture\*', 'social\*' and 'strategy\*'. The collected articles were documented and reviewed after which, the ones not meeting inclusion criteria were excluded from the study. Below are the key words and inclusion criteria considered during literature search:

Table 1 Key search terms and Inclusion Criteria for Specific Objectives

Objective Number	Search Terms	Key Search Term	Search Engines	Websites
	'National Demographic Health Survey', 'National Health Policy', 'Country Profile', 'Nepal Health Strategy'			Government of Nepal, Ministry of Health and Population, Nepal
1 And 2	'Cesarean Section', 'Rising Cesarean Section', 'Robson 10- Group Classification'			WHO, FIGO
	'Cesarean Section', 'Rising Cesarean Section', 'Trend of Cesarean Section', 'Comparison of Cesarean Rate' AND Asia NOT Africa, 'Factors for Cesarean Section', 'Causes of Cesarean Section', 'Factors Influencing Cesarean section', 'Need for Cesarean Section', 'Private Hospital-based Cesarean', 'Public facilities based Cesarean', 'Recommendation for Cesarean Section', 'Providers and Cesarean Section' OR India, 'Changes in Cesarean Section', 'Patient-Doctor Relationship for Cesarean', 'Socio-economic factor' AND 'Cesarean Section' OR India OR Asia, 'Culture* Factors' AND 'Cesarean Section' OR India OR Asia, 'Patient Related Factors' AND 'Cesarean Section' OR India OR Asia	AND Nepal	Pubmed, Google Scholar, Vrije University online Library	
3	'Guideline on Cesarean Section', 'Strategies for Cesarean', 'Rational use of Cesarean'			WHO, FIGO
	'Cesarean Section', 'Cesarean Section' AND 'Lower-middle Income Country', 'Cesarean Strategy*' AND Asia OR Africa, 'Cesarean Policy*' AND Asia OR Africa, 'Cesarean Section' AND Implementation, 'Cesarean Section' AND Challenges, 'Cesarean Section' AND Effective, 'Cesarean Section' AND Rationale AND Asia OR Africa, 'Cesarean Section' AND 'Rationale Use', 'Cesarean Section' AND 'Non-Medical Condition' And Asia OR Africa, 'Guidelines AND 'Cesarean Section', Strategies AND 'Cesarean Section', 'Rational Practices' AND 'Cesarean Section'	AND 'Low Income Country' OR LMICs AND High Income Country	Pubmed, Google Scholar, Vrije University online Library	
Inclusion Criteria	<ul style="list-style-type: none"> <li>Articles in English or Nepali</li> <li>Full accessible articles</li> <li>Articles from last 20 years</li> <li>Focus on Factors for Cesarean Section delivery in Nepal</li> <li>Focus on causes of change in CS trend</li> <li>Focus on influencing factors from supply side of CS</li> <li>Focus on influencing factors from demand side for CS</li> <li>Focus on strategies for rationale use of CS in LMICs</li> <li>Focus on reducing CS rates in non-medical conditions</li> </ul>			

## **CHAPTER III: FINDINGS**

This chapter contains the various factors influencing occurrence of CS in Nepal. The chapter is divided into two broad sub-chapters according to personal and socio-environmental factors influencing CS as illustrated in the conceptual framework. The findings are mostly presented from the research done in Nepal and other South Asian countries similar to Nepalese context. During the presentation of findings each factor has been analyzed for leading non-rational CS use in Nepal.

### **3.1 PERSONAL FACTORS**

This sub-chapter is divided into seven sections according the framework. The seven sections are subjective norm, health professionals' role, previous birth experience, number of cesarean/children, perceived behavior control, body image and attitude and individualism.

#### **3.1.1 Subjective Norm**

The societal pressure, exposure and network factors influence women in deciding childbirth method(5). A six countries analysis study by Leone (2008) revealed women in South Asian countries like Bangladesh and Vietnam share aspects of maternity experiences with their relatives, mothers-in-law, husbands and other female friends in the community and these sharing in societal network cause negative or positive impact on the women regarding acceptance of CS(60). It also stated, CS in South Asia and Latin America has become a fashion statement which has been influenced by peers(60). Furthermore, qualitative analysis of this study added, social network being influential in shaping women's decision to uptake CS is the access of posts and messages of social media (Facebook, twitter, Instagram) and mass-media (radio, newspaper, television)(60). This is important factor in moderating urban women of Nepal in choosing childbirth procedure and not for rural women as 87% of Nepalese rural women are yet to access internet(61).

Satisfied clients of CS, recommend it to their friends or relatives(62). For instance, according to the study done in Bangladesh, if the society has perception of CS being safer than NVD then women and their family members demand CS(60). Women who are connected with some community networks, for example mother's groups (*Aama Samuha*) in Nepal, are two times more likely to share their reproductive health related matters and gain information regarding benefits and side-effects of CS and make informed choice(62). A recent mother during the Key Informant Interview (KII) of this study revealed that she preferred elective CS before the onset of labor because she heard about birth asphyxia case due to prolonged labor in one of her relatives' child. She did not any complications during her childbirth so chose CS beforehand. Similar findings were shown by six countries' study where families pressurized women and even physicians to choose CS due to the fear of loss of baby during NVD(60, 63) and this often happened if family knew that the fetus is boy child(64) possibly due to the tradition of son preference in Nepalese context.

#### **3.1.2 Health Professional's Role**

Fetal distress, oligohydramnios, previous CS and breech were the common reasons for childbirth by CS in Nepal(45). The common reasons for CS in women having baby for the first time were

postdates, cephalopelvic disproportion and fetal distress(63). A ten year study at tertiary hospital of Nepal presented that children with larger sizes (mostly above 3 kgs) are considered to be delivered by CS whereas children below 3 kgs are twice less likely to be delivered by CS(45) and the result was statistically significant ( $p < 0.001$ ). Women with less than 145 cm height(65) were prone to deliver their child through CS(60, 66). If a woman had previous CS then repetitive CS in next pregnancy is not mandatory which was known by the physicians(63) however, women with previous CS are not considered for NVD by almost all health professionals(67). During the KII, Dr. Jageshwar Gautam, Director of Paropakar Maternity and Women's Hospital (PMW) (largest public tertiary referral hospital of Nepal for maternity), said that after Nepali Mass Movement of 2005/06 Nepal was declared Federal Democratic Republic in 2008 which allowed large freedom to public to speak against irresponsibility and misconduct of health professionals. There have been many incidences when doctors were beaten when failed in any delivery cases, so doctors preferred to deliver most pregnancies by CS (mostly provide CS to almost all cases with previous CS) to avoid any kind of risk. This has increased defensive obstetrics in past decades contributing to increase CS rate(52). Fear of blame, litigation and less confidence on other procedures like vacuum assisted vaginal delivery causes physicians to opt CS as parents may later blame physicians for CS done at late phase if baby suffers from asphyxia(63). If denied of CS on demand, families often threatened physicians in public facilities to shift patient to other private hospitals(63).

In a study by Kiran Regmi (2005) an obstetrician said that public had become very aware and would not spare a single mistake of doctors(68). If anything happened to the mother or child during childbirth, then faces of doctors would be painted with "*kalo moso*" (black ash from utensils)(68). Thus, obstetricians didn't want to wait and watch for NVD instead proceeded CS(68). And if any unfavorable event would happen during CS then the family of patient would pacify themselves thinking doctor did his/her best(68). These examples indicate the tendency of health care professionals to practice defensive obstetrics to be on the safe side.

Increase in CS patterns when not needed for medical conditions were also due to profit gaining motive of health professionals as they get 50%-60% of fees per case(47, 60). According to Mukherjee (2006), in India, physicians make large amount of money from CS than NVD and 82% of physicians practice CS to avoid blame of negligence(47). Dr. Jageshwar explained, doctors did not prefer coming to hospitals at night or during unofficial hours thus, performed CS during day time. He also added, CS cases were observed more on Thursdays and Fridays as doctors did not want to work on weekends. Similar situation was found in Bangladeshi study where, 66% (i.e. 108 out of 164) of elective CS and 76% (i.e. 274 out of 360) of emergency CS were done during day time from 08:00 to 14:00 hours(63). This was a mixed-method study done in five semi-urban and rural public hospitals with large sample of 2503 deliveries. CS was preferred by physicians as it takes 20-30 minutes whereas NVD may need 12 hours or more(47).

The study of six developing countries by Leone et al. (2008) stated that when patient visited physician on regular basis, good rapport was built between them which increased trust of patient upon physician(60). Thus, patients followed advice of physicians to uptake CS without any doubt and question(60). According to Aminu et al. (2014), physicians in Bangladesh believed CS was the main contributor in decreasing maternal mortality and morbidity in the country which molded their attitude for performing more CS(63). According to the statement in Zahra Shams-Ghahfarokhi (2016) from study of Iran, 30% of women chose CS as they were ill-treated by

physicians in their previous delivery during hours of NVD(5). Inappropriate treatment by physicians during childbirth is existence in Nepal too(69). Health workers tend to express their frustration over women in long labor and use foul language, talked down to her and even threatened to deliver child by CS if women in labor did not stop to shout and cry and incidences like these demotivated women to choose NVD(69).

In addition, rural Nepal witnessed non-rational use of CS when medically not indicated as health professionals did not prefer working in there causing lack of Human Resource for Health (HRH) and women being proceeded to CS for reducing waiting and watching time for NVD(70). According to studies, urban cities like Kathmandu had one doctor per 850 population whereas rural areas of Nepal had one doctor per 150000 population(71, 72). The doctor-population density in urban was approximately forty times more than in rural(71, 72).

### **3.1.3 Previous Birth Experience**

A study done in central region of Nepal presented that out of total CS cases in the hospital, 2.2% of women with elective CS chose it due to previous traumatic experience during the NVD(73). Despite this study being carried out in one specific region of the country, this could be representative for the whole nation because unpleasant experience of previous painful labor compelled women to choose CS according to another nationwide study done by Laxmi et al. (2017)(46). Only one existing Nepalese study from 2003 on painless vaginal delivery presented that 16.3% of Nepalese women were aware about painless delivery through epidural analgesia(74). However, this study included just 270 samples from urban Nepal and result cannot be generalized for the whole country as majority of Nepalese women reside in rural areas with minimum awareness about such medical interventions. Previous experience of verbal or physical abuse from physicians during childbirth where nurses abused women in delivery room either by using abusive words towards them or even by pinching her thighs, slapping and using excessive fundal pressure compelled women in choosing CS(47, 69). Bhagwati Dhungana expressed in her article that, when she was in her labor, she was scolded by the nurses not to cry if she had chosen to deliver the baby by NVD(69). She did not receive any support from nurses during her painful time(69). The study done in Iran also revealed that women who faced rough behavior from doctors earlier chose CS also 20% of women in the study believed their previous CS delivery got them more care and attention from both hospital and family thus, preferred CS in next delivery too(5).

Similarly, Nazneen et al. (2011) in his Bangladeshi study discovered that 2.3% of patient themselves came to the hospital with the demand for CS in their next pregnancy due to their experience of less painful childbirth before(75). On the other hand, 68% of women who had negative experience of childbirth where they lost their previous child during NVD, preferred to take CS in their next childbirth as it is perceived to be safer than NVD(75). They believed CS to be safer than NVD and to receive more quality care. This was the retrospective observational study for ten-year period with large sample of 23,748 women who delivered at big tertiary hospital of Bangladesh where women from every part of the country came. Thus, the study was representative of the whole country and could be generalized.

On the contrary, there were also 5% women in a study done in Iran, who liked to try for Vaginal Birth After Cesarean (VBAC) as they wanted to recover quicker and be home sooner(5, 76). However, women wanting to have NVD after their previous CS, were not provided with such option by 98% of Nepalese health professionals(45, 62). During her qualitative study Kiran Regmi (2005) interviewed a rural woman, Malti, who recently gave birth to a child where the women said, she was referred for CS by the hospital doctor(68). She did not have any money so she along with her mother-in-law were hesitant about having CS, but doctor insisted for CS because Malti had infertility for seven years of her marriage, so doctor did not want to take any risk in delivery(68). However, the lab technician was not in the hospital, so they had to wait for few hours(68). During that waiting time Malti gave birth by NVD, which created distrust among the villagers and Malti herself upon the doctor who unnecessarily recommended CS to her(68). Incidences like these recommendation for CS in non-medically indicated cases create barrier among rural women in accessing maternity service and cause under-utilization of CS service even when needed(68). This could also be linked with previously discussed defensive obstetrics among physicians.

### **3.1.4 Number of Cesarean / Number of Children**

According to the study by Aminu et al. (2014), 193 out of 242 primiparous women delivered their babies by CS whereas only 168 out of 288 multiparous women delivered by CS(54, 63). This showed that CS rate between primiparous and multiparous women was 79.8% vs 58.3%(63). In Nepal, parity of a woman also determined CS rate for first time, as highest percentage of CS among women with first, second and third or more child were 82.5%, 17.0% 0.4% respectively(33). A qualitative study presented that more the fertility intention, lesser the demand for CS among Nepalese women(46). Women/couples who wanted less children (one/two) chose CS as there might be repetitive CS when a woman has it once(5) whereas women who preferred many children intended to avoid CS. A five year retrospective study by Malla et al. in Nepalese tertiary hospital stated that nulliparous women were the highest contributors, 28%, in overall CS rate of the hospital(77). This study had the sample of 4892 deliveries and could be generalized nationwide. However, there were also cases like presented in qualitative study by Kiran Regmi (2005) where a woman of late thirties had her seventh child and had to go through CS due to late childbirth age and multiple pregnancies(68). Thus, CS is not just determined by fertility intention but by the age of a woman too.

If a woman had previous CS experience then she did not want to try for vaginal birth after c-section (VBAC) in her next pregnancy due to fear of uterine rupture(60). Women get such information from their peers, internet access(60) and from physicians(52) (please refer health professionals' role for influence of repetitive CS). A study by Apurwa Prasad et al. in Nepal, found that out of total CS cases, 21% were done because of previous CS childbirth among those pregnant women and no VBAC was found whereas remaining 79% of CS were done due to various medical conditions, non-progressive labor and elective CS(78). This was 6 months hospital-based quantitative study with sample size of 1172 deliveries. Similar result was seen in the study in Bangladesh by Aminu et al. (2014) where 29.4% of CS cases were done because of previous CS(63). On the other hand rural women preferred NVD as they preferred many children to continue their farming and family lineage(68).

### 3.1.5 Perceived Behavior Control

In Nepal, number of CS is observed much higher among women with higher education (20% among higher education and 5% among no education) and economic stability (14.8% CS among women from poorest wealth quintile whereas 30.9% CS among women from richest wealth quintile)(19). Employment and literacy largely impact a woman's perception on ability to control her own behavior regarding selection of method for childbirth(63) because she will have information and access to other resources along with the power to make decision. Having higher number of CS cases among women with higher education in Nepal indicates that educated women are able to make decisions for their own health and for the health of their child to be born(79). This might also be linked with the family status as educated women often belong to educated family and such family might prefer CS over NVD regarding it safer and better outcome for both mother and child. Similar case was observed in the study done in India, where women with high school degree or above take necessary steps of maternal health like Ante Natal Care (ANC)/Post Natal Care (PNC), lactation and consulting doctors for mode of delivery to decide for their reproductive health and rights(54). Different literatures suggest that factors like women's sense of control in decision making process, control over own health, participation in decision making for household matters, ability to establish good relation with health-service providers, capacity to spend money for own health and respectful care play important role in helping women decide to choose CS(62, 70, 80). Out of these, capacity of a woman to spend money and her relation with the health service provider plays most important role(60) in decision making for CS as 72% of women who visit their doctors on regular basis choose CS for childbirth(70). However, sole decision of a woman due to her education and economic condition might not be influencing her choice for CS as indicated in the study by Bastola (2017).

Similarly a mixed-method study by Sarker et al. (2012) in Bangladesh it was shown that only 5% of the total CS rates were influenced by decision of women and rest 58% and 37% were influenced by doctors alone and combination of doctors and family members respectively(81). Working women opt for CS as they need to schedule their works and maternity leave accordingly. Dr. Jageshwar explained that, many working women tend to demand for CS on specific day and time to match everything at their work and to adjust dates according to holidays of their spouse. Working urban women may have work related travels and assignments and they control their health and body according to their convenience. A systematic review of 17 articles from different countries of the world by McCourt et al. also suggested that women's dedication for her career influences uptake of elective CS and date preference(82) as indicated by Dr. Jageshwar. Almost 80% of educated and working women in formal sector have health insurance so they don't worry about cost associated with CS(46).

On the other hand, according to Kiran Regmi (2005), in Nepalese rural areas 75% of wives rely on money of their husbands for maternal checkup(68). In such case the husband or other family members decide for her issues of sex and childbirth(68). If she would be told to choose particular method of childbirth by them then she would not be able to deny and mostly rural women are compelled to have unassisted delivery at home(68).



### **3.1.6 Body Image and Attitude**

Women opt for CS because some studies showed that having planned CS helps to prevent prolapse of pelvic organ, maintain control over urine and feces also prevent sexual dissatisfaction which women think might occur after NVD(64, 83). According to qualitative data from study of Laxmi et al. (2017), Nepalese women might believe in uterine enlargement after NVD which might not keep their body physiology as before(46). Nepalese women from educated background and economically stable family tend to adopt CS to avoid painful NVD and to maintain their tighter vaginal tone which they believed would loosen during NVD(46, 47, 84). 35% of Nepalese women believed that right to CS on demand should be the right of a woman(84). However, this study might not be representative for whole Nepal because its sample was just 200 post-partum women in one hospital setting of urban Nepal.

On the other hand, there were women who liked to have NVD as stitches from CS would take time to heal and NVD helped in soon recovery(84). This attitude was mostly seen among the women from rural areas as they had to work in farmlands as soon as possible and did not get/prefer rest after childbirth(85). In her study Kiran Regmi (2005) mentioned that a rural woman who had uterine prolapse during her delivery, and had to be assisted by CS, insisted for her early discharge from the hospital soon after her delivery because her goat was pregnant and she had to be home for goat's delivery(68). This clearly projected the rural scenario in Nepal where women compromised their life to look after their farms and household chores and searched ways to avoid CS even when medically needed. Addition to that, women were asked for different food restrictions after CS so rural women who could not afford planned diet as asked by doctors, preferred to have NVD(85). Also, there are women who chose NVD despite perceiving it painful, to cherish the joy of giving birth to their child through natural process(84).

### **3.1.7 Individualism**

In Nepal, individualism influenced the decision of a woman to have CS when she had the intention of lower fertility, focus on career and control over ones behavior(46). Perceived behavior control played role in shaping individualism of a woman and as stated earlier by Dr. Jageshowr, women who were career focused, wanted to plan delivery according to their convenience. According to Nepalese study by Shrestha (2007), when women had planned CS, it gave them sense of executing their reproductive right(84). Different studies around the world suggested that independent working women voiced their opinion and chose CS without consulting with other people in their surroundings(5, 53, 86). According to the study done by Zahra in Iran, a woman said, she set her life goals by herself and did not seek validation of others on the choice she made for delivery(5). The study also revealed that mean score of CS intention was significantly greater among the individualist women than other women who had NVD (18.3 vs 11.8,  $p < 0.001$ )(5). Attitude and perceived behavior control of a woman was linked with individualism and practice of CS as women who perceived CS on demand as their right, and were in control of their decision tend to have individualistic opinions(5). Individualism also influenced women's choice for NVD as some despite having the perception of NVD being painful, they wanted to bear that pain to rejoice the moment of giving birth to their child(84). Also, rural women endured pain during labor and did not prefer facility based delivery to display their bravery in the community, leading to underuse of CS(70).

## 3.2 SOCIO-ENVIRONMENTAL FACTORS

This sub-chapter is divided into three sections according to the factors listed in conceptual framework. The three sections are economic and socio-cultural factors, organization and system related factors and national strategies.

### 3.2.1 Economic and Socio-Cultural Factors

The health expenditure of Nepal is low (5.8%)(10) causing lower expenditure on maternal health leading non-rational CS(56). Nepal slipped-down five positions in 2017 as it was at 144<sup>th</sup> position in 2016 for HDI(16) which influenced economic status of Nepalese. The delivery by CS varied among women with different wealth quintile and education(33) (refer fig.7 for data). Also, among the women from high-wealth-quintile, CS was regarded as matter of class and status because CS in private hospitals gained more care by spending large amount of money(84, 87). The rate of planned CS was observed in increasing trend in 2001, 2006 and 2011 with percentage of 31.5%, 37.2% and 39.9 % respectively among women aged 25 to 29 years(33, 67). Use of CS for delivery observed great inequity according regions as it was 12% in urban and only half of it i.e. 6% in rural areas(19).

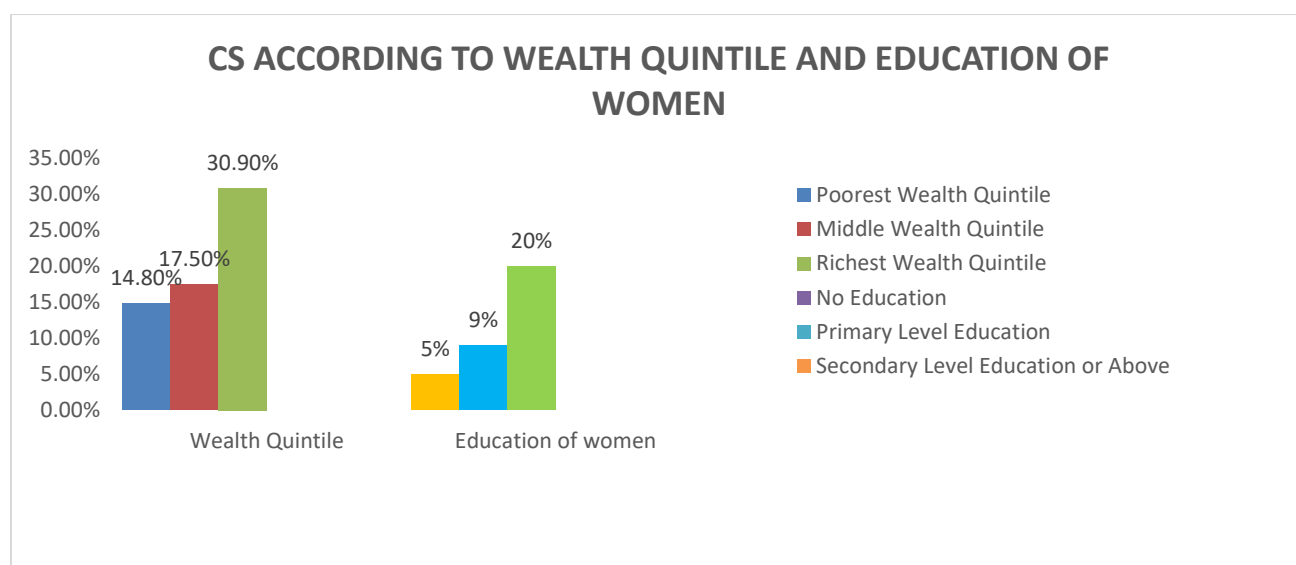


Figure 7 CS According to Wealth Quintile and Education of Women; Source NDHS 2016

Urban areas witnessed 92% elective CS and only 8% emergency CS, whereas rural areas observed 12% elective CS and 88% emergency CS(73). In Nepal, there had been disparities in the CS rate according to caste and ethnicity too. Women from upper castes (*Brahmins* and *Chhettris*), middle castes (*Janajatis*) and lower castes (*Dalits* who are still regarded as untouchables) had 30.6%, 51.8% and 17.6% CS rate respectively(88). In Nepal and India, women and family members demanded CS on auspicious day according to the astrological significance in their religion(47). According to Dr. Jageshwor, if the fetus was known to be a girl child then delivery was not allowed by family members on the day called "Aunshi", new moon day, because the girl child born on that day was believed to be of bad omen and people did not prefer marrying such girl in Hindu religion. In the urban areas the culture of increasing marital

age and child bearing age of women had prevailed since past decade which had also added to some medical complications during childbirth due to aged pregnant mothers leading to CS(88).

In addition, women in rural areas did not prefer going to hospitals for ANC and delivery where there were only male doctors(89). Also, rural women had limited utilization of CS due to less mobility outside house, geographical barriers and cultural believes like women should not be crossing rivers during their pregnancy(89). Even if woman wanted medical checkup, due to patriarchal social construct, women needed to seek permission from their husbands or mothers-in-law to go to the hospital also relied for checkup fees upon their husbands(68). These were some reasons for home delivery and lower CS cases in rural parts of Nepal(89). Other studies also showed that women in rural Nepal often feared to undergo CS due to their lack of trust on the health professionals as they thought were being suggested for CS due to high cost involved in it(42, 89). Rural people also believed that if they went to teaching hospitals, they would be tested upon by medical students, also many doctors in such teaching hospitals were from India, so people were reluctant to go to such hospitals due to fear of language and cultural barriers(68).

### **3.2.2 Organization and System Related Factors**

“Once a cesarean always a cesarean”(90) was used as a rule by doctors in Nepal(67). According to NDHS, private health service providers displayed important role in increase of CS among the women with higher education and from higher wealth quintile due to their feasibility to pay for high fees of private hospitals and profit motive of the hospitals(67). CS helped in economic benefit for private health facilities in comparison to NVD(73). Dr. Gautam who is also a professor at medical school of Nepal, added that health professionals were not well taught on assisted vaginal delivery despite of it being in medical curricula. Thus, there were less practice of such delivery and more of CS procedures taking place. An official from Family Health Division (FHD) mentioned that medical colleges practiced CS on their patients when not medically needed in order to train their students(91).

Also, practice of epidural analgesia for painless delivery is not common in Nepalese health facilities(2, 74). The Nepalese study by Kiran (2005) where doctor said that there weren't enough resources in public facility so women were processed to have childbirth as soon as possible by CS(68). A health care provider in that study explained that spending time with a single patient during her labor was not possible due to shortage of staffs in the public facility(68). So, CS was carried out soon to reduce the waiting and care taking hours of the patient for NVD(68). Such similarity was found in Bangladeshi study by Aminu where physician said that in public facility, many CS cases in were more or less elective because they lacked HRH who was available only in the afternoon and there was no electricity so could not wait for the emergency cases which could be done at night(63). Also, public facilities in Nepal had provision of getting \$70 per CS case by the Nepal government(28) so CS cases had been money earning source for public facilities too.

Private facilities on the other hand processed the client for CS as soon as possible due to high benefits and fee charges(46) which according to Dr. Jageshwar, ranged from \$300 to \$1000. According to the KII with one of the nurses in private hospital of Kathmandu, there were existing protocols and guidelines available for the emergency obstetric case with CS, however, only few followed it despite knowing its advantages thus, most of the cases were referred for CS even in

the absence of emergency. She added, hospitals did not check physicians to find whether guidelines were followed but mostly focused on profit aspect and physicians worked according to their convenience. Public facilities in Nepal also reported of incidences when patients were taken to other private facilities when denied of CS when not needed(46). Similar situation was observed in Bangladesh where there were different agents in public hospitals who worked for discharge of patients from there and channeled them to private hospitals because they received financial benefits from private hospitals for referred cases(63). Such situation prevailed in public facilities of Nepal too according to one of the nurses of private hospital, but study was not found in Nepalese context maybe due to its existence in small or negligible number. A study also showed that when quality time and attention was given to the patient (which is often the case in private facilities) patients tend to return or refer such facilities to others(62). Even in rural Nepal, if a delivery was done in private hospitals then 30% of childbirth are done by CS(42) and many women in rural areas when visited private hospitals were denied of CS even when needed due to lack of money from patient side to bear the hospital cost(92). In addition, presence of only 10% of private facilities of the country in rural area of Nepal contributed to non-rational CS use to utilize optimal hospital time by conducting quick CS procedure and not waiting for long NVD hours(19, 32).

### **3.2.3 National Strategies**

Dr. Jageshwar mentioned that Nepal still followed the guideline of WHO to keep CS rate within 10-15% of the total delivery cases which was stated similarly in National Health Policy(15). Except that there was no country specific protocol for CS either in National Health Policy of Nepal or in National Health Sector Strategy 2015-2020(91). According to WHO guideline, repeat CS is not mandatory if a woman had previous CS but this guidance was neglected in Nepal and doctors advised women for childbirth by CS who had previous CS(33). The imbalance in availability of the health professionals were the issues tried to addressed by national strategy of sending doctors studying in government scholarship to rural area for 2 years but this rule was seldom followed(93). FHD official stated that there used to be monitoring at the private hospitals for checking irrational use of CS but this program stopped since end of 2017 due to lack of monitoring staffs from government side(91).

## **CHAPTER IV: INTERVENTIONS FROM OTHER COUNTRIES FOR RATIONAL USE OF CS**

As stated in above findings, there are complex factors affecting the trend of CS in Nepal and finding interventions for reducing unnecessary use of CS. The studies with randomized and non-randomized trials and studies with before-after control with population of mixed pregnant women in age, nulliparous, fear of childbirth, multiparous, previous CS, etc. whose main outcome measures were CS or NVD are included. The framework used for this study has four broad aspects affecting CS; factors from women and family, factors from health professionals, factors from health facilities and other cross-cutting factors. Thus, the interventions here are have been grouped in four sub-headings as the interventions for women and families, healthcare providers, healthcare facilities and other cross-cutting interventions.

### **4.1 INTERVENTIONS FOR WOMEN AND FAMILIES**

A study by Mausomi et al. (2016) in Iran, suggested providing antenatal education program for NVD (birth preparation training) significantly helped to reduce fear of NVD among women (intervention group was  $51.7 \pm 22.4$  and control group was  $58.7 \pm 21.7$ ) ( $p = 0.007$ )(94). The rate of intention of CS was reduced in the intervention group from 80% to 9.3%(94, 95). However, the sample size of this study (75 per group) was low to be generalized for all pregnant women. Another study on the workshop education program on knowledge and attitude towards different delivery methods in Iran, demonstrated NVD was most preferred by pregnant women and their spouse leading to 60% vs 26.7% NVD among intervention and control group respectively ( $p < 0.017$ )(96). Another study in Iran by Bastani et al. (2006) intervention group was provided prenatal care along with applied relaxation training whereas control group was just provided with regular prenatal checkup(95, 97). The intervention group showed significant difference in lowering of pregnancy and delivery related stress and anxiety ( $P < 0.001$ ) than the control group(97). Similarly, a study done in Sweden by Bergstrom et al. (2009) found that providing antenatal education on relaxation and breathing technique to promote NVD actually lowered the risk of emergency CS (Odds Ratio (OR) 0.57; 95% Confidence Interval (CI), 0.37–0.88)(95, 98). This study had low risk bias in randomization as it was done by computerized algorithm and baseline characteristics of samples were similar, however, the blinding of the participants and health professionals were not made clear in the study. Also, the study might not have been protected against contamination because some women in control group received relaxation and breathing technique at home from different media.

Sharifirad et al. (2013) in their study found that beforehand education to husbands of pregnant women on knowledge and attitude towards delivery helped to increase spousal support to the women from their husbands and reduced the rate of elective CS in Iran(CS in intervention group vs control group were 29.5% vs. 50% respectively,  $p < 0.05$ )(95, 99). Study done in the US revealed the couples who received psychosocial prevention program on adverse effect of birth outcomes had less stress during the whole process of pregnancy and delivery and had lower CS rate (OR 0.357,  $p < 0.05$ ; 95% CI 0.149-0.862)(95, 100). A study by Fenwick et al. (2015) in Australia demonstrated 8% lower CS rate among the women who received psycho-education by telephone from midwives during their pregnancy(95, 101). The study found low risk for biases however, no sufficient information was found about the similarity of baseline outcome

measurements. Similarly, a study done in Finland by Rouhe et al. (2013) showed that 87.8% of pregnant women who received psycho-education chose NVD for childbirth compared to 77.4% NVD in another group who did not receive it(102). A study from UK by Montgomery et al. (2007) included the group of women having previous CS delivery, who received computer-based information regarding planned delivery methods, usual care and different outcomes of different types of delivery methods. This helped women to choose NVD and greater vaginal delivery among the women in intervention vs control group (37% vs 30%, OR 1.42; 95% CI, 0.94-2.14) who had previous CS(103). But this randomized trial did not provide sufficient information about the blinding of participants and similarity of the baseline characteristics of samples. Another study done in Finland by Saisto et al. (2001) was conducted among the pregnant women who were provided intensive therapy with the obstetrician and one therapy with the midwives(104). At the end of the research it was found that 62% of the women who had initially chosen CS for childbirth switched to NVD after receiving the therapy(95, 104). Also, Eden et al. (2014) conducted a study in US to compare effectiveness of two types of teaching methods (interactive decision aid and paper brochures) for women in deciding mode of delivery(105). It was found that 41% of women had NVD after previous CS experience who received interactive decision aid compared to 37% of women having NVD after previous CS in paper brochure group(95, 105).

Similarly, Australian study by Shorten et al. (2005) where pregnant women were provided with decision-aid booklet, found reduced (intervention vs control group with 2.17 vs 0.42 points respectively on 15 point scale;  $p < 0.001$ ) decisional conflict for childbirth and improved knowledge on mode of delivery after previous CS experience(95, 106). However, it did not significantly influence women's decision for NVD or CS(106). An Iranian study by Navaee et al. (2015) showed that teaching technique and method plays very important role in influencing women to decide the method of child birth(107). In the study it was found that pregnant women who received education on delivery methods through role play had five times lesser CS rate than the women who received same information through means of lecture(95, 107). The result of this study had no such biases as it was blind clinical trial, however, the sample size was just 67 pregnant women which is not enough to generalize the result obtained.

## **4.2 INTERVENTIONS FOR HEALTHCARE PROVIDERS**

A study by Hemminki et al. (2008) in Finland explored that education on childbirth classes to Public Health Nurses (PHNs) was effective in changing PHNs' behavior towards women but CS rate was observed to be more in intervention group than control group (15% vs 12%) however, the result was not statistically significant (OR 1.23; 95% CI, 0.71–2.11)(95, 108). This was a large-scale randomized control study which took prospective data for two years and included 20 maternity health centers with their PHNs and 1601 mothers(108). But the result was unlikely due to weak intervention where PHNs did not take childbirth classes and delivery as their priority or expertise due to other workloads(108). The concept of peer-review and mandatory second opinion was brought in Taiwan during a study conducted by Liang et al. (2004) which showed decrease in CS rate from 37% to 30% within 4 years ( $p < 0.001$ ) where primary CS rate was decreased from 21.3% to 17.8% and repeat CS from 15.7% to 12.9%(95, 109). The study was conducted for three consecutive years and used chi-square test, thus, the result obtained in this study were not likely by chance. Also, a multi country study done by Althabe et al. (2004) in

Latin America found that hospitals with the policy of mandatory second opinion on CS could prevent 2.2% unnecessary CS cases(110). It was conducted in 36 hospitals(110) and blinding of participants along with health professionals were sufficient and there was low risk of selection bias as the paired units were assigned randomly by statistical software SAS.

A study done in Canada by Lomas et al. (1991) presented significant difference of 46% and 86% of CS rate among intervention and control group respectively where intervention group were the physicians who were followed by audit after CS case, provided feedback and were also educated by the local leaders with their opinion about unnecessary use of CS(95, 111). However, another Canadian study by Chaillet et al. (2015) found slight decrease (22.5% to 21.8%) in the CS rate among pregnant women from the intervention of auditing the indications for CS, providing feedback to the health care providers and encouraging them to follow guidelines from best practices(95, 112). The study took place in 32 public hospital of Canada with 300 deliveries and had low risk of selection bias as it used computer-generated randomization of samples. Similarly, there wasn't attrition bias and baseline characteristics of the samples were comparable.

Study done in a hospital of Chile by Scarella et al. (2011) observed decrease in CS rate from 36.8% to 26.5% after the implementation of intervention to provide feedback to health professionals and audit the indications of CS by three hospital members(113). It was a interrupted time series study so the rate was again observed to increase from 26.5% to 31.8% when the intervention was stopped(113). However, it is unclear in the study that the other status of the hospital remained unchanged during the study, also the outcome data is incomplete thus might have attrition bias. Similarly, a study in Iran revealed that when auditing was introduced in a hospital by Safe Motherhood Committee (SMC), the CS rate decreased from 40% to 33% ( $p < 0.001$ )(114). This was a retrospective study done for all pregnancies (3494 cases) in a hospital for seven months. There weren't any data collection or reporting bias as it included all the deliveries. However, the study did not mention the intervention being independent of any other changes in the hospital. A study by Poma et al. (1998) in the USA found that after maternity department followed delivery guidelines and looked after each CS case which did not meet the requirement or criteria for CS and provided confidential feedback to the health service providers also the provision of 24-hour in house physician, led to decrease in CS rate from 22.5% to 18.6%(115). The repeat CS rate was reduced from 9% to 7.9% and primary Cs rate was reduced to 10.6% from 13.5% ( $p = 0.001$ )(115).

### **4.3 INTERVENTIONS TOWARDS HEALTH FACILITIES**

A study done in the USA presented decrease in CS rate by 0.7% when the fees for physicians of the NVD cases and CS cases were equalized by the health facility(95, 116). However, another study conducted in Taiwan by Lo John (20018) found that after the implementation of National policy in Taiwan to provide equal incentive to the physicians for VBAC and CS did not show any decrease in the CS rate of the country(95, 117). However, this interrupted time series study did not reveal the intervention being independent of any other changes and showed incomplete outcome data, therefore attrition bias. A study done in India by Goonewardene et al. (2012) suggested that having regular audits from the government in the different health facilities will assist in reducing the CS rate in the country and make health facilities more accountable towards

obstetric care(118). Study done in the USA showed that combining midwifery laborist model to private and community facilities helped in the reduction of CS rate in primary CS cases from 31.7% to 25% and VBAC rate increased from 13.3% to 22.4%(119).

#### **4.4 "CROSS-CUTTING" INTERVENTIONS**

Runmei et al. (2012) conducted the study in China which found use of various cross cutting interventions like auditing the practice of CS among the surgeons, educating health professionals, women and their husbands, conducting different campaigns for public health and regular tracking of CS and neonatal health lead to decrease in CS rate from 54.8% to 40.3% ( $p < 0.001$ )(95, 120). A study conducted in Portugal by Ayres-De-Campos et al. (2015) demonstrated the significant decrease in Cs rate from 36.6% to 33.1% after introducing interventions like providing training to health professional on best obstetric practice, giving comprehensive information on CS and criteria of hospital funding with reduction in CS rate(95, 121). However, there was high risk of other policy level aspect of hospital not being constant during the intervention as the study suggested it was not possible to measure the impact made by the intervention of study alone.



## **CHAPTER V: DISCUSSION**

The findings of this study demonstrated the personal level factors and socio-environmental factors of women, families, health professionals and organizational system influencing the trend of CS in Nepal. The discussion section below has been divided into three sub-headings according to the objectives of this study.

### **5.1 SUPPLY-SIDE FACTORS ASSOCIATED WITH CS**

Findings from different studies indicated that role of health professionals and organizational system played significant role in providing CS to Nepalese women when not indicated medically. As maximum CS cases have been observed in private hospitals of Nepal it was shown by different studies that the financial motive have been driving such trend as fees for CS is thrice or more than NVD. Doctors also recommended CS unnecessarily because they receive substantial percentage of CS charge from the hospitals so given the economic condition of the country and doctors' earning, they prefer to gain more money through these means. The findings showed that CS rate ranged from 46% to 81% in private hospitals. 81% of CS rate was observed in the Om hospital of Kathmandu and the rate might have been very high in this hospital as it is the tertiary referral hospital in the capital where many complicated labor cases are sent which might have led to high CS rate. Nevertheless, this number is very high, and it cannot be denied that financial motive among private health facilities is contributing to irrational use of CS. Private facilities are booming in the urban regions of the country and there is no proper regulation by the government in monitoring and auditing of their price for services or rationale use of medical procedures as indicated by one of the FHD officers. This has created lack of accountability among the private sectors thus, as driven for-profit, they perform CS unnecessarily. Similar result was discussed by Shabnam (2009)(122) in a study from India which has alike socio-cultural condition like Nepal. Unnecessary use of CS when there are limited staffs, professionals do not let the labor cases prolong for hours and proceed for CS. Also, lack of health resources, limited private facilities in remote areas, power dynamics and cultural factors have caused unjustifiable (both unnecessary and underuse) CS among rural women.

Role of health professionals in process of supplying respectable maternal service effects woman's decision for choosing method for next childbirth or conveying the message to other women. There are very limited medical seats at the government medical colleges in Nepal, so many Nepalese pursue their medical degree from private colleges in or outside the country which is very expensive. So, as they spend large amount on gaining the medical degree, they may perform unnecessary procedures to earn back the money. Also, health professionals are not taught about alternative assisted vaginal delivery method in their school curriculum which created incompetency and lack of expertise to refer other methods than CS. In addition to that, painless vaginal delivery is not known by many women and health professionals and even if it is known to any of them, epidural analgesia may not be available in the facilities. Adding to that, there is just one Nepalese research on painless delivery. The lack of expertise and infrastructure for different methods of delivery has been causing irrational use of CS. Also, the inequity in distribution of health facilities and HRH between rural and urban areas has caused inequity in use of CS as urban areas had been observed to practice it unnecessarily and rural women were both, not able to receive it even when needed and forced to go through CS when not needed.

However, the above supply-side factors alone are not responsible factors for determining childbirth by CS in Nepal as there are influential demand-side factors too.

## **5.2 DEMAND-SIDE FACTORS ASSOCIATED WITH CS**

The socio-economic status and cultural context of a woman were also found to be influential factors for use of CS among Nepalese women. It was also evident from the findings that more educated and wealthy urban women delivered through CS than uneducated and unemployed rural women. This is related with the perceived behavior control of a woman where woman can make decision for her health when she gets information and can spend for her health. Another reason for this could also be the availability of modern hospitals and health services in the urban areas. Demand side factor is also influenced by the doctor-patient relationship as educated women who are aware about their health issues tend to go on regular ANC and build good rapport with the doctors. They may be highly influenced by doctors to go through CS when recommended as they trust their physicians. On the other hand, there are also many families who pressurize doctors to conduct CS as they perceive CS is safer than NVD. This is mostly observed if it is known that child to be born is son. Nepalese context observes son preference where daughters are often regarded as burden to the family as they will have to be married and sent to someone else's house whereas sons are perceived as descent of the family heritage. Another cultural factor influencing CS is preferring certain day and time for delivery by regarding it auspicious according to Hindu and Buddhist culture. Such practice was also observed in the study done by Lo John (2008) in neighboring country China which shares some similarity in religion(117).

Doctors are often compelled to do CS do to fear of being blamed by the families for not carrying out advanced intervention earlier if anything would go wrong with the mother or the child. This is mainly due to increasing awareness among the people regarding their rights after mass movement 2005/06. Women often feared vaginal delivery by perceiving it painful thus chose CS. This is linked with the lack of availability of expertise and infrastructure for painless NVD in the country. Also, women in urban areas become hesitant for CS due to their previous birth experience where they were ill-treated by the health personnel during NVD. And, rural women often refer home delivery due to this reason and cultural barriers among rural women like not being allowed to cross rivers during pregnancy hinders their health service seeking behavior. The power dynamics where rural women usually rely on their husbands for their health-related decisions and financial aspect has also been contributing to the unjustifiable CS use among them. This is related with the role of health professionals and respectable maternity. Also, when there is any complain at the concerned authority regarding such cases, no concrete action is taken against such disrespect towards patients.

However, it is sometimes difficult to differentiate whether the demand for CS is from a pregnant woman or the family members as in most of the cases the setup is complex within the family. It might also be that women who are educated and have money go to big private hospitals and choose the method of delivery as advised by the doctors which might be contributing to increase the cases of CS among these affluent groups. Similar result was conveyed in the study by Aminu et al. (2014), which presented that elective CS is 70% of the time influenced either by the suggestion of doctor or by pressure of the family rather than a woman's decision alone(63).

Nevertheless, the demand-side factors solely are not contributing to increase the irrational use of CS in Nepal because doctors might be persuading rich educated women to go through CS for financial benefit as shown in discussion of objective 1 of this study. It is clear from the above discussion that unnecessary CS use in Nepal has been largely influenced by supplier side for their profit motive among the women from affluent education and wealth background. On the contrary, underuse of CS has been prevailing due to contributing factors like lack of health resources in those regions and existing socio-cultural context.

### **5.3 BEST STRATEGIES FOR RATIONAL USE OF CS**

Interventions section presented findings from different countries to reduce non-rational use of CS when medically not indicated. The interventions on increasing CS in places where it is underused were not listed in the findings as there are enough studies and literature present to increase CS rate in Nepal where low. As one of the influential reasons of pregnant women opting CS was fear and anxiety NVD so many countries adopted interventions of training women to overcome their fear and anxiety of natural birth and providing information to husbands through psychoeducation program to encourage their wives and support them for NVD. Among the interventions for health care professionals, the lowering of 62% of CS rate in Finland through psycho-education by midwives over telephone was noteworthy finding. The result was statistically significant and similar to findings by Shorten and colleagues. Trend of Cs in Nepal had been observed to be highly driven by profit motive of health professionals and health facilities so the study of USA where incentive for NVD and CS were equalized could be implemented. However, the result showed slight decrease (0.7%) in CS rate which could also have been due to the turnover of physicians with new scheme of equalizing the incentives. Nevertheless, this scheme might be very beneficial in reducing unnecessary CS rate in low-income countries where salary of health professionals is already low, and they could get extra incentive even through normal vaginal delivery. Moreover, interventions designed within the social context might play important role in changing the attitude of physicians towards unnecessary use of CS and might lower the irrational CS cases. The interventions included in this study were majority from the high-income countries, middle-income countries and one from lower-income countries. None of the interventions were found from the low-income countries.

The study done by conducting childbirth classes for PHN did not work well for Finland as they did not consider it their priority and had another workload to handle. But this intervention could be very beneficial in the low-income country like Nepal as PHN are already there in health facilities who are dedicated mostly for maternal and child health but not regarded highly by the society as other nurses and doctors. Thus, receiving on-job training for childbirth will enhance their skill and they will most probably implement it well to gain respect from their communities too. Similar case was observed among the Female Community Health Volunteers (FCHVs) of Nepal who despite getting different trainings delivered them well in the community to gain the respect and trust(123). Another issue triggering irrational CS in Nepal is lack of monitoring from the relevant authority on facilities. It was interesting to see that same intervention of auditing and feedback mechanism was carried out in two different studies of Canada where one showed high decrease in CS rate while other showed slight decrease. This could be because on study with high decrease had no clear indication of randomization of samples allocation concealment, hence selection bias.

Also, there were incomplete information about blinding whereas another study presenting slight decrease in CS revealed no such biases. However, the implementation of intervention from study in Iran where SMC was established to audit CS cases could be implemented in Nepal too. This will help to create accountability among the health facilities and regular monitoring will decrease CS cases when medically not indicated.

Thus, these interventions despite not being administered in low-income countries, have high possibility to promote rational use of CS in Nepal.

## **LIMITATIONS OF THE STUDY**

Framework used in this study from modifying and adapting from two different studies have been very helpful in fulfilling the objectives of this study. The framework helped in systematic presentation and critical analysis of the findings which influenced CS trend in Nepal as per the aim of this study. The framework helped to analyze inter-connection between different factors also guided me to shape my findings and discussion. The framework provided enough flexibility to adjust according to study requirement. However, the factors subjective norm, perceived behavior control and individualism seemed to be overlapping in the study findings here. The socio-cultural factor had to be either in a different layer between environmental level and personal level or in the personal level as most of the factors determined are at personal degree. Thus, if the framework is to be used in future then I would consider these aspects and use the framework by keeping rest of the aspects as they remain.

Shortcomings faced during the study were, firstly, not having enough Nepalese literature to cover different factors of the framework. Documents used from Nepali language were just from Nepal Government and no research articles in Nepali could be found with the use of online database in this study. This might be due to unavailability of health journals in Nepali language in the country. This limitation was addressed by referring many studies from the neighboring countries like India, China, Bangladesh which have similar socio-cultural context as Nepal however, having direct Nepalese studies would have been much beneficial. Secondly, there were also some studies which did not give concrete reasoning for their result except for mere assumptions. Hence, the queries on some aspects remained unaddressed. Finally, no interventions carried out in low-income countries were found during the study. Very few from Low-and Middle-Income Countries (LMIC) and mostly from HIC were found which may not be feasible to implement in low-income country like Nepal.

## **CHAPTER VI: CONCLUSION AND RECOMMENDATIONS**

### **6.1 CONCLUSION**

The unnecessary use of CS and its increasing trend has been arising concern worldwide considering its harmfulness on mother and child. Similar trend has been observed in Nepal too. Moreover, Nepal witnesses the situation of “Too Much Too Soon” and “Too Little Too Late”(50) as urban areas with good health facilities observe maximum unnecessary CS cases indicating overuse whereas rural areas have underuse of CS as they cannot access it easily due to various constraints. This study concluded that supply side factor from health professionals and health facilities are most influential driving factors for irrational use of CS in Nepal. It also revealed that educated and rich/employed urban women are the ones mostly practicing CS. Urban women are often convinced by the service providers to go through CS due to profit earning intention of such providers. They are also prone to use CS services as they have availability of the private hospitals with advanced technologies and they can afford such services unlike the rural women who still have both underuse and unnecessary use of CS influenced by lack of health resources. Family pressure and instances of request of CS from pregnant women themselves play minimal role in creating current CS pattern in the country and was highly influenced by physician’s role. Thus, role of health professionals, organizational norm and socio-economic condition of women are the factors triggering CS when not medically indicated.

Use of CS when not indicated by medical condition has been very dangerous and causes short- and long-term health problems and even death. Thus, this is a serious issue to be considered for uplifting maternal and child health. The decision to carry out CS should be done only when medically required, doctors being taught about other assisted vaginal deliveries and dangers of unnecessary CS and taking second opinion from other health professionals may decrease unnecessary CS rate. Creating sense of accountability among health professionals and private organizations through regular monitoring and auditing of their medical interventions will be effective interventions in Nepal for rationale use of CS. Also, the assurance of rationale and relevant use of CS is not easy procedure but will take serious task and effort for formation and implementation of policies ensured by continuous governmental supervision. Psychoeducation to to-be-mothers and to-be-fathers on different methods of childbirth can reduce irrational CS use in Nepalese context. Regardless of these interventions not being implemented in low-income countries, if executed as indicated above, will help to mitigate the gap of CS utilization between high and low resource settings.

The framework used in this study was beneficial to conceptualize the objective of this study and it can be concluded that same framework could be used for future studies in similar topic by merging subjective norm, perceived behavior control and individualism.

## 6.2 RECOMMENDATIONS

Reducing unnecessary CS in the country and mitigating its underuse at places may not include one “magic formula” but should incorporate different strategies. Depending upon the evidence assembled in this literature review, below recommendations are provided for Nepalese context:

### 6.2.1 To the Government

- ✦ Regular monitoring and auditing mechanism from the government at all health facilities should be introduced to ensure rationale use of CS with mandatory second opinion system. Also, formation and dissemination scientifically experimented and locally designed guidelines on CS delivery is necessary. It should be ascertained that medical schools teach their students about different methods for assisted vaginal delivery along with possible dangers of unnecessary CS.
- ✦ Mass media campaign to aware people about benefits of NVD and hospital based-delivery along with myth busters related to it should be carried out. Adequate information conveyance to pregnant women and their families by health professionals and organizations related to childbirth and methods of delivery should be ascertained.
- ✦ Introducing PHN training protocol on enhancing labor care and psycho-education to pregnant women and their spouse during childbirth should be ensured.
- ✦ Strict implementation of assigning health professionals in fair ratio at the urban and rural areas with adequate health facilities and infrastructures at all regions should be done. There should be adequate SBAs, proper fetal monitoring, emergency obstetric care and assisted deliveries in both urban and rural areas.
- ✦ Provision of minimal fees difference or equal fees for NVD and CS to the health facilities and health professionals should be introduced.

### 6.2.2 To the Health Facilities

- ✦ Arrange on-call obstetricians to instruct doctors on maintaining low CS also introduce water delivery and painless delivery option for women. Train the staffs to increase use of assisted vaginal deliveries, close monitoring of partograph to record fetal heart rate and ensure guidelines formulated by the government are followed by their staffs.
- ✦ Encourage their staffs to educate women about advantages of NVD and provide them with respectable maternal services. Physicians should be trained to counsel the women who choose CS just for their convenience and women should be motivated to mitigate their fear and anxiety about NVD.
- ✦ Trial of VBAC with proper precautions and supervision should be advised to the health professionals to reduce repeat CS. 24 hours coverage of midwifery should be regulated in the facilities as they are growing in Nepal and are experts in delivery.

### **6.2.3 To the Researchers**

- ✚ Conduct national level research to understand detail dynamic of private sectors' role in non-rational use of CS. Also, research on effectiveness of painless vaginal delivery system on CS trend.

Nepal has witnessed the dual problem of overuse as well as underuse of CS. Thus, while implementing the interventions or regulations it should be considered that no pregnant women be forced to uptake CS unnecessarily due to absence of expertise for NVD or for personal financial benefit of health professionals nor should they be refused for CS when needed due to constraints in health resources and the infrastructure.

## REFERENCES

1. Sacheeta G, James K. Levels and Trends in Cesarean Births: Cause for Concerns. *Economic Political Weekly*. 2010;19-22.
2. Maharjan S, Karki C. Painless delivery--a short experience. *Kathmandu Univ Med J*. 2003;1(2):128-31.
3. Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. *American journal of health promotion*. 1996;11(2):87-98.
4. Boerma T, Ronsmans C, Melesse DY, Barros AJ, Barros FC, Juan L, et al. Global epidemiology of use of and disparities in caesarean sections. *The Lancet*. 2018;392(10155):1341-8.
5. Shams-Ghahfarokhi Z, Khalajabadi-Farahani F. Intention for cesarean section versus vaginal delivery among pregnant women in Isfahan: Correlates and determinants. *Journal of reproduction infertility*. 2016;17(4):230.
6. Cronje H, Cilliers J, Pretorius M. *Clinical obstetrics: a South African perspective*. South Africa: Van Schaik; 2011.
7. WHO. WHO recommendations non-clinical interventions to reduce unnecessary caesarean sections. [Guideline]. In press 2015.
8. Brazier Y. WHO suggest new C-section recommendations Online: *Medical News Today*; 2015 [updated February 2019; cited 2019 13/03]. Available from: <https://www.medicalnewstoday.com/articles/303326.php>.
9. Organization WH. WHO statement on caesarean section rates. Report. Avenue Appia 20, CH-1211 Geneva 27, Switzerland: World Health Organization, Organization DoRHaRWH; 2015 2015. Contract No.: WHO/RHR/15.02.
10. Bank T. Country Profile: Nepal Internet: *The World Bank*; 2017 [updated 6 Feb 2019; cited 2019 7th May 2019]. Available from: <http://data.worldbank.org/country/nepal>.
11. Konema. Nepal - Health Financing Internet: *Konema*; 2015 [updated 3rd May 2019; cited 2019 5 May 2019]. Available from: <https://knoema.com/atlas/Nepal/topics/Demographics/Population/Male-to-female-ratio>.
12. CBoS N. National population and housing census 2011 (National Report). In: *Statistics CBo*, editor. Kathmandu, Nepal: Nepal Government; 2012.
13. Review WP. Nepal- Country Profile Internet: *World Population Review*; 2018 [updated 26 May 2019; cited 2019 25 May 2019]. Available from: <http://worldpopulationreview.com/countries/nepal-population/>.
14. Nepal CAS. Constitution Bill of Nepal 2015. Kathmandu, Nepal: Government of Nepal; 2015.
15. Government N. New National Health Policy 2017. In: *Population MoHa*, editor. Kathmandu, Nepal: MoHP; 2017.
16. UNDP. Human Development Indicators - Nepal New York, United States: UNITED NATIONS DEVELOPMENT PROGRAMME; 2017 [updated May 2019; cited 2019 20 Feb 2019]. Available from: <http://hdr.undp.org/en/countries/profiles/NPL>.
17. Organization IL. *Informal Economy in Nepal* Geneva, Switzerland: International Labour Organization (ILO); 2017 [updated May 2019; cited 2019 6 April 2019]. Available from: <http://ilo.org/kathmandu/areasofwork/informal-economy/lang--en/index.htm>.
18. Government N. *Nepali Youths in Figures*. In: *Sports GoNMoYa*, editor. Kathmandu, Nepal: Government of Nepal Ministry of Youth and Sports; 2014.
19. MoHP. *Nepal demographic and health survey (NDHS), 2016*. In: *Population Division MoHaP*, editor. Kathmandu, Nepal: New ERA; 2016.
20. Nepal C. *POPULATION MONOGRAPH OF NEPAL: VOLUME I (Population Dynamics)*. In: *Statistics CoBa*, editor. Kathmandu, Nepal: Government of Nepal; 2014.



21. Pandey JP. Maternal and child health in Nepal: the effects of caste, ethnicity, and regional identity: further analysis of the 2011 Nepal demographic and health survey: Ministry of Health and Population; 2013.
22. Gellner D, Pfaff-Czarnecka J, Whelpton J. Nationalism and ethnicity in a Hindu Kingdom: The politics and culture of contemporary Nepal: Routledge; 2012.
23. Evaluation IfHMa. Global Burden of Disease - Nepal [Internet]. Washington, United States of America: University of Washington; 2018 [updated 6th May 2019; cited 2019 6th May 2019]. Available from: <http://www.healthdata.org/nepal>.
24. Sreeramareddy CT, Shankar RP, Sreekumaran BV, Subba SH, Joshi HS, Ramachandran U. Care seeking behaviour for childhood illness-a questionnaire survey in western Nepal. *BMC international health human rights*. 2006;6(1):7.
25. Mosites EM, Matheson AI, Kern E, Manhart LE, Morris SS, Hawes SE. Care-seeking and appropriate treatment for childhood acute respiratory illness: an analysis of Demographic and Health Survey and Multiple Indicators Cluster Survey datasets for high-mortality countries. *BMC Public Health*. 2014;14(1):446.
26. Mishra SR, Khanal P, Karki DK, Kallestrup P, Enemark UJGha. National health insurance policy in Nepal: challenges for implementation. 2015;8(1):28763.
27. WHO. Global Health expenditure Geneva, Switzerland: World Health organization (WHO); 2016 [updated 20 May 2019; cited 2019 26 May 2019]. Available from: <https://apps.who.int/nha/database/ViewData/Indicators/en>.
28. MoHP. NEPAL HEALTH SECTOR STRATEGY 2015 – 2020. In: Population MoHa, editor. Kathmandu, Nepal: Nepal Government; 2015.
29. Vaidya A, Mayer AL. The utility of the participatory approach for sustainable development assessments. 2016:13.
30. de Rus Jacquet A, Subedi R, Ghimire SK, Rochet J-C. Nepalese traditional medicine and symptoms related to Parkinson's disease and other disorders: Patterns of the usage of plant resources along the Himalayan altitudinal range. *Journal of ethnopharmacology*. 2014;153(1):178-89.
31. Furber AS. Referral to hospital in Nepal: 4 years' experience in one rural district. *Tropical doctor*. 2002;32(2):75-8.
32. MoHP. Nepal demographic and health survey (NDHS), 2011. In: Population Division MoHaP, editor. Kathmandu, Nepal: New ERA; 2011.
33. Prakash K, Neupane S. Cesarean deliveries among Nepalese mothers: changes over time 2001–2011 and determinants. *Archives of gynecology obstetrics Gynecology*. 2014;289(2):421-7.
34. Furuta M, Salway S. Women's position within the household as a determinant of maternal health care use in Nepal. *International family planning perspectives*. 2006:17-27.
35. Biccard BM, Madiba TE, Kluys H-L, Munlemvo DM, Madzimbamuto FD, Basenero A, et al. Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *The Lancet*. 2018;391(10130):1589-98.
36. Arlier S, Seyfettinoğlu S, Yilmaz E, Nazik H, Adigüzel C, Eskimez E, et al. Incidence of adhesions and maternal and neonatal morbidity after repeat cesarean section. *Archives of gynecology obstetrics*. 2017;295(2):303-11.
37. Kupari M, Talola N, Luukkaala T, Tihtonen K. Does an increased cesarean section rate improve neonatal outcome in term pregnancies? *Archives of gynecology obstetrics Gynecology*. 2016;294(1):41-6.
38. Morales KJ, Gordon MC, Bates Jr GW. Postcesarean delivery adhesions associated with delayed delivery of infant. *American journal of obstetrics gynecology*. 2007;196(5):461. e1- e6.
39. Organization WH. Caesarean section without medical indication increases risk of short-term adverse outcomes for mothers: policy brief. Geneva: World Health Organization; 2010.

40. Betrán AP, Ye J, Moller A-B, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. *Journal PloS one*. 2016;11(2):e0148343.
41. Gibbons L, Belizan JM, Lauer JA, Betran AP, Merialdi M, Althabe F. Inequities in the use of cesarean section deliveries in the world. *American journal of obstetrics gynecology*. 2012;206(4):331. e1-. e19.
42. Neuman M, Alcock G, Azad K, Kuddus A, Osrin D, More NS, et al. Prevalence and determinants of caesarean section in private and public health facilities in underserved South Asian communities: cross-sectional analysis of data from Bangladesh, India and Nepal. *BMJ* 2014;4(12):e005982.
43. (IIPS) IIfPS. National Family Health Survey (NFHS 1), 2005-06. In: (IIPS) IIfPS, editor. Mumbai, India: Macro International; 2007.
44. Mitra S, Ali MN, Islam S, Cross AR, Saha T. Bangladesh Demographic and Health Survey 1993-1994. In: (NIPORT) NloPRaT, editor. Dhaka, Bangladesh: Mitra and Associates, and Macro International Inc; 1994.
45. Paudyal P, Gurung G, Baral J, Rana A. Changing trends in caesarean deliveries at a tertiary care Centra: a ten year appraisal. *Society of Surgeons of Nepal*. 2014;17(2):7-11.
46. Laxmi T GD, Kumariniraula H, Roshnitui T and Binod A. Rising Cesarean Section Rates in Nepal: Question of safety and Integrity on Obstetric Emergency Practice. *Journal of Gynecology and Women's Health*. 2017;7(4).
47. Mukherjee S. Rising cesarean section rate. *Obstet Gynecol India*. 2006;56(4):298-300.
48. Smith JF, Hernandez C, Wax JR. Fetal laceration injury at cesarean delivery. *Obstetrics Gynecology*. 1997;90(3):344-6.
49. Betrán AP, Temmerman M, Kingdon C, Mohiddin A, Opiyo N, Torloni MR, et al. Interventions to reduce unnecessary caesarean sections in healthy women and babies. *The Lancet*. 2018;392(10155):1358-68.
50. Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comandé D, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *The Lancet*. 2016;388(10056):2176-92.
51. Dhakal Rai S, Regmi P, Van Teijlingen E, Wood J, Dangal G, Dhakal K. Rising Rate of Caesarean Section in Urban Nepal. *Journal of Nepal Health Research Council*. 2019;16(41):479-80.
52. Kattel P. Defensive Medicine: Is It Legitimate or Immoral? *Journal of Nepal Health Research Council*. 2018;16(41):483-5.
53. Subedi S. Rising rate of cesarean section-A year review. *Journal of Nobel Medical College*. 2011;1(2):50-6.
54. Ghosh S. Increasing trend in caesarean section delivery in India: Role of medicalisation of maternal health: Institute for Social and Economic Change Bangalore; 2010.
55. Furber AS. Referral to hospital in Nepal: 4 years' experience in one rural district. *Tropical doctor*. 2002;32(2):75-8.
56. Karkee R, Lee AH, Khanal V, Pokharel PK, Binns CW. Obstetric complications and cesarean delivery in Nepal. *International Journal of Gynecology Obstetrics Gynecology*. 2014;125(1):33-6.
57. Maru S, Rajeev S, Pokhrel R, Poudyal A, Mehta P, Bista D, et al. Determinants of institutional birth among women in rural Nepal: a mixed-methods cross-sectional study. *BMC pregnancy childbirth*. 2016;16(1):252.
58. Belizán JM, Minckas N, McClure EM, Saleem S, Moore JL, Goudar SS, et al. An approach to identify a minimum and rational proportion of caesarean sections in resource-poor settings: a global network study. *The Lancet Global Health*. 2018;6(8):e894-e901.
59. WHO. Robson classification: implementation manual Geneva, Switzerland: World Health Organization; 2017 [updated 9 June 2019; cited 2019 10 June 2019]. Available from:

<https://apps.who.int/iris/bitstream/handle/10665/259512/9789241513197-eng.pdf;jsessionid=8A53ABC4D29B6DF9EA6860952010631F?sequence=1>.

60. Leone T, Padmadas SS, Matthews Z. Community factors affecting rising caesarean section rates in developing countries: an analysis of six countries. *Social science medicine*. 2008;67(8):1236-46.
61. Telecom N. Internet users in Nepal increases rapidly, penetration reaches 63 percent Kathmandu, Nepal: Nepal Telecom; 2018 [updated Mar 12, 2019; cited 2019 6th August 2019]. Available from: <https://www.nepalitelecom.com/2018/01/internet-in-nepal-users-rapid-increase.html>.
62. Paudel YR, Mehata S, Paudel D, Dariang M, Aryal KK, Poudel P, et al. Women's satisfaction of maternity care in Nepal and its correlation with intended future utilization. *International journal of reproductive medicine*. 2015;2015.
63. Aminu M, Utz B, Halim A, Van Den Broek N, childbirth. Reasons for performing a caesarean section in public hospitals in rural Bangladesh. *BMC* 2014;14(1):130.
64. Chhetri S, Singh U. Caesarean section: its rates and indications at a tertiary referral center in Eastern Nepal. *Health Renaissance*. 2011;9(3):179-83.
65. Nestel P, Rutstein S. Defining nutritional status of women in developing countries. *Public health nutrition*. 2002;5(1):17-27.
66. Allen VM, O'Connell CM, Liston RM, Baskett TF. Maternal morbidity associated with cesarean delivery without labor compared with spontaneous onset of labor at term. *Obstetrics Gynecology*. 2003;102(3):477-82.
67. Singh D, Regmi R, Gurung T, Sunar L. Cesarean Delivery and its Indication: A Cross Sectional Study in a Tertiary Care Hospital, Pokhara, Nepal. *Nepal Journal of Obstetrics and Gynaecology*. 2017;12(2):79-82.
68. Regmi K. Barriers to quality maternity care in rural Nepal: Perceptions of postpartum women and their families: University of New England; 2005.
69. Dhungana B. Violence during childbirth. *The Himalayan Times*. 2017 January 27, 2017.
70. Regmi K, Smart R, Kottler J. Understanding gender and power dynamics within the family: a qualitative study of Nepali women's experience. *Australian New Zealand Journal of Family Therapy*. 2010;31(2):191-201.
71. Ailuogwemhe J, Rajbhandari R, Iliaki E, Villar M, Dieterich M. Tackling shortages of health care workers in rural Nepal: "Train to Retain". *Harvard School of Public Health*. 2005;262.
72. Shankar PR. Brain drain and practice locations of Nepalese medical students. *Janaki Medical College Journal of Medical Science*. 2017;5(2):1-4.
73. Samdal LJ, Steinsvik KR, Pun P, Dani P, Roald B, Stray-Pedersen B, et al. Indications for Cesarean Sections in Rural Nepal. *The Journal of Obstetrics and Gynecology of India*. 2016;66(1):284-8.
74. Sharma M, Dhungel S, Niroula S, Karki M. Knowledge and Acceptance of Labour Analgesia in Pregnant Women. *Journal of Nepal Health Research Council*. 2018;16(3):302-6.
75. Nazneen R, Begum R, Sultana K. Rising trend of caesarean section in a tertiary hospital over a decade. *Journal of Bangladesh College of Physicians Surgeons*. 2011;29(3):126-32.
76. Ben-Joseph EP. Can I Have a Vaginal Birth If I Had a Previous C-Section? *Internet: Kids Health*; 2015 [updated 15th July 2019; cited 2019 18th Jylu 2019]. Available from: <https://kidshealth.org/en/parents/vbac.html>.
77. Malla RV, Hamal C, Neupane B, Khatri R. Analysis of Cesarean Section Using Robson's 10-Group Classification at a Tertiary Level Hospital in Nepal. *Medical Journal of Shree Birendra Hospital*. 2018;17(2):4-11.
78. Prasad A, Bhandari G, Saha R. Profile of Caesarean Section at Kathmandu Medical College. *Journal of Nepal Health Research Council*. 2017;15(2):110-3.
79. Banstola A. MHTF Blog [Internet]. MHTF Blog MHTF Blog 2017. [cited 2017]. Available from: <https://www.mhtf.org/2017/12/29/the-current-state-of-maternal-health-in-nepal/>.

80. Furuta M, Salway S. Women's position within the household as a determinant of maternal health care use in Nepal. *International family planning perspectives*. 2006;17-27.
81. Sarker B, Higgins J, Mridha M, Ferdous J, Dasgupta S, Ahmed S, et al. Caesarean delivery in urban slums of Dhaka City: indications and consequences. 2012;18.
82. McCourt C, Weaver J, Statham H, Beake S, Gamble J, Creedy DK. Elective cesarean section and decision making: a critical review of the literature. 2007;34(1):65-79.
83. Hemminki E, Meriläinen J. Long-term effects of cesarean sections: ectopic pregnancies and placental problems. *American journal of obstetrics gynecology*. 1996;174(5):1569-74.
84. Shrestha NS, Pradhan S. On demand caesarean section: What's women's attitude? *Nepal Journal of Obstetrics Gynaecology*. 2007;2(2):12-5.
85. Sharma S, Van Teijlingen E, Hundley V, Angell C, Simkhada P, childbirth. Dirty and 40 days in the wilderness: eliciting childbirth and postnatal cultural practices and beliefs in Nepal. *BMC pregnancy*. 2016;16(1):147.
86. Sharma S, Dhakal I. Cesarean vs Vaginal Delivery : An Institutional Experience. *JNMA; journal of the Nepal Medical Association*. 2018;56(209):535-9.
87. Bhatta DN, Aryal UR. Paternal factors and inequity associated with access to maternal health care service utilization in Nepal: a community based cross-sectional study. *Journal PloS one*. 2015;10(6):e0130380.
88. Karkee R, Lee AH, Khanal V, Pokharel PK, Binns CWJJoG, Obstetrics. Obstetric complications and cesarean delivery in Nepal. 2014;125(1):33-6.
89. Acharya LB, Cleland JHp, planning. Maternal and child health services in rural Nepal: does access or quality matter more? 2000;15(2):223-9.
90. Morley GW. Once a cesarean, always a cesarean? *Journal of the American Medical Association* 1961;178(12):1128-31.
91. Poudel A. Cesarean section rate is alarmingly high in Nepal, but officials say they can't control it. *The Kathmandu Post*. 2019 March 23, 2019.
92. Chaudhary R, Raut KB, Pradhan K. Prevalence and Indications of Cesarean Section in a Community Hospital of Western Region of Nepal. *Journal of the Nepal Medical Association*. 2018;56(213).
93. Shankar PR. Attracting and retaining doctors in rural Nepal. *Rural Remote Health*. 2010;10(3):1420.
94. Masoumi SZ, Kazemi F, Oshvandi K, Jalali M, Esmaili-Vardanjani A, Rafiei H. Effect of training preparation for childbirth on fear of normal vaginal delivery and choosing the type of delivery among pregnant women in Hamadan, Iran: a randomized controlled trial. *Journal of family reproductive health*. 2016;10(3):115.
95. Chen I, Opiyo N, Tavender E, Mortazhejri S, Rader T, Petkovic J, et al. Non-clinical interventions for reducing unnecessary caesarean section. *Cochrane Database of Systematic Reviews*. 2018(9).
96. Valiani M, Haghghatdana Z, Ehsanpour S. Comparison of childbirth training workshop effects on knowledge, attitude, and delivery method between mothers and couples groups referring to Isfahan health centers in Iran. *Iranian journal of nursing midwifery research*. 2014;19(6):653.
97. Bastani F, Hidarnia A, Kazemnejad A, Vafaei M, Kashanian M. A randomized controlled trial of the effects of applied relaxation training on reducing anxiety and perceived stress in pregnant women. *Journal of midwifery women's health* 2005;50(4):e36-e40.
98. Bergström M, Kieler H, Waldenström U. Psychoprophylaxis during labor: associations with labor-related outcomes and experience of childbirth. *Journal Acta obstetrica et gynecologica Scandinavica*. 2010;89(6):794-800.
99. Sharifirad G, Rezaeian M, Soltani R, Javaheri S, Mazaheri MA. A survey on the effects of husbands' education of pregnant women on knowledge, attitude, and reducing elective cesarean section. *Journal of education health promotion*. 2013;2.

100. Feinberg ME, Roettger ME, Jones DE, Paul IM, Kan ML. Effects of a psychosocial couple-based prevention program on adverse birth outcomes. *Maternal child health journal*. 2015;19(1):102-11.
101. Fenwick J, Toohill J, Gamble J, Creedy DK, Buist A, Turkstra E, et al. Effects of a midwife psycho-education intervention to reduce childbirth fear on women's birth outcomes and postpartum psychological wellbeing. *BMC pregnancy childbirth*. 2015;15(1):284.
102. Rouhe H, Salmela-Aro K, Toivanen R, Tokola M, Halmesmäki E, Saisto T. Obstetric outcome after intervention for severe fear of childbirth in nulliparous women—randomised trial. *An International Journal of Obstetrics Gynaecology*. 2013;120(1):75-84.
103. Montgomery AA, Emmett CL, Fahey T, Jones C, Ricketts I, Patel RR, et al. Two decision aids for mode of delivery among women with previous caesarean section: randomised controlled trial. *BMJ*. 2007;334(7607):1305.
104. Saisto T, Salmela-Aro K, Nurmi J-E, Könönen T, Halmesmäki E. A randomized controlled trial of intervention in fear of childbirth. *Obstetrics Gynecology*. 2001;98(5):820-6.
105. Eden KB, Perrin NA, Vesco KK, Guise JM. A randomized comparative trial of two decision tools for pregnant women with prior cesareans. *Journal of Obstetric, Gynecologic, Neonatal Nursing*. 2014;43(5):568-79.
106. Shorten A, Shorten B, Keogh J, West S, Morris J. Making Choices for Childbirth: A Randomized Controlled Trial of a Decision-aid for Informed Birth after Cesarean a. 2005;32(4):252-61.
107. Navaee M, Abedian Z. Effect of role play education on primiparous women's fear of natural delivery and their decision on the mode of delivery. *Iranian journal of nursing midwifery research*. 2015;20(1):40.
108. Hemminki E, Heikkilä K, Sevón T, Koponen P. Special features of health services and register based trials—experiences from a randomized trial of childbirth classes. *BMC health services research*. 2008;8(1):126.
109. Liang W-H, Yuan C-C, Hung J-H, Yang M-L, Yang M-J, Chen Y-J, et al. Effect of peer review and trial of labor on lowering cesarean section rates. *Journal Chinese Medical Association*. 2004;67(6):281-6.
110. Althabe F, Belizán JM, Villar J, Alexander S, Bergel E, Ramos S, et al. Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomised controlled trial. *The Lancet*. 2004;363(9425):1934-40.
111. Lomas J, Enkin M, Anderson GM, Hannah WJ, Vayda E, Singer J. Opinion leaders vs audit and feedback to implement practice guidelines: delivery after previous cesarean section. 1991;265(17):2202-7.
112. Chaillet N, Dumont A, Abrahamowicz M, Pasquier J-C, Audibert F, Monnier P, et al. A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine*. 2015;372(18):1710-21.
113. Scarella A, Chamy V, Sepúlveda M, Belizán JM. Medical audit using the Ten Group Classification System and its impact on the cesarean section rate. *European Journal of Obstetrics Gynecology and Reproductive Biology*. 2011;154(2):136-40.
114. Mohammadi S, Källestål C, Essen B. Clinical Audits: A practical strategy for reducing cesarean section rates in a general hospital in Tehran, Iran. *Journal of reproductive medicine*. 2012;57(1-2):43-8.
115. Poma PA. Effect of departmental policies on cesarean delivery rates: a community hospital experience. *Obstetrics Gynecology*. 1998;91(6):1013-8.
116. Keeler EB, Fok T. Equalizing physician fees had little effect on cesarean rates. *Medical Care Research Review*. 1996;53(4):465-71.
117. Lo JCJ. Financial incentives do not always work—an example of cesarean sections in Taiwan. 2008;88(1):121-9.
118. Goonewardene M, Manawadu MH, Priyaranjana D. Audit: the strategy to reduce the rising caesarean section rates. *South Asian Feder Obst Gynae*. 2012;4(1):5-9.

119. Rosenstein MG, Nijagal M, Nakagawa S, Gregorich SE, Kuppermann M. The association of expanded access to a collaborative midwifery and laborist model with cesarean delivery rates. *Obstetrics gynecology*. 2015;126(4):716.
120. Runmei M, Terence T, Yonghu S, Hong X, Yuqin T, Bailuan L, et al. Practice audits to reduce caesareans in a tertiary referral hospital in south-western China. *Bulletin of the World Health Organization*. 2012;90:488-94.
121. Ayres-De-Campos D, Cruz J, Medeiros-Borges C, Costa-Santos C, Vicente L. Lowered national cesarean section rates after a concerted action. *Acta obstetrica et gynecologica Scandinavica*. 2015;94(4):391-8.
122. Shabnam S. *Caesarean section delivery in India: causes and concerns*. Ne Delhi, India: Jawaharlal Nehru University; 2009.
123. Glenton C, Scheel IB, Pradhan S, Lewin S, Hodgins S, Shrestha VJS, et al. The female community health volunteer programme in Nepal: decision makers' perceptions of volunteerism, payment and other incentives. 2010;70(12):1920-7.
124. Campbell OM, Graham WJ, group LMSSs. Strategies for reducing maternal mortality: getting on with what works. *The Lancet*. 2006;368(9543):1284-99.
125. UNICEF, Organization WH. *Countdown to 2015: Building a future for women and children, The 2012 report*. 2012.
126. Sandall J, Tribe RM, Avery L, Mola G, Visser GH, Homer CS, et al. Short-term and long-term effects of caesarean section on the health of women and children. *The Lancet*. 2018;392(10155):1349-57.

## **ANNEXS**

### **ANNEX 1: CS DATA AND ITS COMPLICATIONS DUE TO UNNECESSARY USE**

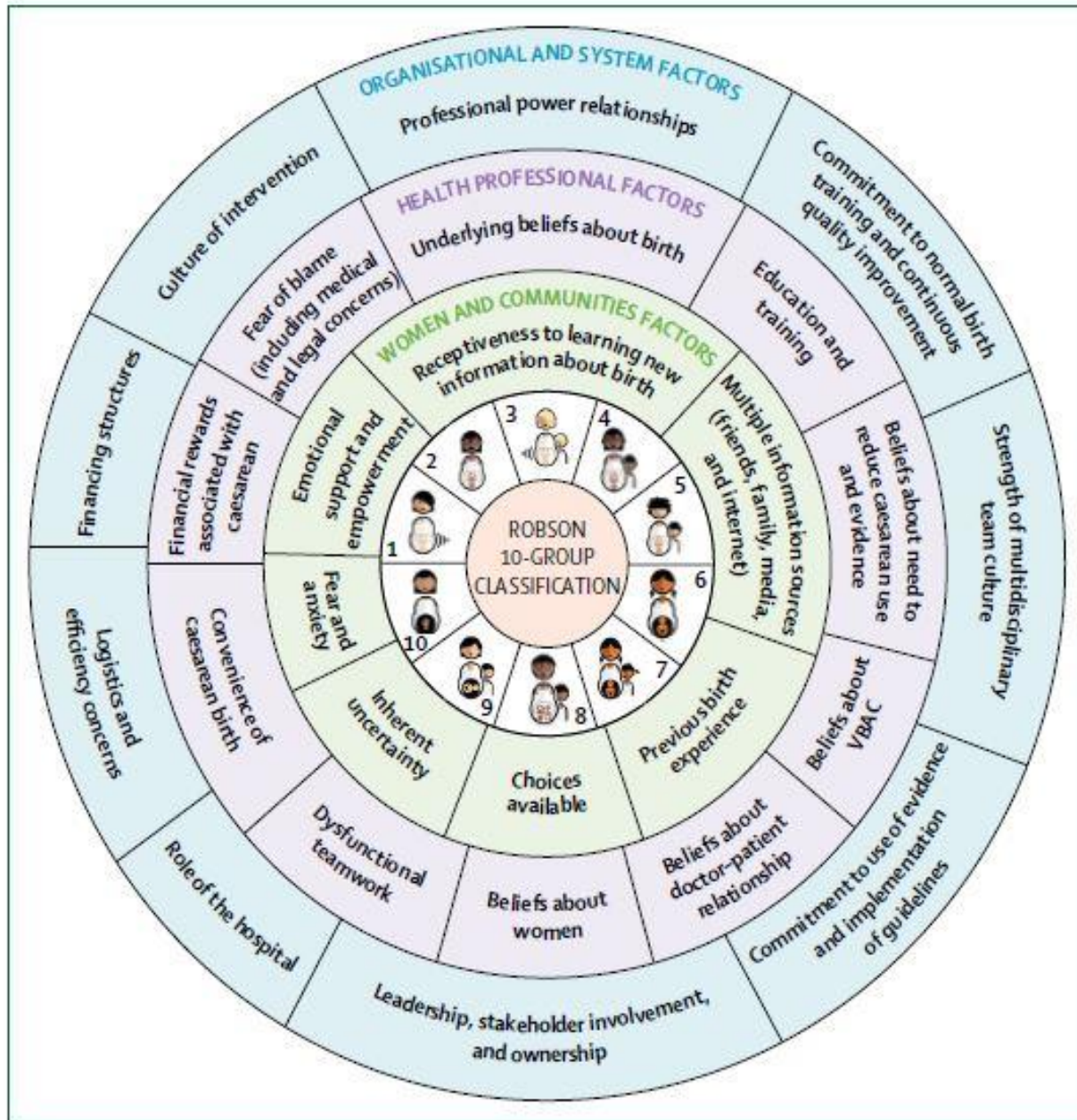
According to the data from 150 countries, the rate of CS is 18.6% per total live births in the world which varies from 6% to 27.2% from low to high income regions(40). The trend analysis from 1990 to 2014 among 121 countries showed the increment of global average CS rate by 12.4% i.e. from 6.7% to 19.1% according to which annual rate of increment was 4.4%(40). The increasing trend had been observed in Asia too which was 4.4% in 1990 and increased by 15.1% making it 19.5% in 2014(40). Being the integral part of comprehensive emergency obstetric care, CS has played a vital role in preventing around 287000 maternal and 2.9 million neonatal deaths around the world every year(42, 124, 125) but when used unnecessarily it has no evidence of any benefit(7, 9, 49). Instead CS also has its long term and short term risks and may trigger various forms of harms(7). The studies showed prevalence of maternal mortality higher among CS deliveries than among vaginal and occurrence of various complications like uterine rupture, stillbirth, different physical, medical, hormonal and bacterial exposures, allergy, asthma and abnormal placentation among deliveries by CS(7, 126). Short term risks of CS include likeliness of blood transfusion, involving anesthetic complications, thromboembolic disease, organ injury and infection for both mother and child and also respiratory distress in neonates(7). In long term, CS may induce asthma and obesity in children, whereas pregnancy related complications like placenta accrete, uterine rupture, ectopic pregnancy, infertility, intra-abdominal adhesions, placenta previa and hysterectomy(7).

## **ANNEX 2: QUESTIONNAIRE FOR KEY INFORMANT INTERVIEWS WITH HEALTH PROFESSIONALS**

1. What is your view on existing trend of Cesarean section in Nepal?
2. What is the rate of cesarean in your hospital?
3. What are the possible factors influencing cesarean in Nepal?
4. Is there incentive scheme for doctors performing cesarean?
5. What is the range of fees for cesarean in different hospitals?
6. Do public facilities get incentives from government for cesarean cases? If yes, how much?
7. How common is the practice of other assisted vaginal delivery in Nepal?
8. How relevant is the practice of painless vaginal delivery by epidural analgesia in Nepalese context?
9. What could be done to reduce unnecessary cesarean when not indicated medically?



**ANNEX 3: CONCEPTUAL FRAMEWORK FROM LANCET SERIES FOR "OPTIMIZING CESAREAN SECTION USE 3"(49)**



**ANNEX 4: CONCEPTUAL FRAMEWORK FROM “INTENTION FOR CESAREAN SECTION VERSUS VAGINAL DELIVERY AMONG PREGNANT WOMEN IN ISFAHAN”(5)**

