THE DETERMINANTS OF GOOD NEWBORN CARE PRACTICES IN THE RURAL AREAS OF NEPAL

A thesis submitted in fulfilment of the requirements for the Degree of

Master of Health Sciences

University of Canterbury

Sabita Tuladhar

October 2010

ABSTRACT

Newborn morbidity and mortality remains high despite a remarkable decline in the infant mortality and under five mortality rates in Nepal over the last decade (1996-2006). Research shows that newborns' health outcome is associated with maternal and other factors. This study was designed to understand the factors that have an impact on three good newborn care practices: safe cord cutting, early breastfeeding and delayed bathing.

The study used the interview data of 815 married women aged 15-49 years who delivered a live baby between February 2008 and February 2009, collected for the baseline survey of the Community-Based Maternal and Newborn Health program implemented in the Sindhuli district of Nepal. The mean age of the sample women was 26 years. Two-thirds of them were from disadvantaged indigenous caste/ethnicity groups, about 70% were uneducated and the majority were poor. Safe cord cutting, early breastfeeding and delayed bathing practices were studied for 803, 810 and 812 women respectively and 70.7%, 46.7%, and 16.6% of the eligible samples demonstrated the practices respectively. The logistic regression method was used to examine the association of independent factors with the outcome variables.

Social gradient was found to be associated with all three practices. Rich women were more likely to demonstrate good practices and bearing a child at the prime age (20-34 years) was likely to result in safe cord cutting. Disadvantaged indigenous and 'other' caste/ethnicity women demonstrated unsafe cord cutting practices and dalit caste/ethnicity women demonstrated poor bathing practices. Maternal knowledge also emerged as a strong predictor of early breastfeeding and delayed bathing practices. Antenatal care from a SBA determined good breastfeeding and advice from a FCHV determined good bathing practices.

The results showed that the uptake of antenatal and delivery services from a skilled birth attendant is unacceptably low in rural Nepal, which is a challenge for meeting the millennium development goals. The study recommends programmes for improving economic status as a key to improving newborn care practices. As the vast majority of the deliveries are still assisted by traditional birth attendants; including them in maternal health programmes is crucial. Increasing women's access to a skilled birth attendant and boosting the spirit of the FCHVs to increase their efficiency is also recommended. Future research on newborn health should focus on identifying other determinants of newborn care practices and survival. Qualitative studies to understand the cultural perspectives of newborn care practices are also recommended.

ACKNOWLEDGEMENTS

The author would like to thank all the individuals who have made this thesis possible. Firstly, my thanks go to Dr. Pauline Barnett, Associate Professor, Health Sciences Centre and Dr. Raymond Kirk, Director and Associate Professor, Health Sciences Centre of the University of Canterbury for guiding me throughout the conduct of this study. I am indeed grateful to Dr. Stephen Hodgins, the former Project Director of the Nepal Family Health Program-II, Kathmandu, Nepal for providing me with the opportunity to use the project's data for my thesis. I am equally grateful to Mr. Ashoke Shrestha, Project Director, and Mr. Bharat Ban, Team Leader of the Monitoring and Evaluation Team of the Nepal Family Health Program-II for their encouragement and support in the conduct of the study. I express my thanks to Mrs Pat Coope, Post Graduate Statistician of the College of Education for helping me in the statistical analysis. I also express my thanks to Ms Philippa Drayton for helping with the administrative work. Lastly, I would like to thank my husband Mr. Sagar Raj Pradhan for his support throughout the duration of the study.

TABLE OF CONTENTS

	Page Number
ABSTRACT	**i**
ACKNOWLEDGEMENTS	**ii**
TABLE OF CONTENTS	**iii**
LIST OF TABLES	**x**
LIST OF FIGURES	**xiii**
ABBREVIATIONS	**xviii**
GLOSSARY OF TERMS	**xx**
CHAPTER ONE: Introduction	**1**
1.1 Background	1
1.2 Problem statement	3
1.3 Rationale	6
1.4 Research aim and questions	9
1.5 Study objectives	9
1.6 Organization of the thesis	9
CHAPTER TWO: Research into Newborn Care Practices in Developing Countries	**10**
2.1 Theoretical frameworks	10
2.1.1 Mosley and Chen's analytical framework on child survival in developing countries	10
2.1.2 Andersen's behavioural model of health service utilisation	12
2.2 The patterns of newborn care practices and their determinants	13
2.2.1 Socio-demographic factors	13
2.2.2 Socio-economic status	18
2.2.3 Use of maternal health services	19
2.2.4 Birth preparedness	20
2.2.5 Mothers' knowledge	21

2.2.6 Health system factors 22
2.2.7 Counselling from health workers 23
2.2.8 Exposure to media 24
2.2.9 Cultural factors 25
2.3 Conclusions 27

CHAPTER THREE: Conceptual Framework of the Study 29
3.1 Conceptual framework 29
3.2 Rationale for the framework 32
3.2.1 Socio-demographic factors as predictors of good newborn care practices 32
3.2.2 Socio-economic factors as predictors of good newborn care practices 32
3.2.3 Use of maternal health services as a predictor of good newborn care practices 32
3.2.4 Mothers' knowledge of specific newborn care practices as a predictor of good newborn care practices 33
3.2.5 Birth preparedness as a predictor of good newborn care practices 33
3.2.6 Health worker's counselling as a predictor of good newborn care practices 33
3.2.7 Exposure to media as a predictor of newborn care practices 34
3.2.8 Health system factors as a predictor of good newborn care practices 34
3.2.9 Cultural factors as a predictor of good newborn care practices 34
3.3 Conclusions 35

CHAPTER FOUR: Methodology 36
4.1 Study design 36
4.2 Study area 36
4.3 Study population 37
4.4 Data source and instrument 37
4.5 Sample design and size and the selection of the respondents 38
4.6 Field organization and data collection 39

4.7 Study variables and coding 40
4.7.1 Dependent variables 40
4.7.2 Independent variables 41
4.8 Data analysis 44
4.8.1 Logistic regression 45
4.9 Study hypotheses 48
4.10 Ethical Considerations 49

CHAPTER FIVE: Results: Patterns of newborn care practice and associated variables 50
5.1 Characteristics of the sample population 50
5.1.1 Socio-demographic characteristics 50
5.1.2 Socio-economic status 52
5.1.3 Use of maternal health services 52
5.1.4 Birth preparedness 53
5.1.5 Mothers' knowledge of newborn care issues 54
5.1.6 Advice from a FCHV and counselling from a health worker on newborn care issues 55
5.1.7 Exposure to media 57
5.1.8 Prevalence of outcome behaviours 58
5.2 Distribution of safe cord cutting practice by the study variables 60
5.2.1 Socio-demographic factors and safe cord cutting practice 60
5.2.2 Socio-economic status and safe cord cutting practice 63
5.2.3 Use of maternal health services and safe cord cutting practice 64
5.2.4 Birth preparedness and safe cord cutting practice 66
5.2.5 Mothers' knowledge and safe cord cutting practice 67
5.2.6 Advice from a FCHV and counselling from a health worker and safe cord cutting practice 69
5.2.7 Exposure to media and safe cord cutting practice 72
5.3 Distribution of early breastfeeding practice by the study variables 73
5.3.1 Socio-demographic characteristics and good breastfeeding practice 73
5.3.2 Socio-economic status and early breastfeeding practice 76
5.3.3 Use of maternal health services and early breastfeeding practice 77

5.3.4 Birth preparedness and early breastfeeding practice 79
5.3.5 Mothers' knowledge of newborn care issues and early breastfeeding practice 80
5.3.6 Advice from a FCHV and counselling from a health worker and early breastfeeding practice 82
5.3.7 Exposure to media and early breastfeeding practice 85
5.4 Distribution of delayed newborn bathing practice by the study variables 86
5.4.1 Socio-demographic characteristics and delayed newborn bathing practice 87
5.4.2 Socio-economic status and delayed newborn bathing practice 89
5.4.3 Use of maternal health services and delayed newborn bathing practice 90
5.4.4 Birth preparedness and delayed newborn bathing practice 91
5.4.5 Mothers' knowledge of newborn care issues and delayed newborn bathing practice 92
5.4.6 Advice from a FCHV and counselling from a health worker and delayed newborn bathing practice 95
5.4.7 Exposure to media and good newborn bathing practice 96
5.5 Conclusions 98

CHAPTER SIX: Results: Analysis of the determinants of good newborn care practices 100
6.1 Logistic Regression 100
6.2 Safe cord cutting practice 101
6.2.1 Hypothesis: Socio-demographic factors are related to safe cord cutting practice 101
6.2.2 Hypothesis: Socio-economic status is related to safe cord cutting practice 102
6.2.3 Hypothesis: Use of maternal health services is related to safe cord cutting practice 103
6.2.4 Hypothesis: Birth preparedness is related to safe cord cutting practice 103
6.2.5 Hypothesis: Mothers' knowledge of specific newborn care issues is related to safe cord cutting practice 104

6.2.6 Hypothesis: Advice from a FCHV and counselling from a health worker are related to safe cord cutting practice 105
6.2.7 Hypothesis: Exposure to media is related to safe cord cutting practice 105
6.2.8 Combined analysis of the independent variables 106
6.3 Early breastfeeding practice 111
6.3.1 Hypothesis: Socio-demographic variables are related to early breastfeeding practice 111
6.3.2 Hypothesis: Socio-economic status is related to early breastfeeding practice 112
6.3.3 Hypothesis: Use of maternal health services is related to early breastfeeding practice 112
6.3.4 Hypothesis: Birth preparedness during pregnancy is related to early breastfeeding practice 113
6.3.5 Hypothesis: Mothers' knowledge of specific newborn care issues is related to early breastfeeding practice 113
6.3.6 Hypothesis: Advice from a FCHV and counselling from a health worker is related to early breastfeeding practice 114
6.3.7 Hypothesis: Exposure to media is related to early breastfeeding practice 114
6.3.8 Combined analysis of the independent variables 115
6.4 Delayed Bathing 120
6.4.1 Hypothesis: Socio-demographic factors are related to delay newborn bathing practice. 120
6.4.2 Hypothesis: Socio-economic status is related to delay newborn bathing practice. 121
6.4.3 Hypothesis: Utilization of maternal health services is related to delayed newborn bathing practice 122
6.4.4 Hypothesis: Birth preparedness during pregnancy is related to delayed newborn bathing practice 122
6.4.5 Hypothesis: Mothers' knowledge of newborn care issues is related to delayed newborn bathing practice 122
6.4.6 Hypothesis: Advice from a FCHV on newborn bathing is related to delayed newborn bathing practice 124

6.4.7 Hypothesis: Exposure to media is related to delayed newborn bathing practice 124
6.4.8 Combined analysis of the independent variables 125
6.5 Conclusions 131

CHAPTER SEVEN: Discussion and Conclusion 133
7.1 Discussion of the sample and its characteristics 133
7.1.1 Socio-demographic and socio-economic factors 133
7.1.2 Use of maternal health services 135
7.1.3 Birth preparedness 135
7.1.4 Mothers' knowledge 136
7.1.5 Health workers' counselling and FCHVs' advice 136
7.1.6 Exposure to media 138
7.2 Patterns and determinants of good newborn care practices 138
7.2.1 Safe cord cutting practice 139
7.2.2 Early breastfeeding practice 142
7.2.3 Delayed newborn bathing 146
7.3 Strengths and limitations of the study 150
7.4 Policy implications and recommendations 151
7.5 Recommendations for future research 153
7.6 Summary and conclusion 154

REFERENCES 158

APPENDICES 166
Appendix A Safe cord cutting, early breastfeeding and delayed newborn bathing practices by the study variables 166
Appendix B Safe cord cutting, early breastfeeding and delayed newborn bathing practices according the categories of the independent variables 168
Appendix C Odds ratio and 95% confidence interval for the effect of socio-demographic variable on good breastfeeding practice 170
Appendix D Odds ratio and 95% confidence interval for the effect of

	advice from a FCHV and counselling from a health worker variables on early breastfeeding practice	170
Appendix E	Community Based-Maternal and Newborn Health (CB-MNH) Baseline Survey Questionnaire	171

LIST OF TABLES

		Page Number
Table 4.1:	Variable sets that were added in each step of the combined analysis	46
Table 5.1:	Distribution of the study sample by their knowledge of specific newborn care issues	54
Table 5.2:	Distribution of the study sample who received counselling from a health worker or advice from a FCHV on specific newborn care issues among those who met a health worker and a FCHV during pregnancy	56
Table 5.3:	Safe cord cutting practice and mothers' knowledge on specific newborn care issues	68
Table 5.4:	Early breastfeeding practice and mothers' knowledge of specific newborn care issues	82
Table 5.5:	Delayed newborn bathing practice and mothers' knowledge of specific newborn care issues	94
Table 6.1:	Odds ratio and 95% confidence interval for the effect of socio-demographic variables on safe cord cutting practice	102
Table 6.2:	Odds ratio and 95% confidence interval for the effect of the SES variable on safe cord cutting practice	103
Table 6.3:	Odds ratio and 95% confidence interval for the effect of use of maternal health service variables on safe cord cutting practice	103
Table 6.4:	Odds ratio and 95% confidence interval for the effect of the mothers' knowledge variables on safe cord cutting practice	104
Table 6.5:	Odds ratio and 95% confidence interval for the effect of advice from a FCHV and counselling from a health worker variables on safe cord cutting practice	105
Table: 6.6:	Odds ratio and 95% confidence interval for the effect of exposure to media variables on safe cord cutting practice	106
Table 6.7:	Odds ratio and 95% confidence interval for the effect of	

	demographic/SES/use of maternal health service variables on safe cord cutting practice	107
Table 6.8:	Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/mothers' knowledge/advice from a FCHV and counselling from a health worker variables on safe cord cutting practice	108
Table 6.9:	Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/birth preparedness/mothers' knowledge/advice from a FCHV and counselling from a health worker and exposure to media variables on safe cord cutting practice	110
Table 6.10:	Odds ratio and 95% confidence interval for the effect of the SES variable on early breastfeeding practice	112
Table 6.11:	Odds ratio and 95% confidence interval for the effect of maternal service use variables on early breastfeeding practice	112
Table 6.12:	Odds ratio and 95% confidence interval for the effect of birth preparedness on early breastfeeding practice	113
Table 6.13:	Odds ratio and 95% confidence interval for the effect of mothers' knowledge variables on early breastfeeding practice	114
Table 6.14:	Odds ratio and 95% confidence interval for the effect of exposure to media variables on early breastfeeding practice	115
Table 6.15:	Odds ratio and 95% confidence interval for the effect of socio-demographic/SES/use of maternal health services and birth preparedness variables on early breastfeeding practice	115
Table 6.16:	Odds ratio and 95% confidence interval for the effect of socio-demographic, SES, use of maternal health services, birth preparedness, knowledge of mothers, and advice from a FCHV and counselling from a health worker variables on early breastfeeding practice	118
Table 6.17:	Odds ratio and 95% confidence interval for the effect of socio-demographic, SES, use of maternal health services, birth preparedness, knowledge of mothers, and advice from a FCHV and counselling from a health worker, and exposure to media variables on early breastfeeding practice	119

Table 6.18: Odds ratio and 95% confidence interval for the effect of socio-demographic variables on delayed newborn bathing practice 121

Table 6.19: Odds ratio and 95% confidence interval for the effect of socio-economic status variable on delayed newborn bathing practice 121

Table 6.20: Odds ratio and 95% confidence interval for the effect of the use of maternal health service variable on delayed newborn bathing practice 122

Table 6.21: Odds ratio and 95% confidence interval for the effect of mothers' knowledge on specific newborn care issue variables on delayed newborn bathing practice 123

Table 6.22: Odds ratio and 95% confidence interval for the effect of advice from a FCHV on delayed newborn bathing practice 124

Table 6.23: Odds ratio and 95% confidence interval for the effect of exposure to media variables on delayed newborn bathing practice 124

Table 6.24: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health service variables on delayed newborn bathing practice 125

Table 6.25: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/mothers' knowledge and advice and counselling variables on delayed newborn bathing practice 128

Table 6.26: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/mothers' knowledge/advice and counselling and exposure to media variables on delayed newborn bathing practice 129

LIST OF FIGURES

		Page Number
Figure 1.1:	Trends in childhood mortality in Nepal, 1991-2005	2
Figure 1.2:	Use of different instruments to cut the umbilical cord among non-institutional live births in Nepal, 2006	4
Figure 1.3:	Thermal care practices among the non-institutional live births in rural areas of Nepal, 2006	5
Figure 1.4:	Early breastfeeding practices in the rural areas of Nepal, 2006	6
Figure 1.5:	Utilization of maternal health services in Nepal, 2006	7
Figure 2.1:	Mosley and Chen's framework: Operation of five groups of proximate determinants on the health dynamics of a population	11
Figure 2.2:	Anderson and Newman's framework of health service utilisation	12
Figure 3.1:	Conceptual framework of the study	31
Figure 5.1:	Distribution of the study sample by age	51
Figure 5.2:	Distribution of the study sample by caste/ethnicity	51
Figure 5.3:	Distribution of the study sample by education	52
Figure 5.4:	Distribution of the study sample by socio-economic status (wealth quintiles)	52
Figure 5.5:	Distribution of the study sample by use of ANC services	53
Figure 5.6:	Distribution of the study sample by receiving assistance during delivery	53
Figure 5.7:	Distribution of the study sample by birth preparedness made during pregnancy	54
Figure 5.8:	Distribution of the study sample according to meeting a FCHV and a health worker during pregnancy	56
Figure 5.9:	Distribution of the study sample by their exposure to media	58
Figure 5.10:	Prevalence of safe cord cutting practice among the study sample	58
Figure 5.11:	Prevalence of breastfeeding practice among the study sample	59
Figure 5.12:	Prevalence of bathing practice among the study sample	59
Figure 5.13:	Cord cutting practice among the sample population	60

Figure 5.14a:	Age distribution of women who demonstrated safe cord cutting practice	60
Figure 5.14b:	Safe cord cutting practice according to age groups	61
Figure 5.15a:	Caste/ethnicity distribution women who demonstrated safe cord cutting practice	61
Figure 5.15b:	Safe cord cutting practice according to caste/ethnicity	62
Figure 5.16a:	Education of women demonstrating safe cord cutting practice	62
Figure 5.16b:	Safe cord cutting practice according to education levels education	63
Figure 5.17a:	Socio economic status (wealth quintiles) of the women demonstrating safe cord cutting practice	63
Figure 5.17b:	Safe cord cutting practice according to wealth quintiles	64
Figure 5.18a:	Use of ANC service among the women demonstrating safe cord cutting practice	64
Figure 5.18b:	Safe cord cutting practice according to ANC service use	65
Figure 5.19a:	Use of delivery service among the women demonstrating safe cord cutting practice	65
Figure 5.19b:	Safe cord cutting practice according to delivery services use	65
Figure 5.20a:	Birth preparation among women demonstrating safe cord cutting practice	66
Figure 5.20b:	Safe cord cutting practice according to birth preparation made	66
Figure 5.21:	Contact with a FCHV or a health worker for women reporting safe cord cutting practice	69
Figure 5.22a:	Women receiving advice from a FCHV on using CHDK among the women meeting a FCHV and demonstrating safe cord cutting practice	70
Figure 5.22b:	Safe cord cutting practice according to receiving advice from a FCHV on using CHDK	70
Figure 5.23a:	Women receiving counselling from a health worker on using CHDK among the women meeting a health worker and demonstrating safe cord cutting practice	71
Figure 5.23b:	Safe cord cutting practice according to receiving counselling from a health worker on using CHDK	71
Figure 5.24a:	Exposure to media among women demonstrating safe cord	

	cutting practice	72
Figure 5.24b:	Safe cord cutting practice according to women's exposure media	72
Figure 5.25:	Breastfeeding practice among the sample population	73
Figure 5.26a:	Age distribution of the women demonstrating early breastfeeding practice	73
Figure 5.26b:	Early breastfeeding practice according to age groups	74
Figure 5.27a:	Caste/ethnicity of women demonstrating early breastfeeding practice	74
Figure 5.27b:	Early breastfeeding practice according to caste/ethnicity groups	75
Figure 5.28a:	Education of women demonstrating early breastfeeding practice	75
Figure 5.28b:	Early breastfeeding practice according to education levels	76
Figure 5.29a:	Socio-economic status (wealth quintiles) of women demonstrating early breastfeeding practice	76
Figure 5.29b:	Early breastfeeding practice according to quintiles of wealth	77
Figure 5.30a:	Antenatal service use among women demonstrating early breastfeeding practice	77
Figure 5.30b:	Early breastfeeding practice according to ANC service use	78
Figure 5.31a:	Delivery service use among women demonstrating early breastfeeding practice	78
Figure 5.31b:	Early breastfeeding practice according to delivery service use	79
Figure 5.32a:	Birth preparation among women demonstrating early breastfeeding practice	79
Figure 5.32b:	Early breastfeeding practice according to birth preparation	79
Figure 5.33:	Contact with a FCHV or a health worker for women reporting early breastfeeding practice	82
Figure 5.34a:	Women receiving advice from a FCHV on breastfeeding among women who met a FCHV and demonstrated early breastfeeding practice	83
Figure 5.34b:	Early breastfeeding practice according to meeting a FCHV and receiving advice on breastfeeding	83
Figure 5.35a:	Women receiving counselling from a health worker on breastfeeding among women who met a health worker and demonstrated early breastfeeding	84
Figure 5.35b:	Early breastfeeding practice according to women who met a	

health worker and received counselling on breastfeeding 84
Figure 5.36a: Proportion of women exposed to media among those who demonstrated early breastfeeding practice 85
Figure 5.36b: Early breastfeeding practice according to women's exposure to media 86
Figure 5.37: Newborn bathing practice among the sample population 86
Figure 5.38a: Age distribution of the women demonstrating delayed newborn bathing practice 86
Figure 5.38b: Delayed newborn bathing practice according to age groups 87
Figure 5.39a: Caste/ethnicity of the women demonstrating delayed newborn bathing practice 87
Figure 5.39b: Delayed newborn bathing practice according to caste/ethnicity groups 88
Figure 5.40a: Education levels of the women demonstrating delayed newborn bathing practice 88
Figure 5.40b: Delayed newborn bathing practice according to education levels 89
Figure 5.41a: Socio-economic status (wealth quintiles) of the women demonstrating delayed newborn bathing practice 89
Figure 5.41b: Delayed newborn bathing practice according to quintiles of wealth 90
Figure 5.42a: Antenatal service use among the women demonstrating delayed newborn bathing practice 90
Figure 5.42b: Delayed newborn bathing practice according to antenatal service use 90
Figure 5.43a: Delivery service use among women demonstrating delayed newborn bathing practice 91
Figure 5.43b: Delayed newborn bathing practice according to delivery service use 91
Figure 5.44a: Birth preparation among women demonstrating delayed newborn bathing practice 92
Figure 5.44b: Delayed newborn bathing practice according to birth preparation 92
Figure 5.45: Contact with a FCHV or a health worker for women reporting delayed newborn bathing practice 95
Figure 5.46a: Women receiving advice from a FCHV on newborn bathing

among the women meeting a FCHV and demonstrating delayed newborn bathing practice 96
Figure 5.46b: Delayed newborn bathing practice according to receiving advice from a FCHV 96
Figure 5.47a: Exposure to media among women demonstrating delayed newborn bathing practice 97
Figure 5.47b: Delayed newborn bathing practice according to exposure to media 97

ABBREVIATIONS

ANC	Ante-Natal Care
BK	Biswa Karma
BPP	Birth Preparedness Package
CB-MNC	Community-Based Maternal and Newborn Care
CB-MNH	Community-Based Maternal and Newborn Health
CHW	Community Health Workers
CI	Confidence Interval
COR	Conditional Odds Ratio
DoHS	Department of Health Services
FCHV	Female Community Health Volunteer
FHD	Family Health Division
HW	Health Worker
I/NGO	International/Non Government Organization
JHUSPH	Johns Hopkins University School of Public Health
JHBSPH	John Hopkins Bloomberg School of Public Health
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MINI	Morang Innovative Neonatal Initiative
MIRA	Maternal and Infant Research Activities
MoHP	Ministry of Health and Population
MNCH	Maternal Newborn and Child Health
NDHS	Nepal Demographic and Health Survey
NFHP	Nepal Family Health Program
NHEICC	National Health Education Information and Communication Centre
NMR	Neonatal Mortality Rate
N	Number
OR	Odds Ratio
PNC	Post-Natal Care
p	Probability

PPS	Probability Proportionate to Size
PVO	Private Voluntary Organization
RDW	Recently Delivered Women
RLG	Radio Listeners' Group
RR	Relative Risk
SBA	Skilled Birth Attendant
SES	Socio Economic Status
SD	Standard Deviation
SLC	School Leaving Certificate
SNL	Saving Newborn Lives
SPSS	Statistical Package for Social Sciences
TBA	Traditional Birth Attendant
TTBA	Trained Traditional Birth Attendant
UNDP	United Nations Development Program
US	United States
USAID	United States Agency for International Development
VaRG	Valley Research Group
VDC	Village Development Committee
WHO	World Health Organization

GLOSSARY OF TERMS

Antenatal Care (ANC): Also known as prenatal care is the complex of interventions that a pregnant woman receives from organized health care services. The number of different interventions in antenatal care is large, however, the basic elements include taking a medical history, a physical examination, measuring blood pressure, a urine test, blood test, giving iron/folic acid tablets, hearing the fetal heart sound, nutritional education, and health education and counselling on birth preparedness.

Birth Preparedness: Birth preparedness is advance planning and preparation for delivery, which helps ensure that women can reach professional delivery care when labour begins and can help reduce the delays that occur when women experience obstetric complications. These involve recognising the complications and deciding to seek care, reaching a facility where skilled care is available and receiving care from a Skilled Birth Attendant (SBA) at the facility. Key elements of birth preparedness include attending ANC at least four times during pregnancy; identifying a SBA and making a plan for reaching the facility during labour; setting aside personal funds to cover the costs of travelling to the health facility, and delivering with a SBA and any required supplies; recognising signs of complications; knowing what community resources such as emergency transport, funds and communications are available in the case of emergencies; having a plan for emergencies i.e. knowing what transport can be used to get to the hospital, setting aside funds; identifying person(s) to accompany one to the hospital and/or to stay at home with the family; and identifying a blood donor (Family Care International, n.d.).

Cleanliness during Delivery: Cleanliness during delivery refers to keeping the following items clean during delivery- the nails and hands of the person assisting the delivery, the cord cutting instrument (razor blade), the surface on which the cord is cut, surface on which newborn is placed, the cord tie (thread), the perineum, the mother's clothes and the clothes for wrapping the baby.

Clean Home Delivery Kit (CHDK): The CHDK (*Sutkeri Samagri)* is a disposable kit developed by Maternal and Child Health Products Limited for use during delivery. It contains materials

such as a clean delivery surface (plastic sheet), a clean cutting instrument (blade and plastic disc to cut on), clean ties for the cord (cord ties), and a soap for cleaning the hands of birth attendants. It also contains an illustrated instruction sheet to educate users on hand washing, immediate wrapping of the newborn, proper tying of the cord, immediate breast feeding, and burial of the placenta.

Delayed Bathing/Good bathing: The recommended practice of bathing a newborn baby only after the first 24 hours of birth to reduce the risk of hypothermia.

Disadvantaged Indigenous Caste/Ethnicity: A terminology used to classify those groups of people who have their distinct culture and are traditionally disadvantaged. Hierarchically, this group of people falls below the upper caste group but are above the Dalit group in the caste system in Nepal. In this study, the following castes/ethnicities are included in the disadvantaged indigenous group- Rai, Tamang, Magar, Sherpa, Yadav, Kumhar, Kayastha, Rajbhar, Baniya, Dhobi, Sudi, Kalwar, Kanu, Kurmi, Bhumihar, Brahman (Terai), Rajput, Tharu, Chepang, Praja, Bhujel, Karnakar, Majhi, and Danuwar.

Dalits Caste/ethnicity: *Dalits* are a socio-culturally disadvantaged caste/ethnic groups found in Nepal. They are regarded as an 'Impure' group, collectively called *pani nachalne* or 'those from whom water cannot be accepted'. *Dalits* were ranked at the very bottom and classified as *achut* (untouchable) in the Nepalese caste system (Bennett, Dahal, & Govindasamy, 2008). In this study the following castes/ethnicities are included as Dalits- Damai, Kami, Sarki, Biswo-Karma (BK), Lohar, Chamar, Dom, Marik, Ram, Harichan, Sunar, Kori, Khatik, Pasi, Soni and Lohari.

Early Breastfeeding/Good breastfeeding: The recommended practice of putting a newborn to the mother's breast within one hour of birth.

Education: Education here means attending formal education. Education is categorized into four categories where uneducated describes those women who never went to school. Primary level educated refers to those who attended school up to fifth grade. Secondary level educated refers to those who attended grades 6 to 10 and higher level educated refers to those who attained School Leaving Certificate (SLC) and above qualification.

Essential Newborn Care: A set of practices that reduces neonatal morbidity and mortality such as clean cord care, thermal care (keeping baby warm by wrapping in clean and dry clothes and delaying bathing until 24 hours after birth) and initiating breastfeeding within the first hour of birth are defined as essential newborn care practices.

Ethnicity: Ethnicity is a social construction that indicates identification with a particular group, which is often descended from common ancestors. Members of the group share common cultural traits (such as language, religion, and dress) and are normally an identifiable minority within the larger nation-state.

Female Community Health Volunteers (FCHV): A cadre of female volunteers selected locally at ward[1] level in the villages of Nepal, who play an important role in contributing to a variety of key public health programs, including family planning, maternal care, child health, vitamin A supplementation, de-worming and immunization. FCHVs are the foundation of Nepal's community-based Primary Health Care system and are the key referral link between the health services and communities. Some municipalities also have FCHVs. In Nepal, there are about 50,000 FCHVs working in the 75 districts (DoHS, 2006).

Good Newborn Care Practices: The practice of cutting the cord with an instrument from the CHDK, a new blade or a boiled blade; the practice of breastfeeding child within an hour of birth (early breastfeeding) and the practice of not bathing the child until 24 hours after birth (delayed bathing) are considered good newborn care practices in this study.

Maternal Services: The services which are essential for a pregnant woman and new mothers to ensure their and their baby's good health. These include antenatal care, delivery care, postnatal care and birth preparedness.

Maternal Deaths: According to the World Health Organization (WHO) definition "maternal deaths" are deaths from pregnancy related complications occurring throughout pregnancy, labour and childbirth, and in the postpartum period (up to 42 days after birth).

---

[1] The smallest administrative unit in a Village Development Committee. Nine wards comprise a VDC.

Maternal Newborn and Child Health (MNCH): MNCH refers to the Maternal Newborn and Child Health which is the repositioning of the well-known acronym MCH (Maternal and Child Health) after the recognition of the special needs of newborns by WHO in 2005.

Neonates/Newborn: A newborn baby or an infant aged 0-28 days of birth.

Other Castes/Ethnicity: In this study "other castes/ethnicity" refers to those castes/ethnicity which do not fall in any of the three major caste/ethnic groups (upper caste, disadvantaged indigenous and dalit). Newar, Gurung and Teli are categorised as "other" caste/ethnic groups in the present study.

Parity: The number of children to whom a woman has given birth.

Postnatal Care (PNC): Care provided to women and the newborn baby following the delivery up to 42 days. The World Health Organization guidelines recommend that postnatal care for mothers include monitoring and referral for complications such as excessive bleeding, pain, and infection; counselling on breast care and breastfeeding; and advice on nutrition during breastfeeding, newborn care practices, and family planning. For all newborns, PNC should include immediate and exclusive breastfeeding, warming of the infant, hygienic care of the umbilical cord, and timely identification of danger signs with referral and treatment.

Recently Delivered Women (RDW): A terminology used in this study to denote the married women aged 15-49 years who delivered a living baby at home in the 12 month period, between February 2008 and February 2009.

Safe Cord Cutting: In this study, safe cord cutting means the practice of cutting a newborn's cord with the help of the instrument from a clean home delivery kit, a new blade or a boiled blade.

Skilled Birth Attendant (SBA): An accredited health professional such as a midwife, doctor or nurse who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns (World Health

Organization, 2005). In Nepal only doctors and nurses have been recognized as SBAs by the government.

Thermal Care: Keeping the newborn warm to reduce the hypothermia risk. It includes practices such as drying and wrapping the newborn immediately after delivery and delaying the newborn's first bath for at least six hours or several days to reduce the hypothermia risk (Baqui et al, 2006).

Upper Castes/Ethnicity: The caste/ethnic group such as Brahmin and Chhetris that occupy the highest position in the caste system in Nepal. They are considered 'pure' in the Nepalese caste system. In this study the upper castes include four castes- Brahmin, Chhetri, Thakuri and Sanyasi.

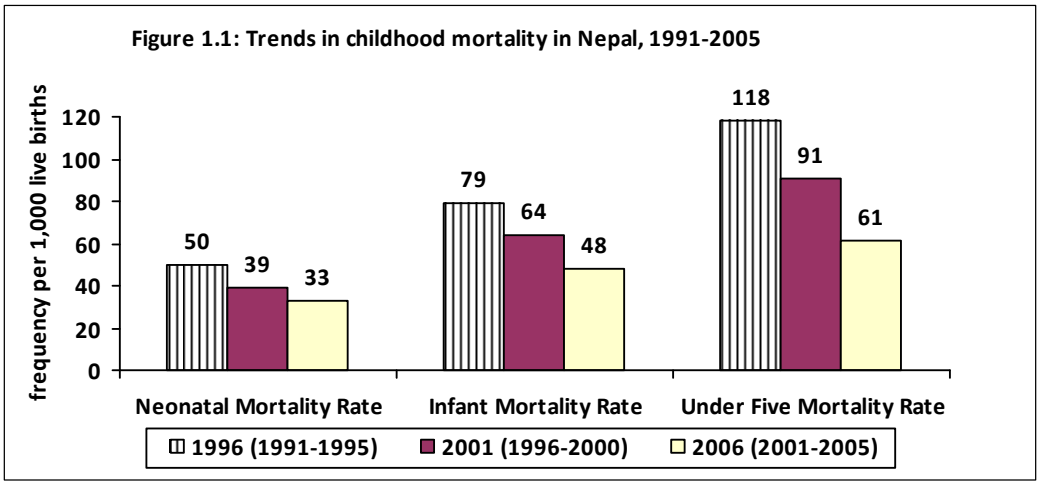
CHAPTER ONE
Introduction

1.1 Background

Great efforts have been made to improve the health of children around the world over the past four decades, with some notable successes. Yet, achievements have not been as expected and child mortality rates are still high. Globally, it is estimated that 10 million children under five years die in a year, out of which four million deaths occur in the first 28 days alone. Two-thirds of newborn deaths are due to infections, pre-maturity and asphyxia, which are preventable. Of these deaths, 99% occur in the lower and middle income countries (Kippenberg et al, 2005). One of the eight Millennium Development Goals (MDG) drawn up and accepted by the international community in 2000, as a means of achieving social and economic progress in all countries, is a reduction in under five mortality rates by two-thirds by the year 2015. To meet this goal all countries, particularly sub-Saharan African and South East Asia where child mortality rates, especially newborn mortality rates, are high, need to make more effort (United Nations Development Program, 2000).

In Nepal, over the ten-year period from 1996 to 2006, there has been a massive reduction in child mortality rates. The under five-mortality rate has declined from 118 per 1,000 live births to 61 per 1,000 live births. The infant mortality rate has declined from 79 per 1,000 live births to 48 per 1,000 live births (Ministry of Health & Population, New ERA & Macro International Inc., 2007). See Figure 1.1. Overall, these indicators confirm improvements in the status of child health. However, the Newborn Mortality Rate (NMR) has not declined much. In 1996, NMR was 39 per 1,000 live births and in 2006 it was 33 per 1,000. Over the last two decades owing to rapidly falling infant and under-5 mortality rates, the relative proportions of neonatal deaths among all infants and under-5 deaths have risen to 66% and

54% respectively (Nepal Family Health Program, United States Aid for International Development and John Hopkins Bloomberg School of Public Health, 2007). There is a great difference in the NMR according to urban-rural settings. In 2006, the NMR was 40 per 1,000 live births in rural areas and in urban areas it was 25 per 1,000 live births. Nepal's NMR is the third highest in the world (Family Health Division, 2004). Hence, unless the neonatal mortality rate is substantially reduced, the MDG for child survival cannot be achieved.



Source: MoHP, New ERA, & Macro International Inc. (2007)

Maternal and neonatal outcomes are inseparable. The quality of care, both health facility-based and household-based, available during pregnancy, delivery and post partum period has much impact on newborn health (Population Reference Bureau & Save the Children, 2006). Complications that affect women during pregnancy and childbirth also affect fetal and newborn health (Save the Children, 2006). Hence, to ensure better health for newborns, the mother and child should be treated as one entity. Any range of interventions that seek to prevent perinatal and neonatal deaths must address both maternal and neonatal factors. As such, many interventions of the Nepal Government's Ministry of Health and Population (MoHP) that are included in its safe motherhood program, broader reproductive health programs, the integrated management of childhood illness, the maternal and neonatal tetanus elimination program, and immunization and nutrition initiatives have been in some way contributing to neonatal mortality reduction.

Furthermore, the Nepal Government in a bid to meet the MDG related to child survival and to reduce the deaths of newborns has developed the National Neonatal Health Strategy 2004 with support from the Saving Newborn Lives Initiatives, Save the Children Federation. This strategy has described the specific directions and broad objectives for future interventions focused directly on improving neonatal health. The goal of the strategy is to improve the health and survival of newborn babies in Nepal and its objectives include: to achieve a sustainable increase in the adoption of healthy newborn care practices and reduce prevailing harmful practices, and to strengthen the quality of promotional, preventive and curative newborn health services at all levels (Family Health Division, 2004).

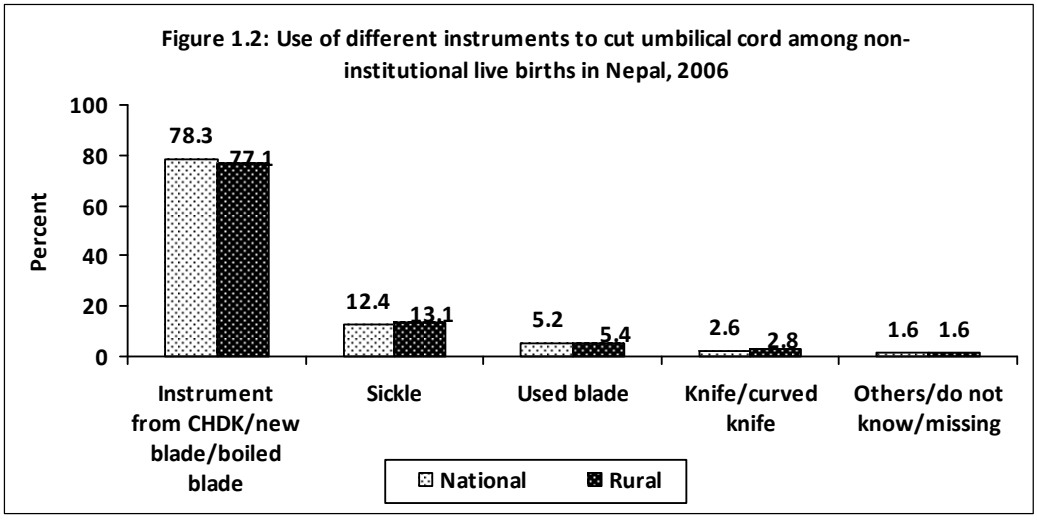
The National Newborn Health Strategy 2004 of Nepal has focused on strengthening and expanding evidence-based cost effective newborn care interventions at all levels of services (FHD, 2004). As such, several pilot projects to reduce newborn mortality and improve newborn health have been or are being implemented in selected districts of Nepal. These have included the Birth Preparedness Package (BPP) program, Saving Newborn Lives (SNL) supported trials of improved newborn care, the Morang Innovative Neonatal Initiative (MINI): the program for the management of neonatal sepsis, Community Based-Maternal and Newborn Care (CB-MNC), implemented in Jhapa, Banke and Kanchanpur districts, and the Community-Based Maternal Neonatal Health (CB-MNH) implemented in Sindhuli district. Most of these interventions have both maternal and newborn components and they focus primarily on improving household care behaviours. These programs address the key health needs of mothers and newborns in the rural areas of Nepal who have limited or no contact with facility-based health services.

1.2 Problem Statement

Newborns are a vulnerable group and therefore need more attention and care. Globally, two-thirds of total infant deaths comprise newborns and 99% of these deaths are concentrated in Sub-Saharan Africa and the South East Asian region (Kippenberg et al, 2005). Nepal has a NMR of 33 per 1,000 live births, which is quite high. Nepal is predominantly rural, where household newborn care practices are poor and some of which are also harmful (Yadav, 2007). Many maternal and newborn deaths can be averted through changes in household level practices regarding delivery and newborn care (USAID, NFHP & JHBSPH, 2007). A set of practices that reduces newborn morbidity and mortality has been identified as essential and.

these include clean cord care (cutting and tying of the umbilical cord with a sterilized instrument and thread), thermal care (drying and wrapping the newborn immediately after delivery and delaying the newborn's first bath for at least six hours or several days to the reduce hypothermia risk), and initiating breastfeeding within the first hour of birth (World Health Organization, 1996; Saving Newborn Lives, 2001; Marsh, et al, 2002).

Statistics show that about three-quarters (77.1%) of the newborns' cords are cut using a sterile instrument from the clean home delivery kit or a new boiled blade in the rural areas of Nepal, but a considerable proportion (22.9%) are still using other unsterile instruments such as a sickle, knife, curved knife and wood for cord cutting (Figure 1.2). The use of unsterile instruments for cord cutting increases the chances of neonatal tetanus and infection among newborns, hence, the use of such instruments for cord cutting is not recommended. A quarter (25.1%) of newborns receives the application of substances such as oil, turmeric paste and ash on their freshly cut cord stump (MoHP, New ERA & Macro International Inc., 2007). Application of substances to the freshly cut umbilical cord stump is not necessarily harmful but the ways in which such substances are prepared in the household are usually not very hygienic. Application of such substances on the freshly cut cord stump increases the chance of infection, so hence MOHP of Nepal recommends keeping the cord dry for newborns.



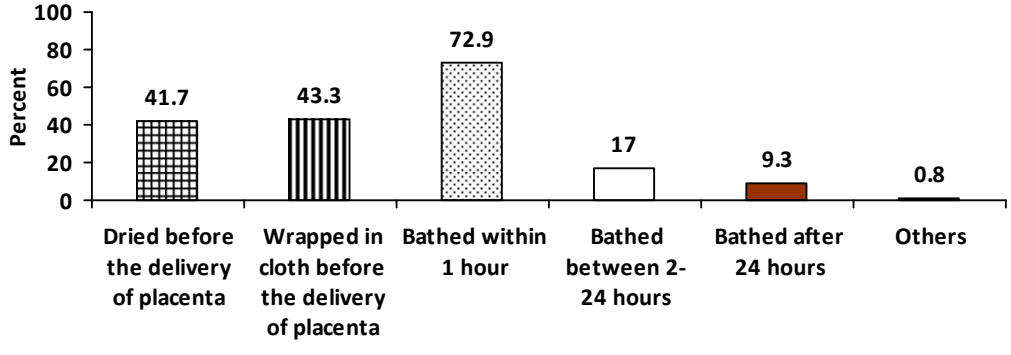
Source: MoHP, New ERA,& Macro International Inc. (2007)

In Nepal, keeping the newborn warm after birth is not a common practice. Usually, families look for clothes only after birth and often they do not have warm clothes ready at the time of delivery. The newborn is kept naked or covered with a thin piece of cloth until the placenta is

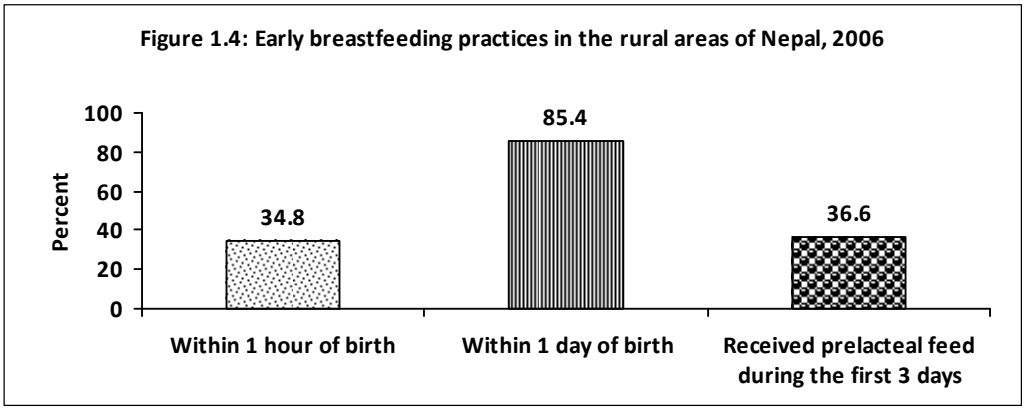
delivered or the umbilical cord is cut. There may be no preparedness for birth. NDHS 2006 data shows that only 41.7% of the newborns in rural Nepal were dried soon after birth before the delivery of the placenta. Similarly, only 43.3% were wrapped in a clean and dry cloth before the delivery of the placenta (MoHP, New ERA, & Macro International Inc., 2007). Another common newborn care practice is the bathing of the newborn soon after birth. The body of the newborn baby is coated with vernix, which is considered dirty and impure. Therefore, most newborn babies are bathed immediately after birth to remove the vernix and keep the baby pure and clean. In rural Nepal 72.9% of the newborns were bathed within an hour of birth and 17% were bathed between 2-24 hours of birth. Less than 10% were bathed after 24 hours of birth (See Figure 1.3) (MoHP, New ERA, & Macro International Inc., 2007). Bathing newborns soon after birth makes them more vulnerable to hypothermia and also interferes with their suckling ability, hence, MoHP recommends bathing newborn only after 24 hours of birth.

The early breastfeeding behavior is also not ideal in rural Nepal. The recommended practice is that the mothers breastfeed their child soon after birth, at least within one hour. However, only 34.8% of the newborns were breastfed within one hour of birth in rural Nepal. Prelacteal feeding, that is, giving something other than breast milk during the first three days of life is also practised by a considerable proportion (36.6%) of the rural people (See Figure 1.4) (MoHP, New ERA, & Macro International Inc., 2007). Furthermore, not feeding colostrum and throwing out the first breast milk is commonly practised in Nepal. Overall, the newborn care practices related to cord care, thermal care and early breast-feeding are not satisfactory in rural areas of Nepal.

Figure 1.3: Thermal care practices among the non-institutional live births in rural areas of Nepal, 2006



Source: MoHP, New ERA, & Macro International Inc. (2007)



Source: MoHP, New ERA, & Macro International Inc. (2007)

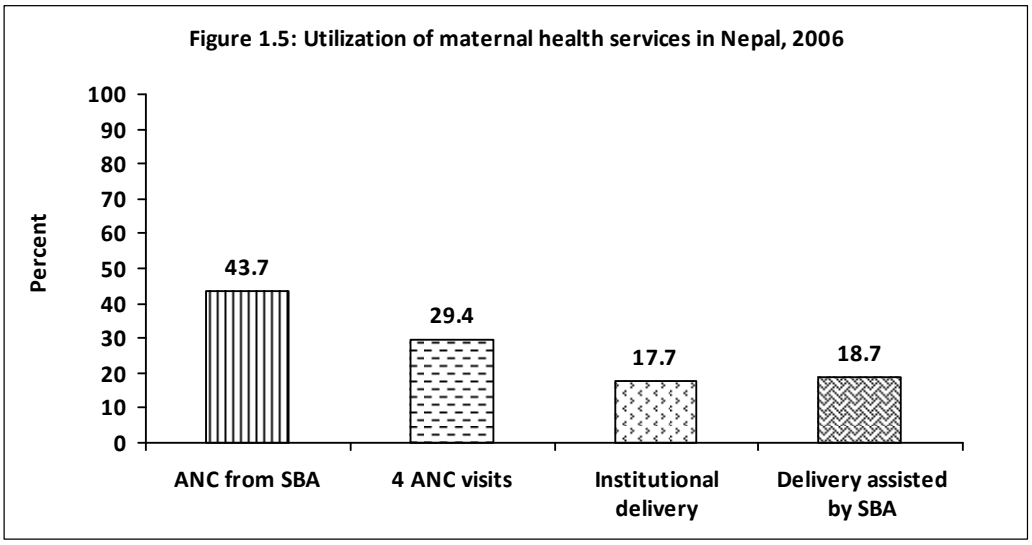
An understanding of the ways in which newborns are taken care of after birth is essential to the study of newborn and child mortality. Research suggests that there is an association between child mortality and socio-demographic variables such as the mother's age, education and income but the links between these factors and child mortality are not direct but are mediated by the behaviours and practices of the mother and other caretakers. (Cleland & van Ginneken, 1988). Therefore, to ensure the survival of newborns there is a need to understand how the newborns are taken care of in households.

1.3 Rationale

Many studies on newborn mortality have concluded that one of the important reasons for the high level of newborn deaths in the developing countries is poor household newborn care practices. There could be various factors that determine these, such as the mother's knowledge and understanding of pregnancy and childbirth, socio-economic status, geography, education and availability of the health services.

In Nepal, the majority (65.1%) of women is illiterate and this figure is much higher for the rural areas. The utilisation of maternal health services is low in Nepal (See Figure 1.5). For instance, antenatal care (ANC) coverage from a skilled birth attendant (SBA) is less than fifty percent (43.7%), the uptake of four or more antenatal visits is low (29.4%). Only 17.7% of the total deliveries happen in health institutions and the vast majority (81%) happens at home. Only one-fifth (18.7%) of the deliveries are assisted by SBAs and four-fifths (81.3%) are either assisted by other persons or not assisted at all (Central Bureau of Statistics, 2001;

MoHP, New ERA, & Macro International Inc., 2007). Home deliveries are mostly assisted by Traditional Birth Attendants (TBAs), relatives, neighbors and other senior women from the community who lack the requisite knowledge of safe delivery and newborn care practices. Pregnancy and birth are taken as a normal stage in a woman's life, so families are hesitant about spending money for medical check-ups and services. When a mother does not get proper care during the antenatal, delivery and post partum periods, it is very likely that the newborn too will not get proper care. Underlying all these factors is the patriarchal nature of society that places lower importance on women and their needs. Women's lower status, traditional beliefs, misconceptions and taboos surrounding pregnancy, childbirth and childcare further prevent women from going to health institutions and receiving health services.



Source: MoHP, New ERA, & Macro International Inc. (2007)

In Nepal, there are plenty of traditional newborn care practices, some of which are harmful to the newborn. In rural parts of Nepal, using an unsterile knife, a sickle, a piece of wood or bamboo to cut the cord of the newborn is a common practice. Furthermore, in some ethnic groups, the cord is cut several hours after birth. Often substances such as cowdung, different ointments, or ash are applied on the freshly cut cord stump. (Nepal Family Health Program, 2006). Nevertheless, over the past few decades there has been a decline in such practices. Keeping newborns naked for a long time after birth, using dirty and old clothes to wrap the newborn, bathing of the newborn immediately after birth, delayed breastfeeding, and throwing out colostrum are some of the common newborn care behaviours practised that need

to be changed. In order to change such practices, understanding the factors that determine such behaviours is necessary.

In rural Nepal, a small proportion of newborns receive good newborn care from their mother and caretakers. For instance, only 9.3% of the newborns are bathed after 24 hours of birth and just about one-third (34.8%) are breastfed within an hour of birth. The use of sterile instruments to cut the umbilical cord is comparatively higher (77.1%), but the practice is quite poor among some of the ethnic groups (MoHP, New ERA, & Macro International Inc., 2007). An understanding of the factors that are related to these good newborn care practices is necessary to comprehend the factors that need to be focused on or changed where the practices are poor. Therefore, this study has been designed to examine the factors that are related to good newborn care practices.

So far, studies on child survival have focused mainly on the determinants of child mortality. Various studies have reported that child mortality is the result of poor household care and health care seeking practices. Underlying these are socio-economic status, women's status and traditional values. Studies on newborn health in developed countries mostly focus on hospital-based care, which is not common in developing countries. A few studies have also tried to examine the determinants of safe motherhood and newborn care practices together, but there are very few studies that have focused specifically on determinants of newborn care practices. Studies on newborn care practices have mostly examined the patterns of newborn care by the mother's age, parity, education, ethnicity, socio-economic status, the findings of which show that there could be some associations between these variables (Sharan, 2004). Hence, this study, by examining the possible determinants of good newborn care practices and their relationships with one another might add important knowledge to the prevailing newborn care literature.

Currently, the child survival efforts have been to focus on addressing the need of families and communities and promoting household practices rather than depending too much on the performance of the health facilities and system (Claeson & Waldman, 2000). Hence, by studying and identifying the predictors of good newborn care practices, this study can help newborn care planners to understand the barriers to good newborn care practices at household and community levels and act upon those barriers for improved newborn survival.

1.4 Research Aim and Questions

The aim of the study was to determine the patterns of selected newborn care practices, the influence of different independent factors on those practices, and to seek which of the independent factors are the determinants of the outcome practices. The three specific research questions that were addressed in this study are:

1. What are the patterns of newborn care practice in the rural areas of Nepal?
2. How is good newborn care practices distributed in the rural areas of Nepal?
3. To what extent do particular independent variables determine good newborn care practices?

1.5 Study Objectives

The specific objectives of the study were to –

1. Examine the distribution of safe cord cutting practice by the study variables.
2. Examine the distribution of early breastfeeding practice by the study variables.
3. Examine the distribution of delayed bathing practice by the study variables.
4. Test which independent factors are related to safe cord cutting practice.
5. Test which independent factors are related to good breastfeeding practice.
6. Test which independent factors are related to good bathing practice.

1.6 Organization of the Thesis

The thesis comprises seven chapters. The first chapter introduces and provides a description of the background, problem statement, rationale, aim and research questions and objectives of the study. Chapter two presents the critical review of the literature related to newborn care practices in the developing countries. The third chapter describes the conceptual framework on which the study is based. Chapter four presents the methodology used in the study. The fifth and the sixth chapter present the findings of the study. Chapter five presents the descriptive findings of the study and chapter six presents the results of multivariate analysis. Chapter seven presents the overall discussion based on the findings, strengths, and limitations of the study, policy implications and recommendations of the study and future research areas.

CHAPTER TWO
Research into Newborn Care Practices in Developing Countries

This chapter outlines the theoretical frameworks that best explain the possible determinants of newborn care practices and provides empirical evidence of these patterns, explains the determinants of newborn and infant mortality, and the possible determinants of newborn care practices based on the review of the literature available.

2.1 Theoretical Frameworks

2.1.1 Mosley and Chen's analytical framework on child survival in developing countries

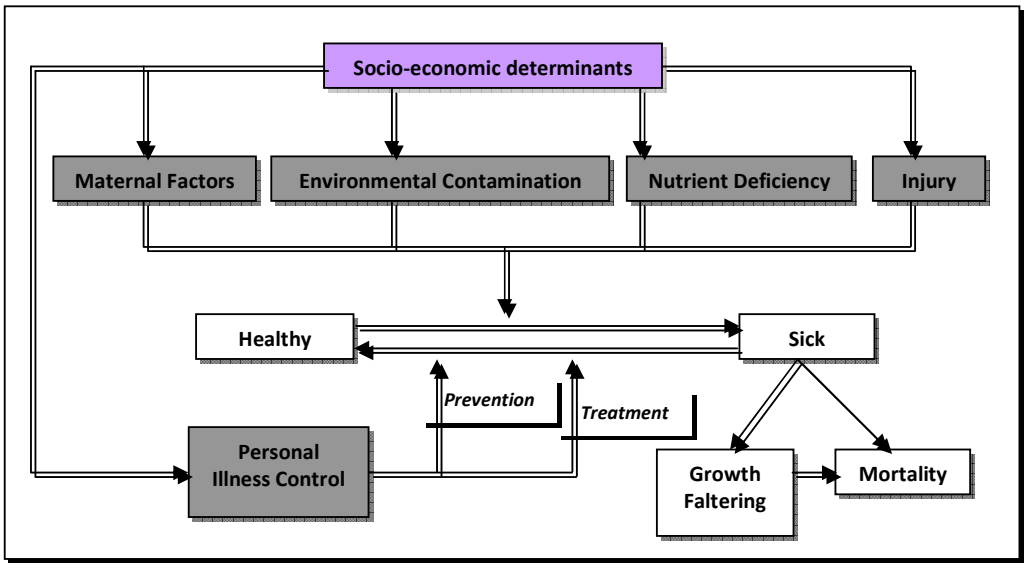
Mosley and Chen (1984) provided a framework for the examination of the determinants of child survival in developing countries. Basically, their framework explains how the socio-economic determinants operate through more basic proximate determinants that in turn influence the risk of disease and the outcome of disease processes. The dependent variable, according to their proposition, combines the nutritional status of the surviving children with the level of mortality of the respective birth cohort into a more general health index that can be scaled over all members of the population of interest. They consider that an excessive focus on mortality handicaps research, because death is a rare event.

According to their framework, the proximate variables to be measured in population-based research comprise maternal factors such as age at birth, parity and birth intervals; environmental contamination (the air, food, water and fingers) which are the four categories of transmission of infectious agents to children (mothers); nutritional deficiency such as nutrients availability to the infant or to the mother during pregnancy and lactation; injury or injury related disabilities; personal illness control such as use of preventive services including

immunization, malaria prophylactics or antenatal care, and the use of curative measures for specific conditions.

The socio-economic determinants, which operate through those proximate determinants, are grouped into three broad categories of factors- individual, household and community. Individual level factors include individual attributes such as skills, health and time, usually measured by the mother's education level, whilst the father's education level correlates strongly with occupation and household income; tradition/norms/attitudes i.e., power relationships within the household, value of children, beliefs about disease causation and food preferences. Household level factors include income/wealth effects such as food availability, quality of the water supply, clothing, bedding, housing conditions, fuel/energy availability, transportation, means to purchase day to day essential items of hygiene/preventive care, and access to information. Community level factors include the ecological setting such as climate, temperature, altitude, season and rainfall; political economy such as organization of food production, physical infra-structure such as railroad, roads, electricity, water, sewage, political institutions and health system variables, see Figure 2.1.

Figure 2.1: Mosley and Chen's framework: Operation of five groups of proximate determinants on the health dynamics of a population



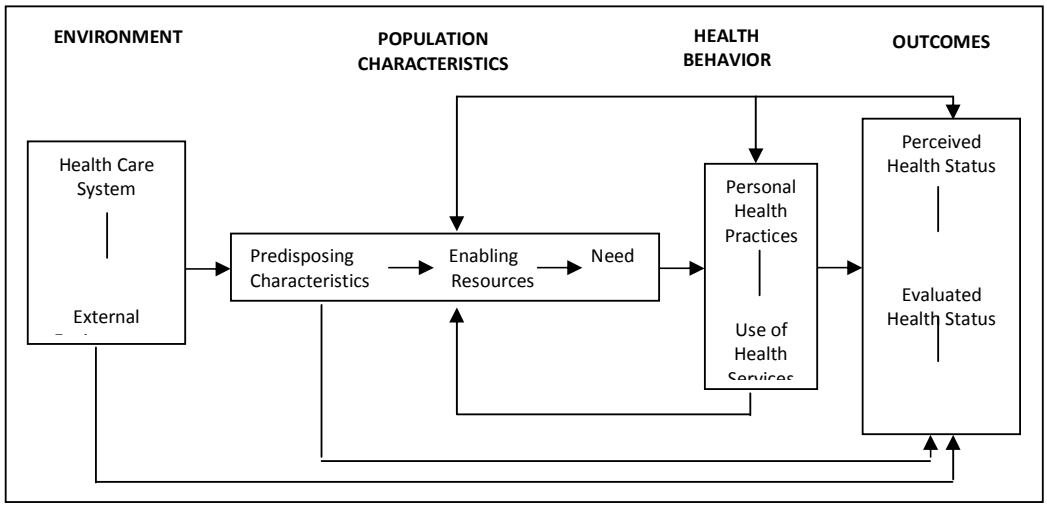
Source: Mosley and Chen (1984)

Mosley and Chen's framework helps to clarify an understanding of the many factors involved in the family's production of healthy children in order to provide a foundation for formulating health policies and strategies. The key advantage of the model lies in the organisation of seemingly disparate measures of environmental conditions; of dietary, reproductive, and health care practices; and of disease states into a coherent framework in which they are linked to one another and to child survival on the one hand and to socio-economic factors on the other.

2.1.2 Andersen's behavioural model of health service utilisation

The Andersen behavioural model of health service utilisation was initially developed in the 1960s and has undergone several modifications over the years. The model posits that people use health services as a function of their predisposition to use services, factors that enable or impede use and their need for care (Andersen, 1995). The predisposing components include the variables that describe an individual's propensity to use the services, including age, gender, race, religion, and personal values. The enabling component describes the means individuals have to use services, including resources that are specific to the individual, the family, and the community. The need component refers to illness level, most commonly the perception of need by individuals or need, as evaluated by the health system (Aday and Andersen, 1974), see figure 2.2.

Figure 2.2: Anderson and Newman's Framework of Health Service Utilisation



Source: Andersen (1995)

2.2 The Patterns of Newborn Care Practices and their Determinants

Prior research on child survival has mostly focused on examining socio-economic and demographic predictors of child mortality. A majority of those studies focus on two age groups - under one year and under five years, and have identified child mortality risk factors as being maternal age, parity, education, birth interval and other socio-economic indicators. More recently, studies on newborn survival have increased as statistics have persistently shown that newborn deaths comprised two-thirds of infant mortality rates and two-fifths of under five mortality rates across the globe. Research on newborn survival so far has either focused on examining the determinants of mortality or shown the patterns of newborn care practices by mother's age, education, ethnicity or socio-economic status. Though a few studies such as those conducted by Baqui et al (2006) and Sharan (2004) have examined the relationships between newborn care practices and socio-demographic factors and service utilisation, there is still a need to study the other predictors of newborn care practices and the interrelationships that influence newborn survival.

Poor newborn care practices together with poor maternal care and staff shortages in rural health facilities have been explained as two contributing factors of newborn mortality in developing countries (Saving Newborn Lives, 2001). Often, these factors do not act in isolation but act upon each other to influence child survival outcomes. Since there is little literature on the determinants of newborn care practices, it would be important and helpful to look at the determinants of newborn mortality and assume that the determining factors of newborn care practices are similar to those determining newborn mortality. This section of the chapter outlines the empirical evidence of the patterns of newborn care practices, determinants of newborn and infant mortality, and the possible determinants of newborn care practices classified and presented as nine major factors – i) socio-demographic factors, ii) socio-economic factors, iii) use of maternal health services, iv) birth preparedness, v) mothers' knowledge, vi) health system factors, vii) health workers' counselling and viii) exposure to media (health information), and ix) cultural factors.

2.2.1 Socio-demographic factors:

A mother's health and a newborn's health are inseparable from each other. The important socio-demographic factors that influence newborn mortality and survival are the age of

mother at birth, parity, education of mother and ethnicity. There could be similar relationships between these maternal factors and the newborn care practices.

2.2.1.1 Mother's age at birth

Association between the mother's age at birth and child mortality has been examined in several studies. Pregnancy complications are higher for women who are under 20 or above 35 years of age. Ibrahim et al (1994) demonstrated in rural communities of Sudan that poor pregnancy outcome is 1.8 times more likely for teenage mothers than for 20-29 year old mothers ($p< 0.0003$). There could be similar associations between the age of the mother and the newborn care practices. Sharan (2004) examined the determinants of safe motherhood and newborn care practices in Uttar Pradesh, India among women who delivered at home. Data were collected from 513 women and it was revealed that older maternal age (>28 years) was associated with decreased odds of adopting hygienic cord care practices. The findings indicate that younger mothers are more aware of clean delivery practices and infections such as tetanus that are associated with poor cord care practices.

2.2.1.2 Parity

Studies have shown that parity has linkage with child survival. Ibrahim et al (1994) studied factors associated with a high risk of perinatal and neonatal mortality in the rural communities of Sudan. A total of 6,275 pregnancies were studied, where there were 6,084 live births surviving more than 30 days, 150 fetal deaths, 124 early neonatal deaths, and 43 late neonatal deaths. When age and parity were controlled, multiple pregnancies carried a higher risk of stillbirth, perinatal mortality, and neonatal mortality than did singleton pregnancies (relative risk [RR] 6.1, 8.9, and 12.3, respectively; $p<0.0001$). First pregnancy and grandmultiparity (8 previous pregnancies) were associated with a higher risk of perinatal mortality when compared to mothers of parity 1-4 (RR 1.9 [$p<0.001$] and 1.8 [$p<0.01$] respectively). A poor outcome of the last pregnancy was the most important risk factor for the neonatal death of the current pregnancy ($\chi^2 = 55$ when adjusted for multiple pregnancies and $\chi^2 = 36.5$ when adjusted for age, parity, and multiple pregnancies; $p<0.0001$). The risk was highest when the last pregnancy outcome was stillbirth (RR 6.9; $p<0.001$). Mothers with a previous stillbirth faced a 2.4 times increased risk of neonatal death for the current pregnancy ($p <0.001$).

Van den Broeck et al (1989) in their study of the maternal determinants of child survival in a rural African community, found that high parity together with illiteracy and chronic maternal stress hampered the survival of children. Health workers visited 766 exclusively breastfed infants, 0-3 months old every three months for a total of six visits. The child mortality rate was found to be 7.5%. More than 3% of the mothers suffered from chronic illness, 28.2% had at least two children, 86.1% were illiterate and 55% had already experienced at least one child death. Four variables namely parity, number of surviving children, maternal age, and number of dead children were interrelated and, together increased the risk of mortality. The multiple logistic regression analysis found the risk factors for mortality to include parity greater than five (conditional odds ratio [COR] 4.9; $p<0.01$), more than five kilometres distance from the health centre (COR 1.9; $p<0.06$), at least two signs or symptoms of maternal chronic disease (COR 4.8; $p<0.03$), and any education for mothers (COR 2.2; $p< 0.05$).

Similar findings were observed in a prospective study conducted by Bari et al (2002) in rural Bangladesh. The differentials and determinants of perinatal mortality were studied among 1,020 pregnant women (less than 6 months), which found that five or more pregnancies prior to the index pregnancy were positively associated with perinatal deaths. Sharan (2004), using a logistic regression model, found associations of gravidity and education with breastfeeding within 48 hours of birth. Women who had higher order births (>3) were at lower odds of breastfeeding (OR 0.40, 95% CI 0.26-0.98), compared to mothers who had second or third births.

2.2.1.3 Caste/Ethnicity

Caste/ethnicity could be an important determining factor for newborn care practices, particularly in the communities where there is a caste system which considers some castes as superior and others as inferior. Often the lower castes have limited access to education and health services which may influence their child care practices. Thapa et al (2000) examined birth related practices and their determinants in Nepal. Data were collected from villages in Nepal through a household survey of 657 women who had given birth in the previous five years. In addition, qualitative data were collected from Traditional Birth Attendants, mothers-in-law, community leaders and pregnant women. Analysis of the quantitative data described the determinants of selected birth practices associated with a high risk of adverse health

outcomes for mothers and infants, where ethnicity emerged as a significant predictor of not obtaining antenatal care and delivering without an attendant.

Descriptive studies of newborn care practices have shown that newborn care practice is poor among lower caste groups. The evaluation of the CB-MNC program conducted in the Jhapa district of Nepal, which included interviews of nearly 900 women aged 15-49 years who delivered over the 12 month period prior to the survey, has shown that the newborn practices such as delaying bathing of the newborn until 24 hours after birth and early breastfeeding were better among the upper castes groups (Brahmins/Chhetris) and among the advantaged indigenous caste groups (Tibeto-Burmese) than among the disadvantaged groups (Dalits and Muslims) (VaRG, NFHP, & USAID, 2007). In the same survey, the proportion of the newborns who received newborn care within four weeks of delivery from trained health personnel was higher among the Brahmin/Chhetri (75.2%) followed by Tibeto-Burman (56.4%) caste groups while the proportion was relatively less among Dalits (51.2%) and Muslims (22.4%). The patterns of newborn care behaviours observed in the survey suggest that there could be some correlation between ethnicity and the newborn care practices. So far, none of the research publications available has looked into the effect of ethnicity/caste on newborn care practices.

2.2.1.4 Education of mother

The education of the mother has been shown to have a strong influence on the utilisation of maternal health services and child survival. Educated women are more likely to break away from tradition to use modern means of safeguarding their own health and that of their children, are better able to use the available services in their community to their advantage and seek quality health services (Caldwell & Caldwell, 1988; Magadi et al, 2000 & Barrera, 1990). There could be a similar relationship between the education of the mother and the newborn care practices.

Baqui et al (2006) in their study on newborn care in rural Uttar Pradesh of India has linked three newborn care practices- clean cord care, thermal care and early breastfeeding with socio-demographic, antenatal and delivery care factors. Interviews were conducted with 13,167 women who had a live birth at home during the two-year period preceding data collection. Logistic regression was used to study the association. The results revealed that maternal education of secondary school level or higher (OR 1.3, 95% CI 1.2-1.5) was one of

the two socio-demographic factors related to clean cord care. Regarding the thermal care practice, mothers with secondary school or higher education levels were less likely to report thermal care (OR 0.6, 95% CI 0.5-0.8). Similarly, secondary or higher education was also the predictor of early breastfeeding (OR 2.6, 95% CI 2.1-3.3). Overall, secondary and higher level education had a positive impact on clean cord care and early breastfeeding practices but had a negative impact on thermal care practice.

The Nepal Demographic and Health Survey 2006 showed that essential newborn care practices are better among educated mothers. Out of 3,275 newborns born during the five-year period, 94.8% of the highest educated mothers used a sterile instrument to cut the cord whereas only 73.4% of the uneducated used sterile instruments. Similarly, among the highest educated, 82.8% kept the newborn's cord dry after cutting it, while this was true for 72.9% among the uneducated. Among the highest educated mothers 47.2% breastfed their baby within the first hour of birth while the proportion was 31.7% among the uneducated mothers (MoHP, New ERA, Macro International Inc., 2007). Similarly, a descriptive study conducted by VaRG and NFHP (2007) in three districts of Nepal reported that there was a significant difference in the use of sterile instruments for cord cutting between the illiterate and the literate mothers in two out of three districts. Likewise, dry cord keeping practice was significantly higher among literate mothers in all three districts.

Thapa et al (2000) in Nepal found an association between maternal and newborn care practices and mothers' education. Low education of women was significantly associated with two practices, including not getting antenatal care and not boiling the cord cutting instruments before cord cutting. The husbands' education was significantly associated with a reduced odds of practising high risk birth practices- not getting antenatal care, delivering in an animal shed, having an unattended delivery and not boiling the cord cutting instrument.

A study conducted by Ibrahim et al (1994) in the rural communities of Sudan showed a correlation between maternal education and perinatal and neonatal mortality. As maternal education increased, perinatal mortality rates fell ($p<0.02$ for the trend). Education had the main effect on reducing neonatal deaths (for trend $\chi^2 = 5.3$ [$p<0.05$] vs. 1.8 for perinatal deaths and 1.1 for stillbirths). However, the study by Sharan (2004) conducted in the rural areas of India did not find maternal education to be associated with cord care practice.

2.2.2 Socio-economic status

Many studies have already showed relationships between the socio-economic status of families and child survival outcomes. A study conducted by Yunis et al (2003) has studied the effect of low socio-economic status indicators, specifically parental educational and occupational characteristics on neonatal health outcomes. Giashuddin & Kabir (n.d.) have concluded from their study of income inequality and child survival in Bangladesh that the children of poorest families suffered greater mortality than the children of rich families. Owing to existing socio-economic differentials in Bangladesh, the poor children are more vulnerable to premature mortality. The Ohio study by Stockwell and Goza (1998) has stressed the need to enhance the economic well being of lower socio-economic groups. Despite a very remarkable decline in infant mortality at all class levels since 1960, there continues to be a very clear and pronounced inverse association between income status and infant mortality. Indeed, the evidence indicates that the relationship has become stronger over the years, is applicable to both sexes, to whites and nonwhites, for neonatal and postneonatal deaths, and for both major causes of death groups.

The NDHS 2006 survey provides information about the patterns of newborn care by household wealth quintiles in Nepal. About 92.1% of mothers from the highest wealth quintiles used a sterile instrument such as an instrument from the CHDK or a new-boiled blade to cut the cord of their newborn while this was true for about 52.5% of mothers in the lowest wealth quintile. This shows that safe cord cutting practices are better among the wealthy women. Similarly, drying and wrapping of the newborn soon after birth were more common among the women belonging to the highest wealth quintiles (drying-58.5%; wrapping-62.3%) compared to their counterpart women belonging to the lowest wealth quintiles (drying-28.9%; wrapping-32.2%). These findings indicate that socio-economic status has an impact on the cord cutting and thermal care practices. However, the practice of keeping a newborn's cord stump dry was highest among the women belonging to the lowest wealth quintiles (MoHP, New ERA & Macro International Inc., 2007).

Fariyal et al (2004) examined the newborn care practices in a low socio-economic area of Karachi, Pakistan. Both qualitative and quantitative information was collected through five focus group discussions, 15 in-depth interviews, and 525 interviews with women who had given birth recently. Results revealed that many of the newborn care practices were not

consistent with recommended practice. A significant proportion of women (44.8%) reported giving lacteals, colostrum (41.7%), or animal/formula milk (3.1%), as the first feed. Newborns were bathed immediately (82.1%) after delivery as the vernix was considered 'dirty looking' (78.5%) and it was felt it should be removed. In the low socio-economic area, during the neonatal period, breast milk was the preferred feed; however, honey, *ghutti* and water were also given in order to 'reduce colic' or 'act as a laxative', which were perceived health benefits mentioned by mothers and traditional birth attendants.

A study conducted by Sharan (2004) in the rural areas of India found a weak association between hygienic cord care practices and higher socio-economic status. When the confounding effects of mother's age, education, caste/religion, gravidity, use of ANC and birth assistant's knowledge of danger signs and complications during delivery were controlled, a higher socio-economic status (OR 1.08, 95% CI 0.98-1.19) was associated with an increased odds of better cord care. Therefore, it is likely that women who are socio-economically advantaged are inclined to purchase a new blade and be more health conscious compared to women who are socio-economically disadvantaged.

2.2.3 Use of maternal health services

It has been estimated that 99% of the world's maternal deaths and 50-60% of infant deaths in developing countries occur within one month of birth, mainly because of lack of maternal health care (Shakya et al, 2001). Patterns of birth related practices among women from an urban and slum population of Bangladesh were examined by Hoque and Selwyn (1996). Quantitative data were collected from 289 women aged 15-49 years of age, where results indicated that the majority of women did not receive antenatal care (69%) and almost all (96%) had not delivered in a hospital. TBAs carried out more than three quarters of the deliveries. Most women (95%) reported that the umbilical cord was cut by a razor blade, which was not sterilized well in 13% of the cases. A cotton thread was used to tie the cord in 72% of the deliveries; in 19% of the cases, the thread was sterilised. About 71% of the women reported not applying anything on the umbilical cord, whereas 28% applied mustard oil. Almost all respondents (98%) breastfed their last child, with 58% starting breastfeeding more than 24 hours after birth. These findings suggest that there could be some association between use of antenatal and delivery care and the newborn care practices.

The place of delivery is an important indicator of maternal service use and appears to be an important factor in understanding the newborn care practices. The findings from the qualitative data collected by Hoque and Selwyn (1996) from in depth interviews of 40 mothers explain why home deliveries are preferred in slums of Bangladesh. The most important reason was the easy availability of support from relatives. Attendance by male doctors, cost of services and transportation problems deterred women from delivering in hospitals. Women perceived childbirth as a natural event that does not require medical intervention unless there is a complication. These findings show that the availability of maternal health services and its quality greatly determine the use of maternal health services in the rural areas, which might also impact on the newborn care practices.

Baqui et al (2006) found that clean cord care practice was positively associated with receiving antenatal care (OR 1.1, 95% CI 1.0-1.3), a home visit (OR 1.2, 95% CI 1.1-1.4), antenatal counselling (OR 1.8, 95% CI 1.6-2.1), and birth attendance by a SBA (OR 1.3, 95% CI 1.2-1.6). Among antenatal and delivery care factors, only receiving counselling emerged as a significant predictor (OR 1.6, 95% CI 1.3-1.9) of thermal care. Early breastfeeding practice was significantly associated with receiving information about breastfeeding during pregnancy (OR 1.5, 95% CI 1.1-1.9) and having a skilled birth attendant (OR 1.8, 95% CI 1.4-2.2) for delivery but it was not significantly associated with having an antenatal check up or receiving a home visit. Overall, the findings indicate that contact of pregnant women with health workers provides them with health information and makes them aware of proper newborn care and thus they are inclined towards practising good newborn care.

Sharan (2004) examined the influence of antenatal care on breastfeeding practice and found increased odds of breastfeeding associated with antenatal care (OR 2.09, 95% CI 0.93-4.70). Use of antenatal care was associated with hygienic cord care practices indicating that women might have received information on newborn care during their antenatal care visits.

2.2.4 Birth preparedness

Birth preparedness has been recognised as an important factor for the healthy pregnancy outcome, but preparing for birth is not commonly practised in Nepal. VaRG, NFHP, and USAID (2007) evaluated the CB-MNC program in three districts of Nepal. CB-MNC is a program that focuses on counselling pregnant women and their families for birth preparedness. The study found that birth preparedness practices such as managing money,

clothes for the mother and the newborn, and materials for clean delivery were very poor, below 10% in the baseline and below 20% in the follow up survey. Managing money was found to be higher, and increased from 67.4% to 83.5% from baseline to follow up survey in one district. A similar increase was reported in another two districts. The CB-MNH baseline survey conducted in the rural areas of Sindhuli district of Nepal showed that 85.3% of the women who delivered in the given one year period made one or more preparations for birth during pregnancy. Managing food (80.2%) was the most frequently made preparation followed by financial (69.8%). All other preparations were carried out by fewer than half the women studied (VaRG, NFHP-II & USAID, 2009).

In Nepal, pregnant women and their family members are educated to prepare for birth during pregnancy by the health workers and FCHVs. Studies have established the relationship between maternal health service use and newborn care practices (Baqui et al, 2006; Sharan, 2004). Therefore, it is likely that there could be some association between birth preparedness and newborn care practices. At present there is no research publication available which has studied the correlation between newborn care practices and the birth preparedness in Nepal and elsewhere.

2.2.5 Mothers' knowledge

Studies related to home-based infant care have found that caregivers' knowledge and beliefs have a strong influence on the health care of the infant. A study by Sharan (2004) found knowledge of danger signs to be positively associated with the odds of breastfeeding the newborn within 24 hours of birth (OR 1.24, 95% CI 1.09-1.40), indicating that mothers who are more health conscious may be more aware of the benefits of early breastfeeding. However, the study also found that greater knowledge of danger signs was associated with decreased odds of adopting cord care (OR 0.86, 95% CI 0.79-0.94). Obimbo et al (1999) studied the mother's knowledge of cord care practices in an urban slum area in Nairobi, Kenya, where 307 mothers with infants less than three months of age attending clinics were interviewed. The results showed that 91% and 28% of mothers knew of the need for hygiene while cutting and tying the cord respectively. As for postnatal cord care, 40% had good knowledge and 66% had good practice. Results of a multivariate analysis showed that increased levels of education, living in middle class areas, increased maternal age, and acquisition of knowledge from health workers rather than from other sources had significant independent association with good maternal knowledge, attitude and practice.

A study by Senarath et al (2007) assessed the patterns of mothers' knowledge of newborn care practices as well as factors associated with poor knowledge. Exit interviews with 446 mother-newborn pairs from five hospitals in the Puttalam district of Sri Lanka were conducted. The findings revealed that mothers had a satisfactory level of knowledge about breastfeeding and recognition of danger signs, but knowledge about care of the umbilical cord was poor. Multivariate analysis results showed that primiparae (OR 2.31; 95% CI 1.53-3.50), unemployed women (OR 3.31; 95% CI 1.89-5.80) and those with delayed antenatal booking visits (OR 2.02; 95% CI 1.26-2.23) were more likely to have poor knowledge. The result indicates women who are pregnant for the first time lack experience regarding health care compared to those women in their subsequent pregnancy. Therefore, they are likely to have poor knowledge. Being unemployed restricts women from contacting persons outside their home, thus they are likely to acquire less health information compared to those who are employed. Women who book for antenatal service later receive health information late and thus might miss out some of the important health messages. All these conditions make them less knowledgeable about newborn care issues.

2.2.6 Health system factors

The examination of supply side factors is important in studying the predictors of newborn care practices. Access to and availability of services and their quality are found to have an impact on care seeking behaviour. Kumar et al (1997) examined the impact of the availability of health centres on antenatal and delivery care in Haryana, India. Interviews were conducted with 600 married women aged 15-45 years and information on the use of antenatal and delivery services was obtained from 228 women who delivered in the past two years. The study found that those women who were living in the catchment area of primary health care centres had higher utilisation of maternal care services and lower perinatal mortality than those women living in the catchment area of a sub-health centre. It suggests that availability of health centres equipped with higher facilities has more influence upon health care seeking behaviour and pregnancy outcomes of rural women.

Distance to the health facility is found to have a relationship with the use of maternal health services. Hotchkiss (2001) in Nepal found a modest influence of access to the health facility on maternal health service utilisation. Data from the World Bank Living Standards Survey

were used from 3,338 households from which 1,826 ever married women who had given birth in the last three years were analysed. A binary probit model was used to estimate the effect of physical access to government health services, along with individual, household and other location specific characteristics on the use of prenatal and delivery care. Having a health facility within one hour had a significant but modest impact on both the use of prenatal care (coefficient 0.401, $p<.01$) and assistance by a trained provider during delivery (coefficient 0.356, $p<.05$). The study points out that the effect of physical access is modest, indicating that other factors related to quality of service provision may have had a greater impact on service use.

The qualitative study by Thapa et al (2000) examining the birth related practices and their determinants in Nepal comprises information collected from traditional birth attendants, mothers in law, community leaders and pregnant women. The study mentions that apart from the belief that childbirth is polluting and unholy religiously, other important reasons for delivering in an animal shed or a dirty room are that the hospital did not have a heating system and was too cold, relatives were not allowed to stay with the mother during the delivery, and the inconvenience of getting there. These factors are related to the facilities available and the service quality at the health institutions.

The supply side factors have already been found to be associated with maternal health service utilisation. It is likely that there could be a similar relationship between the supply side factors and the newborn care practices. At present, there is a lack of research studies that have examined the association between health system factors and newborn care practices.

2.2.7 Counselling from health workers

Baqui et al (2006) in their study conducted in rural Uttar Pradesh of India found antenatal counselling to be positively associated with three newborn care practices- clean cord care (OR 1.8, 95% CI 1.6-2.1), thermal care (OR 1.6, 95% CI 1.3-1.9) and early breastfeeding (OR 1.5, 95% CI 1.1- 1.9).

Mannan et al (2008) examined whether early postpartum home visits by health workers and counselling in the Sylhet district of Bangladesh could improve breastfeeding of newborns. Data from 3,495 neonates were analyzed and results showed that inappropriate breastfeeding

position and attachment were the predominant problems (12-15%) among new mothers. Only 6% of newborns who received a home visit from Community Health Workers (CHWs) within three days had feeding difficulties, compared to 34% of those who did not (OR: 7.66, 95% CI: 6.03-9.71, p<0.01). The latter group was 11.4 times (95% CI: 6.7-19.3, p<0.01) more likely to have feeding problems as late as days six to seven, than the former. The study results emphasized the importance of counselling and hands-on support for breastfeeding techniques by trained workers within the first three days of birth as an essential part of community-based postpartum interventions.

2.2.8 Exposure to media

Much research has studied the effect of mass media in changing reproductive health behaviours. Some research has also examined the impact of mass media in changing maternal and neonatal care behaviours. McDivitt et al (1993) examined the impact of a mass media campaign in Jordan within the context of other activities occurring during and after the child's birth and found that the campaign had a positive impact on mothers' knowledge and on the timely initiation of breastfeeding in home and public hospital deliveries. The findings indicate that communication campaigns can bring about changes in breastfeeding initiation behaviour.

Exposure to media might play an important role in changing the behaviour of individuals and the mass media in particular might be more effective. The NDHS 2006 of Nepal shows that radio is the most commonly used medium followed by television and newspapers. Six out of 10 women aged 15-49 years listen to radio once a week; while only 38.1% watch television at least once a week and only 10.3% read a newspaper at least once a week. About 8% of women use all three media at least once a week while 30% of women do not use any of them (MoHP, New ERA, & Macro International Inc., 2007).

Descriptive statistics show that in Nepal electronic media such as radio and television are important sources of health information at the community level. Radio emerged as the most popular source of health information about early breastfeeding in the baseline survey conducted in two out of the three districts (Jhapa-23% and Banke-18%) in which the CB-MNC program was implemented. In Jhapa, television was reported as the fourth most important source of information on early breastfeeding while in Banke television was the least popular medium (VaRG, NFHP and USAID, 2007).

VaRG and NFHP (2005b) assessed the added-value of the radio listeners' groups (RLG) to the Radio Health Program in three districts of Nepal. A 30-cluster sampling design was used and 1,367 currently married women aged 15-49 years were interviewed, out of which 467 were RLG members, 450 non-members from the RLG wards and 450 residents of non-RLG wards. The level of knowledge about different types of danger signs or symptoms related to newborns was found to be slightly higher among the RLG members than the respondents of other two categories. On average, RLG members were able to mention 2.2 types of danger signs or symptoms while this figure was 1.9 among non-RLG members and 1.8 among the respondents of control areas.

In the study, almost all the RLG and non-RLG members and about 95% of the respondents of control areas reported that one should use a new or sterilized blade to cut the cord of the newborn. Slightly over half (53%) of the RLG members followed by 42% non-RLG members and 38% of the respondents of control areas correctly mentioned that the newborn should be dried and wrapped before the placenta is delivered. About 50% of the RLG members compared to only 26% of non-RLG members and 18% of respondents in control areas correctly mentioned that the baby should be given a bath after 24 hours of birth. Only about one-third of the RLG members and about 22% of the respondents of the other two categories correctly reported that the baby should be put to the breast immediately after the birth. The above findings reflect that women who listened to radio as RLG members were likely to have better knowledge about some of the newborn care practices compared to women who did not listen to radio. It could also be assumed that women who have better knowledge are more inclined towards demonstrating good newborn care practices.

Currently, there is lack of research studies that focus on the impact of mass media on newborn care practices in Nepal and other developing countries.

2.2.9 Cultural factors

An exhaustive literature review of domiciliary maternal and newborn care practices in Bangladesh conducted by Darmstadt et al (2006) included the cultural beliefs associated with newborn care practices. After the delivery of the baby, the family focuses on the delivery of placenta, which is believed to have spiritual value. So, until the placenta is delivered the baby

is left unattended. If the placenta is not delivered immediately, it is believed that the placenta can grow inside the abdomen or move up into the throat and choke the woman to death. Hence, while the placenta has not come out, the newborn's cord is not cut nor is the baby wrapped in a clean cloth. Often a contaminated razor blade, bamboo slice or other materials are used to cut the cord and potentially infectious materials are applied to the umbilical cord stump. TBAs usually assist during deliveries but they do not cut the cord because of the belief that whoever does so remains unholy and cannot go to prayer for 41 days. Therefore, usually the mother of the baby has to cut the cord as she already is considered unclean after delivery and will be placed in seclusion regardless of whether she cuts the cord or not.

The study also explains that the risk of hypothermia may stem from deeply rooted beliefs and practices. Until the placenta is delivered, the newborn is typically placed on the ground. It is believed that the mother's body is colder than the baby's. The baby is wrapped with dirty clothes, and to keep baby warm, an earthen pot containing coal is heated on a fire then placed close to the baby to provide heat. Among Hindus, mothers and babies are kept together in a room isolated from others, and *dhup* (incense) is burnt to emit fumes which are believed to expel evil spirits. Relatives rub the newborn with oil and then bathe the baby to make him/her holy and clean, even on cold nights. Usually, the baby is bathed on the first day, within several hours of delivery. Among Hindus, babies are bathed after putting turmeric on the body immediately after the delivery. Only after cleaning the mother, may the attendants clean the baby. Vernix caseosa is considered unholy, and attempts are made to remove it.

The beliefs associated with breastfeeding are also described in the study. Breastfeeding is usually delayed until the mother is cleaned to a holy state. In most cases it is withheld up to three days after delivery. Colostrum is rejected because it looks like pus and is termed dirty milk. It is believed to be harmful, cause diarrhoea and abdominal pain, and contain some evil spirit. Owing to its thick and concentrated texture, it is believed that the baby would not digest it. It is also considered to cause fever and illness in the mother if she feeds the colostrum to the baby.

A formative study by Gurung (2008) conducted in the Kailali district of Nepal mentions that immediate newborn bathing is a ritual for a family. The newborn is considered dirty because it is covered with blood and comes from a dirty place. Thus bathing immediately is necessary for the purity of the baby. It is also believed that if the baby is not bathed, he/she will get skin

infections. Some TBAs believe that immediate bathing of the baby is required to protect the baby from cold. Usually the baby is bathed after cord cutting and within a few hours of birth with lukewarm water.

Thapa et al (2000) in their qualitative study have examined the birth related practices and their determinants in Nepal. It comprises information collected from traditional birth attendants, mothers-in-law, community leaders, and pregnant women. Findings indicate that customs surrounding childbirth were steeped in superstition and lack of knowledge. Women preferred to deliver in the animal shed because childbirth was considered polluting; they also believed that the household deity would get angry if they delivered inside the house.

2.3 Conclusions

There are many studies of child survival. Some of those focus on the health of children by age category such as under one month (newborn), under one year (infant) and under five years (children) while others focus on specific disease conditions and mortality or its determinants. Several studies have identified the intermediate and the socio-economic predictors of child survival. If survival of the newborn is to be taken as the ultimate result, then healthy domestic care practices for newborns should be considered as an intermediate result. Like newborn mortality, the newborn care practices are also affected by various intermediate and socio-economic factors. The understanding of the mechanism of how such factors function independently and with each other for the survival or mortality of the newborn is important for newborn programmes.

Descriptive studies of newborn care behaviour provide valuable information on the patterns of newborn care practices across the world. In developing countries, newborn care practices are poor and these are the areas having the highest burden of neonatal mortality. Studies that have used quantitative data for statistical analysis have identified demographic, social and economic factors associated with newborn care practices. These findings are useful for knowing which segment of the population uses recommended practices and which does not. However, such studies have not examined the mechanism through which the risk factors operate to influence the health behaviours. On the other hand, studies have used qualitative methods to explain the cultural practices prevailing in a community and the beliefs associated

with them. Often the ethnographic studies explain the cultural beliefs that relate the newborn care practices with supernatural powers such as evil, spirits, and gods.

The way in which newborn care practices are described varies from study to study. Some studies distinguish between domestic care and health care seeking behaviour while others explain them together. The examination of factors that are related to both the demand side and supply side is essential while studying the determinants of care practice. However, most of the studies conducted so far have captured only the impact of demand variables such as the knowledge of mothers and use of health services on care behaviours and have not captured the supply side factors such as service availability and quality that are equally important in determining good practices.

In conclusion, much of the existing literature on newborn, infant and child mortality and care behaviour has established associations between factors such as maternal knowledge and service utilisation with the health outcomes and care practices among infants and newborns. However, there are still plenty of areas, especially in neonatal health that need to be further investigated. For instance, associations of newborn care practices with birth preparedness and exposure to media need to be examined. Descriptive studies have indicated relationships between caste/ethnicity and newborn care practices, therefore, there is now a need to examine such relationships statistically. Analytical studies based on a comprehensive framework could best explain why some of the newborn care practices are better than others in any particular setting.

CHAPTER THREE
Conceptual Framework of the Study

This chapter presents the conceptual framework guiding the study and the rationale for it.

3.1 Conceptual Framework

The child survival framework for developing countries proposed by Mosley and Chen (1984) explains the operation of socio-economic factors through proximate factors to influence the outcome of disease processes among children. The Andersen behavioural model of health service utilization (Andersen, 1995) explains that people use health services as a function of their predisposition to use services, factors that impede or enable use and their need for care. Based on these two models, this study conceptualises good newborn care practices as the result of interaction between various factors, some of which are directly related to good newborn care while others are intermediate in nature.

Socio-demographic factors such as the mother's age, parity and education do not have a direct impact on good newborn care behaviours, thus are the predisposing factors. Those indirect factors are mediated by other intermediate factors such as mothers' knowledge, household wealth, exposure to media, counselling by health workers and Female Community Health Volunteers, health system factors, utilisation of maternal health services and birth preparedness. Therefore, those factors are the enhancing factors that drive towards healthy newborn care practices, or are the impending factors that result in poor newborn care practices. Underlying all these factors are the culture, tradition and beliefs prevailing in the community that also influence the practices of women and families. The ultimate outcome of the conceptual framework of this study is the newborn survival or mortality, which is determined by the adoption of good or bad newborn care practices.

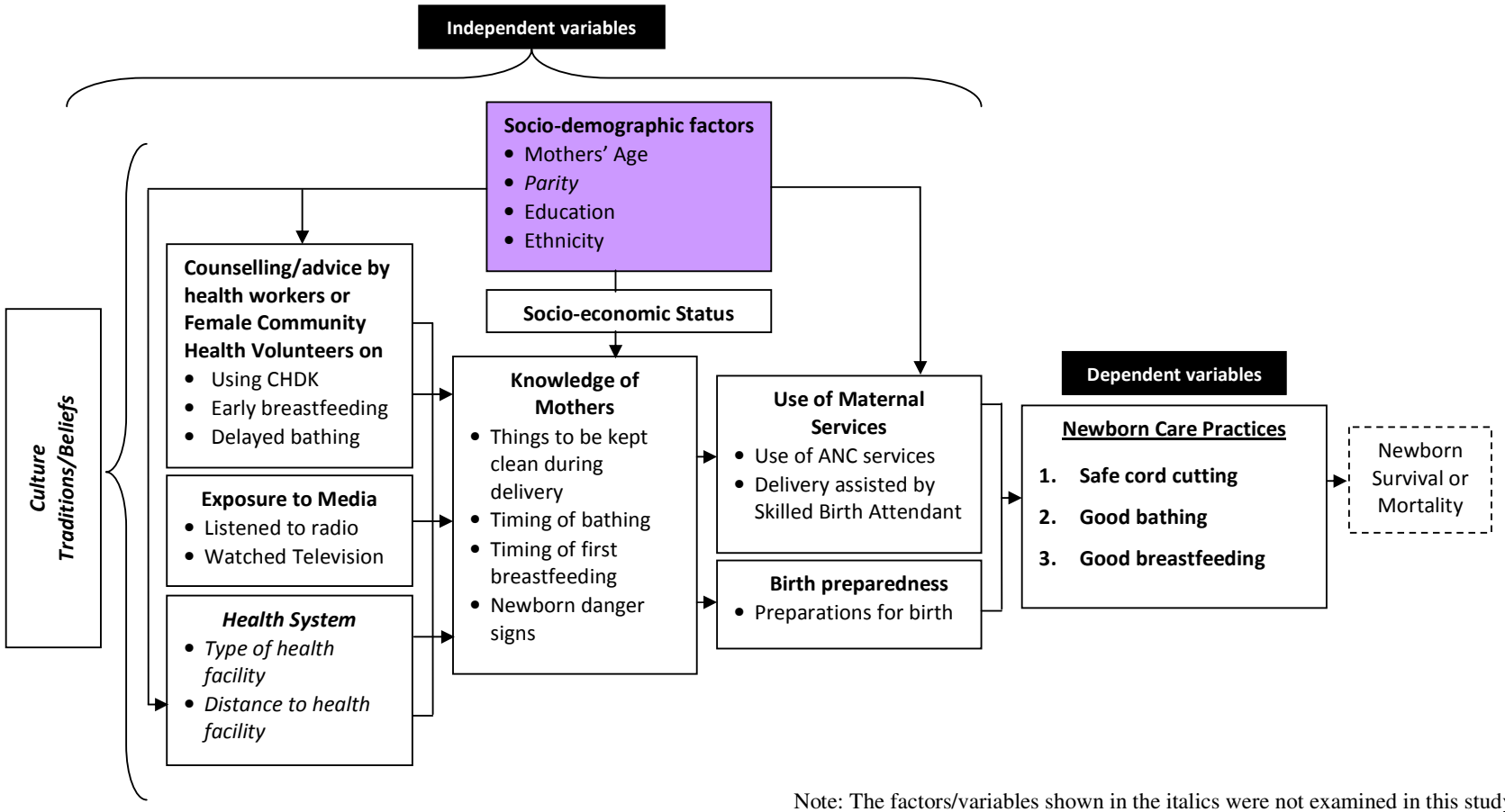
There are nine sets of independent variables in the conceptual framework of the study. These are:

1. Socio-demographic factors: mother's age at birth, parity, education, ethnicity
2. Socio-economic factors: household wealth quintiles
3. Use of maternal health services: use of ANC services, delivery assisted by a SBA
4. Birth preparedness
5. Mother's knowledge: things to be kept clean during delivery, newborn bathing, early breastfeeding, newborn danger signs
6. Counselling from a health worker and advice from a FCHV:
    - Received counselling from a health worker on
        i) Using the CHDK, and
        ii) Breastfeeding, and
    - Received advice from a FCHV on
        i) Using CHDK,
        ii) Bathing a newborn after 24 hours of birth,
        iii) Breastfeeding a newborn within an hour of birth
7. Exposure to media: listening to radio at least once a week, watching television at least once a week
8. Health system: type of health facility, distance to the health facility
9. Cultural factors

Of the nine sets of independent variables, the study has focused on examining the impact of only the seven variable sets: i) socio-demographic factors, ii) socio-economic factors, iii) use of maternal health services, iv) birth preparedness, v) mother's knowledge, vi) counselling from a health worker and advice from a FCHV, and vii) exposure to media on the outcomes of interest. The two variable sets of health system factors and the cultural factors were not considered in the study owing to the unavailability of data.

The outcome variables of interest to the study are the three newborn care practices: safe cord cutting, early (good) breastfeeding and delayed (good) bathing. However, the ultimate outcome of the framework is newborn survival or mortality, which has not been studied in the present study. Figure 3.1 shows the diagrammatic view of the conceptual framework of the study.

Figure 3.1: Conceptual framework of the study



Note: The factors/variables shown in the italics were not examined in this study

3.2 Rationale for the Framework

3.2.1 Socio-demographic factors as predictors of good newborn care practices

Previous research has established the association of socio-demographic factors with newborn care practices. For instance, household newborn care practices during delivery have been found to be associated with maternal socio-demographic factors such as education and ethnicity (Thapa et al, 2000: Sharan, 2004); breastfeeding of newborns is influenced by the mother's age (Holman, 2001; Sharan, 2004). Therefore, this study conceptualizes socio-demographic factors as one of the important determinants of good newborn care practices.

3.2.2 Socio-economic factors as predictors of good newborn care practices

A study by Sharan (2004) found an association between economic status and cord care practices. It is apparent that the mothers belonging to higher economic status are better exposed to health care information and services, thus are more likely to demonstrate safer newborn care practices. Therefore, the present study considers household socio-economic status as one of the predictors of good newborn care practices.

3.2.3 Use of maternal health services as a predictor of good newborn care practices

Home-based delivery practices are related to use of antenatal care services. Sharan (2004) found a positive association between antenatal care and cord care and early breastfeeding, which indicates that if a woman receives ANC services, she is likely to get information on safe cord cutting and early breastfeeding. Receiving such information enables her to adopt good practices. Similarly, receiving the assistance of a skilled birth attendant during delivery and the use of postnatal care services are also likely to provide women with information that might help them to demonstrate safe newborn care practices. Hence, in the conceptual framework of the current study, use of maternal health services has been examined as a possible determinant of good newborn care practices.

3.2.4 Mothers' knowledge of specific newborn care practices as a predictor of good newborn care practices

The literature related to knowledge and health service utilisation shows that the mothers' knowledge can influence health care practices in several ways (Senerath et al, 2007; Sharan, 2004). It is also evident from the literature that the knowledge factor is an important intermediate factor that mediates other factors to demonstrate good practices. On one hand knowledgeable mothers are more inclined to use health services and thus practice safe newborn care behaviours. On the other hand, the use of health services increases a woman's knowledge and the ability to practise safe newborn care behaviours. In this framework it is assumed that knowledgeable mothers are more likely to use maternal health services and practice good newborn care practices, but that using health services makes women more knowledgeable.

3.2.5 Birth preparedness as a predictor of good newborn care practices

Birth preparedness has been recognised as an important factor for a healthy pregnancy outcome but preparing for birth is not commonly practised in Nepal. Making preparations for birth during pregnancy might influence newborn care practices. Therefore, the current study conceptualizes that there might be an association between making birth preparations and demonstrating good newborn care practices.

3.2.6 Health workers' counselling as a predictor of good newborn care practices

A study by Baqui et al (2006) found a positive impact of antenatal counselling on clean cord care, thermal care and early breastfeeding. In Nepal, FCHVs play an important role in educating mothers on various health matters including safe motherhood and newborn care. FCHVs as health human resources are different from health workers because they do not have specific qualifiactions. They are just female volunteers who are selected locally at ward levels and are given short term trainings to educate pregnant women and mothers on various health matters. They also distribute few health commodities such as condom, iron tablets, cotrimoxazole and oral redhydration salts at community level. Hence, this study conceptualizes that receiving counselling from health workers as well as receiving advice from FCHVs on specific newborn care issues during pregnancy might influence good newborn care practices.

3.2.7 Exposure to media as a predictor of good newborn care practices

Radio emerged as the most important source of information on early breastfeeding in two out of three districts in the baseline survey of the CB-MNC program conducted in Nepal (VaRG, NFHP & USAID, 2007). Television was also frequently reported as a source of information on early breastfeeding by the new mothers (VaRG & NFHP, 2005a). The study also reported that the knowledge of maternal and newborn danger signs are better among women who were the members of radio listener groups. Although, studies have not examined the association of newborn care practices with radio listening and television viewing, it could be expected that women having access to radio and television receive health information and thus will be more inclined towards demonstrating safe newborn care practices. Therefore, exposure to mass media such as radio and television has been considered as a possible predictor of good newborn care practices.

3.2.8 Health system factors as a predictor of good newborn care practices

Evidence provided by Kumar et al (1997) shows that women living in a catchment area of health institutions with higher level facilities such as primary health care centres are more likely to use services than women living in one with limited service facilities such as sub health posts. The qualitative study by Thapa et al (2000) examining the birth related practices and their determinants in Nepal reports that supply side factors such as lack of heating arrangements in hospital and a distant health facility are also the reasons for the high prevalence of deliveries at home. Therefore, it is expected in this framework that the supply system factors, including the type of health institution and its distance, could have influenced service utilisation and thus, newborn care practices. Based on this evidence, this study conceptualizes health system factors as one of the important predictors of good newborn care practices.

3.2.9 Cultural factors as a predictor of good newborn care practices

Beliefs in supernatural powers such as God, spirits and evil are still widely prevalent in the rural areas of Nepal, India and Bangladesh. Cutting the cord is considered unholy; bathing immediately after birth is considered important to purify and protect the baby from skin infections. Breastfeeding is withheld up to several days after birth as colostrum is considered

dirty and poisonous for the baby (Thapa et al 2000; Darmstadt, 2006; Gurung, 2008). These findings suggest that such cultural traditions have a deep impact on newborn care practices. Therefore, cultural factors have been considered as one of the determinants of good newborn care practices in this study.

3.3 Conclusions

The conceptual framework of this study is based on Mosley and Chen's child survival framework for developing countries and Andersen's behavioural model of health service utilization. In the conceptual framework of the study, there are nine sets of independent variables- 1) Socio-demographic factors, 2) Socio-economic status, 3) Use of maternal health services, 4) Birth preparedness, 5) Knowledge of the mother, 6) Counselling/advice by health workers/FCHVs, 7) Health system factors, 8) Exposure to media, and 9) Cultural factors, which are expected to have some association with the three outcome variables of interest. However, out of those nine sets of independent variables, this study was limited to the examination of the independent and the combined effect of the seven sets of independent variables (socio-demographic factors, socio-economic status, use of maternal health services, birth preparedness, mother's knowledge, counselling by health workers/FCHVs, and exposure to the media) on the outcome variables of interest. Two variable sets (cultural factors and health system factors) have not been studied as data were not available. The outcome variables of interest to this study are the three newborn care practices: 1) safe cord cutting, 2) early breastfeeding, and 3) delayed bathing.

CHAPTER FOUR
Methodology

This is the fourth chapter of the report and presents the methodologies that were employed to investigate the research questions of the study. It includes the following:

4.1 Study Design

This study was conducted as a cross sectional study. It is also a correlational and analytical study.

4.2 Study Area

The study was conducted in the rural areas of the Sindhuli district of Nepal which includes 53 Village Development Committees (VDC). Sindhuli is a hilly district and lies in the Janakpur zone in the central development region of Nepal. The district covers an area of 2,491 square kilometres. Sindhulimadhi Kamalamai is the district headquarters. It has a total population of 316,036.

There are 56 government owned health institutions in the district which include 42 sub health posts, 10 health posts, three primary health care centres and one hospital. Sindhuli district ranks 34th out of the 75 districts in the Human Development Index rank (United Nations Development Program, 2004). Religiously, most of the people of the district follow Hinduism. A considerable proportion of the population follows Buddhism whilst a few follow Kirat, Christianity, and Islam. Tamangs, Chhetri, Magar and Brahmins are the four major caste/ethnic groups of the district. The proportion of dalit, and disadvantaged indigenous out of the total population is 11.2% and 55.6% respectively (Central Bureau of Statistics, 2001).

4.3 Study Population

The study population comprised the married women of reproductive age (15 to 49 years) who had delivered a living baby at home in the one year period (February 2008-February 2009) preceding the conducting of the baseline survey of the Community Based Maternal and Newborn Health program. The study population has been referred as 'recently delivered women' (RDW) in this study report. The excluded criteria included the RDW who delivered a dead baby at home, and a live or a dead baby in a health institution in the 12 month period (February 2008- February 2009) preceding the survey date and women of childbearing age who had no children in that period.

4.4 Data Source and Instrument

This study was based on interview data from the CB-MNH programme baseline survey which was conducted in the Sindhuli district of Nepal. CB-MNH is a program implemented by the Nepal Family Health Program-II. NFHP-II is a bilateral project of the Nepal Government's Ministry of Health and Population and the United States Agency for International Development (USAID). Valley Research Group, a local research firm conducted the baseline survey during February-March 2009.

A close-ended questionnaire was used to conduct the interview with women who delivered a living baby at home in the given one-year period. Information was collected on the following areas: the respondent's background, use of the Female Community Health Volunteer services, antenatal care and delivery care; misoprostrol and post partum haemorrhage; post-partum care, postpartum family planning and birth spacing, immediate newborn care, newborn care during the first month and birth preparedness (VaRG & NFHP-II, 2009). See the CB-MNH baseline survey questionnaire in Appendix E. This study has mainly used data related to immediate newborn care and newborn care during the first month from the questionnaire. The baseline survey of the CB-MNH programme of the Sindhuli district has used the questionnaire developed for the baseline and follow up surveys of the Community Based-Maternal and Neonatal Care programme of the Jhapa, Bank and Kanchanpur districts. The researcher was involved in the development,, pre-test and finalization of the survey questionnaires of the CB-MNC programme in these three districts. Therefore, the researcher was well familiar with the contents of the questionnaire used in the CB-MNH baseline survey of Sindhuli district.

4.5 Sample Design and Size and the Selection of the Respondents

The study has used the baseline data of the CB-MNH baseline household survey, which used the cluster sampling design to select the required number of 900 individuals from the study areas. A three-stage sampling design was followed in the baseline survey.

a) Stage 1: Selection of clusters/wards

In the first stage, 30 clusters were selected randomly by combining 477 wards[2] from the 53 VDCs of the Sindhuli district. The ward was treated as the primary sampling unit. Thirty rural clusters were chosen in the district following probability proportional to size (PPS) methodology. Selection of the wards was carried out using 2001 census data from the Central Bureau of Statistics of Nepal. The sample frame was constructed by listing all VDCs of the study district in alphabetical order within the electoral constituencies. Each of the nine wards in each VDC was listed together with the number of households in the ward. Stratification of the sample frame in each of the electoral constituencies of the district was carried out in order to ensure the representation of the geographical distribution of the sample wards.

b) Stage 2: Selection of segment

In the selected wards, the surveyors in consultation with the local leaders and key informants, prepared sketch maps. The number of households in each segment was estimated and recorded. The surveyors then chose one segment randomly using PPS.

c) Stage 3: Selection of index household and respondents

The surveyors then located the centre of the selected segment and spun a bottle or pen. They then walked from the centre of the segment to the border of the segment in the direction shown by the bottle/pen, and noted and assigned a number to each of the houses situated within 10-20 metres on either side of the path they walked. Finally, they then randomly chose a number ”x” between one and the “total number of houses counted” using a random number table and identified the x^{th} house along the path as the index household.

Following the selection of the index household, the interviewers determined firstly the existence and availability of an eligible RDW in the index household, who was then

[2] The smallest administrative unit in a VDC. Nine wards comprise a VDC.

interviewed if she was available. The interviewers then proceeded to the next nearest household where they again determined the existence/availability of a RDW. The process was continued till 30 RDW were interviewed in the ward. If the required number of 30 RDW was not reached, the interviewers moved to an adjacent ward to interview RDW until the required number of respondents was reached. All the RDW of the sampled households that slept the night in the household prior to the survey day were considered eligible respondents for the purpose of the study.

The sample of the CB-MNH baseline survey had 900 recently delivered women. The STATA version 8 statistical software was used to determine the sample size that could detect a 10% baseline to follow-up change in key indicators of the CB-MNH baseline survey based on the assumptions of 50% baseline prevalence, 5% type I error and 20% type II error, 10% non-response, and design effect of two. These assumptions yielded a required sample size of 889. Thirty RDW were thus selected in each of the 30 clusters to achieve a total sample size of 900 (NFHP, USAID and JHBSPH, 2007).

The sample population (900 RDW) in the CB-MNH survey included both the women who had live births as well as still births at home or in health institutions in the one year period between February 2008 and February 2009. However, the current study has analysed the data of 815 RDW (out of 900) who gave birth to a living baby at home. The data from the 85 women who gave birth to a dead baby or had an institutional delivery has been excluded.

4.6 Field Organization and Data Collection

The study was entrusted by Nepal Family Health Program II to a local consulting firm Valley Research Group (VaRG). For data collection in the rural areas of Sindhuli district, seven teams, consisting of one supervisor and two female interviewers in each team, were mobilized to collect information from the study district. Most of the field staff had previous experience in conducting field research. Each team covered 4-5 clusters. A nine-day training was given to the supervisors and interviewers before mobilizing them to the study district. Training topics included program/intervention, short presentations role-play and field practices. NFHP officials also participated during the field staff training.

The field supervisors were mainly involved in field supervision, mapping and dividing clusters into different segments, selection of segments, selection of index house, questionnaire checking

and editing, and logistics management. The interviewers were mainly involved in interviewing women who delivered a baby within the last twelve months period and other women of the sampled households. In addition, one field research assistant was deputed in the study district to supervise and monitor the data collection activities. The fieldwork was carried out during February and March 2009.

4.7 Study Variables and Coding

Since the survey has used secondary data from the CB-MNH baseline survey, most of the variables of the data set were not coded in the format that was necessary for analysis in this study. Therefore, before the analysis most of the variables were recoded to create new variables required for the analysis.

4.7.1 Dependent Variables

The three outcome variables of the study are set out below.

4.7.1.1 Safe cord cutting: A dichotomous variable was created to measure the safe cord cutting practice. Those women who used a new blade, a boiled blade or the instrument from a clean home delivery kit to cut the cord of the newborn were assigned a score of "1". Those women who used any other instruments such as used blade, sickle, knife, wood were assigned a score of "0". Those women who could not recall what instrument was used to cut the cord of their newborn were not included in the analysis. A score of '1' represented the preferred practice.

4.7.1.2 Good breastfeeding: A dichotomous variable was created as a measure for early (good) breastfeeding practice. Those mothers whose newborn were breastfed within one hour of birth were scored as "1". Those women whose newborn were breastfed anytime after one hour of birth were scored as "0". Those women who could not recall when their newborns were first put to the breast were not included in the analysis. A score of '1' represented the preferred practice.

4.7.1.3 Good newborn bathing: A dichotomous variable was created as an indicator to measure the good newborn bathing practice. Those women whose newborn were first bathed after 24 hours of birth were assigned a score of "1" and those mothers whose newborn were bathed anytime before 24 hours after birth were assigned a score of "0". Those

women who could not recall when their newborn was bathed were not included in the analysis. A score of '1' represented the preferred practice.

4.7.2 Independent Variables

The independent variables of interest to the study were as following:

4.7.2.1 Socio-demographic factors:

Mother's age: A categorical variable was created as a measure for the mother's age. The categories were 15-19 years, 20-34 years, and 35-49 years. Dummy categories were created for the age variable. The age group '15-19 years' was taken as the reference category.

Education: A variable for the mother's education was created by categorizing the number of years of school attended. The categories included: not educated, primary, secondary and higher level educated. Dummy categories were created for the education variable, where 'not educated' was used as the reference category.

Caste/Ethnicity: A categorical variable was used to denote the woman's ethnicity/caste. The categories included: upper caste, disadvantaged indigenous, dalit, and others. Dummy categories were created for the ethnicity/caste variable and the 'upper caste' group was taken as the reference category.

4.7.2.2 Socio-economic status:

Household wealth index: A categorical variable was used to measure the socio-economic status (SES) of the respondents. This study used the same SES that was constructed in the CB-MNH survey, which used the principal component method to develop a variable that measures the SES based on household characteristics and possession of key household items of the respondents. The SES of the sampled household was calculated by considering specific variables such as: source of drinking water, toilet facility, flooring of the house, roofing, walls, and possessions of the household (electricity, bicycle, television, and radio). Based on the value of the SES variable, each woman was classified into one of five SES quintiles- the lowest, the second, the middle, the fourth, and the highest.

Dummy categories were created as a variable for the wealth quintiles. The 'lowest wealth quintile' category was taken as the reference category.

4.7.2.3 Use of maternal health services:

Use of antenatal care services: A categorical variable was created to measure the use of antenatal care services. The categories included received ANC from a SBA, received ANC from other persons and did not receive ANC. Dummy categories were created and 'did not receive ANC' was used as the reference category.

Use of delivery service: A categorical variable was created as an indicator to measure whether the woman used a delivery service. The categories included delivery assisted by a SBA, delivery assisted by others, and delivery not assisted. Dummy categories were created for the variable, with the 'delivery not assisted' taken as the reference category.

4.7.2.4 Birth preparedness:

Birth Preparedness: A dichotomous variable was created as a measure for birth preparedness. If the woman said that she prepared for birth during her most recent delivery, she was assigned a score of "1". If the woman said she did not make preparations for birth, then a score of "0" was assigned.

4.7.2.5 Mother's knowledge:

Things to be kept clean during delivery: Things to be kept clean during delivery are also referred to as 'delivery cleans' in the study. A categorical variable was created to indicate the mother's knowledge of such things as i) nails, ii) hand, iii) blade, iv) surface on which the cord is cut, v) surface on which the newborn is placed, vi) thread, vii) perineum, viii) mother's clothes ix) clothes for wrapping the baby which needed to be kept clean during delivery. The categories include:, do not know any of the delivery cleans, knows 1-3 delivery cleans, and knows four or more delivery cleans. Dummy categories were created for the variable and 'know four or more delivery cleans' was taken as the reference category.

Bathing time: A categorical variable was created as a measure for the knowledge of the mother about the correct time to bathe the newborn for the first time after birth. The categories included: after 24 hours of birth, before 24 hours of birth and do not know. Dummy categories were created for the variable and 'do not know' was taken as the reference category.

Early breastfeeding: A categorical variable was created as a measure for the mother's knowledge of the time of the first breastfeeding. The categories included: immediately after the birth, after the placenta is out, after bathing the newborn/after 24 hours of birth and do not

know. Dummy categories were created for the variable and 'do not know' was taken as the reference category.

Newborn danger signs: A categorical variable was created as a measure for the mother's knowledge of newborn danger signs. The dummy categories included: does not know any danger signs, knows 1-3 danger signs, and knows four or more danger signs. The category 'knows four or more danger sign' was used as the reference category.

4.7.2.6 Counselling from health workers and advice from FCHVs

Received counselling from a health worker about using a CHDK: A categorical variable was created to measure whether the woman was counselled by a health worker during pregnancy about using the CHDK. The dummy categories included: received counselling from a health worker about using CHDK, did not meet a health worker during pregnancy, and did not receive counselling from a health worker about using a CHDK/do not know. Dummy variables were created and the category 'did not receive counselling from a health worker about using CHDK' was taken as the reference category.

Received counselling from a health worker about breastfeeding: A categorical variable was created to measure whether the woman was counselled by a health worker during pregnancy about breastfeeding. The dummy categories included: received counselling from a health worker about breastfeeding, did not meet a health worker during pregnancy, and did not receive counselling from a health worker about breastfeeding/do not know. Dummy variables were created and the category 'did not receive counselling from a health worker about breastfeeding' was taken as the reference category.

Received advice from FCHV about using a CHDK: A categorical variable was created as a variable to measure whether a FCHV advised women during pregnancy about using a CHDK or not. The categories included: received advice from a FCHV about using a CHDK, did not meet a FCHV during pregnancy, and did not receive advice from a FCHV about using a CHDK. Dummy categories were created for the variable and the category 'did not receive advice from a FCHV about using a CHDK' was taken as the reference category.

Received advice from FCHV about bathing newborn after 24 hours of birth: A categorical variable was created to measure whether a FCHV advised women during pregnancy about bathing the newborn only after 24 hours. The categories included: received advice from a

FCHV about bathing the newborn after 24 hours of birth, did not meet a FCHV during pregnancy, and did not receive advice from a FCHV about the bathing of a newborn after 24 hours of birth/do not know. Dummy categories were created for the variable and the category 'did not receive advice from a FCHV about the bathing of a newborn after 24 hours of birth' was taken as the reference category.

Received advice from a FCHV about breastfeeding the newborn within an hour: A categorical variable was created to measure whether a FCHV advised women during pregnancy about breastfeeding the newborn within an hour of birth. The categories included: received advice from a FCHV about breastfeeding the newborn within an hour of birth, did not meet a FCHV, and did not receive advice from a FCHV about breastfeeding the newborn within an hour of birth. Dummy categories were created for the variable and the category 'did not receive advice from a FCHV about breastfeeding newborn within an hour of birth' was taken as the reference category.

4.7.2.7 Exposure to media:

Watched television at least once a week: A dichotomous variable was created to measure whether the women watched television or not. Women who watched television at least once a week were assigned a score of "1" and the women who did not watch television at least once a week were assigned a score of "0".

Listened to radio at least once a week: A dichotomous variable was created to measure whether the women listened to radio or not. Women who listened to radio at least once a week were assigned a score of "1" and the women who did not listen to radio at least once a week were assigned a score of "0".

4.8 Data Analysis

This study has used univariate, cross tabulation and logistic regression methods to meet the study objectives. Initially, univariate analyses method such as frequencies, percent distribution, means, and standard deviations were used to describe the individual characteristics of the sample women. In the next step, cross tabulation between the independent variables and the outcome variables (good newborn care practices) were carried out to examine the pattern of good newborn care practices by the study variables. The chi-square test was also used to examine the significant difference in newborn care practices (good practice and bad practice)

by the independent factors. Finally, logistic regression method was used to examine the impact of each of the independent variables on the three outcome variables separately and also the combined effect of the variables on each of the outcome variables separately.

4.8.1 Logistic regression

Both the simple and multiple logistic regression methods were used in the analysis of determinants of the dependent variables. Since the three outcome variables had binary outcomes, binary logistic regression models were used. The simple logistic regression analysis was carried out to examine the associations between each of the independent variables and the three outcome variables separately and the unadjusted odds ratios of the associations and the 95% confidence intervals of each independent variable with the outcome variable were obtained. The independent variables that were found not associated with the outcome variables at $p<0.05$ in the simple regression were not included in the multiple regression.

In multiple regressions, association of the independent variables with each of the three dependent variables were tested separately, while controlling for the confounding aspects of the other independent variables. Adjusted odds ratios that were obtained from the multiple logistic regression models compared individuals who differ in the characteristics of interest and have the values of all other variables constant (Hosmer and Lemeshow, 1989).

Logistic regression modelling is based on the assumption that the log of the dependent variable is a linear function of the independent variables. The multivariate regression models provided the odds ratio and 95% confidence intervals for each of the explanatory variables. The models used in this study were based on the following formula.

$$\log [p/(1-p)] = \alpha + \beta_1 * X_1 + \beta_2 * X_2 + \ldots.. + \beta_N * X_{N,}$$

where,

p is the probability of practising the outcome behaviour,

α is the intercept,

$\beta_1 \ldots.. \beta_N$ is the regression coefficients.

The regression coefficients represent the change in the log odds of the outcome variable associated with a unit change in each corresponding independent variable while controlling the effects of the other independent variables. The exponentiated log odds denotes the odds ratio

for the outcome practices associated with a one unit change in the independent variable, while controlling for the effects of other independent variables.

Logistic regression was carried out in a series of steps. Initially, simple logistic regression was carried out to examine the association between each of the independent variables and the outcome variable separately. In the second step, the independent variable that was not significant at $p<0.05$ was discarded. The independent variables that form a set of variables and were significant in the simple regression were then regressed to examine its association with the outcome variable, and hypotheses were tested. In the third step, combined analysis of the independent variables was carried out, where a new set of variables was added one by one to the first variable set to see the combined effect of the independent variable sets on each of the outcome variables separately. The multiple logistic regression (including the combined analysis of the variables) tested the associations of the independent variables with each of the three outcome variables, while controlling for the confounding effects of other independent variable or variable sets. The variable sets were added as blocks and according to the conceptual framework of the study (Table 4.1). At the end, a full regression model was tested that comprised all the variables that were found significantly associated with the outcome variable in the simple logistic regression.

Table 4.1: Variable sets that were added in each step of the combined analysis

Steps	Independent variables
1	• Socio-demographic factors
2	• Socio-demographic factors • Socio-economic factors
3	• Socio-demographic factors • Socio-economic factors • Use of maternal health services
4	• Socio-demographic factors • Socio-economic factors • Use of maternal health services • Birth preparedness
5	• Socio-demographic factors • Socio-economic factors • Use of maternal health services • Birth preparedness • Mothers' knowledge of specific newborn care issues
6	• Socio-demographic factors

	• Socio-economic factors • Use of maternal health services • Birth preparedness • Mothers' knowledge of specific newborn care issues • Advice from a FCHV and counselling from a health worker
7	• Socio-demographic factors • Socio-economic factors • Use of maternal health services • Birth preparedness • Mothers' knowledge of specific newborn care issues • Advice from a FCHV and counselling from a health worker • Exposure to media

Table 4.1 displays the process of combined analysis of the variables. In the combined analysis of the variables, firstly the outcome variable was regressed on all the three socio-demographic factors. Secondly, the socio-demographic variables and the socio-economic status were regressed. In the third step, socio-demographic variables, socio-economic status and the maternal service utilisation variables were regressed together. In the fourth step, the socio-demographic variables, the socio-economic status, maternal service utilisation and the birth preparedness were regressed. In the fifth step the following variables- the socio-demographic, the socio-economic status, maternal service utilisation, the birth preparedness and knowledge of mothers were regressed. In the sixth step, the following variables- the socio-demographic, the socio-economic status, maternal service utilisation, the birth preparedness, knowledge of mothers and advice from FCHV/counselling from health workers were regressed. In the seventh and the final step all the independent variables (the socio-demographic, the socio-economic status, maternal service utilisation, the birth preparedness, knowledge of mothers and advice from FCHV/counselling from health workers, and exposure to media were regressed) were regressed. The changes in the covariates for the different models were examined to determine how each set of independent variables and the combinations thereof influenced the outcome variable. This pattern of analysis was carried on for each of the dependent variables separately and the adjusted odds ratio and 95% confidence intervals were obtained.

The statistical software package Statistical Package for Social Sciences (SPSS) version 17.00 was used for the analysis.

4.9 Study Hypotheses

The study tested the following hypotheses:

I Safe cord cutting practice is related to:

- Socio-demographic factors,
- Socio-economic status,
- Use of maternal health services,
- Birth preparedness,
- Mothers' knowledge of specific newborn care issues,
- Advice from a FCHV and counselling from a health worker, and
- Exposure to media

II Early breastfeeding practice is related to:

- Socio-demographic factors,
- Socio-economic status,
- Use of maternal health services,
- Birth preparedness,
- Mothers' knowledge of specific newborn care issues,
- Advice from a FCHV and counselling from a health worker, and
- Exposure to media

III Delayed bathing practice is related to:

- Socio-demographic factors,
- Socio-economic status,
- Use of maternal health services,
- Birth preparedness,
- Mothers' knowledge of specific newborn care issues,
- Advice from a FCHV and counselling from a health worker, and
- Exposure to media

4.10 Ethical Considerations

Consent to use the CB-MNH baseline survey data and to include it in the Masters of Health Sciences thesis has been obtained in writing from the Nepal Family Health Program-II, Kathmandu, Nepal which owns the data. The conducting of this study was approved by the Human Ethics Committee of the University of Canterbury and also by the College of Education, University of Canterbury.

The CB-MNH programme is one of the interventions of the Nepal Government's MoHP that is technically supported by NFHP-II. Hence, the MoHP's approval for the conduct of the baseline survey was not required. However, with regard to informed consent from the respondents, the questionnaire administered to the eligible women in the CB-MNH household survey included a well explained informed consent sheet which was read out to all the respondents. Interviews were only completed, when the women gave their verbal consent. In Nepal, as the majority of the village women are illiterate, the common practice is to take verbal consent from the respondents instead of written consent.

CHAPTER FIVE

Results: Patterns of newborn care practice and associated variables

The aim of this study was to understand the factors that were related to the three immediate newborn care practices- safe cord cutting, good breastfeeding and good newborn bathing in the rural areas of Nepal. Univariate, bivariate and multivariate analysis methods were employed to fulfil the aim of the study. This chapter presents the descriptive results related to characteristics of the sample population and the distribution of the outcome variables: safe cord cutting, good breastfeeding and good bathing practices by the study variables.

5.1 Characteristics of the Sample Population

The sample population of the study constituted a total of 815 married women aged 15-49 years who delivered a living baby at home during the twelve month period (February 2008-February 2009) preceding the conducting of the interviews. The following sections describe the characteristics of the sample population by their socio-demographic status, socio-economic status, use of maternal health services, birth preparedness, knowledge of newborn care issues, advice received from FCHVs and counselling from health workers on newborn issues, and exposure to media and also the prevalence of outcome behaviours of the study: safe cord cutting, good breastfeeding, and good newborn bathing among the sample population.

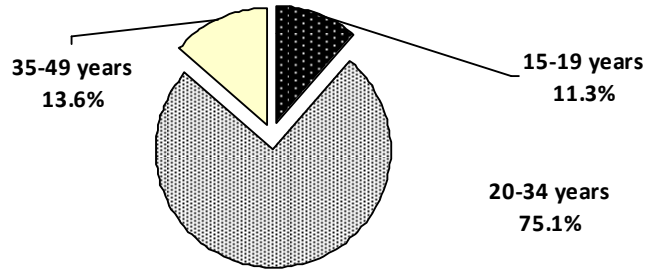
5.1.1 Socio-demographic characteristics

5.1.1.1 Age

Figure 5.1 shows that three-quarters (75.1%) of the sample women were in the prime childbearing age (20-34 yrs), 13.6% were older (>35 years), while 11.3% were younger than

the prime childbearing age (<20 years). The mean age of the respondents was 26 years (SD 6.1). The age of the women ranged from 16-46 years.

Figure 5.1: Distribution of the study sample by age

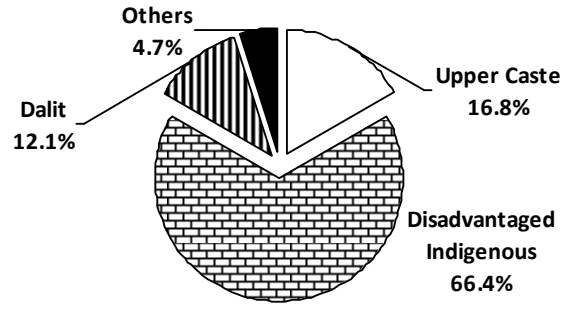


N=815

5.1.1.2 Caste/ethnicity

Of the 815 mothers interviewed, two-thirds (66.4%) belonged to the disadvantaged indigenous caste/ethnicity group. The proportions of the upper and the Dalit caste/ethnicity group women were 16.8% and 12.1% respectively. About five percent of the women belonged to the 'others' caste/ethnicity group. See Figure 5.2.

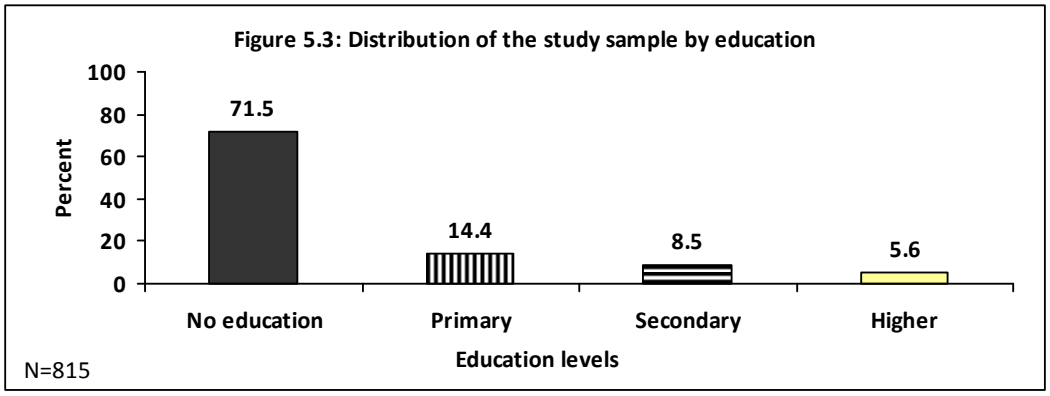
Figure 5.2: Distribution of the study sample by caste/ethnicity



N=815

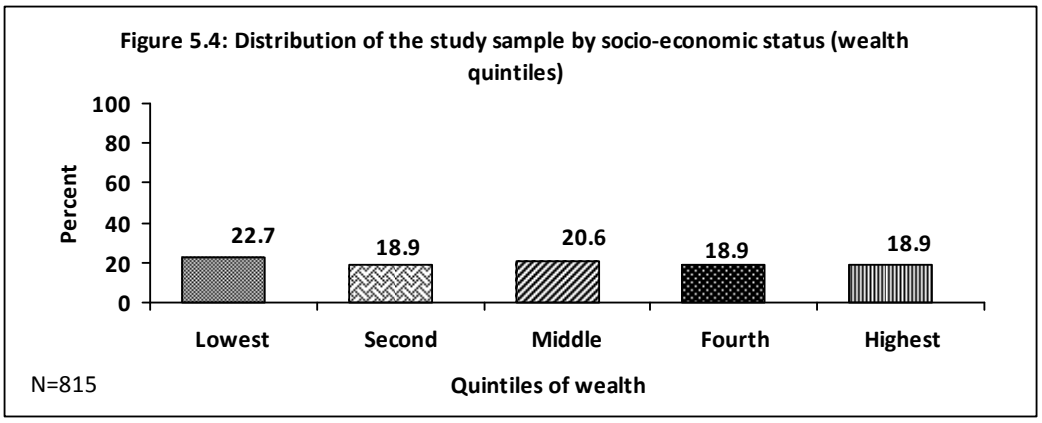
5.1.1.3 Education

With respect to education, the majority of the respondents (71.5%) never went to school, 14.4% received a primary level of education, 8.5% a secondary level, and 5.6% received a higher level of education (Figure 5.3).



5.1.2 Socio-economic status

Regarding the socio-economic status of the recently delivered women, it was found that the greatest proportion of the women (22.7%) were in the lowest wealth quintile and 20.6% were in the middle wealth quintiles. Nearly 19% of the sample population were in each of the second, the fourth and the highest wealth quintiles. Refer to Figure 5.4. Overall, the results show that the sample population is distributed fairly uniformly in the wealth quintiles.

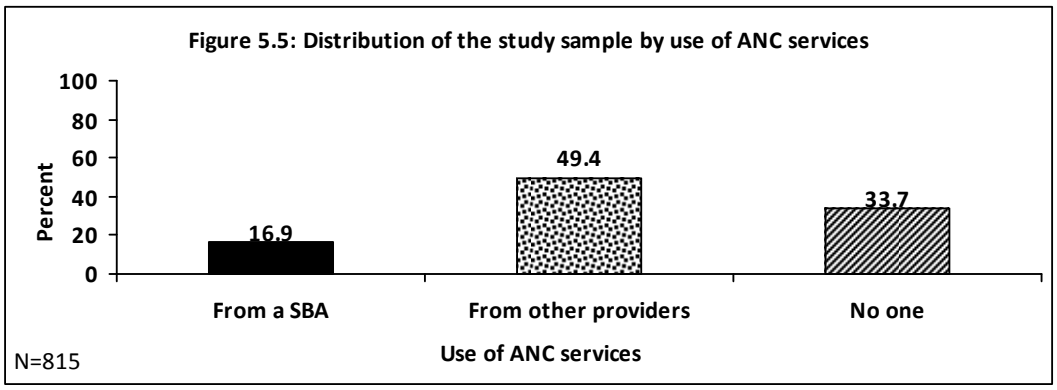


5.1.3 Use of maternal health services

5.1.3.1 ANC service

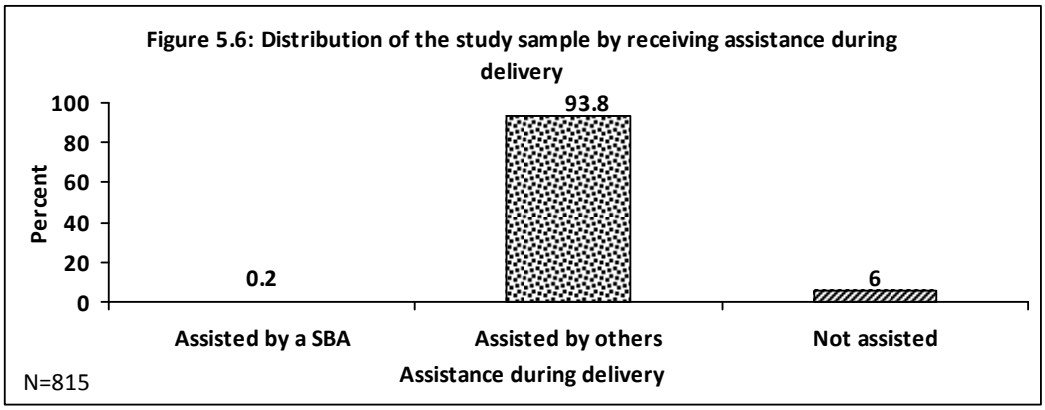
It is recommended that a pregnant woman receive antenatal care and delivery services from a SBA. In the study areas only 16.9% of the women reported that they received antenatal care from a SBA. Half of the women (49.4%) reported that they received antenatal care from other providers such as Auxiliary Health Workers, Maternal and Child Health Workers, Village

Health Workers, FCHVs while one-third (33.7%) reported that they did not receive it from anyone at all. (Figure 5.5).



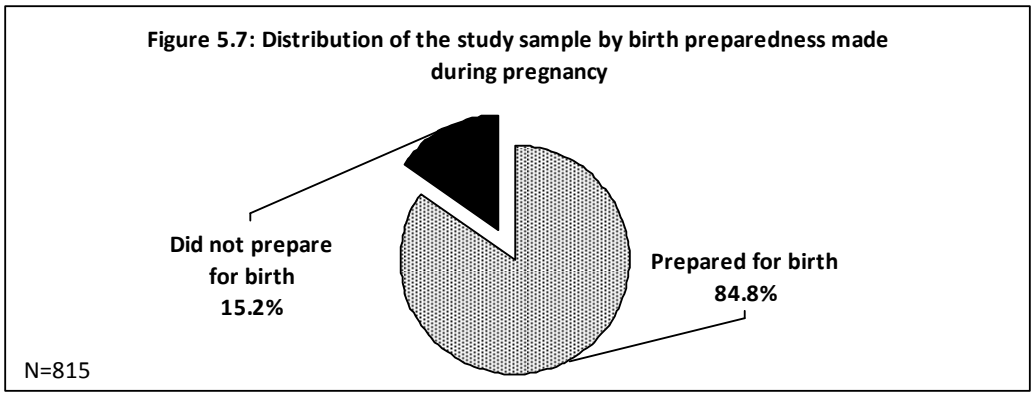
5.1.3.2 Delivery service

With regard to receiving the assistance of a SBA during delivery only two women (0.2%) reported that they received the assistance of a SBA during delivery. An overwhelming 93.8% of the women received assistance from other people while 6.0% received no assistance at all during delivery. See Figure 5.6.



5.1.4 Birth preparedness

Birth preparedness such as managing money, transportation, food and clothes and identifying a SBA, identifying a person for a blood donation in case of emergency during pregnancy are important for healthy delivery. In the total sample women, a majority (84.8%) claimed that they made one or more preparations for the birth of their most recent baby while they were pregnant. The remaining women (15.2%) did not claim that they made birth preparations during their pregnancy. See Figure 5.7.



5.1.5 Mothers' knowledge of newborn care issues

Table 5.1 displays the results of the mothers' knowledge of selected newborn care issues.

5.1.5.1 Delivery cleans

Nine items have been identified which need to be kept clean during delivery. These include i) nails, ii) hand, iii) blade, iv) surface on which cord is cut, v) surface on which the newborn is placed, vi) thread, vii) perineum, viii) mother's clothes, and ix) clothes for wrapping baby. It was found that about two-thirds (64.9%) of the respondents knew of one to three things that need to be kept clean during delivery ('delivery cleans'), about a quarter (27.6%) knew of four to seven things, while 7.5% did not know any of the things that needed to be kept clean during delivery.

5.1.5.2 Delayed Bathing

With respect to having knowledge of the time of first bathing the newborn bathing, only 20.2% of the respondents knew that the newborn should not be bathed until 24 hours after birth. A majority (71.7%) replied that newborns should be bathed before 24 hours after birth. A small proportion (7.9%) of the women did not know about the time of the first newborn bathing while two women said that the newborn should not be bathed at all.

5.1.5.3 Early breastfeeding

About half (45.3%) of the respondents knew that the newborn should be put to the mother's breast within an hour of birth. One-fifth (19.0%) of the women replied that the newborn should be put to the breast after the placenta is out. A surprising 32.6% of the women said that the newborn should be breastfed only after bathing. A few women (2.5%) said they did not know

about the timing of first breastfeeding while five women said that the newborn should be breastfed 24 hours after birth.

5.1.5.4 Newborn danger signs

There are seven signs/conditions which have been defined as danger signs for the newborn. They include i) poor suckling or not able to breastfeed, ii) fast breathing, iii) severe chest indrawing, iv) hypothermia, v) fever, vi) difficulty in waking/lethargy/unconsciousness, vii) pustules on skin including one large or more than ten small ones, and viii) severe umbilical infection, redness of skin around the cord and foul smelling discharge. If a newborn baby has any one of those signs, the baby needs to be taken to a health facility. The results reveal that more than three quarters (77.1%) of the sample population were aware of one to three danger signs in which the newborn needs attention, less than a quarter (22.3%) of the women were aware of four or more danger signs while only five (0.6%) of the mothers were not aware of any of the danger signs in the newborn.

Table 5.1: Distribution of the study sample by their knowledge of specific newborn care issues

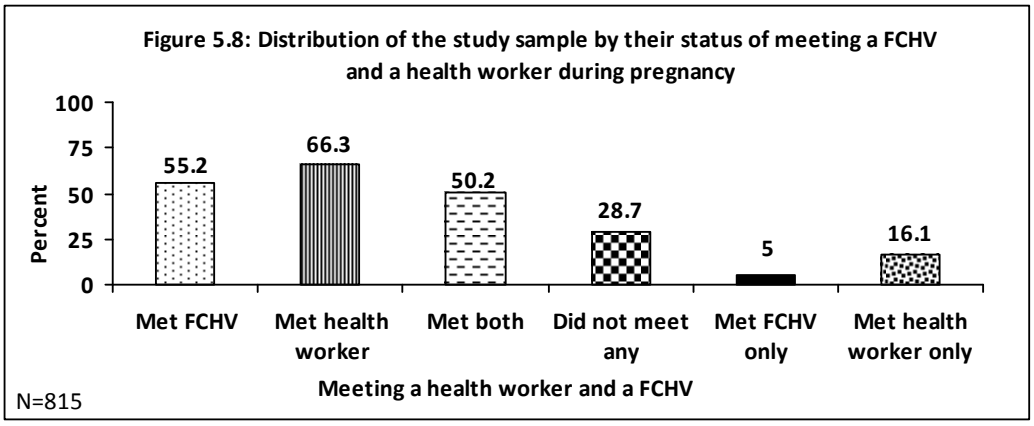
Mothers' knowledge of	*Number*	*Percent*
Cleanliness during delivery		
Know 1-3 cleans	529	64.9
Know 4-7 cleans	225	27.6
Do not know any of the cleans	61	7.5
Time of first newborn bathing		
After 24 hours	165	20.2
Before 24 hours	584	71.7
Do not know	64	7.9
Should not be bathed	2	0.2
Time of first breast feeding		
Immediately after birth	369	45.3
After placenta is out	155	19.0
After bathing the newborn	266	32.6
After 24 hours after birth	5	0.6
Do not know	20	2.5
Newborn danger signs		
Knows 1-3 danger signs	628	77.1
Knows 4-6 danger signs	182	22.3
Do not know any of the signs	5	0.6
Total	***815***	***100***

5.1.6 Advice from a FCHV and counselling from a health worker on newborn care issues

A question about whether the respondents received advice from a FCHV and counselling from a health worker on specific newborn care issues during pregnancy was asked of all women.

In the study areas, a greater (66.3%) proportion of the sample women met health worker during pregnancy compared to meeting a FCHV (55.2%). Just half (50.2%) of the sample women claimed that they met a FCHV as well as a health worker during their pregnancy while more

than a quarter (28.7%) claimed that they did not meet anyone during pregnancy. It was also found that 16.1% of the total sample women met only a health worker and 5% met only a FCHV during pregnancy. Refer to Figure 5.8.



5.1.6.1 FCHVs' advice

Table 5.2 presents the distribution of the women who claimed that they were advised by a FCHV and counselled by a health worker during pregnancy on specific newborn care issues among the women who met a FCHV and a health worker during pregnancy.

Among those women who met a FCHV during their pregnancy, only 18.5% reported that they were advised on using the CHDK whereas a majority of 80.2% were not advised about it. A few women (1.3%) were not

Table 5.2: Distribution of study sample who received counselling from a health worker and advice from a FCHV on specific newborn care issues among those who met a health worker and a FCHV during pregnancy

Advice from a FCHV on	*Number*	*Percent*
Using a CHDK		
Yes	83	18.5
No	361	80.2
Do not know	6	1.3
Newborn bathing		
Yes	103	22.9
No	337	74.9
Do not know	10	2.2
Breastfeeding		
Yes	113	25.1
No	332	73.8
Do not know	5	1.1
Total	***450***	***100***
Counselling from a health worker on		
Using a CHDK		
Yes	55	10.2
No	476	88.1
Do not know	9	1.7
Breastfeeding		
Yes	97	18.0
No	436	80.7
Do not know	7	1.3
Total	***540***	***100***

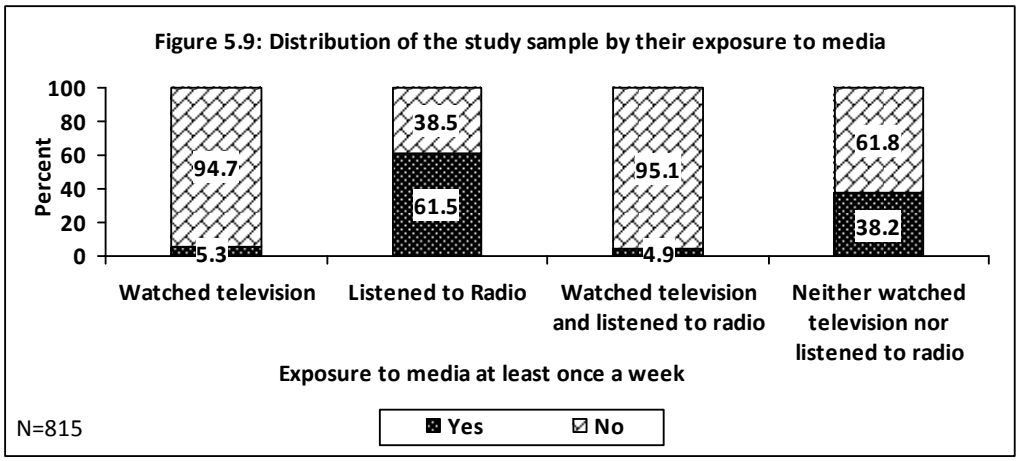
sure whether they were advised by their FCHV or not. Similarly, only 22.9% of the women who met a FCHV during their pregnancy claimed that they were advised on newborn bathing time but three-quarters of the women (74.9%) claimed that they were not advised on it. Ten women could not recall whether they were advised by their FCHV about bathing time or not. Regarding receiving advice from a FCHV about breastfeeding, a quarter of the women (25.1%) who met their FCHV during pregnancy claimed that they received it while nearly three-quarters (73.8%) claimed that they did not receive it. Five women could not recall if they received advice on breastfeeding. These findings show that the majority of the women were not advised by their FCHV on newborn care issues during their pregnancy which is a serious concern for both the FCHV programme and the safe motherhood programme.

5.1.6.2 Health workers' counselling

Among those women who visited a health worker for ANC during their pregnancy, only one out of ten (10.2%) reported that they were counselled by their ANC provider about using a CHDK during delivery. A majority (88.1%) of the women reported that they were not counselled on it while a few (1.7%) women could not say if they were counselled on using a CHDK or not. Similarly, one-fifth (18.0%) of the women who met a health worker during their pregnancy claimed that they received counselling from a health worker on breastfeeding time while four-fifths (80.7%) claimed that they did not receive counselling on it. A few women (1.3%) were not sure if they were counselled on breastfeeding or not during their ANC visit to a health worker. See Table 5.2. The results show that a greater proportion of women did not receiving counselling from their ANC provider on using a CHDK and early breastfeeding. This indicates the poor quality of ANC services provided to pregnant women in the rural areas of Nepal.

5.1.7 Exposure to media

Watching television was not common among the sample population. Figure 5.9 shows that in the study areas almost all the women (94.7%) did not watch television at least once a week. Only 5.3% of them watched television at least once a week. However, listening to radio was more common. Six out of ten women (61.5%) listened to radio programmes at least once a week and four out of ten (38.5%) did not listen it at least once a week. Overall, only 4.9% of the women watched television as well as listened to radio at least once a week and 38.2% neither watched television nor listened to radio at least once a week.

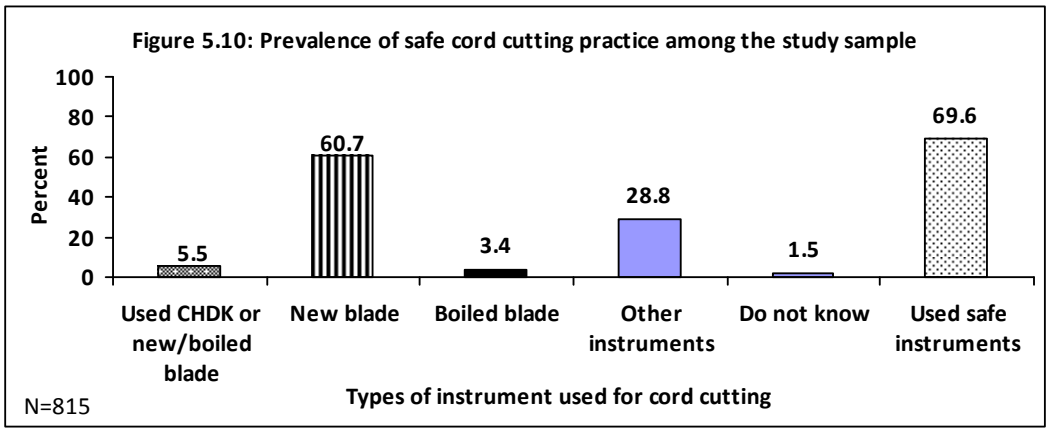


5.1.8 Prevalence of outcome behaviours

Figure 5.10 to 5.12 displays the prevalence of the outcome behaviours in the sample population and is further discussed below.

5.1.8.1 Safe cord cutting

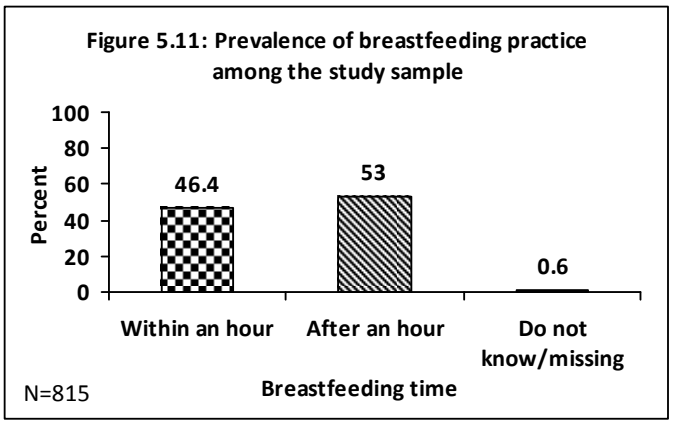
The umbilical cord of a newborn baby should be cut with a safe instrument such as an instrument from the CHDK, a new blade or a boiled blade. The use of a CHDK is not just useful for safe cord cutting but also useful for clean cord tying and clean delivery. However, in the study areas, its use was not common. Only 5.5% of the women who had home deliveries used it for cord cutting. A new blade was the most common instrument for cord cutting in the study areas used by 60.7% of the women while a boiled blade was used by 3.4% of the women. Hence, in aggregate 69.6% of the women used a safe instrument for cord cutting. A



considerable 28.8% of the women used other instruments such as a knife, grass cutter, and scissors to cut the umbilical cord of their newborn. A few women (1.5%) could not recall the type of instrument used to cut the cord of their newborn baby. See Figure 5.10.

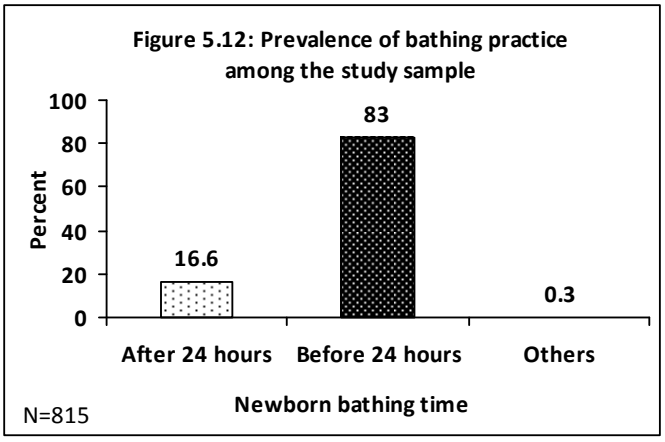
5.1.8.2 Early Breastfeeding

It is recommended that a newborn should be put to the mother's breast for breastfeeding within an hour of birth. Compared to safe cord cutting, a relatively lower proportion (46.4%) of the sample women practised good breastfeeding for their newborns. Slightly more than half of the women (53.0%) breastfed their newborn later than within an hour of birth. Five women (0.6%) could not recall when they first breastfed their baby or did not breastfeed their baby at all. Refer to Figure 5.11.



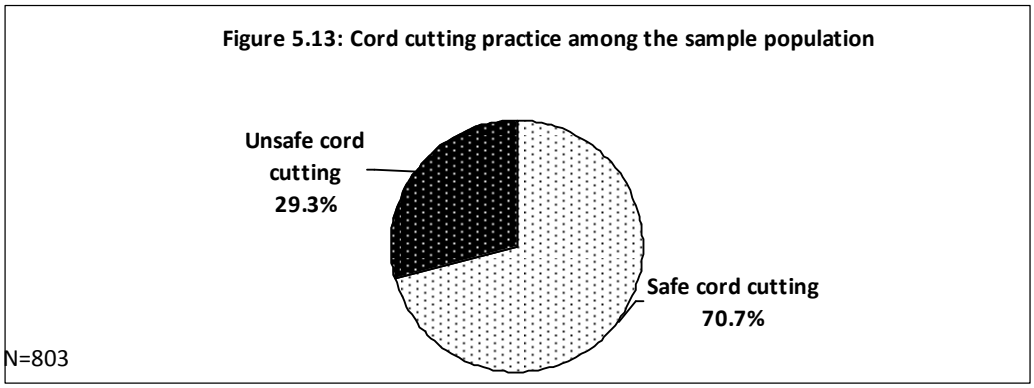
5.1.8.3 Delayed Bathing

Bathing of a newborn baby should be delayed until after the first 24 hours of birth to prevent the risk of hypothermia. With respect to adopting a good bathing practice, the result shows only 16.6% of the sample women bathed their newborn baby 24 hours after birth. A majority (83%) bathed their newborn baby before 24 hours of birth and three women (0.3%) hadn't bathed their newborn at the time of interview or the baby died soon after birth. See Figure 5.12.



5.2 Distribution of safe cord cutting practice by the study variables

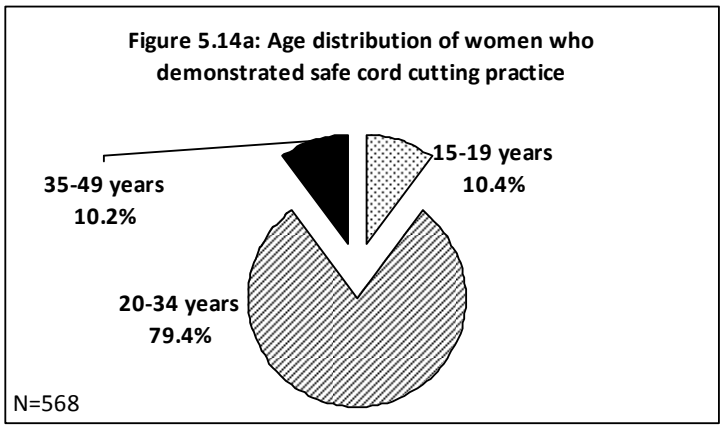
Safe cord cutting here means cutting the umbilical cord of the newborn baby with an instrument from the CHDK, a new blade or a boiled blade. In the analysis for safe cord cutting, only those women who used safe instruments or unsafe instruments to cut the cord have been included. Those women who could not recall the type of instrument that was used to cut the umbilical cord of their baby have been excluded from the analysis. Therefore, of the 815 women who were the study samples, data of only 803 women were analysed for safe cord cutting and data of 12 women have been discarded. It was found that the majority (70.7%, N=568) of the 803 women adopted safe cord cutting practices while a considerable (29.3%) did not adopt safe cord cutting practice. See Figure 5.13.

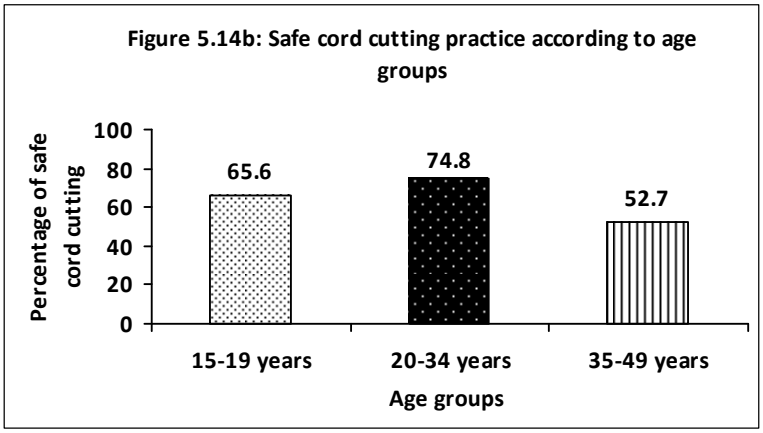


5.2.1 Socio-demographic factors and safe cord cutting practice

5.2.1.1 Age

Eight out of ten women (79.4%) who cut the cord of their newborn baby with an instrument from a CHDK, a new blade or a boiled blade were aged between 20-34 years, which is the prime childbearing age. The proportion of women younger than the prime childbearing age was 10.4% and older than the prime childbearing age was 10.2%. See Figure 5.14a.

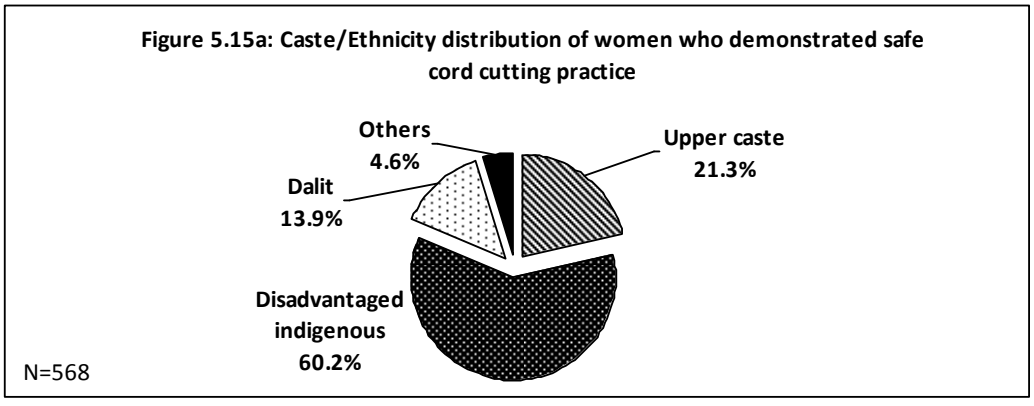




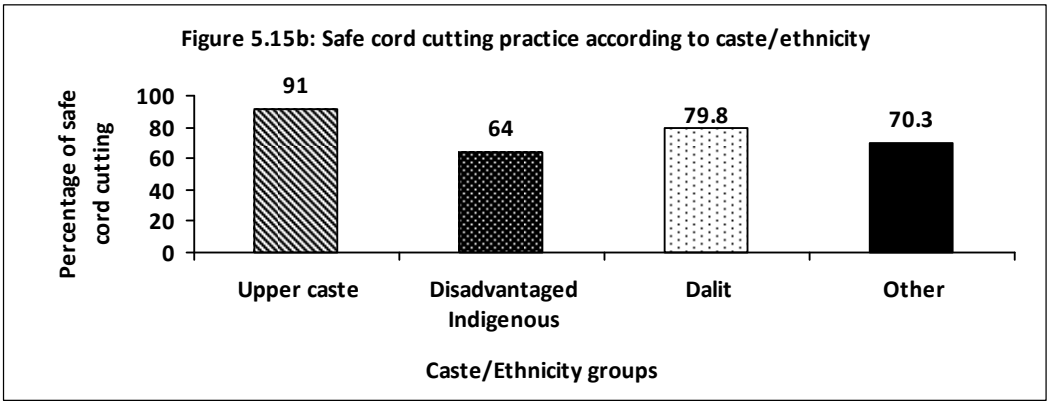
The chi-square test was performed to test whether cord cutting has a significant relation with the age of the women. The result found a significant relation between mother's age and cord cutting practice, χ^2 (2, N=803) = 23.1 at p<0.001. Figure 5.14b shows the distribution of safe cord cutting practices within the different age groups. Three-quarters (74.8%) of the women who were aged 20-34 years cut the cords of their babies with a safe instrument whereas only about two-thirds (65.6%) and about half (52.7%) of the women who were aged 15-19 years and 35-49 years respectively cut the cords with a safe instrument. Overall, the findings show that safe cord cutting is most widespread among women aged 20-34 years.

5.2.1.2 Caste/Ethnicity

With respect to caste/ethnicity, results reveal that three-fifths of the women (60.2%) who adopted safe cord cutting were from the disadvantaged indigenous caste/ethnicity group, one-fifth (21.3%) were from the upper caste/ethnicity group, a considerable 13.9% were from the dalit caste/ethnicity group and a few (4.6%) were from the 'others' caste/ethnicity group. See Figure 5.15a.

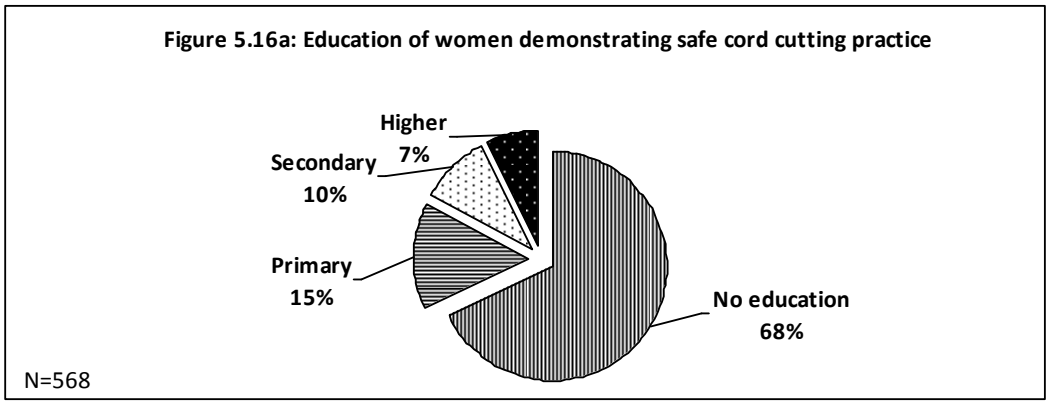


The chi-square test was carried out to test whether cord cutting has a significant relation with caste/ethnicity of the mother. The result found a significant difference in cord cutting practice by the caste/ethnicity of the mothers, χ^2 (3, N=803) = 41.8 at p<0.001. Figure 5.15b shows the cross tabulation result between safe cord cutting practice and age. Within the different caste/ethnicity groups, safe cord cutting was greatest (91%) in the upper caste/ethnicity group. Eight out of ten Dalit women (79.8%), seven out of ten 'other' caste/ethnicity women (70.3%), and six out of ten disadvantaged indigenous caste/ethnicity group women (64%) also demonstrated safe cord cutting.



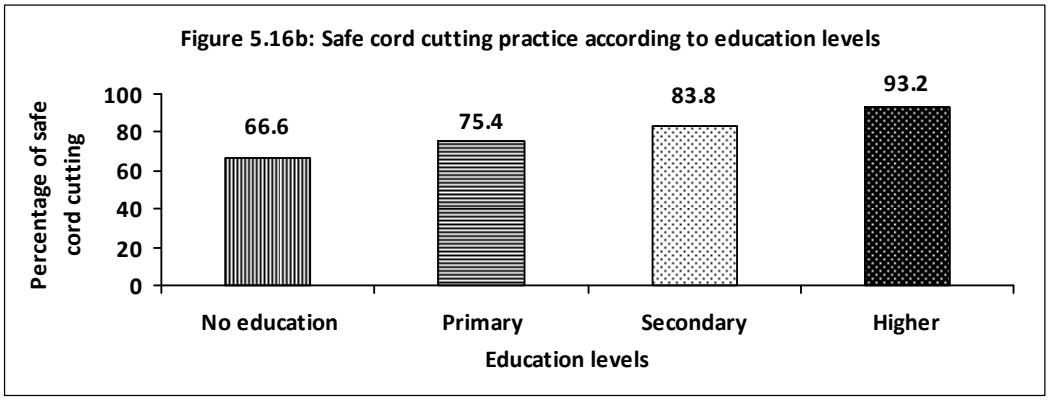
5.2.1.3 Education

With regard to education, Figure 5.16a shows that two-thirds of the women (67.7%) who performed safe cord cutting of their newborn baby were not educated. A quarter of women were primary or secondary level educated (primary-15.1% and secondary-10%) and very few women were higher level educated (7.2%).



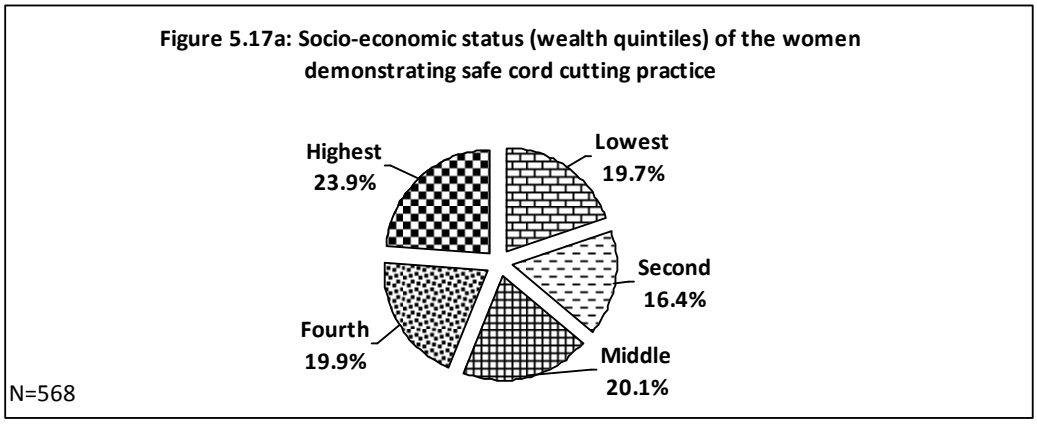
The chi-square test was performed to test whether cord cutting has a significant association with mothers' education. The result found a significant association between mothers' education

and cord cutting practice, χ^2 (3, N=803) = 22.4 at p<0.001. The cross tabulation result between safe cord cutting practice and education also shows that among the women who attained higher education level, the great majority (93.2%) demonstrated safe cord cutting. As the level of education decreased, the proportion of women demonstrating safe cord cutting also decreased. Among the uneducated women, only two-thirds (66.6%) demonstrated safe cord cutting. See Figure 5.16b.

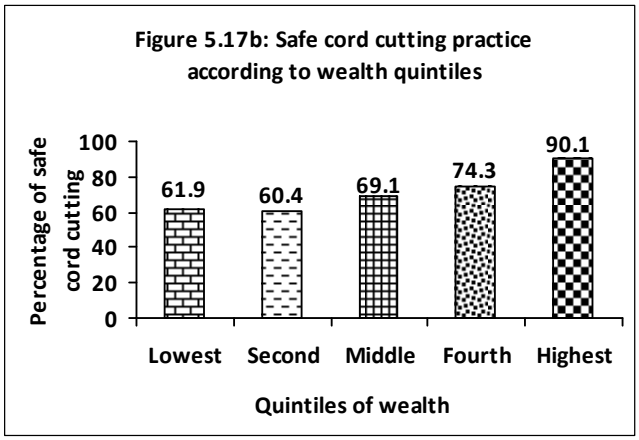


5.2.2 Socio-economic status and safe cord cutting practice

With respect to SES, among the women who adopted a safe cord cutting practice of their newborn, the greatest proportion (23.9%) belonged to the highest wealth quintile. The proportions of women in the middle (20.1%), the fourth (19.9%) and the lowest quintiles (19.7%) were almost equal. The smallest proportion of women (16.4%) belonged to the second wealth quintile. See Figure 5.17a.



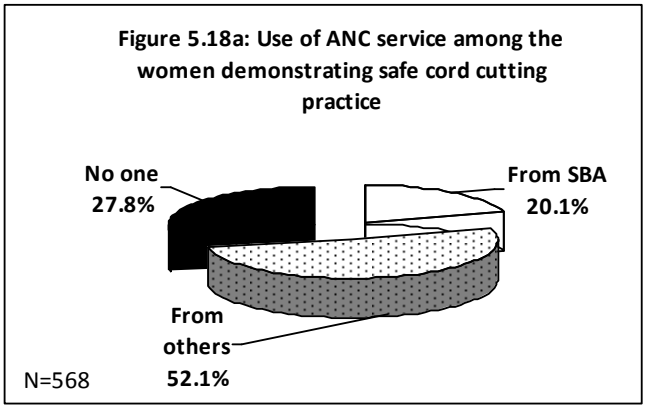
The chi-square test was carried out to test whether cord cutting has a significant association with SES and the result found a significant difference in cord cutting practice by SES, χ^2 (4, N=803) = 43.2 at p<0.001. The data for the distribution of safe cord cutting practice within the wealth quintiles reveal that 90.1% of the women belonging to the highest wealth quintiles adopted safe cord cutting, which is the greatest proportion among all the wealth quintiles. The smallest proportion of women (60.4%) that demonstrated safe cord cutting amongst the wealth quintiles was within the second wealth quintile. Data also show that as the wealth quintiles increased from the second to the highest, the proportion of women demonstrating safe cord cutting within the quintiles also increased from smallest to the greatest. Refer to Figure 5.17b. These results suggest that safe cord cutting practice is more likely to be adopted by the richer women.



5.2.3 Use of maternal health services and safe cord cutting practice

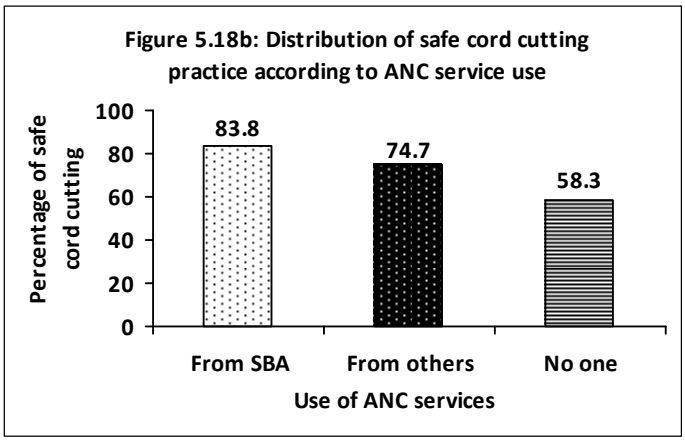
5.2.3.1ANC Service

Receiving ANC services from a SBA was not common among the women who cut the cord of their newborn with an instrument from a CHDK, a new blade or a boiled blade (Figure 5.18a). Only two out of ten women (20.1%) who adopted a safe cord cutting practice received ANC from a SBA while about half (52.1%) received ANC from other people. More than a quarter (27.8%) of the women did not receive ANC at all.



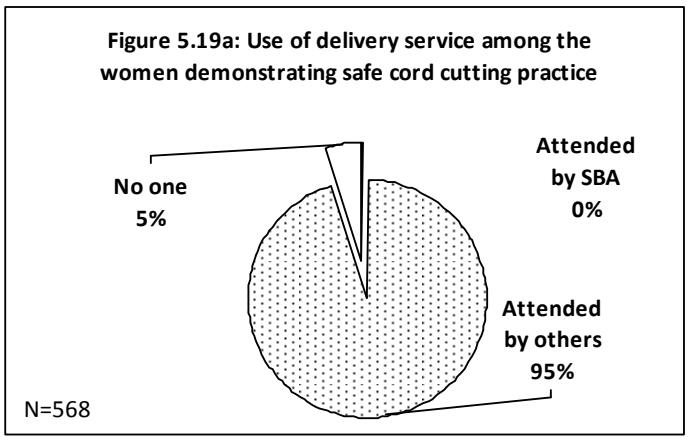
The chi-square test was performed to test whether cord cutting practice has a significant association with utilization of ANC services. A statistically significant association was found

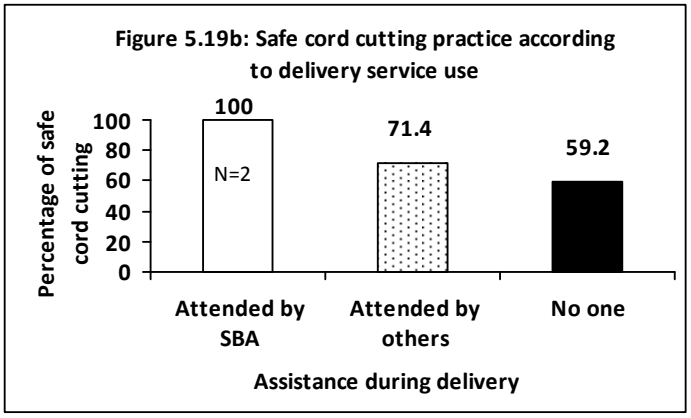
between use of ANC service and cord cutting from the chi-square test, χ^2 (2, N=803) = 34.5 at p<0.001. With respect to the distribution of safe cord cutting practice among the women who received ANC, Figure 5.18b reveals that about four-fifths (83.8%) of the women who received ANC from SBAs cut the cord of their baby using a safe instrument compared to three-quarters (74.7%) of the women who received ANC from other providers and three-fifths (58.3%) of the women who did not receive ANC at all. These findings show that safe cord cutting is most prevalent among those women who received ANC service from SBAs.



5.2.3.2 Delivery Service

With respect to receiving assistance during delivery, almost all women (94.5%) received the assistance of persons other than a SBA during delivery. Only two women (0.4%) who performed safe cord cutting of their newborn were assisted by a SBA during delivery while 5.1% were not assisted by anyone during delivery. See Figure 5.19a.





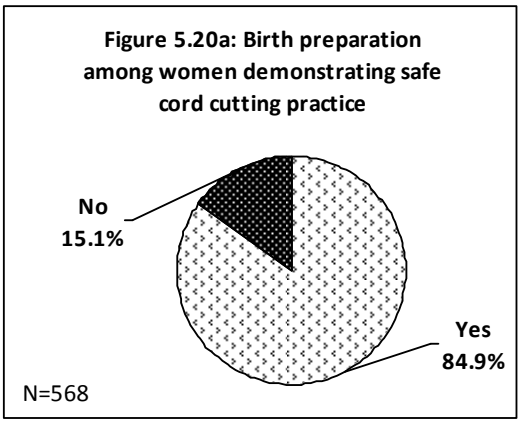
Both the two women whose deliveries were attended by SBA used a safe instrument to cut the cord. Seven out of ten

women (71.4%) whose deliveries were attended by other persons and six out of ten women (59.2%) whose deliveries were not assisted at all also used a safe instrument to cut the cord of their newborn baby. Refer to Figure 5.19b.

Overall the SBA assistance to all women was exceptionally low. Therefore, no statistically significant association between use of delivery service and cord cutting was found from the chi-square test.

5.2.4 Birth preparedness and safe cord cutting practice

Figure 5.20a shows that preparing for birth during pregnancy was commonly practised among the women who demonstrated safe cord cutting in the study areas. Out of the 568 women who adopted safe cord cutting practice for their newborn baby, an overwhelming 84.9% claimed that they made one or more preparations for birth during their pregnancy. The remaining women (15.1%) did not claim that they made such preparations.



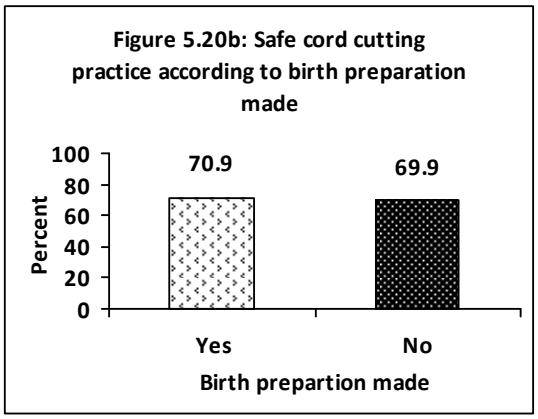


Figure 5.20b shows that there was not much difference in the proportions of women who used safe instruments to cut the cord among those who made birth preparation and among those who did not. Seven out of ten women (70.9%) who claimed to make birth preparations used safe instruments for cord cutting. Surprisingly, 69.9% of women who did not claim to make birth preparations also used a safe instrument for cord cutting. The chi-square test was carried out to test whether cord cutting was significantly associated with birth preparation made during pregnancy. The result showed that there is no statistically significant association between making birth preparations and cord cutting practice.

5.2.5 Mothers' knowledge and safe cord cutting practice

Table 5.3 displays the distribution of safe cord cutting practice by the mothers' knowledge of specific newborn care issues and is further discussed below.

5.2.5.1 Delivery cleans

The chi-square test was performed to see whether cord cutting has a significant relation with mother's knowledge of delivery cleans. The result found a statistically significant association between mothers' knowledge of delivery cleans and cord cutting practice overall, χ^2 (2, N=803) = 6.3 at $p<0.05$. The cross tabulation analysis between knowledge of delivery cleans and safe cord cutting practice found that about two-thirds of the women (64.4%) who adopted safe cord cutting practices for their newborn baby had knowledge of 1 to 3 things that needed to be kept clean during delivery of the baby, 29.4% had knowledge of four or more things that needed to be kept clean during delivery while a few women (6.2%) did not have knowledge of any of the things that needed to be kept clean during delivery.

Table 5.3 also shows that the proportions of women who used safe instruments to cut the cord of their baby by the knowledge levels of women. It shows that there is not much difference in the proportion of women who demonstrated safe cord cutting among the women who had knowledge of four or more delivery cleans (75.6%) and among the women who had knowledge of 1 to 3 delivery cleans (70.0%). However, smaller proportion of women (59.3%) who did not know any of the delivery cleans demonstrated safe cord cutting.

5.2.5.2 Newborn bathing

Among mothers who adopted safe cord cutting, about a quarter (23.1%) also knew that newborns should be bathed 24 hours after birth while a majority of the women (71.0%) said that newborns should be bathed before 24 hours after birth. Some women (6.0%) did not know when a newborn should be bathed.

The chi-square test was carried out to test whether cord cutting practice was significantly associated with mother's knowledge of newborn bathing. The result found a significant association between mothers' knowledge of newborn bathing and cord cutting, χ^2 (2, N=803) = 20.5 at $p<0.001$. Among the women who had correct knowledge of newborn bathing, a majority (81.9%) used a safe instrument to cut the cord. A higher proportion of the women (69.7%) who said that newborn baby should be bathed before 24 hours after birth compared to

those (52.3%) who did not know the bathing time at all also used a safe instrument to cut the cord of their newborn.

5.2.5.3 Early breastfeeding

Among mothers who adopted safe cord cutting, nearly half (46.3%) said that the newborn should be put to the breast within an hour of birth, one-third (32.4%) said that the newborn should be breastfed after bathing the child or after 24 hours of birth, and one-fifth (20.1%) said that baby should be breastfed after the placenta is out. Seven women (1.2%) did not have any idea of the breastfeeding time.

The chi-square test was performed to test whether cord cutting practice has a significant associated with mother's knowledge of breastfeeding. The result revealed a statistically significant association between mothers' knowledge of breastfeeding and cord cutting, χ^2 (3, N=803) = 11.3 at $p<0.05$. Cross tabulation results between knowledge of early breastfeeding and safe cord cutting practice showed that there was not much difference in the proportions of women who cut the cord using a safe instrument between those women having correct knowledge of early breastfeeding (72.7%) and those women having incorrect knowledge of breastfeeding (after the placenta is out-74.5%; after bathing/after 24 hours of birth-68.1%). But the difference was great for women who had no idea of early breastfeeding (38.9%).

Table 5.3: Safe cord cutting practice and mothers' knowledge on specific newborn care issues

Mothers' knowledge of		Knowledge among women demonstrating safe cord cutting	Safe cord cutting according to knowledge levels
Delivery cleans	**Number**	**Percent**	**Percent**
Do not know any of the cleans	35	6.2	59.3
Know 1-3 cleans	366	64.4	70.0
Know 4 or more cleans	167	29.4	75.6
Newborn bathing time			
After 24 hours	131	23.1	81.9
Before 24 hours	403	71.0	69.7
Do not know	34	6.0	52.3
Early breastfeeding			
Immediately after birth	263	46.3	72.7
After the placenta is out	114	20.1	74.5
After bathing child/After 24 hours of birth	184	32.4	68.1
Do not know	7	1.2	38.9
Newborn danger signs			
Do not know any of the signs	3	0.5	60.0
Know 1-3 danger signs	437	76.9	70.3
Know 4 or more danger signs	128	22.5	72.7
Total	**568**	**100.0**	**70.7**

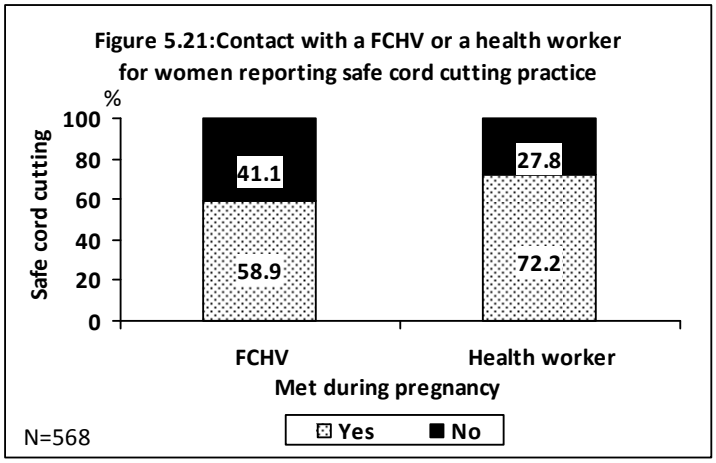
5.2.5.4 Newborn danger signs

Of the 568 women who used an instrument from CHDK, a new blade or a boiled blade for cord cutting of their newborn baby, about three quarters (76.9%) had knowledge of 1-3 newborn danger signs and about one-quarter (22.5%) had knowledge of four or more danger signs. Three women (0.5%) did not have knowledge of any danger signs in the newborn.

With regard to the distribution of safe cord cutting within the three categories of knowledge level of newborn danger signs, it is clear from Table 5.3 that there is not much difference in the proportion of women cutting the cord with a safe instrument between women having knowledge of 1-3 danger signs (70.3%) and women having knowledge of four or more danger signs (72.7%). The chi-square test did not find a statistically significant association between mothers' knowledge of newborn danger signs and cord cutting practice.

5.2.6 Advice from a FCHV and counselling from a health worker and safe cord cutting practice

The results show that out of the 568 women who used a safe instrument to cut the cord of their newborn, three-fifths (58.9%) reported that they met a FCHV during their pregnancy while the remaining two-fifths (41.1%) of them did not report meeting a FCHV during their pregnancy. About three-quarters of the women (72.2%) who cut the cord of their baby with a sterile instrument also claimed that they met a health worker during their pregnancy while the remaining (27.8%) did not claim that they met a health worker during their pregnancy. Refer to figure 5.21.

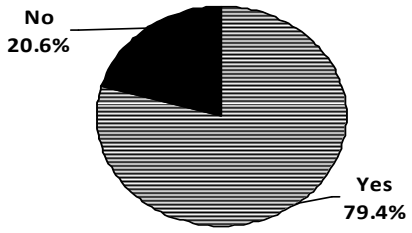


5.2.6.1 FCHV's advice

With regard to receiving advice from a FCHV on using a CHDK during pregnancy, the results reveal that among those women who met a FCHV during their pregnancy and demonstrated safe cord cutting, one-fifth (20.6%) reported that they were advised by a FCHV about using a CHDK and a four-fifths (79.4%) reported that they were not advised (includes four women who could not remember whether they were advised or not). See Figure 5.22a.

The chi-square test was performed to test whether cord cutting has a significant relation with FCHV's advice on using a CHDK. The test found a statistically significant relation between a FCHV's advice on using a CHDK and cord cutting practice [χ^2 (2, N=803) = 13.2 at p<0.01].

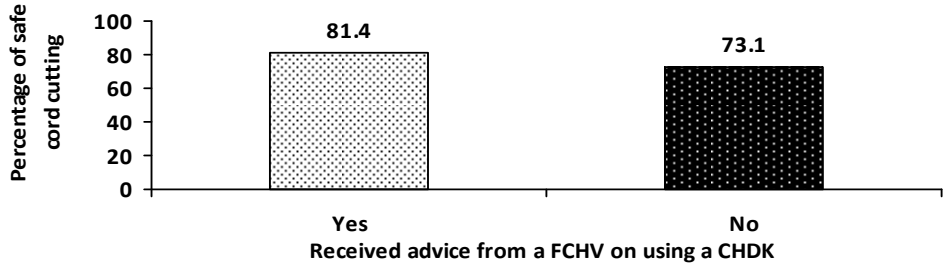
Figure 5.22a: Women receiving advice from a FCHV on using CHDK among the women meeting a FCHV and demonstrating safe cord cutting practice



Note: The category 'No' included four 'do not know' responses

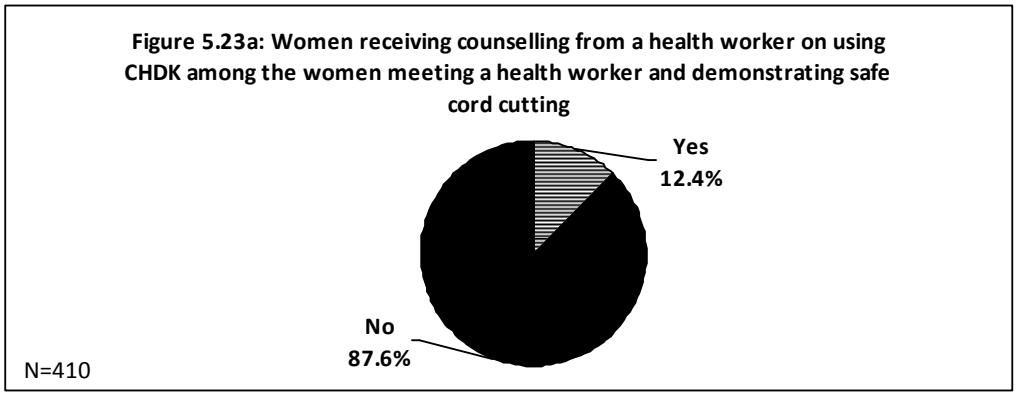
Figure 5.22b shows the difference in the proportions of women who cut the cord of their baby using safe instruments among those who were advised by a FCHV about using a CHDK. Eight out of ten women who were advised by FCHV about using CHDK (81.4%), demonstrated safe cord cutting. Interestingly nearly three-quarters of those women who were not advised about using CHDK (73.1) also demonstrated safe cord cutting.

Figure 5.22b: Safe cord cutting practice according to receiving advice from a FCHV on using CHDK



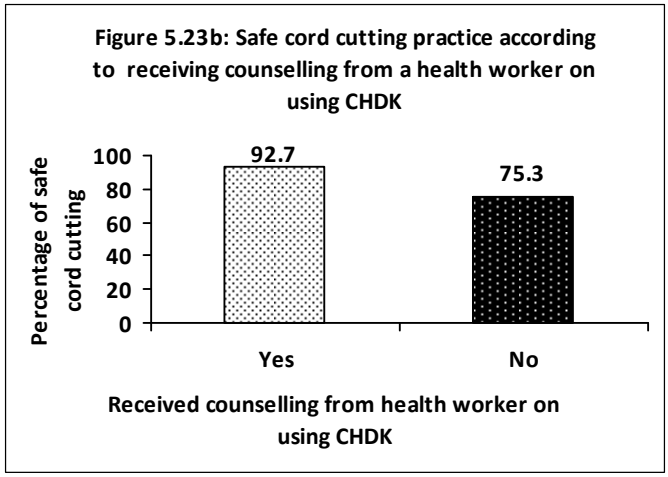
5.2.6.2 Health worker's counselling

With respect to receiving counselling on using CHDK from a health worker during ANC visits among the women who met a health worker and demonstrated safe cord cutting, results reveal that only 12.4% were counselled about using a CHDK during delivery and the majority (87.6%) were not counselled (also includes five women who could not recall whether they were counselled or not). See Figure 5.23a.



Note: The category 'No' included five 'do not know' responses

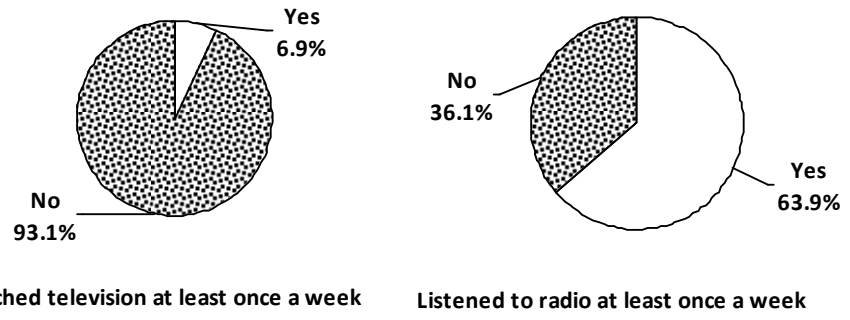
The chi-square test was performed to test whether cord cutting has a significant association with receiving counselling from a health worker. The result revealed that there is a statistically significant difference in cord cutting practice by receiving counselling from a health worker about using CHDK [χ^2 (2, N=803) = 37.8 at p<0.001]. Figure 5.23b shows that 92.7% of the women who were counselled by a health worker about using CHDK demonstrated safe cord cutting. The figure also shows that of the women who were not counselled by a health worker about using CHDK, 75.3% also demonstrated safe cord cutting.



5.2.7 Exposure to media and safe cord cutting practice

With regard to exposure to media, results show that listening to radio is more common than watching television among the women who used a sterile instrument to cut the cord of their newborn baby. It was found that 6.9% watched television at least once a week while an overwhelming (93.1%) did not watch television at least once a week. Nearly two-thirds (63.9%) of women who demonstrated safe cord cutting listened to radio at least once a week while about one-third (36.1%) did not do so. See Figure 5.24a.

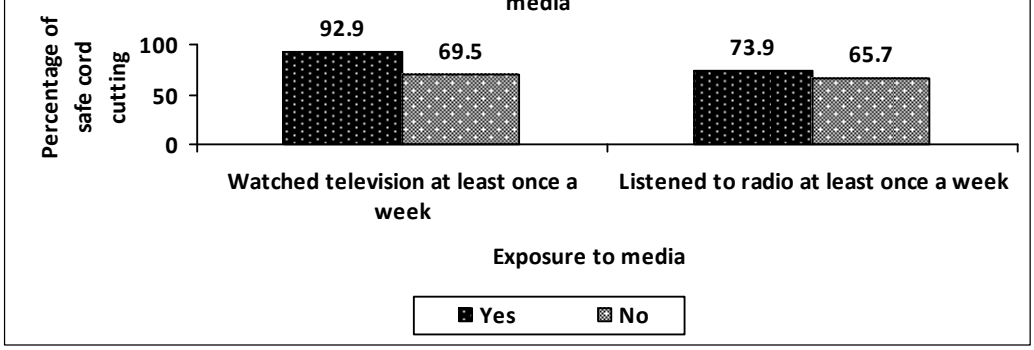
Figure 5.24a: Exposure to media among women demonstrating safe cord cutting practice



N=568

The chi-square test was carried out to test whether cord cutting has a significant relation with watching television and listening to radio. The results found a statistically significant association between watching television weekly and cord cutting [χ^2 (1, N=803) = 10.4, $p<0.01$] and between listening to radio weekly and cord cutting [χ^2 (1, N=803) = 6.2, $p<0.05$]. Figure 5.24b shows that compared to women who did not watch television on weekly basis (69.5%), a much greater proportion of women who watched television on weekly basis (92.9%) adopted safe cord cutting. Likewise, compared to women who did not listen to radio on weekly

Figure 5.24b: Safe cord cutting practice according to women's exposure to media

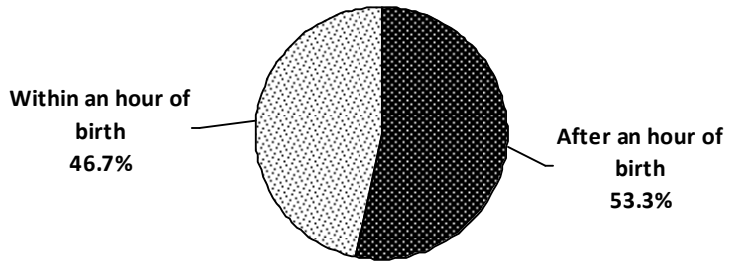


basis (65.7%), a slightly greater proportion of women who listened to radio on weekly basis (73.9%) adopted safe cord cutting.

5.3 Distribution of early breastfeeding practice by the study variables

Early breastfeeding here means breastfeeding a newborn baby with an hour of birth. Out of the 815 women who were the sample population of the study, 810 were analysed for early breastfeeding practice because they demonstrated either early or late breastfeeding. The data of the remaining five women were not included in the analysis because they could not remember when they first breastfed their baby. Out of the 810 women, 378 (46.7%) breastfed their newborn within an hour of birth (good breastfeeding practice) while 432 (53.3%) breastfed their newborn baby after the first hour of birth (inappropriate breastfeeding practice). See Figure 5.25.

Figure 5.25: Breastfeeding practice among the sample population

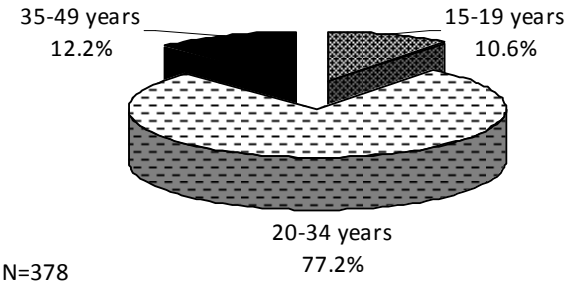


5.3.1 Socio-demographic characteristics and good breastfeeding practice

5.3.1.1 Age

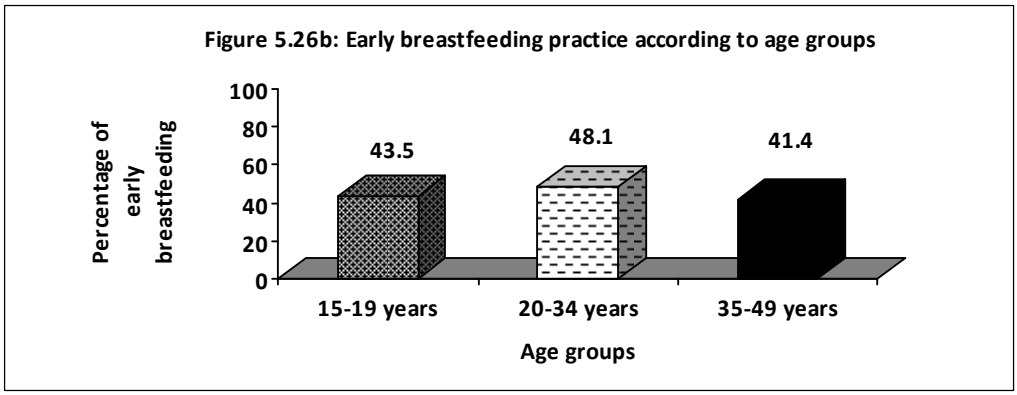
Figure 5.26a shows that out of the 378 women who breastfed their newborn baby within an hour of birth, more than three-quarters (77.2%) were aged between 20-34 years; 12.2% were aged above 35 years and 10.6% were aged below 19

Figure 5.26a: Age distribution among the women demonstrating early breastfeeding practice



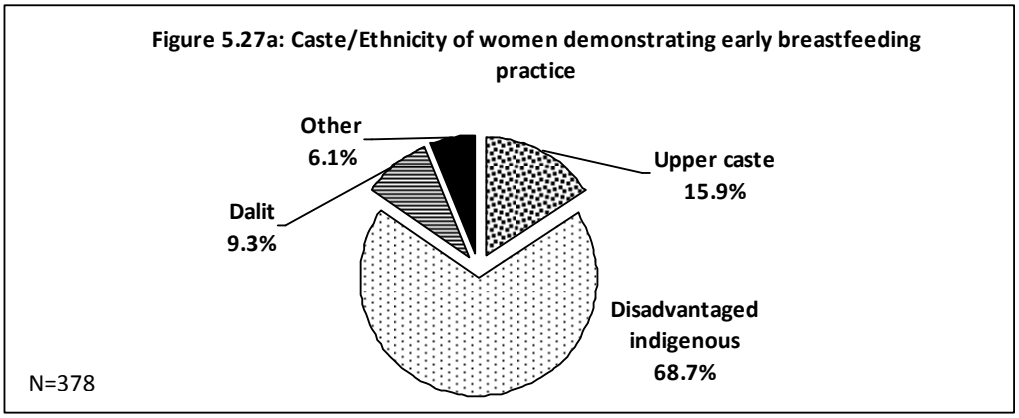
years.

There was not much difference in the proportions of women who breastfed their babies early among all the women aged 20-34 years (48.1%), 15-19 years (43.5%) and 35-49 years (41.4%). See Figure 5.26b. The chi-square test was also performed to test whether breastfeeding practice has a significant relation with mother's age. The result did not find a statistically significant relation between mother's age and breastfeeding practice.

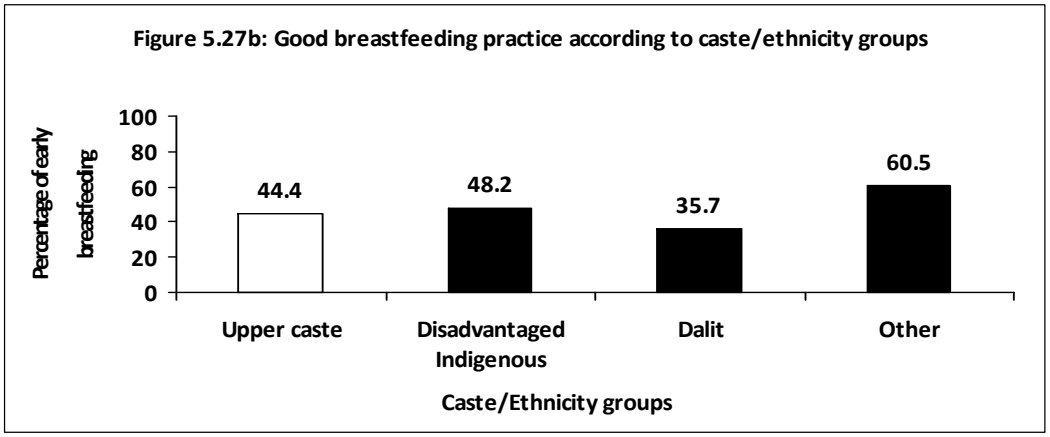


5.3.1.2 Caste/Ethnicity

With respect to caste/ethnicity, Figure 5.27a shows that nearly two-thirds (68.7%) of the women who performed good breastfeeding practice belonged to the disadvantaged indigenous caste/ethnic group, 15.9% belonged to the upper caste/ethnic group, 9.3% belonged to the dalit caste/ethnic group and the remaining 6.1% belonged to 'others' caste/ethnic group.



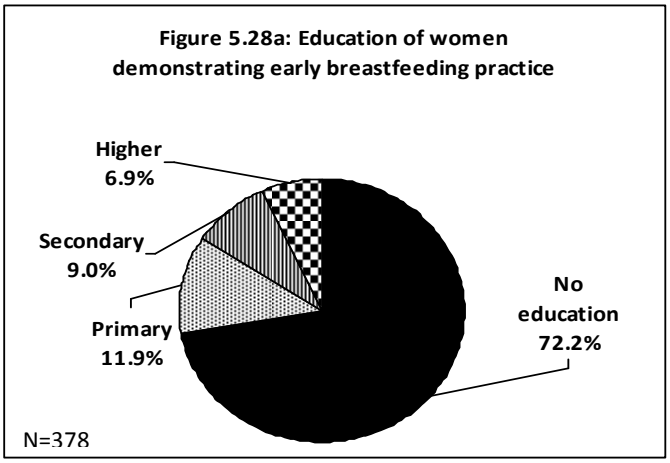
The chi-square test was carried out to test whether breastfeeding practice has a significant association with caste/ethnicity and the result revealed a significant association between caste/ethnicity and breastfeeding practice, χ^2 (3, N=810) = 8.4, p<0.05. Figure 5.27b shows that within the caste/ethnic categories, the greatest proportion of early breastfeeding practice was demonstrated by the 'others' caste group (60.5%). About half of the disadvantaged indigenous caste/ethnic group (48.2%), and the upper caste/ethnic group (44.4%) also demonstrated good breastfeeding. Among all the dalit caste/ethnic group women just over one third (35.7%) demonstrated early breastfeeding. See figure 5.27b.



5.3.1.3 Education

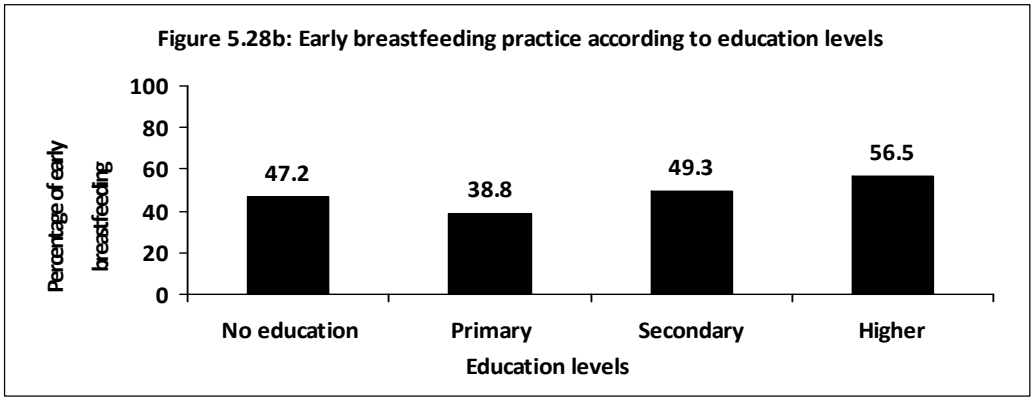
Figure 5.28a shows that seven out of ten women (72.2%) who breastfed their baby within an hour of birth were uneducated; 11.9% were primary level educated, 9.0% were secondary level educated and 6.9% were higher level educated.

Slightly more than half of the women (56.5%) who were higher level educated breastfed their babies during the first hour of birth. There was not much difference in the proportions of women who breastfed their babies during the first hour of birth between the secondary level



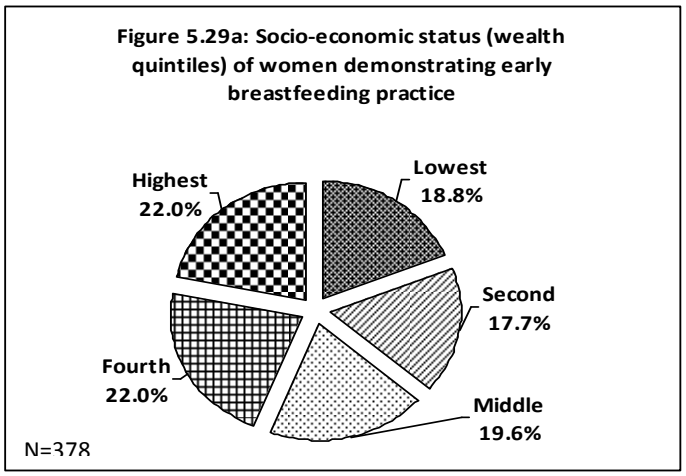
(49.3%) and uneducated women (47.2%). About two-fifths of (38.8%) women who were primary level educated also breastfed their babies during the first hour of birth. Refer to Figure 5.28b.

The chi-square test was performed to test whether breastfeeding has a significant association with education. The result revealed that there is no significant association between education and breastfeeding practice.

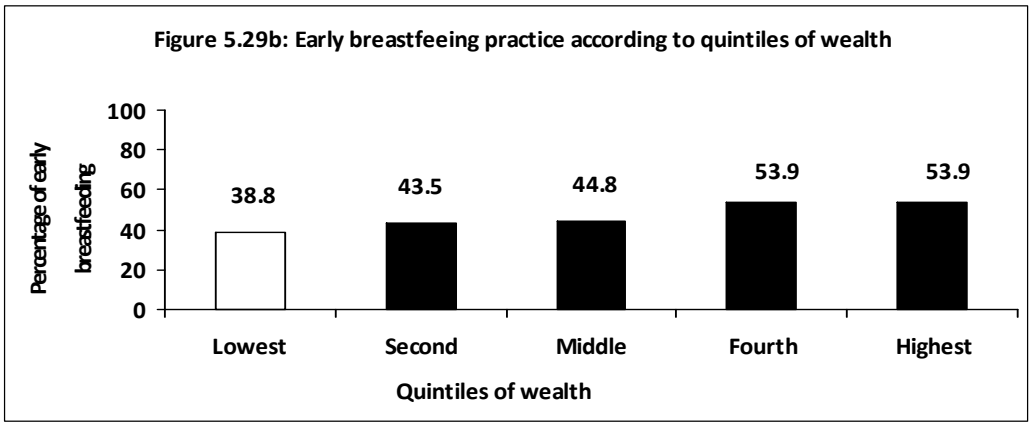


5.3.2 Socio-economic status and early breastfeeding practice

The distribution of women who breastfed their newborn within an hour of birth by the quintiles of wealth is shown in Figure 5.29a. Twenty-two percent each were in the fourth and the highest wealth quintiles, which is the greatest proportion. The proportion of women in the lowest (18.8%), the second (17.7%) and the middle (19.6%) wealth quintiles were almost equal. The findings show that nearly half of the women (44%, the fourth and the highest wealth quintiles combined) who breastfed their child early were rich in terms of household wealth possessions.



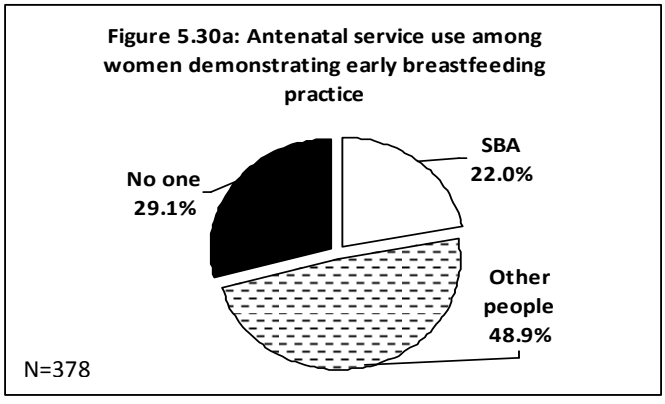
The chi-square test was performed to test whether breastfeeding practice has a significant relation with SES. The result showed that there is difference in breastfeeding practice by the SES of women, therefore indicating a significant association between the two variables, χ^2 (4, N=810) = 11.8, $p<0.05$. Figure 5.29b shows that among those women who belonged to the fourth and the highest wealth quintiles, slightly more than half (53.9%) demonstrated good breastfeeding. Nearly equal proportions of women belonging to the second (43.5%) and the middle (44.8%) wealth quintiles also demonstrated good breastfeeding while only 38.8% of the women belonging to the lowest wealth quintile demonstrated good breastfeeding.



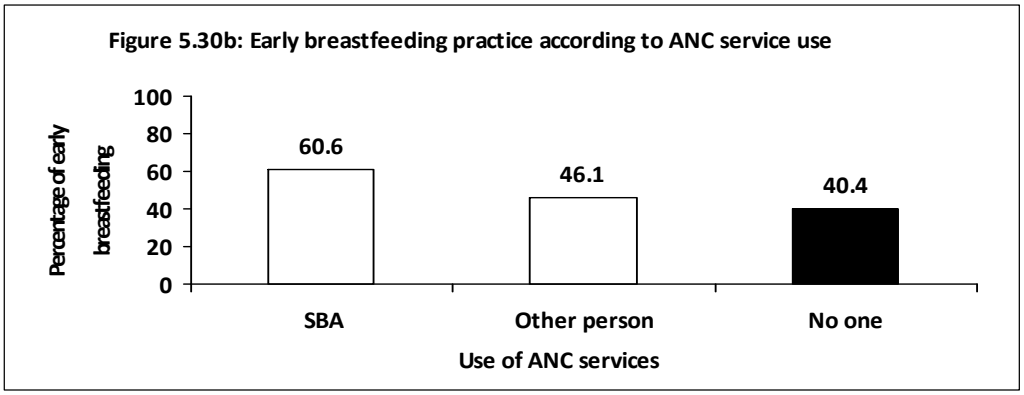
5.3.3 Use of maternal health services and early breastfeeding practice

5.3.3.1 Antenatal service

Among the women who breastfed their newborn within an hour of birth, less than a quarter (22%) received ANC from a SBA. Nearly half (48.9%) of the women received ANC from health workers other than a SBA while 29.1% did not receive ANC from anyone. See Figure 5.30a.

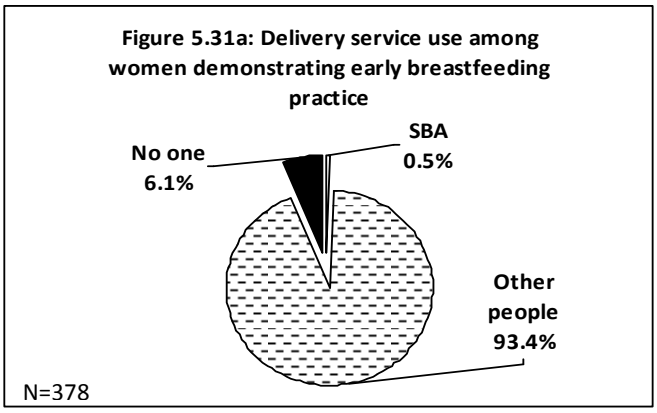


The chi-square test was performed to test whether breastfeeding practice has a significant association with antenatal service use. The result showed that there is a significant association between use of ANC services and breastfeeding, χ^2 (2, N=810) = 14.9, p<0.01. Among those women who received ANC services from SBA, three-fifths (60.6%) breastfed their babies early whereas among those who received ANC services from other providers, only about a half (46.1%) breastfed their babies during the first hour of birth. Among those who did not receive ANC at all, two-fifths (40.4%) breastfed their babies during the first hour of birth. Refer to Figure 5.30b.

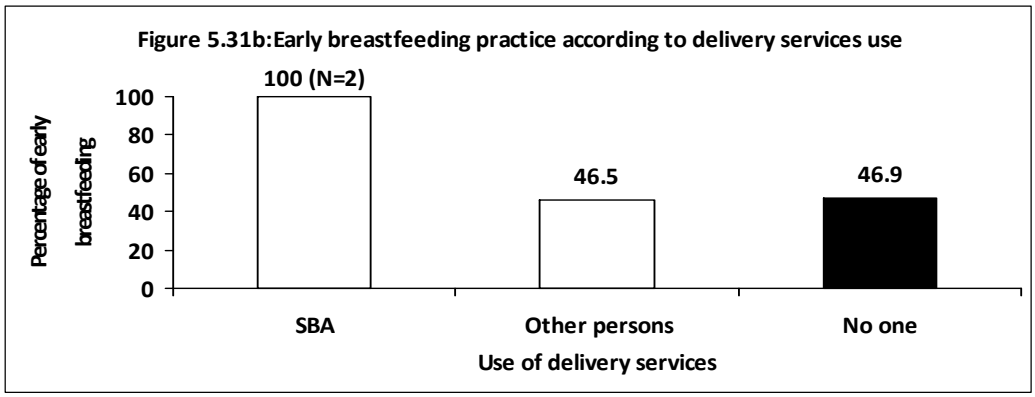


5.3.3.2 Delivery service

With regard to receiving the assistance of a SBA during delivery, it was found that only two women (0.5%) were assisted by a SBA while an overwhelming proportion (93.4%) of the women was assisted by persons other than a SBA during delivery. A few women (6.1%) were not assisted by anyone at all during delivery. See Figure 5.31a.



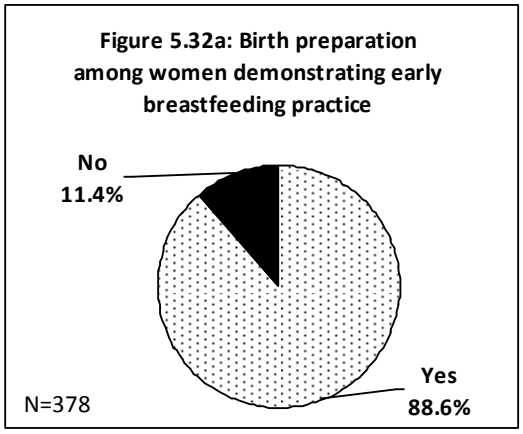
The two women who were assisted by SBAs during delivery, both breastfed their baby within the first hour of birth. Nearly half of the women who were assisted by other persons (46.5%) or were not assisted at all (46.9%) during delivery also breastfed their babies within the first hour of birth. Refer to Figure 5.31b.

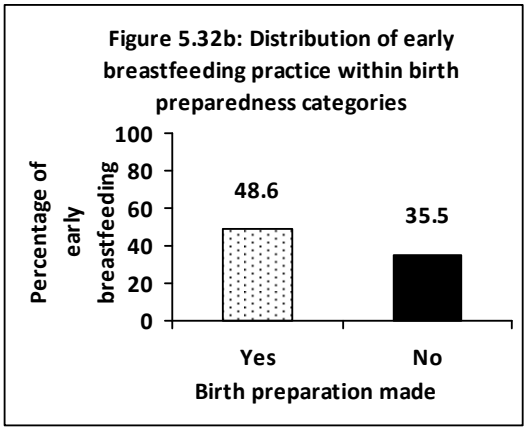


The chi-square test which was performed to test whether breastfeeding practice has a significant relation with use of delivery service showed that there is no significant association between use of delivery service and breastfeeding practice. However, it should be noted that the overall use of delivery service from SBA was very low among the women, which influenced the result.

5.3.4 Birth preparedness and early breastfeeding practice

The chi-square test showed that there is a significant difference in breastfeeding practice by birth preparations made during pregnancy, χ^2 (1, N=810) = 7.0, p<0.01. Figure 5.32a shows that one or more preparations for birth were made by 88.6% of the women who breastfed their newborn baby within an hour of birth. The remaining (11.4%) women did not make any birth preparations. Among all the women who made one or more birth preparations, nearly half (48.6%) demonstrated good breastfeeding whereas among all the women who did not make any birth preparations, only about one-third (35.5%) demonstrated good breastfeeding. See Figure 5.32b.





5.3.5 Mothers' knowledge of newborn care issues and early breastfeeding practice

Table 5.4 shows the cross tabulation results for good breastfeeding practice and knowledge of mothers on specific newborn care issues which are further discussed below.

5.3.5.1 Delivery cleans

The chi-square test was performed to test whether breastfeeding practice has a significant association with mother's knowledge of delivery cleans. The result showed a significant relationship between mothers' knowledge of delivery cleans and breastfeeding practice, χ^2 (2, N=810) = 7.5, $p<0.05$. When the mothers' knowledge of the things to be kept clean during delivery was assessed it was found that a majority (70.4%) of the women who breastfed their newborn within an hour of birth knew 1 to 3 things that needed to be kept clean during delivery. Just over a quarter (28.6%) knew four or more things that needed to be kept clean, and four women (1.1%) did not know any of the things that needed to be kept clean during delivery.

A greater proportion of women (53.5%) among those who knew four or more delivery cleans, breastfed their baby early compared to those who knew one to three delivery cleans (44.1%). Four out of five women who did not know any delivery cleans (80%) also breastfed their baby early.

5.3.5.2 Bathing

With respect to mothers' knowledge of newborn bathing, data shows that only about a quarter (22.8%) of the women who performed good breastfeeding of their newborn knew that the baby should not be bathed until 24 hours of delivery. A majority (70.9%) said that the newborn baby should be bathed within 24 hours of delivery while a few (6.3%) did not know anything about newborn bathing.

There was not much difference in the proportions of women who breastfed their babies during the first hour of birth between those who said that baby should be bathed after 24 hours of birth (52.1%) and those who said that baby should be bathed before 24 hours of birth (46.3%). The chi-square test which was carried out to test whether breastfeeding has a significant association with mother's knowledge of newborn bathing confirmed that there is no significant association between mothers' knowledge of newborn bathing and breastfeeding.

5.3.5.3 Breastfeeding

The chi-square test was performed to test whether breastfeeding practice has a significant association with mother's knowledge of breastfeeding. The result found a significant association between mothers' knowledge of breastfeeding and breastfeeding practice, χ^2 (3, N=810) = 77.8, p<0.001. Six out of ten women (61.1%) who breastfed their baby soon after birth knew that the newborn should be breastfed within an hour of birth, but surprisingly, a considerable proportion of women (19.8%) who breastfed their baby within an hour of delivery said that baby should be breastfed after he/she is bathed or after 24 hours of birth. Furthermore, 17.2% said that the newborn should be breastfed after the placenta is delivered. Few women (1.9%) did not know the early breastfeeding time.

About two-thirds (62.8%) of the women who knew of early breastfeeding, breastfed their baby within the first hour of birth. Two-fifths (41.9%) of the women who said that the newborn should be breastfed after the placenta is out also breastfed their baby during the first hour of birth. Similarly, 28.1% of the women who said that baby should be breastfed after 24 hours of birth or after bathing him/her and 35% of those who did not know when to breastfed the baby also demonstrated early breastfeeding.

5.3.5.4 Newborn danger signs

The chi-square test was carried out to test whether breastfeeding practice has a significant association with mother's knowledge of newborn danger signs. The result revealed that there is a significant association between mothers' knowledge of newborn danger signs and breastfeeding practice, χ^2 (2, N=810) = 9.9, p<0.01. A majority of those women (72.2%) who breastfed their newborn within an hour of birth also knew 1 to 3 newborn danger signs that need attention. About a quarter (26.7%) of them knew 4 to 7 newborn danger signs and very few (1.1%) knew none of the newborn danger signs.

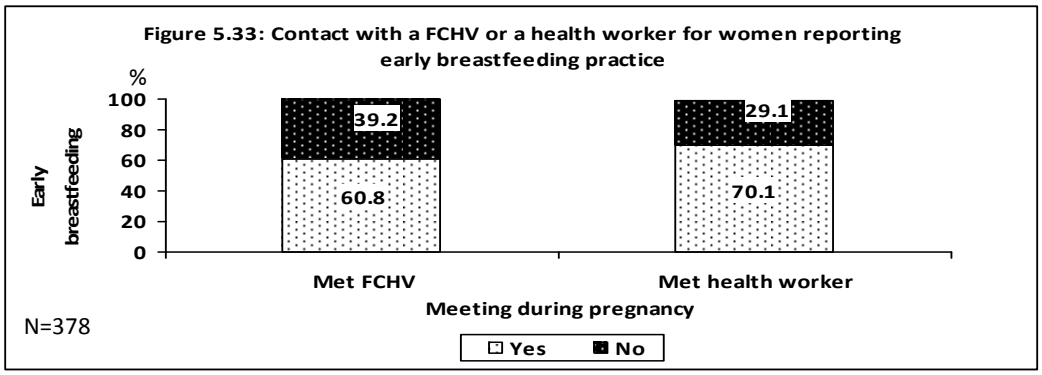
Among the women who knew of four or more danger signs of a newborn, 55.5% demonstrated early breastfeeding, whereas among those who knew of 1 to 3 danger signs, 43.8% demonstrated early breastfeeding.

Table 5.4: Early breastfeeding practice and mothers' knowledge of specific newborn care issues

Mothers' knowledge of	Number	Knowledge of women demonstrating early breastfeeding Percent	Early breastfeeding according to knowledge levels Percent
Cleanliness during delivery			
Know 1-3 cleans	266	70.4	44.1
Know 4 or more cleans	108	28.6	53.5
Do not know any of the cleans	4	1.1	80.0
Newborn bathing			
After 24 hours	86	22.8	52.1
Before 24 hours	268	70.9	46.3
Do not know	24	6.3	36.4
Early breast feeding			
Immediately after birth	231	61.1	62.8
After the placenta is out	65	17.2	41.9
After bathing child/ After 24 hours of birth	75	19.8	28.1
Do not know	7	1.9	35.0
Newborn danger signs			
Know 1-3 danger signs	273	72.2	43.8
Know 4 or more danger signs	101	26.7	55.5
Do not know any of the signs	4	1.1	80.0
Total	**378**	**100**	**46.7**

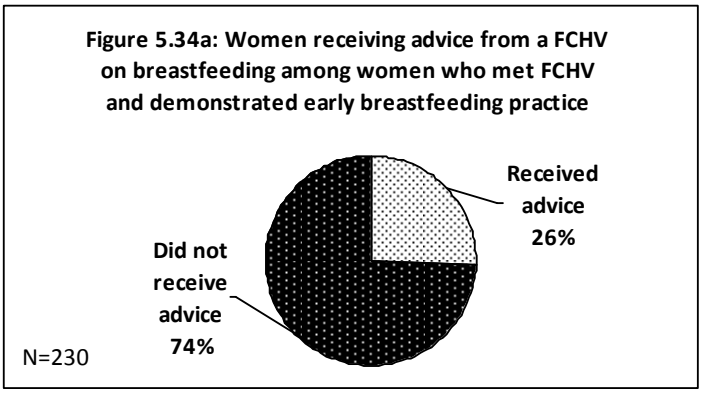
5.3.6 Advice from a FCHV and counselling from a health worker and early breastfeeding practice

Of the 378 women who breastfed their newborn baby within an hour of birth, two-fifths (39.2%) claimed that they did not meet a FCHV during their pregnancy. The remaining three-fifths (60.8%) claimed that they met a FCHV during their pregnancy. Similarly, among those women who demonstrated good breastfeeding, 29.1% claimed that they did not meet a health worker during their pregnancy and the remaining 70.9% claimed that they met a health worker during their pregnancy. See Figure 5.33.

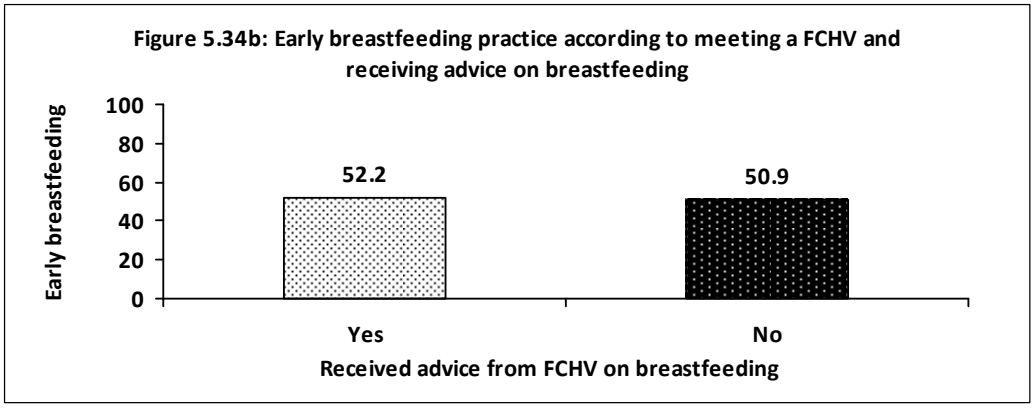


5.3.6.1 FCHV's advice

Cross tabulation results for good breastfeeding practice and receiving advice on breastfeeding shows that only a quarter (25.6%) of the women who met a FCHV during their pregnancy reported that they were advised about breastfeeding time during their pregnancy. The remaining three-quarters (74.4%) of the women reported that they were not advised about breastfeeding time. Refer to Figure 5.34a.

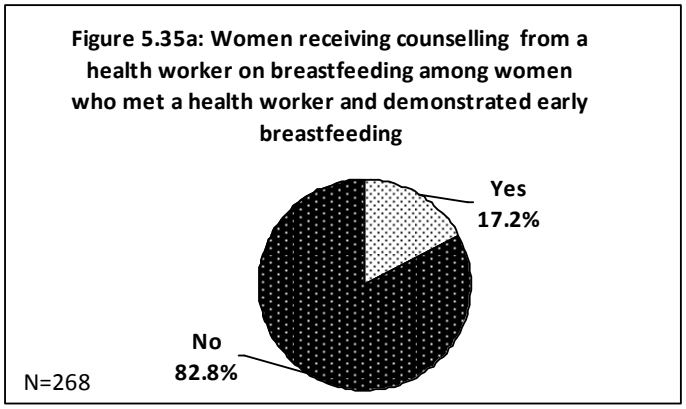


The chi-square test that was performed to test whether breastfeeding practice has a significant association with FCHV's advice on breastfeeding showed that there is a significant association between a FCHV's advice on breastfeeding and breastfeeding practice [χ^2 (2, N=810) = 8.4, $p<0.05$]. Figure 5.34b shows that there is little difference in the proportions of women who breastfed their baby during the first hour of birth between those who were advised by a FCHV on early breastfeeding (52.2%) and those who were not advised on it (50.9%).



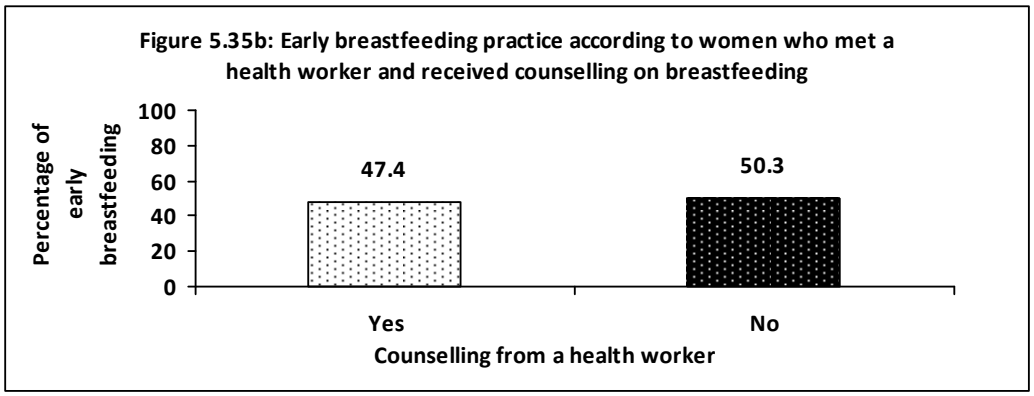
5.3.6.2 Health worker's counselling

With regard to receiving counselling from a health worker on breastfeeding during antenatal care visits, results reveal that only 17.2% of the women who met a health worker during pregnancy reported that they were counselled. The majority (82.8%) of the women reported that they were not counselled by their ANC provider on breastfeeding (includes three 'do not know' responses). See Figure: 5.35a.



Note: The category 'No' includes three 'Do not know' responses

The chi-square test was performed to test whether early breastfeeding has a significant association with counselling on immediate breastfeeding from health workers and the result revealed that there is a significant association between counselling on immediate breastfeeding from health workers and breastfeeding [χ^2 (2, N=810) = 6.6, $p<0.05$]. There was not much difference in the proportions of women who breastfed their baby early, between those who were counselled by a health worker on breastfeeding (47.4%) and those who were not counselled on it (50.3%). See Figure 5.35b.

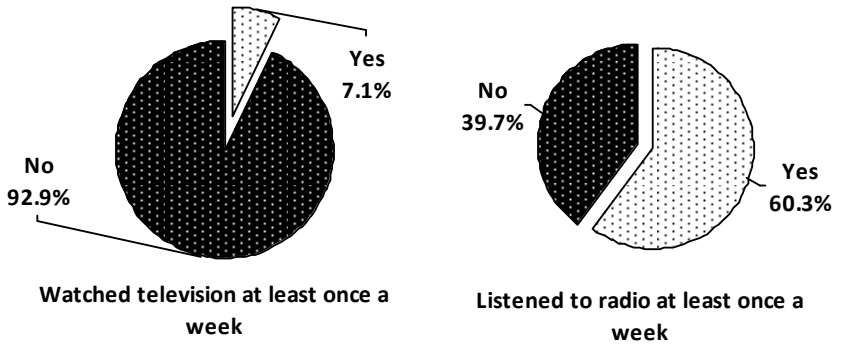


Note: The category 'No' includes three 'Do not know' responses

5.3.7 Exposure to media and early breastfeeding practice

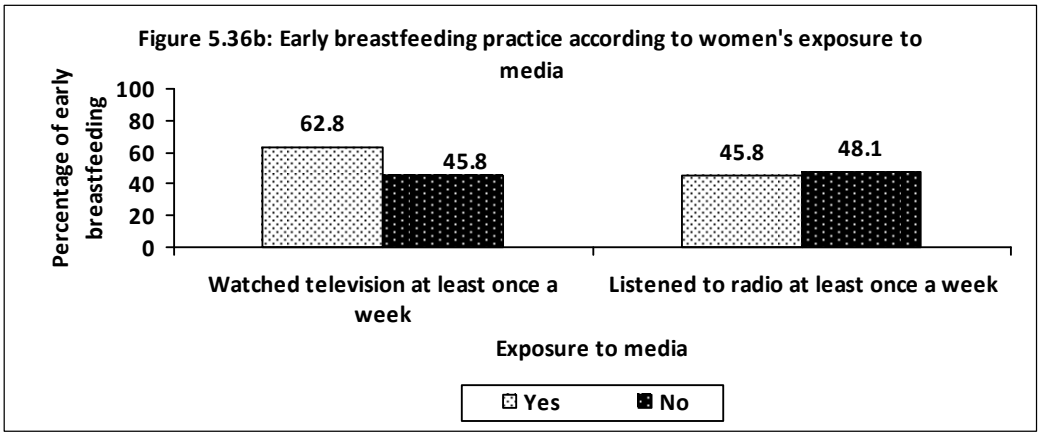
The chi-square test was performed to test whether breastfeeding practice has a significant association with watching television and listening to radio. The results found a significant association between watching television weekly and breastfeeding χ^2 (1, N=810) = 4.7, $p<0.05$ but did not find a significant association between listening to radio weekly and breastfeeding practice. With respect to the exposure to media, as can be seen in Figure 5.36a, among the women who breastfed their newborn within an hour of birth, a majority (92.9%) did not watch television at least once a week and the remaining women (7.1%) watched television at least once a week. Regarding listening to radio, six out of ten women (60.3%) who breastfed their newborn within an hour of birth listened to radio at least once a week and the remaining 39.7% did not listen to radio at least once a week.

Figure 5.36a: Proportion of women exposed to media among those who demonstrated early breastfeeding practice



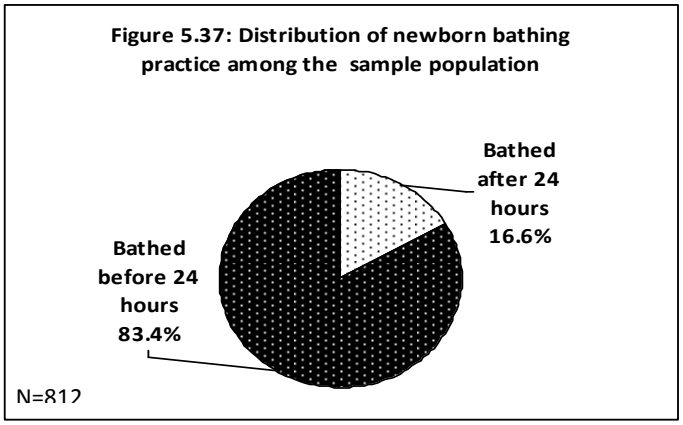
N=378

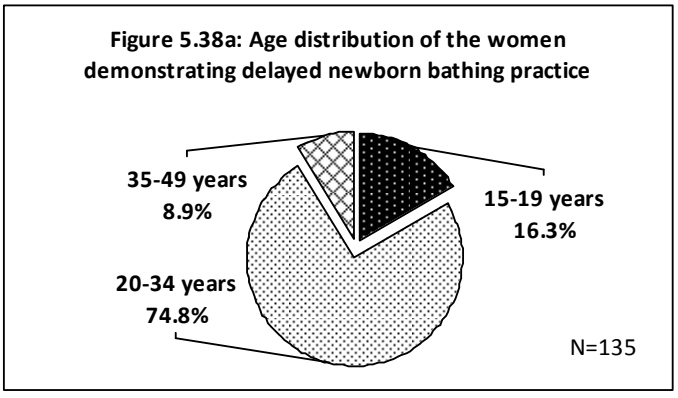
Among those women who watched television once a week, two-thirds (62.8%) demonstrated good breastfeeding compared to only 45.8% among those who did not watch television once a week. With respect to listening to radio, there was not much difference in the proportions of women breastfeeding early, between those who listened to radio at least once a week (45.8%) and those who did not (48.1%). See Figure 5.36b.



5.4 Distribution of delayed newborn bathing practice by the study variables

Delayed bathing here means bathing the newborn baby after 24 hours of birth. Among the 815 sample population, the data of 812 were also analysed for delayed bathing practice because they demonstrated either delayed bathing or early bathing. The remaining three women were not sure of the time when their newborn was first bathed; therefore, their data were not used in the analysis. Out of the 812 women whose data were analysed for good newborn bathing practice, 135 women (16.6%) reported that they bathed their newborn after 24 hours of birth and the remaining 83.4% reported that they bathed their baby before 24 hours of birth. See Figure 5.37.



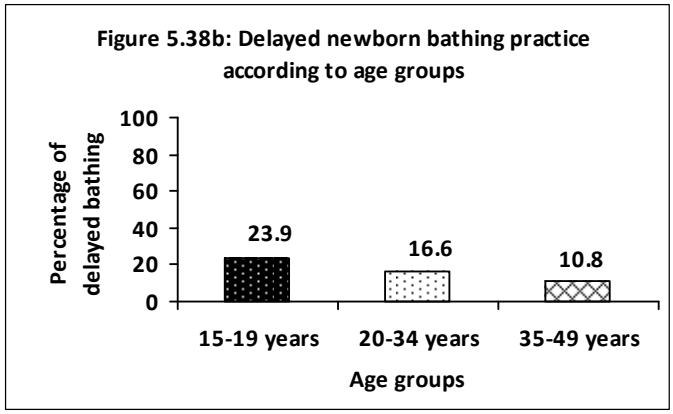


5.4.1 Socio-demographic characteristics and delayed newborn bathing practice

5.4.1.1Age

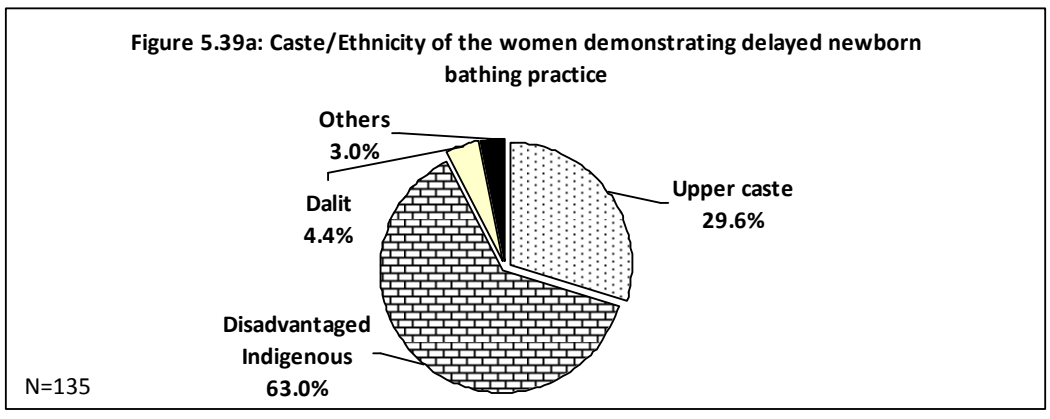
The chi-square test was performed to test whether newborn bathing practice has a significant relation with age of the mother. The result showed that there is a significant association between age of the mother and newborn bathing practice, χ^2 (2, N=812) = 6.2, p<0.05. The cross tabulation result of age and good bathing practice are shown in the Figures 5.38a and 5.38b. Figure 5.38a reveals that three-quarters (74.8%) of the women who bathed their newborn after 24 hours of birth were aged between 20 to 34 years and 16.3% were under 20 years. The remaining 8.9% of the women were above 35 years.

Figure 5.38b shows that about a quarter (23.9%) of the women who were aged 15-19 years practised good newborn bathing compared to only 16.6% and 10.8% among them aged 20-34 years and 35-49 respectively.



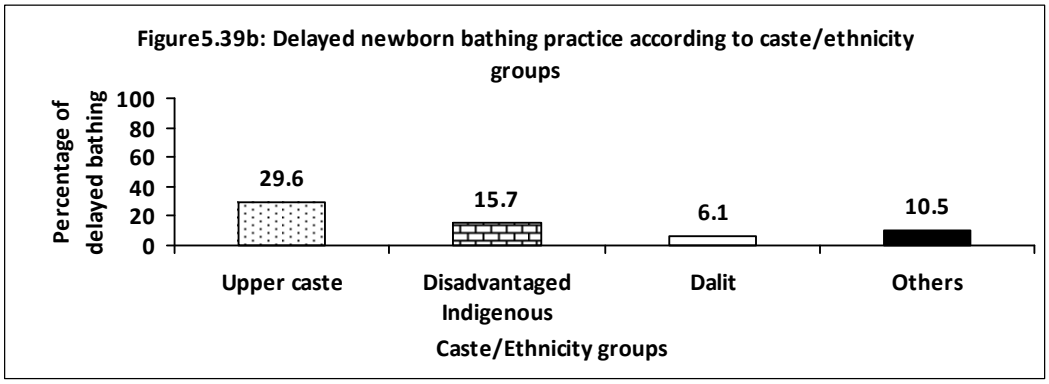
5.4.1.2 Caste/Ethnicity

The chi-square test was performed to test whether newborn bathing practice has a significant association with caste/ethnicity and the result indicated that there is a significant difference in bathing practice by caste/ethnicity, χ^2 (3, N=812) = 25.6, p<0.001. The cross tabulation results of good bathing practice with caste/ethnicity are shown in Figure 5.39a and Figure 5.39b. Figure 5.39a shows that among those women who bathed their baby after 24 hours of birth, about three-fifths (63.0%) belonged to the disadvantaged indigenous caste/ethnic group



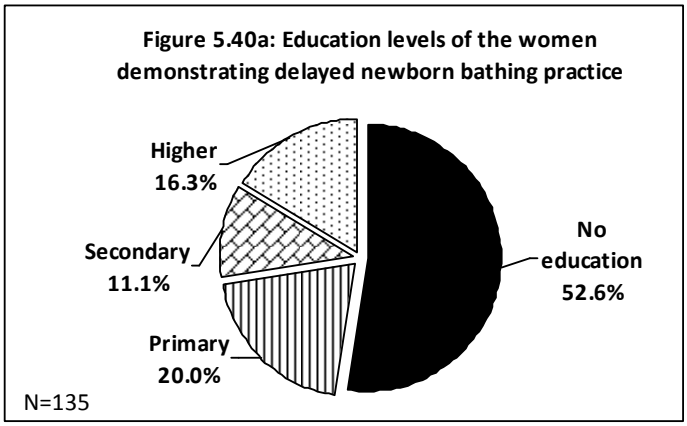
compared with only 29.6% who belonged to the upper caste/ethnic group, 4.4% who belonged to the dalit caste/ethnic group and 3.0% who belonged to 'other' caste/ethnic groups.

Three out of ten women (29.6%) who were from the upper caste/ethnic group demonstrated good newborn bathing, which is the greatest proportion amongst the caste/ethnic groups. Few dalit women (6.1%) also demonstrated good newborn bathing which was the lowest proportion amongst the caste groups. Refer to Figure 5.39b.



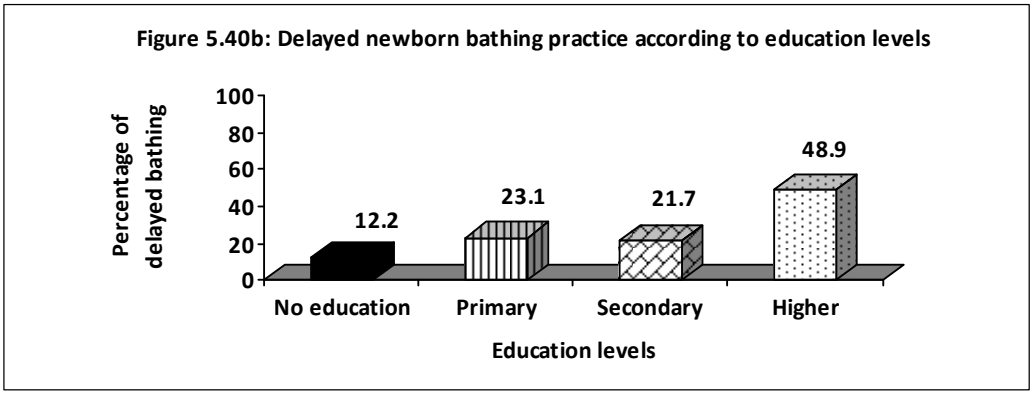
5.4.1.3 Education

With respect to education, the results reveal that among the women who bathed newborns only after 24 hours of birth, about half (52.6%) were not educated, one-fifth (20%) were primary level educated, 16.3% were higher level educated, and 11.1% were secondary level educated. See Figure 5.40.a.



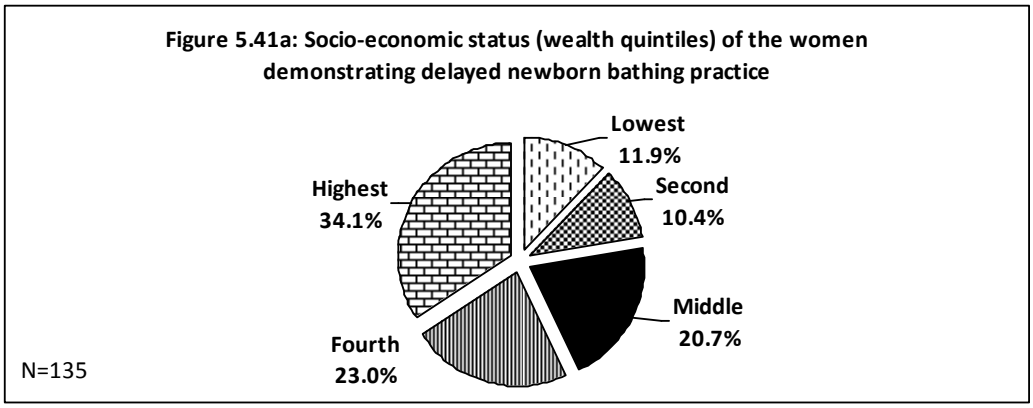
The chi-square test was carried out to test whether newborn bathing practice has a significant relation with mother's education. The result revealed a significant relation between newborn bathing practice and mother's education, χ^2 (3, N=812) = 46.7, p<0.001. Figure 5.40b shows that about half of the women (48.9%) who attained higher education demonstrated good

newborn bathing. Two out of ten women who attained primary (23.1%) and secondary levels (21.7%) of education also demonstrated good newborn bathing. Among the total of uneducated women, only 12.2% demonstrated good newborn bathing.



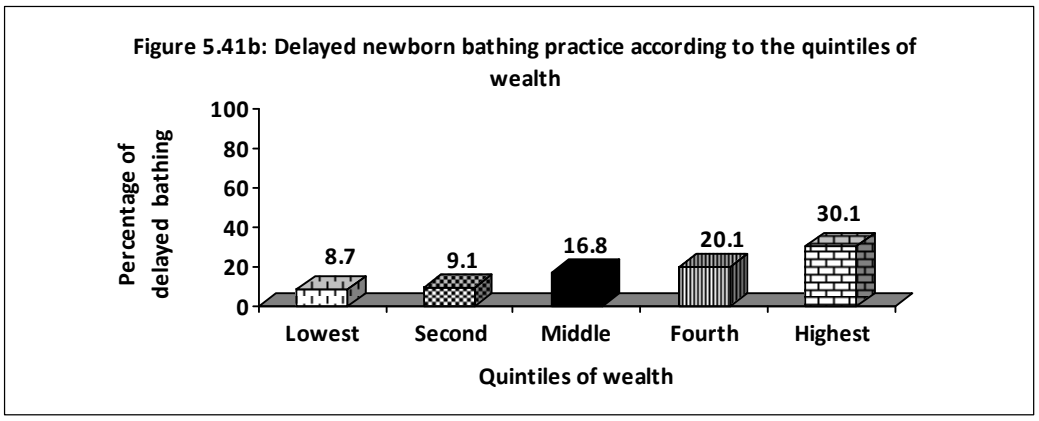
5.4.2 Socio-economic status and delayed newborn bathing practice

With respect to socio-economic status, the results reveal that among those who bathed their newborn only after 24 hours of birth, the greatest proportion came from the highest wealth quintile (34.1%) followed by the fourth wealth quintile (23%). The smallest proportion came from the second wealth quintile (10.4%) followed by the lowest wealth quintile (11.9%). Refer to figure 5.41a.



The chi-square test was carried out to test whether newborn bathing practice has a significant association with socio-economic status. The result showed a significant association between socio-economic status and newborn bathing practice, χ^2 (4, N=812) = 35.9, p<0.001. Within the quintiles of wealth, 30.1% of the women belonging to the highest wealth quintile demonstrated good bathing. Only 8.7% of the women belonging to the lowest wealth quintile demonstrated

good newborn bathing. The proportion of women demonstrating good newborn bathing decreased from the highest to the lowest wealth quintile. See Figure 5.41b.

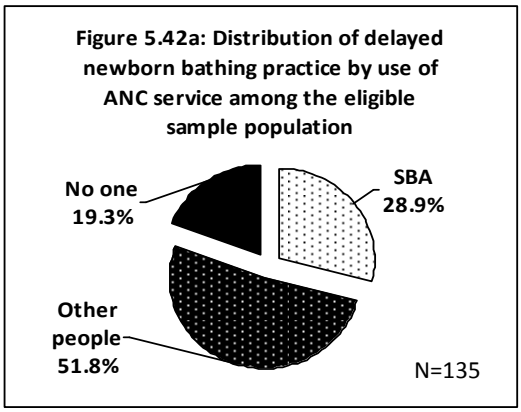


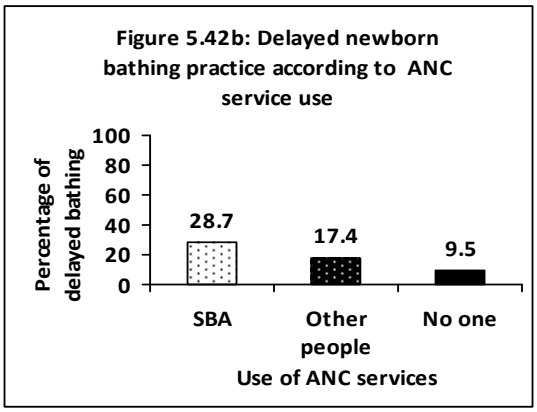
Overall, the findings show that bathing a newborn after 24 hours of birth is more common amongst the rich women compared to the poor ones.

5.4.3 Use of maternal health services and delayed newborn bathing practice

5.4.3.1 Antenatal service

Among those women who bathed their newborn baby after 24 hours of birth, only 28.9% claimed that they received antenatal care from a SBA while a half (51.8%) claimed that they received it from other providers. A considerable proportion (19.3%) claimed that they did not receive ANC services at all. See Figure 5.42a.





The chi-square test was performed to test whether newborn bathing practice has a significant association with use of ANC service. The result revealed that there is a significant difference in the bathing practice by the use of ANC service, χ^2 (2, N=812) = 24.9, p<0.001. Figure 5.42b

shows that a relatively higher proportion of those who used ANC services from a SBA (28.7%) bathed the baby after 24 hours of birth compared to those who received ANC from other providers (17.4%) or did not receive ANC at all (9.5%).

5.4.3.2 Delivery service

The chi-square test was performed to test whether newborn bathing practice has a significant association with assistance during delivery. The result revealed that there is a significant association between assistance during delivery and bathing practice, χ^2 (2, N=812) = 15.7, p<0.001. Figure 5.43a shows that among all the women who bathed their baby after 24 hours of birth, only two (1.5%) were assisted by a SBA during delivery and an overwhelming majority (97%) were assisted by other persons. Two women (1.5%) were not assisted at all.

Figure 5.43b shows that both the women whose deliveries were assisted by SBAs demonstrated good newborn bathing. About one-fifth (17.2%) of the women whose deliveries were assisted by other persons and a very few women (4.1%) whose deliveries were not assisted at all also demonstrated good newborn bathing.

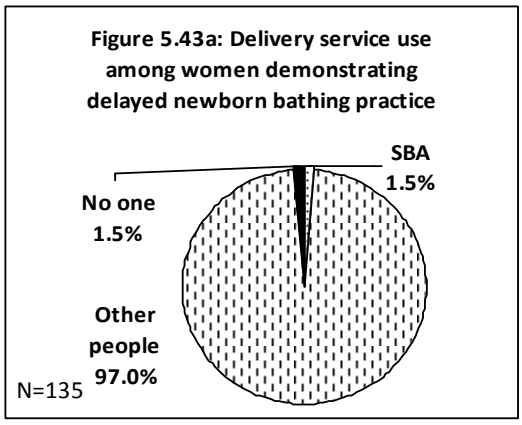


Figure 5.43a: Delivery service use among women demonstrating delayed newborn bathing practice

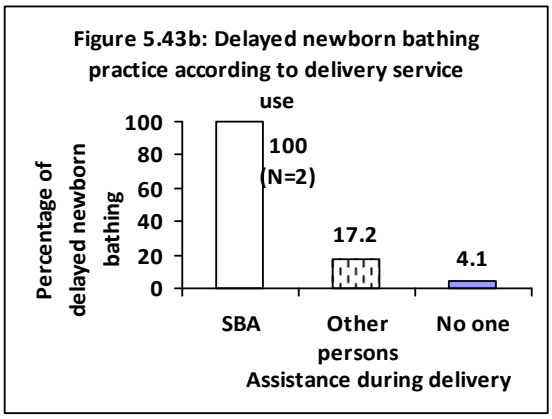
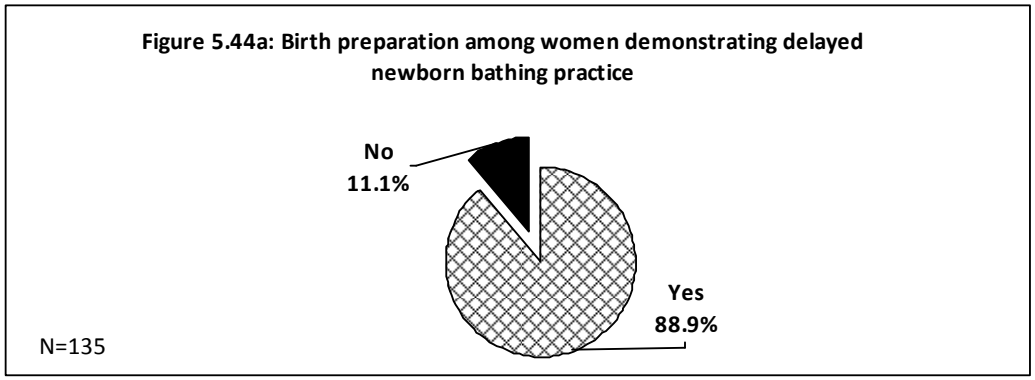


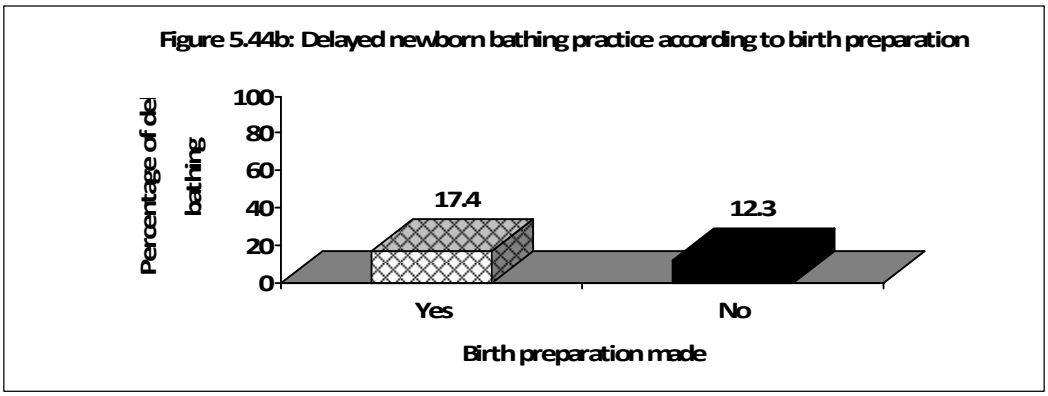
Figure 5.43b: Delayed newborn bathing practice according to delivery service use

5.4.4 Birth preparedness and delayed newborn bathing practice

Figure 5.44a shows that a majority (88.9%) of women who delayed the bathing of their newborn baby until 24 hours of birth reported that they made one or more preparations for the delivery of their baby while only 11.1% reported that they did not make such preparations.



Among all the women who made birth preparations during pregnancy, 17.4% practised good newborn bathing and the remaining did not. A small proportion of the women who did not prepare for birth (12.3%) also practised good newborn bathing. See Figure 5.44b.



The chi-square test result revealed that there is no significant difference in bathing practice by birth preparation made.

5.4.5 Mothers' knowledge of newborn care issues and delayed newborn bathing practice

Table 5.5 shows the cross-tabulation results for mothers' knowledge related to newborn care issues and good newborn bathing practice.

5.4.5.1 Delivery cleans

The mothers were asked about the things that needed to be kept clean during the delivery of the baby, and it was found that more than half (52.6%) women knew about four or more things that needed to be kept clean during delivery, slightly less than half (45.9%) of the women who

adopted good bathing practice knew about 1 to 3 things that needed to be kept clean during delivery. A small proportion of women (1.5%) did not know any of the things that needed to be kept clean during delivery.

The chi-square test was performed to test whether newborn bathing practice has a significant relation with knowledge of delivery cleans. The results revealed that there is a significant association between knowledge of delivery cleans and bathing practice overall, χ^2 (2, N=812) = 53.4, p<0.001. Cross tabulation results between knowledge of delivery cleans and good newborn bathing practice shows that a comparatively higher proportion of the women (31.7%) who knew four or more delivery cleans practised good newborn bathing than those who knew one to three delivery cleans (11.7%) or did not know any of the delivery cleans (3.3%).

5.4.5.2 Newborn bathing

Regarding mothers' knowledge of bathing time, the result revealed that among the women who bathed their newborn baby after 24 hours of delivery, about three-quarters (72.6%) had knowledge that the newborn baby should be bathed only after 24 hours of birth. However, 20.7% of the women who bathed their newborn after 24 hours of birth did not know that the newborn should be bathed after 24 hours of birth while a few women (6.7%) did not know when a newborn baby should first be bathed.

The chi-square test was performed to test whether newborn bathing has a significant association with mother's knowledge of bathing time. The result revealed that there is a significant relationship between bathing practice and mothers' knowledge of bathing time, χ^2 (2, N=812) = 279.1, p<0.001. Of all those women who knew the appropriate bathing time, six out of ten (59.8%) demonstrated good newborn bathing, which is a very high proportion compared to those who said that baby should be bathed before 24 hours (4.8%) or did not know the appropriate bathing time (13.6%).

5.4.5.3 Breastfeeding

Six out of ten women (57.8%) who performed good newborn bathing also knew that a newborn should be put to the breast within an hour of birth. Two out of ten (23.7%) women said that a newborn should be put to the breast after the placenta is out, 16.3% said that newborn should be breastfed after bathing the baby or after 24 hours of birth while three women (2.2%) did not know the breastfeeding time.

The chi-square test was carried out to test whether newborn bathing practice has a significant relation with with knowledge of breastfeeding and the result revealed that there is a significant relationship between bathing practice and knowledge of breastfeeding, χ^2 (3, N=812) = 21.2, p<0.001. Table 5.5 shows that there was not much difference in the proportions of women who bathed the baby after 24 hours among those who said that the baby should be put to the breast within the first hour of birth (21.1%) and among those who said that the baby should be breastfed after the placenta is out (20.8%). However, the difference was large for those women who said that the baby should be breastfed after 24 hours of birth, or after bathing (8.2%) and also for those who had no idea of the breastfeeding time at all (15.0%).

Table 5.5: Delayed newborn bathing practice and mothers' knowledge of specific newborn care issues

Mothers' knowledge of	Number	Knowledge among women demonstrating delayed newborn bathing Percent	Delayed newborn bathing according to knowledge levels Percent
Cleanliness during delivery			
Know 1-3 cleans	62	45.9	11.7
Know 4 or more cleans	71	52.6	31.7
Do not know any of the cleans	2	1.5	3.3
Newborn bathing			
After 24 hours	98	72.6	59.8
Before 24 hours	28	20.7	4.8
Do not know	9	6.7	13.6
Early breast feeding			
Immediately after birth	78	57.8	21.1
After the placenta is out	32	23.7	20.8
After bathing child/After 24 hours of birth	22	16.3	8.2
Do not know	3	2.2	15.0
Newborn danger signs			
Know 1-3 danger signs	77	57.1	12.3
Know 4 or more danger signs	57	42.2	31.3
Do not know any of the signs	1	0.7	20.0
Total	**135**	**100**	**16.6**

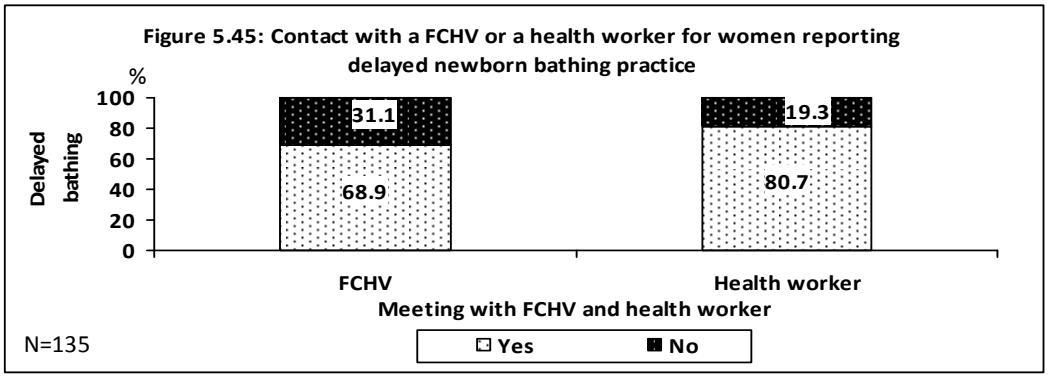
5.4.5.4 Newborn danger signs

Regarding mothers' knowledge of newborn danger signs, more than half (57.1%) of those who bathed their newborn after 24 hours of birth also knew 1-3 newborn danger signs and 42.2% knew 4-7 newborn danger signs. One woman did not know any of the newborn danger signs.

The chi-square test was performed to test whether newborn bathing practice has a significant association with mother's knowledge of newborn danger sign. The result revealed that there is a significant difference in newborn bathing practice according to mothers' knowledge of newborn danger signs, χ^2 (3, N=812) = 36.7, p<0.001. Of all the women who knew of four or more danger signs, 31.3% demonstrated good newborn bathing whereas only 20.0% of those who did not know any danger signs and 12.3% of those who knew of 1 to 3 danger signs demonstrated good newborn bathing.

5.4.6 Advice from a FCHV and counselling from a health worker and delayed newborn bathing practice

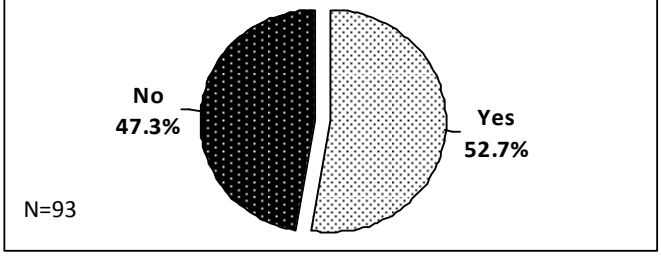
With regard to meeting a FCHV and health worker during pregnancy, Figure 5.45 shows that of the women who adopted good newborn bathing practice, slightly more than two-thirds (68.9%) met a FCHV during their pregnancy. The remaining one-third (31.1%) of them did not meet a FCHV during their pregnancy. Meeting a health worker was more common than meeting a FCHV during pregnancy. Among the women who demonstrated good newborn bathing four-fifths (80.7%) met a health worker during their pregnancy and the remaining one-fifth (19.3%) did not meet one.



5.4.6.1 FCHV's advice

Among those women who met a FCHV during their pregnancy and bathed their newborn baby after 24 hours of birth, about half (52.7%) reported that they received advice from their FCHV about newborn bathing and the remaining half (47.3%) did not report it (includes one 'do not know' response). See Figure 5.46a.

Figure 5.46a: Women receiving advice from a FCHV on newborn bathing among the women meeting a FCHV and demonstrating delayed newborn bathing practice



Note: The category 'No' includes one 'Do not know' response

The chi-square test that was carried out to test whether newborn bathing practice has a significant association with advice of FCHV on newborn bathing showed that newborn bathing practice and advice of a FCHV on newborn bathing is significantly associated [χ^2 (2, N= 812) = 81.6, p< 0.001].

Figure 5.46b: Delayed newborn bathing practice according to receiving advice from a FCHV

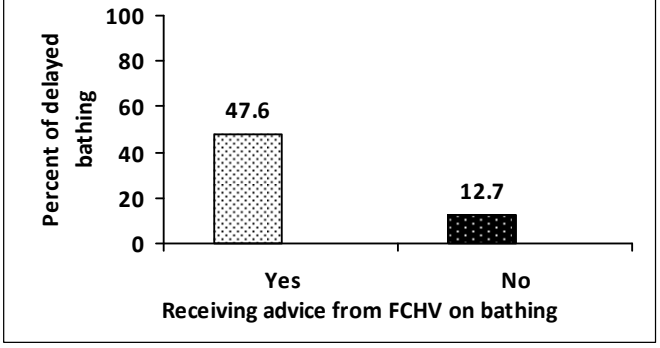


Figure 5.46b shows that amongst those women who were advised by a FCHV on bathing time, nearly half (47.6%) demonstrated good newborn bathing whereas amongst those who were not advised, only 12.7% practised good newborn bathing (includes one 'do not know' response).

Data on health workers' counselling on newborn bathing was not available for analysis.

5.4.7 Exposure to media and good bathing practice

The chi-square test was carried out to test whether watching television has a significant association with newborn bathing practice. The results revealed that there is a significant difference in bathing practice by watching television, χ^2 (1, N= 812) = 8.3, p< 0.01. Similarly, the chi-square test performed to test whether listening to radio has a significant association with

newborn bathing practice also found a significant difference in bathing practice by listening to radio χ^2 (1, N= 812) = 5.5, p< 0.05.

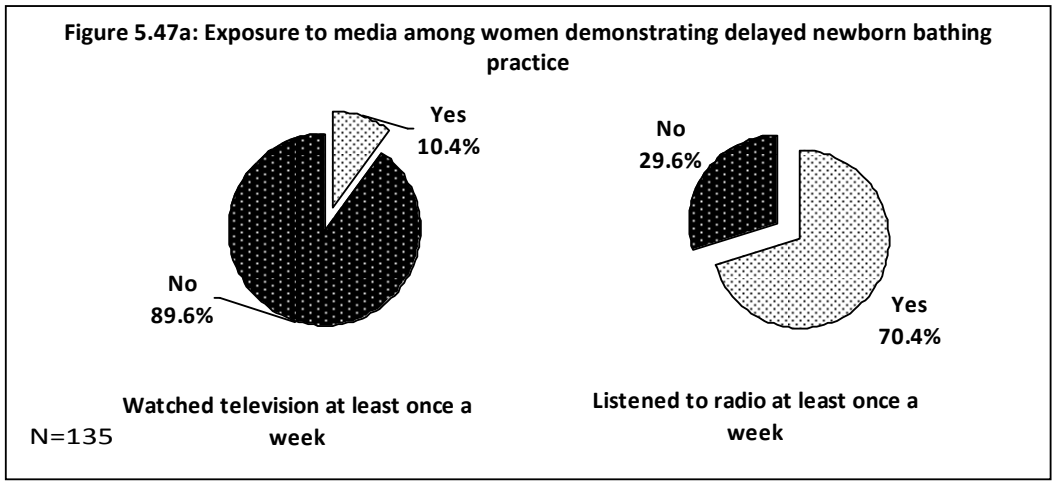


Figure 5.47a shows the proportion of women who were exposed to media among the women who demonstrated good newborn bathing. It was found that 10.4% of the women who bathed their newborn after 24 hours of birth watched television at least once a week while a majority (89.6%) did not watch television at least once a week. Among those women who bathed their newborn baby after 24 hours of birth, 70.4% also listened to radio at least once a week while the remaining 29.6% did not listen to radio at least once a week.

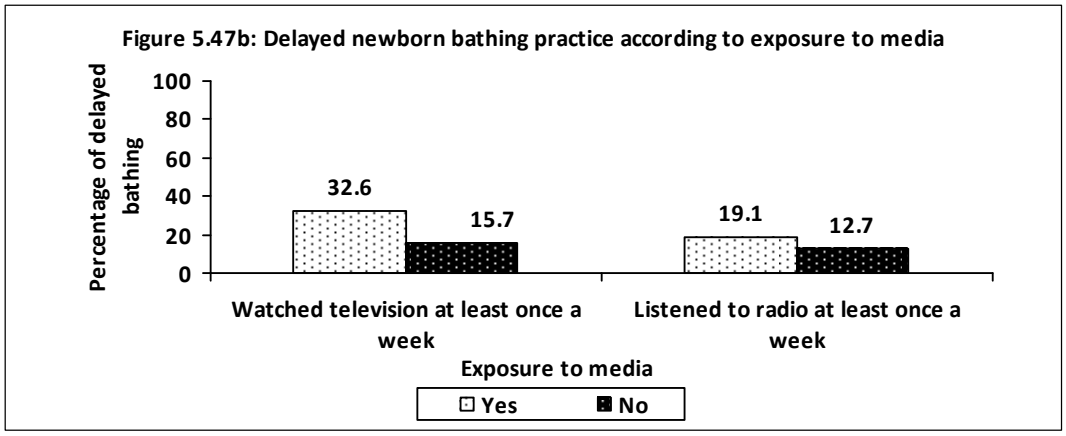


Figure 5.47b shows that among those women who watched television at least once a week, one-third (32.6%) bathed their baby after 24 hours of birth compared to 15.7% among those women who did not watch television at least once a week. With respect to listening to radio, one-fifth

(19.1%) of those who listened to radio at least weekly bathed their baby only after 24 hours of birth compared to 12.7% among those who did not listen to radio at least weekly.

5.5 Conclusions

The total sample of the study was 815 married women who delivered a living baby at home between February 2008 and February 2009 in the VDCs of Sindhuli district of Nepal. The characteristics of the sample women showed that three-quarters were in the prime childbearing age, two-thirds belonged to the disadvantaged indigenous caste/ethnic group and seven out of ten were uneducated. Their uptake of ANC and delivery services from SBAs was poor and most of them had limited knowledge of newborn care issues. Of the three good newborn care practices, the prevalence of safe cord cutting was highest and the prevalence of delayed bathing was lowest among the total sample population.

Out of the 815 sample women data of 803, 810, and 812 women were analysed to examine the distribution of safe cord cutting, early breastfeeding, and delayed bathing practices respectively. The results reveal that compared to early breastfeeding (46.7%) and delayed bathing (16.6%) safe cord cutting (70.7%) was most commonly demonstrated in the study areas. With regards to demographic and economic characteristics, good newborn care practices were found to be mostly demonstrated by the women who were in the prime childbearing age group and those women who belonged to the fourth and the highest wealth quintiles and higher level of education indicating that there are likely associations of age, SES and education with good newborn care practices. The chi-square test results also confirmed that newborn care practices are significantly related to age, SES, and education. With respect to ethnicity, the findings were different for specific newborn care practices. Good breastfeeding practice was higher among the disadvantaged indigenous and 'other' caste/ethnic groups of women while safe cord cutting and delayed bathing were greater among upper caste/ethnic group women. The chi-square test also indicated a significant association of caste/ethnicity with the three newborn care practices.

One important finding of the analysis is the low coverage of SBAs for ANC and delivery services. Good newborn care practices were greatest among those women who used ANC services from SBAs compared to those who received them from other providers or did not receive them at all. The chi-square tests supported that there is a statistically significant association of ANC service use with newborn care practices. Though the coverage of birth

preparedness was high among the women who had good newborn care practices, the chi-square test result indicated significant differences in only the breastfeeding practice by birth preparation made during pregnancy. Between 30-40% of the women who had good newborn care practices did not meet a FCHV and 20-30% of women who had good newborn care practices did not meet a health worker during pregnancy. The majority of those who met FCHVs and health workers were not advised and counselled on specific newborn care issues.

A majority of the women who knew of early breastfeeding breastfed their newborn early and also a majority of the women who knew of delayed bathing bathed their baby later, which are quite expected findings. The chi-square test also confirmed that there is a significant association between mother's knowledge and newborn care practices. Interestingly, findings also showed that a considerable proportion of women having correct knowledge of newborn care practices also did not demonstrate good newborn care practices. Listening to radio was more common than watching television among those women who demonstrated good newborn care practices.

The summary of cross-tabulation results for good newborn care practices with the independent variables is provided in Appendix A and B.

CHAPTER SIX

Results: Analysis of the determinants of good newborn care practices

This chapter presents the results of the study related to the analysis of the determinants of the three newborn care practices: safe cord cutting, good breastfeeding and good newborn bathing.

6.1 Logistic Regression

The dependent variables of the study had a dichotomous outcome. Hence, the binary logistic regression method was used in the study to examine which of the independent variables are the predictors of the outcome variables. Initially, simple logistic regression was carried out to see the association of each of the independent variables with the three outcome variables separately. Thereafter, the multiple logistic regression method was used. The variables that were not significant in the simple logistic regression were not considered in the multiple regression analysis.

The multiple logistic regressions were carried out in a series of steps. Initially all the variables that comprised a variable set were regressed and hypotheses tested for each of the outcome variables. Thereafter combined analysis of the variables were done where a new variable set was added to the first variable set (as blocks) one by one following the conceptual framework of the study. The conceptual framework proposed nine variable sets (socio-demographic, socio-economic, use of maternal health services, birth preparedness, mothers' knowledge, counselling from health workers and advice from FCHVs, cultural factors, health system factors and exposure to media), likely to be associated with good newborn care practices: safe cord cutting, early breastfeeding and delayed bathing. However, two variable sets (cultural and health system factors) were not included in the multivariate regression owing to lack of necessary data. At the end of the combined analysis, a full regression model was tested that contained all the variables

that were found to be significant in the simple logistic regression. This process was carried out for each of the outcome variables separately. Adjusted odds ratios and confidence intervals were obtained from the multiple logistic regression models. The multiple regression models examined the association of independent variables with each of the three dependent variables, while controlling for the confounding aspects of other independent variables. Adjusted odds ratios from the multiple logistic regression models compare individuals who differ in the characteristics of interest and have the values of all other variables constant.

For the data analysis all the cases having response categories such as "do not know" and "others" for the outcome variables were excluded to make each of the three outcome variables dichotomous having only two possible outcomes, either "good practice" or "not good practice". A SPSS data file was created for each of the three outcome variables. The data file for the outcome variable "safe cord cutting", "good breastfeeding" and "good bathing" included 803, 810, and 812 participants respectively.

The results of the multiple logistic regression analysis are presented in the following pages.

6.2 Safe cord cutting practice

The results of the simple logistic regression for safe cord cutting practice showed that three variables: assistance during delivery, birth preparedness, and mothers' knowledge of newborn danger signs were not significantly associated with the safe cord cutting practice at $p<0.05$. Hence, those variables were not included in the further analysis.

6.2.1 Hypothesis: Socio-demographic factors are related to safe cord cutting practice

The multiple logistic regression method was used to test whether socio-demographic factors: age, caste/ethnicity and education is related to safe cord cutting practice. When age, ethnicity, and education were regressed, the result showed that if women delivered babies in their prime childbearing age (20-34 years), they were more likely to cut the cord with a sterile instrument. Women aged 20-34 years had 1.77 fold increases in the odds (95%CI 1.07-2.94) of using a sterile instrument for cord cutting compared to women aged 19 years or less. Being a member of disadvantaged indigenous and 'others' caste/ethnicity groups was negatively associated with safe cord cutting practice. A disadvantaged indigenous caste/ethnicity group woman had a 0.23

(95% CI 0.12-0.43) and an 'others' caste/ethnic woman had a 0.24 (95% CI 0.10-0.62) fold decrease in the odds of using a safe instrument for cord cutting compared to an upper caste woman. Higher education was also associated with safe cord cutting. Compared to an uneducated woman, a higher level educated woman had a four fold increase in the odds (OR 4.16, 95% CI 1.22-14.22) of cutting the cord with a safe instrument. See Table 6.1. Therefore, the hypothesis that socio-demographic factors are related to safe cord cutting practice was supported by the results.

Table 6.1: Odds ratio and 95% confidence interval for the effect of socio-demographic variables on safe cord cutting practice

Socio-demographic characteristics	OR	95% CI
Age		
15-19 years	1.00	
20-34 years	1.77*	1.07-2.94
35-49 years	0.73	0.39-1.37
Ethnicity		
Upper caste	1.00	
Disadvantaged Indigenous	0.23**	0.12-0.43
Dalit	0.53	0.24-1.18
Other	0.24**	0.10-0.62
Education		
No education	1.00	
Primary	1.22	0.74-1.99
Secondary	2.03	0.99-4.14
Higher	4.16*	1.22-14.22
Total sample	**803**	

*p<0.05, **p<0.01

6.2.2 Hypothesis: Socio-economic status is related to safe cord cutting practice

The logistic regression method was used to test whether safe cord cutting practice is significantly related to socio-economic status. Table 6.2 shows that SES is a strong predictor of safe cord cutting practice. Women belonging to the fourth and the highest wealth quintiles had increased odds of demonstrating safe cord cutting relative to women belonging to the lowest wealth quintile. The odds of using a safe instrument for cord cutting for the highest wealth quintile (OR 5.59, 95% CI 3.03-10.30) was greater than that for the fourth wealth quintile (OR 1.79, 95% CI 1.11-2.86). Therefore the results support the hypothesis.

Table 6.2: Odds ratio and 95% confidence interval for the effect of the SES variable on safe cord cutting practice

Socio-economic status (wealth quintiles)	OR	95% CI
Lowest	1.00	
Second	0.94	0.60-1.46
Middle	1.38	0.88-2.15
Fourth	1.79*	1.11-2.86
Highest	5.59**	3.03-10.30
Total sample	**803**	

*p<0.05, **p<0.01

6.2.3 Hypothesis: Use of maternal health services is related to safe cord cutting practice

The simple logistic regression result indicated that assistance during delivery is not significantly associated with safe cord cutting practice, therefore, the variable was discarded. When the association of the use of ANC services with safe cord cutting practice was examined, the result revealed that both the use of ANC services from a SBA and from other providers were positively associated with safe cord cutting practice. If a woman received ANC from a SBA, she had a 3.70 fold increase in the odds (95% CI 2.21-6.21) of safely cutting the cord of her newborn baby compared to a woman who did not receive ANC at all. Similarly, if a woman received ANC from other providers/persons, she had a 2.12 fold increase in the odds (95% CI 1.52-2.95) of adopting safe cord cutting practice compared to a woman who did not receive ANC. Refer to Table 6.3. Hence, the results support the hypothesis.

Table 6.3: Odds ratio and 95% confidence interval for the effect of use of maternal health service variable on safe cord cutting practice

Use of maternal health services	OR	95% CI
Antenatal care		
From SBA	3.70**	2.21-6.21
From other people	2.12**	1.52-2.95
No one	1.00	
Total sample	**803**	

*p<0.05, **p<0.01

6.2.4 Hypothesis: Birth preparedness is related to safe cord cutting practice

The simple logistic regression method was used to test the hypothesis that preparing for birth is significantly related to safe cord cutting practice. The result showed that making preparations

for birth during pregnancy is not associated with safe cord cutting practice. Hence, the results did not support the hypothesis.

6.2.5 Hypothesis: Mothers' knowledge of specific newborn care issues is related to safe cord cutting practice

The simple logistic regression showed that mothers' knowledge of newborn danger signs is not related to safe cord cutting practice. Therefore, the variable was not included in the model that was used to examine the association of the mothers' knowledge with safe cord cutting practice.

The multiple regression method was used to test the hypothesis that mother's knowledge of specific newborn care issues is related to safe cord cutting practice. The multiple regression analysis results for the mothers' knowledge of things to be kept clean during delivery, knowledge of early breastfeeding and knowledge of bathing time with safe cord cutting showed that only having correct knowledge of bathing time is associated with the outcome variable. If a woman knew that the newborn baby should be bathed after 24 hours of birth, she had a 3.14 fold increase in the odds (95% CI 1.59-6.20) of cutting the cord using a safe instrument compared to a woman who had no idea of newborn bathing time (Table 6.4). Therefore, the hypothesis was supported by the results.

Table 6.4: Odds ratio and 95% confidence interval for the effect of the mothers' knowledge variables on safe cord cutting practice

Mothers' knowledge of	OR	95% CI
Things to be kept clean during delivery		
Know none of the cleans	0.69	0.36-1.31
Know 1-3 cleans	0.90	0.62-1.31
Know 4 or more cleans	1.00	
Early Breastfeeding		
Immediately after birth	2.54	0.88-7.34
After placenta is out	2.70	0.90-8.12
After bathing/after 24 hours	2.30	0.79-6.71
Do not know	1.00	
Newborn bathing		
After 24 hours	3.14**	1.59-6.20
Before 24 hours	1.73	0.99-3.03
Do not know	1.00	
Total sample	**803**	

*p<0.05, **p<0.01

6.2.6 Hypothesis: Advice from a FCHV and counselling from a health worker are related to safe cord cutting practice

The simple logistics regression found that both the variables related to advice from a FCHV and counselling from a health worker are significantly associated with safe cord cutting practice. However, when both the variables were included together in a regression model to test their significant relation with safe cord cutting practice, only counselling by a health worker on using a CHDK emerged as a predictor of safe cord cutting practice. If a woman was counselled by a health worker on using a CHDK during an ANC visit, she had a 3.71 fold increase in the odds (95% CI 0.73-2.76) of adopting safe cord cutting compared to a woman who did not receive such counselling. Similarly, if a woman did not meet a health worker during pregnancy, she had a 0.45 fold decrease in the odds (95% CI 0.30-0.57) of adopting safe cord cutting. See Table 6.5. Therefore, the hypothesis that advice from a FCHV and counselling from a health worker is related to safe cord cutting is supported by the regression results.

Table 6.5: Odds ratio and 95% confidence interval for the effect of advice from a FCHV and counselling from a health worker variables on safe cord cutting practice

Advice from FCHV/Counselling from health worker	OR	95% CI
FCHV's advice on using CHDK		
Yes	1.42	0.73-2.76
Did not meet FCHV	1.10	0.74-1.64
No	1.00	
Health worker's counselling on using CHDK		
Yes	3.71*	1.28-10.74
Did not meet health worker	0.45**	0.30-0.57
No	1.00	
Total sample	**803**	

*p<0.05, **p<0.01

6.2.7 Hypothesis: Exposure to media is related to safe cord cutting practice

Exposure to media emerged as a negatively associated with safe cord cutting practice. Watching television at least once a week was weakly associated with a 0.20 fold decrease in the odds of cutting the cord with a safe instrument (OR 0.20, 95% CI 0.06-0.64) compared to not watching television at least once a week. Similarly, listening to radio at least once a week was also associated with 0.73 fold decreases in the odds of adopting safe cord cutting practice (95% CI 0.53-1.00) compared to not listening to radio at least once a week. Refer to Table 6.6.

Therefore, the hypothesis that exposure to media is related to safe cord cutting practice is supported by the results.

Table: 6.6: Odds ratio and 95% confidence interval for the effect of exposure to media variables on safe cord cutting practice

Exposure to media	OR	95% CI
Watched television at least once a week		
Yes	0.20**	0.06-0.64
No	1.00	
Listened to radio at least once a week		
Yes	0.73*	0.53-0.99
No	1.00	
Total sample	**803**	

*p<0.05, **p<0.01

6.2.8 Combined analysis of the independent variables

In the combined analysis, when socio-demographic and SES variables were regressed, results for safe cord cutting practice showed that the age category 20-34 years which was significant when only the socio-demographic variables were included, continued to be significant in the presence of the SES variable. Similarly, both the disadvantaged indigenous and 'others' caste/ethnicity also maintained their significance in this model. However, higher education did not maintain its significance in the presence of the SES variable. SES maintained its significant association with safe cord cutting in the presence of socio-demographic variables. The fourth wealth quintile had 2.10 and the highest wealth quintile had 4.46 fold increases in the odds of adopting safe cord cutting practice (fourth wealth quintile: 95% CI 1.28-3.47 and highest wealth quintile: 95% CI 2.34-8.52) compared to the lowest wealth quintile. See Table 6.7.

When socio-demographic, SES and use of maternal health service variables were regressed, results reveal that the variables that were significant in the previous model (20-34 years, disadvantaged indigenous and 'other' caste/ethnicity, and the fourth and the highest wealth quintiles) retained their significance. In this model, using ANC services from a SBA did not maintain its significant association with safe cord cutting, however, using ANC services from other persons maintained its significant association with safe cord cutting practice. If a woman received ANC from other persons, she had a 1.59 fold increase in the odds (95% CI 1.11-2.27) of adopting safe cord cutting practice compared to a woman who did not receive ANC from

anyone. It is surprising that receiving ANC from a SBA did not emerge as a predictor of safe cord cutting while receiving ANC from other persons emerged as a predictor of safe cord cutting. The possible explanation for this could be because the coverage of ANC from SBAs was quite low (16.9%) compared to the coverage of ANC from other providers (52.1%). Hence, the model was unable to not discriminate against it. See Table 6.7.

Table 6.7: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health service variables on safe cord cutting practice

Independent variables	Socio-demographic/SES		Socio-demographic/SES/use of maternal health services	
	OR	95% CI	OR	95% CI
1. Socio-demographic characteristics				
Age at birth				
15-19 years	1.00		1.00	
20-34 years	1.83*	1.09-3.07	1.80*	1.06-3.03
35-49 years	0.82	0.44-1.56	0.88	0.46-1.67
Ethnicity				
Upper caste	1.00		1.00	
Disadvantaged Indigenous	0.24**	0.12-0.46	0.25**	0.13-0.48
Dalit	0.67	0.30-1.50	0.70	0.31-1.58
Other	0.27**	0.10-0.70	0.27**	0.10-0.70
Education				
No education	1.00		1.00	
Primary	1.13	0.68-1.87	1.10	0.66-1.83
Secondary	1.53	0.73-3.20	1.39	0.65-2.92
Higher	2.80	0.79-9.87	2.30	0.64-8.22
2. Socio-economic status (wealth quintiles)				
Lowest	1.00		1.00	
Second	1.14	0.72-1.81	1.11	0.701.77
Middle	1.55	0.97-2.48	1.51	0.94-2.42
Fourth	2.10**	1.28-3.47	1.92*	1.15-3.20
Highest	4.46**	2.34-8.52	3.94**	2.04-7.62
3. Use of maternal health services				
Antenatal care				
From SBA			1.75	0.98-3.12
From other people			1.59*	1.11-2.27
No one			1.00	
Total sample			**803**	

*p<0.05, **p<0.01

When socio-demographic, SES, use of maternal health services, and mothers' knowledge variables were included, all the variables that were significant in the previous model retained their significance. However, none of the variables related to mothers' knowledge was found

significantly associated with safe cord cutting in the model. The age group 20-34 years had a 1.87 increase in the odds (95% CI 1.10-3.17) of safe cord cutting compared to the age group 15-19 years. Being a member of disadvantaged indigenous and 'others' caste/ethnic groups was associated with a 0.26 (95% CI 0.14-0.51) and 0.27 (95% CI 0.10-0.73) decrease in the odds of safe cord cutting compared to being a member of an upper caste/ethnic group. The odds of using a safe instrument for cord cutting was quadrupled (OR 4.13, 95% CI 2.10-8.12) for the highest wealth quintile and doubled (OR 1.98, 95% CI 1.17-3.35) for the fourth wealth quintile compared to the lowest wealth quintile. Receiving ANC from other persons had 1.52 increase in the odds (95% CI 1.06-2.19) of adopting safe cord cutting practice relative to not receiving ANC from anyone. See Table 6.8.

Similarly, when a set of variables for advice from a FCHV and counselling from a health worker was included, all the variables that were significantly associated with safe cord cutting practice in the previous model retained their significance (age group 20-34 years, disadvantaged indigenous and other caste/ethnic group, the fourth and the highest wealth quintiles) except receiving ANC from other providers. Refer to Table 6.8.

Table 6.8: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/mothers' knowledge/advice from a FCHV and counselling from a health worker variables on safe cord cutting practice

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge		Socio-demographic/SES/ use of maternal health services/ mothers' knowledge/advice and counselling	
	OR	95% CI	OR	95% CI
1. Socio-demographic characteristics				
Age at birth				
15-19 years	1.00		1.00	
20-34 years	1.87*	1.10-3.17	1.83*	1.07-3.12
35-49 years	0.93	0.48-1.79	0.93	0.48-1.80
Ethnicity				
Upper caste	1.00		1.00	
Disadvantaged Indigenous	0.26**	0.14-0.51	0.25**	0.13-0.48
Dalit	0.77	0.34-1.74	0.75	0.33-1.70
Other	0.27*	0.10-0.73	0.27*	0.10-0.73
Education				
No education	1.00		1.00	
Primary	1.14	0.68-1.93	1.15	0.68-1.94
Secondary	1.51	0.69-3.31	1.52	0.69-3.34
Higher	1.85	0.51-6.75	1.33	0.35-5.10

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge		Socio-demographic/SES/ use of maternal health services/ mothers' knowledge/advice and counselling	
	OR	95% CI	OR	95% CI
2. Socio-economic status (wealth quintiles)				
Lowest	1.00		1.00	
Second	1.10	0.69-1.77	1.10	0.68-1.77
Middle	1.53	0.94-2.49	1.50	0.92-2.46
Fourth	1.98*	1.17-3.35	1.97*	1.16-3.34
Highest	4.13**	2.10-8.12	4.01**	2.03-7.92
3. Use of Maternal services				
Antenatal care				
From SBA	1.79	1.00-3.23	1.60	0.85-3.02
From other people	1.52*	1.06-2.19	1.35	0.86-2.12
No one	1.00		1.00	
5. Mothers' knowledge on				
Things to be kept clean during delivery				
Know none of the cleans	1.00	0.50-2.01	1.04	0.52-2.10
Know 1-3 cleans	1.15	0.76-1.73	1.20	0.79-1.83
Know >=4 cleans	1.00		1.00	
Early Breastfeeding				
Immediately after birth	2.90	0.92-9.06	2.70	0.87-8.44
After placenta is out	2.40	0.73-7.84	2.14	0.65-6.97
After bathing/after 24 hours	2.03	0.64-6.41	1.93	0.62-6.07
Do not know	1.00		1.00	
Timing of first bathing				
After 24 hours	2.05	0.98-4.29	1.90	0.89-4.02
Before 24 hours	1.47	0.80-2.71	1.51	0.82-2.80
Do not know	1.00		1.00	
6. Advice from FCHV/Counselling from health worker				
FCHV advised about using CHDK				
Yes			1.49	0.72-3.10
Did not meet FCHV			0.94	0.61-1.46
No			1.00	
Health worker counsel about using a CHDK				
Yes			2.74	0.89-8.49
No			1.00	
Total sample			**803**	

*p<0.05, **p<0.01

In the full regression model, age group 20-34 years, disadvantaged indigenous and 'others' caste/ethnicity groups, and the fourth and the highest wealth quintiles were found to be significantly associated with safe cord cutting. Compared to being a member of an upper caste group, being a member of a disadvantaged indigenous and 'others' caste group had 0.24 and 0.27 fold decreases in the odds of safe cord cutting respectively. Compared to women who

were aged 15-19 years, women who aged 20-34 years had 1.83 increases in the odds of cutting the cord safely and compared to the women of the lowest wealth quintile, the women of the fourth and the highest wealth quintiles had 1.96 and 3.65 fold increases in the odds of safe cord cutting respectively (Table 6.9).

Table 6.9: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/birth preparedness/ mothers' knowledge/advice from a FCHV and counselling from a health worker and exposure to media variables on safe cord cutting practice

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge /advice and counselling/Exposure to media	
	OR	95% CI
1. Socio-demographic characteristics		
Age at birth		
15-19 years	1.00	
20-34 years	1.83*	1.07-3.12
35-49 years	0.94	0.48-1.82
Ethnicity		
Upper caste	1.00	
Disadvantaged Indigenous	0.24**	0.12-0.47
Dalit	0.75	0.33-1.70
Other	0.27**	0.10-0.72
Education		
No education	1.00	
Primary	1.13	0.67-1.91
Secondary	1.49	0.68-3.28
Higher	1.32	0.34-5.10
2. Socio-economic status (wealth quintiles)		
Lowest	1.00	
Second	1.12	0.69-1.81
Middle	1.49	0.90-2.45
Fourth	1.96*	1.15-3.33
Highest	3.65**	1.80-7.40
3. Use of Maternal services		
Antenatal care		
From SBA	1.57	0.83-2.97
From other people	1.33	0.84-2.10
No one	1.00	
4. Mothers' knowledge on		
Things to be kept clean during delivery		
Know none of the cleans	1.05	0.52-2.12
Know 1-3 cleans	1.83	0.78-1.80
Know >=4 cleans	1.00	
Early Breastfeeding		
Immediately after birth	2.73	0.87-8.52
After placenta is out	2.15	0.66-7.02
After bathing/after 24 hours	1.95	0.62-6.13
Do not know	1.00	
Timing of first bathing		
After 24 hours	1.88	0.89-3.98
Before 24 hours	1.50	0.81-2.78

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge /advice and counselling/Exposure to media	
	OR	**95% CI**
Do not know	1.00	
5. Advice from FCHV/Counselling from health worker		
FCHV advised about using CHDK		
Yes	1.52	0.73-3.16
Did not meet FCHV	0.94	0.61-1.46
No		
Health worker counselling about using CHDK		
Yes	2.74	0.89-8.49
No	1.00	
6. Exposure to Media		
Watched television at least once a week		
Yes	0.61	0.16-2.29
No	1.00	
Listened to radio at least once a week		
Yes	0.92	0.64-1.33
No	1.00	
Total sample	**803**	

*p<0.05, **p<0.01

6.3 Early breastfeeding practice

The result of simple logistic regression for early breastfeeding practice showed that of the all variables five (age, education, assistance during delivery, knowledge of bathing time and listening to radio) are not associated with good breastfeeding practice at probability <0.05. Hence, those five variables were not considered in any of the multiple regression models for good breastfeeding practice.

6.3.1 Hypothesis: Socio-demographic variables are related to early breastfeeding practice

The result of simple logistic regression showed that age and education are not associated with good breastfeeding practice. Hence the variables were discarded. Ethnicity on the other hand was found to be weakly associated with good breastfeeding practice (p=0.04) but none of the three ethnic groups were found to be significantly different compared to the reference category (upper caste). See Appendix C. Overall, the socio-demographic variable is weakly related to good breastfeeding practice.

6.3.2 Hypothesis: Socio-economic status is related to early breastfeeding practice

Socio-economic status was found to have a positive association with good breastfeeding practice. Women who belonged to the fourth and the highest wealth quintile both had 1.84 fold increases in the odds (95% CI 1.19-2.85) of breastfeeding their newborn baby within the first hour of birth compared to women who belonged to the lowest wealth quintile. See Table 6.10. Therefore, the result supports the hypothesis.

Table 6.10: Odds ratio and 95% confidence interval for the effect of SES variable on early breastfeeding practice

Socio-economic status (wealth quintiles)	OR	95% CI
Lowest	1.00	
Second	1.22	0.79-1.88
Middle	1.28	0.84-1.97
Fourth	1.84**	1.19-2.85
Highest	1.84**	1.19-2.85
Total sample	**810**	

*p<0.05, **p<0.01

6.3.3 Hypothesis: Use of maternal health services is related to early breastfeeding practice

The simple logistic regression showed that assistance during delivery is not significantly associated with good breastfeeding practice. Hence, the variable was not used in any analysis. The use of ANC services on the other hand was positively associated with good breastfeeding practice. If a woman received ANC from a SBA, she had a 2.26 fold increase in the odds of breastfeeding (95% CI 1.49-3.44) the newborn baby within the first hour of delivery compared to a woman who did not see anyone for ANC. Refer to Table 6.11. Hence, the hypothesis is supported.

Table 6.11: Odds ratio and 95% confidence interval for the effect of maternal service use variables on early breastfeeding practice

Use of maternal health services	OR	95% CI
Antenatal care		
From SBA	2.26**	1.49-3.44
From other people	1.26	0.92-1.72
No one	1.00	
Total sample	**810**	

*p<0.05, **p<0.01

6.3.4 Hypothesis: Birth preparedness during pregnancy is related to early breastfeeding practice

Preparing for birth during pregnancy was negatively associated with good breastfeeding practice, which is an unexpected finding. Table 6.12 shows that compared to women who did not make birth preparations during pregnancy, women who made birth preparations during pregnancy had a nearly 0.58 fold decrease in the odds of breastfeeding their newborn (OR 0.58, 95% CI 0.39-0.87) within one hour of birth. Therefore, the hypothesis that birth preparedness is associated with good breastfeeding practice is supported.

Table 6.12: Odds ratio and 95% confidence interval for the effect of birth preparedness on early breastfeeding practice

Made birth preparedness during pregnancy	OR	95% CI
Yes	0.58**	0.39-0.87
No	1.00	
Total sample		**810**

*p<0.05, **p<0.01

6.3.5 Hypothesis: Mothers' knowledge of specific newborn care issues is related to early breastfeeding practice

The simple logistic regression revealed that mothers' knowledge about bathing time is not associated with early breastfeeding. Therefore the variable was not included in the multiple regression model. When mothers' knowledge of delivery cleans, early breastfeeding, and newborn danger signs were regressed, only mothers' knowledge of early breastfeeding emerged as a predictor of good breastfeeding. If a woman knew that the newborn baby should be put to the breast within an hour of birth, this quadrupled increases in the odds (OR 3.88, 95% CI 1.42-10.60) of early breastfeeding. See Table 6.13. Hence, the hypothesis is supported.

Table 6.13: Odds ratio and 95% confidence interval for the effect of mothers' knowledge variables on early breastfeeding practice

Mothers' knowledge of	OR	95% CI
Things to be kept clean during delivery		
Know none of the cleans	6.84	0.69-67.41
Know 1-3 cleans	2.03	0.78-5.33
Know >=4 cleans	1.00	
Timing of first breast feeding		
Immediately after birth	3.88**	1.42-10.60
After the placenta is out	1.67	0.59-4.69
After bathing child/after 24 hours of birth	0.90	0.33-2.49
Do not know	1.00	
Newborn danger signs		
Know 1-3 danger signs	0.41	0.15-1.10
Know >=4 danger signs	1.00	
Total sample		**810**

*p<0.05, **p<0.01

6.3.6 Hypothesis: Advice from a FCHV and counselling from a health worker is related to early breastfeeding practice

The simple logistic regression showed that a FCHV's advice and a health worker's counselling on breastfeeding are related to early breastfeeding practice. The result for multivariate logistic regression models for the association of advice received from a FCHV and counselling received from a health worker during pregnancy variables with good breastfeeding practice is shown in Appendix D. FCHVs' advice and health workers' counselling to pregnant women about breastfeeding time were found to have no significant association with good breastfeeding practice. Therefore the hypothesis is not supported by the results.

6.3.7 Hypothesis: Exposure to media is related to early breastfeeding practice

The simple logistic regression showed that listening to radio was not significantly associated with good breastfeeding practice. Therefore the variable was discarded. With respect to the association between exposure to television and good breastfeeding practice, surprisingly it was found that if a woman watched television at least once a week, she had a 0.50 fold decrease in the odds (95% CI 0.27-0.94) of adopting good breastfeeding practice compared to a woman who did not watch television at least once a week. See Table 6.14. Hence, the hypothesis that exposure to media is related to good breastfeeding practice is supported.

Table 6.14: Odds ratio and 95% confidence interval for the effect of exposure to media variable on early breastfeeding practice

Exposure to media	OR	95% CI
Watched television at least once a week		
Yes	0.50*	0.27-0.94
No	1.00	
Total sample		**810**

*p<0.05, **p<0.01

6.3.8 Combined analysis of the independent variables

In the combined analysis, the results for the good breastfeeding practice showed that when the SES variable was added to caste/ethnicity (socio-demographic variable), the caste/ethnicity group 'other' and the fourth and the highest wealth quintiles were found to have significant associations with good breastfeeding. Women belonging to the caste/ethnic group 'other' had a twofold increase in odds (OR 2.13, 95% CI 1.01-4.49) of good breastfeeding compared to women belonging to the upper caste/ethnicity group. The fourth wealth quintile was associated with a 1.73 fold increase in the odds of practising good breastfeeding, while the highest wealth quintile was associated with 1.86 fold increases in the odds of early breastfeeding compared to the lowest wealth quintile. However, when use of the ANC service variable was added to the model, the caste/ethnicity group 'others' maintained its significant association with early breastfeeding but SES could not maintain its significant positive association with early breastfeeding. In the model receiving ANC service from a SBA was positively associated with the breastfeeding practice which had a twofold increase in odds (OR 2.08, 95% CI 1.32-3.28) of good breastfeeding practice compared to not receiving ANC at all. Refer to Table 6.15.

Table 6.15: Odds ratio and 95% confidence interval for the effect of socio-demographic/SES/use of maternal health services and birth preparedness variables on early breastfeeding practice

Independent variables	Socio-demographic/SES		Socio-demographic/SES/ use of maternal health services		Socio-demographic/ SES/ use of maternal health services/birth preparedness	
	OR	95% CI	OR	95% CI	OR	95% CI
1. Socio-demographic characteristics						
Ethnicity						
Upper caste	1.00		1.00		1.00	
Disadvantaged Indigenous	1.30	0.88-1.94	1.43	0.95-2.14	1.39	0.92-2.09
Dalit	0.86	0.49-1.51	0.90	0.51-1.58	0.92	0.52-1.62
Other	2.13*	1.01-4.49	2.21*	1.04-4.69	2.14*	1.00-4.54

2. Socio-economic status (wealth quintiles)						
Lowest	1.00		1.00		1.00	
Second	1.15	0.74-1.79	1.14	0.73-1.78	1.12	0.72-1.74
Middle	1.25	0.81-1.92	1.19	0.77-1.83	1.18	0.76-1.82
Fourth	1.73*	1.11-2.68	1.54	0.98-2.42	1.51	0.96-2.37
Highest	1.86**	1.19-2.91	1.52	0.95-2.43	1.48	0.92-2.37
3. Use of maternal health services						
Antenatal care						
From SBA			2.08**	1.32-3.28	1.99**	1.26-3.14
From other people			1.20	0.87-1.65	1.17	0.84-1.62
No one			1.00		1.00	
4. Made preparation for birth						
Yes					0.73	0.48-1.12
No					1.00	
Total sample				**810**		

*p<0.05, **p<0.01

When ethnicity, SES, use of maternal health services and birth preparedness variables were included together in a regression model, the caste/ethnicity group 'others' and receiving ANC from SBAs continued to retain their significant association with early breastfeeding practice as in the previous model. Birth preparedness was not significantly associated with early breastfeeding in this model. The odds for early breastfeeding were 2.14 (95% CI 1.00-4.54) for the 'others' caste group and that for use of ANC service from a SBA was 1.99 (95% CI1.26-3.14). See Table 6.15.

In the next step, caste/ethnicity, SES, use of maternal health services, birth preparedness and mothers' knowledge of specific newborn care issues were regressed together. The results revealed that good breastfeeding practice is positively associated with disadvantaged indigenous caste/ethnicity, the fourth and the highest wealth quintiles (SES), use of ANC from a SBA and correct knowledge of breastfeeding time. The disadvantaged indigenous caste/ethnicity group women had a 1.58 times increase in the odds (95% CI 1.02-2.46) of breastfeeding newborns within the first hour of delivery compared to the upper caste/ethnicity group women. Compared to the women who were in the lowest wealth quintile, women who were in the fourth and the highest wealth quintiles had double increases in the odds (fourth wealth quintile: OR 2.21, 95% CI 1.35-3.63 and highest wealth quintile: OR 2.21, 95% CI 1.32-3.69) of breastfeeding their newborn baby within an hour of birth. Receiving ANC from a SBA continued to stay as a strong predictor of early breastfeeding practice (OR 2.02, 95% CI 1.24-3.31). In this model having knowledge of correct breastfeeding time was associated with

4.62 fold increases in the odds (95% CI 1.66-12.83) of early breastfeeding practice compared to having no knowledge of breastfeeding time (Table 6.16).

When caste/ethnicity, SES, use of maternal health services, birth preparedness, knowledge of mothers on newborn care issues, and advice from a FCHV and counselling from a health worker variables were included together, all the variables that were significant in the previous model continued to stay significantly associated with the good breastfeeding practice except the disadvantaged indigenous caste/ethnicity group. In this model, counselling from a health worker on immediate breastfeeding was found to be not associated with good breastfeeding practice in the presence of other factors. See Table 6.16.

In the analysis of the full model with early breastfeeding practice it was found that the variables that were significant in the preceding model (the fourth and the highest wealth quintiles, receiving ANC from a SBA, and mothers' knowledge of early breastfeeding) retained their significance in this model too. No new variables emerged as predictors of good breastfeeding practice.

Table 6.17 displays that both the fourth and the highest wealth quintiles had nearly twofold increases in the odds of good breastfeeding practice (fourth wealth quintile: OR 2.35, 95% CI 1.42-3.87 and highest wealth quintile: OR 2.09, 95% CI 1.22-3.60) compared to the lowest wealth quintile. The use of ANC from a SBA was also associated with a two fold increase in the odds of good breastfeeding practice (OR 1.92, 95% CI 1.12-3.29) compared to not using ANC at all. The mother's knowledge of early breastfeeding appeared to be a very strong predictor of good breastfeeding practice. Having knowledge of correct breastfeeding time was associated with a nearly fivefold increase in the odds of breastfeeding the newborn (OR 4.64, 95% CI 1.66-12.98) within the first hour of birth compared to not knowing the breastfeeding time.

Table 6.16: Odds ratio and 95% confidence interval for the effect of socio-demographics, SES, use of maternal health services, birth preparedness, knowledge of mothers, and advice from a FCHV and counselling from a health worker variables on early breastfeeding practice

Independent variables	Socio-demographic/SES/ use of maternal health services/ birth preparedness/ mothers' knowledge		Socio-demographic/SES/ use of maternal health services/ birth preparedness/ mothers' knowledge/ advice and counselling	
	OR	**95% CI**	**OR**	**95% CI**
1. Socio-demographic characteristics				
Ethnicity				
Upper caste	1.00		1.00	
Disadvantaged Indigenous	1.58*	1.02-2.46	1.54	0.99-2.40
Dalit	1.12	0.61-2.06	1.11	0.60-2.03
Other	2.13	0.95-4.78	2.12	0.94-4.80
2. Socio-economic status (wealth quintiles)				
Lowest	1.00		1.00	
Second	1.13	0.70-1.81	1.14	0.71-1.84
Middle	1.54	0.96-2.45	1.62	1.01-2.59
Fourth	2.21**	1.35-3.63	2.34**	1.42-3.85
Highest	2.21**	1.32-3.69	2.32**	1.38-3.89
3. Use of maternal health services				
Antenatal care				
From SBA	2.02**	1.24-3.31	1.94*	1.13-3.32
From other people	1.10	0.78-1.56	0.98	0.64-1.52
No one	1.00		1.00	
4. Made preparation for birth				
Yes	0.73	0.47-1.14	0.74	0.47-1.15
No	1.00		1.000	
5. Mothers' knowledge of				
Things to be kept clean during delivery				
Know none of the cleans	8.91	0.85-93.21	9.11	0.86-96.02
Know 1-3 cleans	2.01	0.75-5.38	2.15	0.79-5.80
Know >=4 cleans	1.00		1.000	
Timing of first breast feeding				
Immediately after birth	4.62**	1.66-12.83	4.59**	1.64-12.87
After the placenta is out	1.81	0.63-5.20	1.78	0.61-5.16
After bathing child/after 24 hours of birth	0.84	0.30-2.35	0.84	0.30-2.37
Do not know	1.00		1.00	
Newborn danger signs				
Know 1-3 danger signs	0.47	0.17-1.30	0.45	0.16-1.25
Know >=4 danger signs	1.00		1.00	
6. Advice from a FCHV/Counselling from a health worker				
FCHV's advice on breastfeeding time				
Yes			1.08	0.65-1.79
Did not meet a FCHV			0.78	0.52-1.17
No			1.00	
Health worker's counselling on breastfeeding time				
Yes			0.66	0.40-1.11
No			1.00	
Total sample			**810**	

*p< 0.05, **p<0.01

Table 6.17: Odds ratio and 95% confidence interval for the effect of socio-demographics, SES, use of maternal health services, birth preparedness, knowledge of mothers, and advice from a FCHV and counselling from a health worker, and exposure to media variables on early breastfeeding practice

Independent variables	Socio-demographic/SES/use of maternal health services/birth preparedness/ mothers' knowledge /advice and counselling/exposure to media	
	OR	95% CI
1. Socio-demographic characteristics		
Ethnicity		
Upper caste	1.00	
Disadvantaged Indigenous	1.56	1.00-2.43
Dalit	1.13	0.62-2.08
Other	2.18	0.96-4.94
2. Socio-economic status (wealth quintiles)		
Lowest	1.00	
Second	1.15	0.71-1.85
Middle	1.63	1.02-2.62
Fourth	2.35**	1.42-3.87
Highest	2.09**	1.22-3.60
3. Use of maternal health services		
Antenatal care		
From SBA	1.92*	1.12-3.29
From other people	0.99	0.64-1.53
No one	1.00	
4. Made preparation for birth		
Yes	0.73	0.47-1.14
No	1.00	
5. Mothers' knowledge of		
Things to be kept clean during delivery		
Know none of the cleans	9.41	0.90-99.01
Know 1-3 cleans	2.25	0.83-6.10
Know >=4 cleans	1.00	
Timing of first breast feeding		
Immediately after birth	4.64**	1.66-12.98
After the placenta is out	1.81	0.63-5.23
After bathing child/after 24 hours of birth	0.85	0.30-2.40
Do not know	1.00	
Newborn danger signs		
Know 1-3 danger signs	0.43	0.16-1.21
Know >=4 danger signs	1.00	
6. Advice from a FCHV/Counselling from a health worker		
FCHV's advice on breastfeeding		
Yes	1.08	0.65-1.80
Did not meet FCHV	0.79	0.53-1.17
No	1.00	
Health worker's counselling on breastfeeding time		
Yes	0.64	0.38-1.08
No	1.00	

Independent variables	Socio-demographic/SES/use of maternal health services/birth preparedness/ mothers' knowledge /advice and counselling/exposure to media	
	OR	**95% CI**
7. Exposure to media		
Watched television at least once a week		
Yes	0.61	0.28-1.31
No	1.00	
Total Sample	**810**	

*p<0.05, **p<0.01

6.4 Delayed Bathing

The simple logistic regression for good bathing practice and the independent variables showed that two variables: delivery assistance and birth preparedness are not significantly associated with delayed bathing practice.

6.4.1 Hypothesis: Socio-demographic factors are related to delay newborn bathing practice.

When all the socio-demographic variables (age, caste/ethnicity, and education) were put together, age did not appear to have any significant association with good newborn bathing practice. Amongst the caste/ethnic groups, dalit was found to have a negative association with good newborn bathing practice. Women belonging to dalit caste/ethnic groups were 0.23 times less likely (95% CI 0.09-0.58) to bath their newborn after 24 hours of birth compared to upper caste/ethnicity women. Education was also significantly associated with good newborn bathing practice. Mothers who attained primary education level had double increases in the odds (OR 1.83, 95% CI 1.08-3.10) of performing good newborn bathing practice compared to the mothers who never went to school, whereas women who attained a higher level of education had five fold increases in the odds (OR 4.95, 95% CI 2.48-9.87) of delaying the bathing of their newborn until 24 hours of birth compared to the uneducated mothers. Refer to Table 6.18. Hence, the hypothesis is supported.

Table 6.18: Odds ratio and 95% confidence interval for the effect of socio-demographic variables on delayed newborn bathing practice

Socio-demographic characteristics	OR	95% CI
Age in years		
15-19	1.00	
20-34	0.68	0.39-1.19
35-49	0.53	0.23-1.20
Caste/Ethnicity		
Upper caste	1.00	
Disadvantaged Indigenous	0.64	0.39-1.05
Dalit	0.23**	0.09-0.58
Other	0.33	0.11-1.03
Education		
No education	1.00	
Primary	1.83*	1.08-3.10
Secondary	1.47	0.75-2.87
Higher	4.95**	2.48-9.87
Total sample	**812**	

*p<0.05, **p<0.01

6.4.2 Hypothesis: Socio-economic status is related to delay newborn bathing practice.

The result for the SES and delayed newborn bathing practice is shown in Table 6.19. The odds for bathing the newborn after 24 hours of birth was greatest for the highest (OR 4.51, 95% CI 2.43-8.38) wealth quintile, followed by the fourth wealth quintile (OR 2.65, 95% CI 1.39-5.05) and the middle wealth quintile (OR 2.12, 95% CI 1.10-4.07). Hence, the hypothesis that the socio-economic status is related to good newborn bathing is supported.

Table 6.19: Odds ratio and 95% confidence interval for the effect of socio-economic status variable on delayed newborn bathing practice

Socio-economic status (wealth quintiles)	OR	95% CI
Lowest	1.00	
Second	1.05	0.50-2.23
Middle	2.12*	1.10-4.07
Fourth	2.65**	1.39-5.05
Highest	4.51**	2.43-8.38
Total sample	**812**	

*p<0.05, **p<0.01

6.4.3 Hypothesis: Utilization of maternal health services is related to delay newborn bathing practice

The variable 'assistance during delivery' was not found to be significantly associated with good bathing in the simple logistic regression. Therefore the variable was discarded. The result for use of ANC service with good newborn bathing is shown in Table 6.20. It shows that if a woman received ANC from a SBA, she had a nearly fourfold increase in the odds (OR 3.84, 95% CI 2.22-6.64) of bathing the newborn after 24 hours of delivery compared to a woman who did not receive ANC from anyone. Similarly, if a woman received ANC from other persons, she had a twofold increase in the odds (OR 2.01, 95% CI 1.25-3.25) of bathing the newborn after 24 hours of birth compared to a woman who did not receive ANC at all. Hence, the hypothesis that utilization of maternal health service is related to delay newborn bathing practice is supported by the results.

Table 6.20: Odds ratio and 95% confidence interval for the effect of the use of maternal health service variable on delayed newborn bathing practice

Use of maternal health services	OR	95% CI
Antenatal care		
From SBA	3.84**	2.22-6.64
From other people	2.01**	1.25-3.25
No one	1.00	
Total sample		**812**

*p<0.05, **p<0.01

6.4.4 Hypothesis: Birth preparedness during pregnancy is related to delay newborn bathing practice

The simple logistic regression showed that birth preparedness during pregnancy was not significantly associated with good bathing practice, so, the variable was discarded. Therefore, the hypothesis was not supported by the results

6.4.5 Hypothesis: Mothers' knowledge of newborn care issues is related to delay newborn bathing practice

Multivariate logistic regression models used to examine the association between mothers' knowledge of newborn care issues and the good bathing practice showed that not having knowledge about any of the things that needed to be kept clean during delivery was negatively

associated with a 0.11 fold decrease in the odds of good newborn bathing practice (95% CI 0.02-0.54) compared to having knowledge of four or more things that needed to be kept clean during delivery. Likewise, having knowledge of 1-3 things that needed to be kept clean during delivery was associated with a 0.46 fold decrease in the odds of performing good bathing practice (95% CI 0.28-0.77) compared to having knowledge of four or more things that needed to be kept clean during delivery. Mothers who knew that a newborn should be bathed after 24 hours of birth had a 6.79 times increase in the odds (95% CI 2.91-15.83) of bathing the newborn 24 hours after birth, while mothers who viewed that a newborn should be bathed before 24 hours of birth had a 0.27 decrease in the odds (95% CI 0.11-0.63) of bathing the newborn after 24 hours of birth. See Table 6.21

Knowledge about breastfeeding time and that of newborn danger signs were not significantly associated with good newborn bathing practice. Overall, the results supported the hypothesis that knowledge of mothers about newborn care issues is related to good newborn bathing practice.

Table 6.21: Odds ratio and 95% confidence interval for the effect of mothers' knowledge on specific newborn care issue variables on delayed newborn bathing practice

Mothers' knowledge of	OR	95% CI
Things to be kept clean during delivery		
Know none of the cleans	0.11**	0.02-0.54
Know 1-3 cleans	0.46**	0.28-0.77
Know >=4 cleans	1.00	
Breast feeding		
Immediately after birth	1.11	0.25-4.88
After the placenta is out	0.79	0.17-3.66
After bathing child/after 24 hours of birth	0.95	0.21-4.38
Do not know	1.00	
Newborn bathing		
After 24 hours	6.79**	2.91-15.83
Before 24 hours	0.27**	0.11-0.63
Do not know	1.00	
Newborn danger signs		
Know none of the signs	6.63	0.61-71.54
Know 1-3 danger signs	1.07	0.63-1.83
Know >=4 danger signs	1.00	
Total sample		**812**

*p< 0.05, **p<0.01

6.4.6 Hypothesis: Advice from a FCHV on newborn bathing is related to delay newborn bathing practice

Data on a health worker's counseling on newborn bathing was not available. The regression result showed that receiving advice from a FCHV during pregnancy on newborn bathing time was associated with a 6.23 fold increase in the odds of bathing the newborn after 24 hours compared to not receiving advice on it. Refer to Table 6.22. Thus, the hypothesis that advice from a FCHV on newborn bathing is related to delay newborn bathing practice was supported.

Table 6.22: Odds ratio and 95% confidence interval for the effect of advice from a FCHV on delayed newborn bathing practice

Advice from FCHV/Counselling from a health worker	OR	95% CI
FCHV's advice on newborn bathing		
Yes	6.23**	3.78-10.26
Did not meet FCHV	0.90	0.57-1.41
No	1.00	
Total sample		**812**

*p< 0.05, **p<0.01

6.4.7 Hypothesis: Exposure to media is related to delay newborn bathing practice

The multivariate analysis results for exposure to media and good bathing practice is shown in Table 6.23. The results support the hypothesis. Surprisingly, both watching television at least once a week and listening to radio at least once a week had negative impact on good bathing practice. Watching television at least once a week was associated with 0.44 odds (95% CI 0.22-0.86) of demonstrating good newborn bathing and listening to radio at least once a week was associated with 0.67 odds of demonstrating good newborn bathing practice (95% CI 0.44-1.00).

Table 6.23: Odds ratio and 95% confidence interval for the effect of exposure to media on delayed newborn bathing practice

Exposure to Media	OR	95% CI
Watched television at least once a week		
Yes	0.44*	0.22-0.86
No	1.00	
Listened to radio at least once a week		
Yes	0.67*	0.44-1.00
No	1.00	
Total sample		**812**

*p<0.05, **p<0.01

6.4.8 Combined analysis of the independent variables

In the combined analysis, different sets of independent variables were included together in the logistic regression models to examine their association with good newborn bathing practice. Initially, socio-demographic characteristics and socio-economic status were regressed, where dalit caste/ethnicity group, the higher level of education and the fourth and the highest wealth quintiles retained their association with good newborn bathing practice, but the primary education level and the middle wealth quintile did not retain their significance. Being a member of a dalit caste/ethnicity group had a 0.27 fold decrease in the odds of bathing the newborn baby after 24 hours of birth compared to being a member of an upper caste group. Women with higher levels of education had a 3.62 fold increase in the odds of bathing their baby after 24 hours of birth. Women in the fourth and the highest wealth quintiles had 2.21 and 2.74 fold increases in the odds of demonstrating good newborn bathing. See Table 6.24.

Table 6.24: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health service variables on delayed newborn bathing practice

Independent variables	Socio-demographic/SES		Socio-demographic/SES/use of maternal health services	
	OR	95% CI	OR	95% CI
1. Socio-demographic characteristics				
Age in years				
15-19	1.00		1.00	
20-34	0.69	0.39-1.21	0.67	0.38-1.19
35-49	0.58	0.25-1.35	0.62	0.27-1.43
Ethnicity				
Upper caste	1.00		1.00	
Disadvantaged Indigenous	0.69	0.42-1.15	0.72	0.43-1.20
Dalit	0.27**	0.10-0.71	0.27**	0.10-0.72
Other	0.36	0.11-1.13	0.36	0.12-1.13
Education				
No education	1.00		1.00	
Primary	1.68	0.98-2.87	1.65	0.96-2.82
Secondary	1.17	0.58-2.35	1.04	0.52-2.12
Higher	3.62**	1.76-7.45	3.00**	1.43-6.31
2. Socio-economic status (wealth quintiles)				
Lowest	1.00		1.00	
Second	1.03	0.48-2.21	1.02	0.47-2.19
Middle	1.88	0.96-3.67	1.82	0.93-3.58
Fourth	2.21*	1.14-4.29	2.02*	1.03-3.94
Highest	2.74**	1.41-5.35	2.40*	1.22-4.73

Independent variables	Socio-demographic/SES		Socio-demographic/SES/use of maternal health services	
	OR	95% CI	OR	95% CI
3. Use of maternal health services				
Antenatal care			1.98*	1.06-3.73
From SBA			1.51	0.91-2.52
From other people				
No one			1.00	
Total sample		**812**		

*p<0.05, **p<0.01

In the next step, socio-demographic characteristics, SES and the use of maternal health service variables were regressed. The variables that emerged as predictors of good newborn bathing when only the socio-demographic and SES variables were regressed continued to stay as predictors of good newborn bathing when a maternal health service utilisation variable was added. In addition one more variable- the use of antenatal care service from SBA also emerged as a predictor of good bathing practice in the model. Dalit caste/ethnicity was negatively associated with good bathing practice of newborns. Dalit women had 0.27 fold decreased odds (95% CI 0.10-0.72) of performing good newborn bathing compared to their counterparts in the upper caste/ethnicity group. Education has a positive impact on good newborn bathing practice. The higher educated women had 3.00 fold increased odds (95% CI 1.43-6.31) of bathing their newborn after 24 hours of delivery compared to uneducated women. SES was found to be having a positive association with good bathing practice. The women of the fourth and the highest wealth quintiles had 2.02 (95% CI 1.03-3.94) and 2.40 (95% CI 1.22-4.73) fold increased odds of bathing newborns after 24 hours of birth compared to women of the lowest wealth quintile. If women received ANC from a SBA, they had a two fold increase in the odds (OR 1.98, 95% CI 1.06-3.73) of delaying bathing of their newborn compared to women who did not receive ANC at all. See Table 6.24.

The inclusion of the set of variables for mothers' knowledge of specific newborn care issues in the previous model shows that caste/ethnicity, SES, and mothers' knowledge are significantly associated with delayed bathing practice. The caste/ethnicity group dalit was negatively associated with good bathing practice (OR 0.30, 95% CI 0.10-0.95). The secondary education level was also negatively associated with good bathing (OR 0.38, 95% CI 0.15-0.94). With regard to SES, the fourth wealth quintile was associated with a fourfold increase in the odds (OR 4.14, 95% CI 1.80-9.49) of good bathing practice while the highest wealth quintile was associated with a nearly threefold increase in the odds (OR 3.37, 95% CI 1.44-7.86) of good bathing practice. The mothers who did not have knowledge of any of the things that should be

kept clean during delivery had decreased odds (OR 0.15, 95% CI 0.03-0.76) of performing good bathing practice relative to women who knew of four or more things that should be kept clean during delivery and mothers who knew one to three things that should be kept clean during delivery had 0.49 times decreased odds (95% CI 0.28-0.84) of bathing the newborn after 24 hours of birth relative to women who knew of four or more things that needed to be kept clean during delivery. Compared to not having knowledge of newborn bathing time, having the right knowledge of newborn bathing time had a 5.56 fold increased odds (95% CI 2.24-13.81) and having the wrong knowledge of newborn bathing time had a 0.18 fold decreased odds (95% CI 0.07-0.45) of performing good bathing practice . Refer to Table 6.25.

In the next step of the analysis, advice from a FCHV on newborn bathing variable was included in the model to examine the combined effect of the variables on good newborn bathing practice. The result revealed that the variables that were significant in the previous model (dalit caste/ethnicity, secondary education level, the fourth and the highest wealth quintile, mothers' knowledge of delivery cleans and mothers' knowledge of newborn bathing) retained their significance. In addition, receiving advice from FCHVs on newborn bathing time was also found to be associated with good bathing practice.

A dalit caste/ethnicity woman had 0.25 fold decrease in the odds (95% CI 0.08-0.82) of demonstrating delayed newborn bathing relative to an upper caste/ethnicity group woman. A secondary level educated woman had 0.36 fold decrease in the odds (95% CI 0.14-0.92) of bathing newborn baby after 24 hours of birth relative to an uneducated woman. Women belonging to the fourth SES were associated with greater odds of (OR 4.00, 95% CI 1.73-9.28) adopting delayed bathing than women belonging to the highest SES (OR 3.19, 95% CI 1.34-7.58). Not having knowledge of any of the delivery cleans had 0.16 (95% CI 0.03-0.86) and having knowledge of only 1 to 3 delivery cleans had 0.55 fold decreases in the odds (95% CI 0.31-0.96) of bathing newborn after 24 hours of birth relative to having knowledge of four or more delivery cleans. Having knowledge of correct bathing time was associated with 5.20 increase in odds (95% CI 2.06-13.11) and having incorrect knowledge of bathing was associated with 0.19 decrease in the odds of demonstrating good bathing practice. Mothers who were advised by a FCHV during pregnancy about the correct newborn bathing time had a 3.01 fold increase in the odds (95% CI 1.53-5.91) of performing good newborn bathing compared to women who were not advised by a FCHV. Refer to Table 6.25.

Table 6.25: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/ mothers' knowledge/advice from FCHV variables on delayed newborn bathing practice

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge		Socio-demographic/ SES/use of maternal health services/ mothers' knowledge/ advice and counselling	
	OR	95% CI	OR	95% CI
1. Socio-demographic characteristics				
Age in years				
15-19	1.00		1.00	
20-34	0.64	0.32-1.29	0.67	0.33-1.37
35-49	0.76	0.27-2.13	0.72	0.25-2.07
Ethnicity				
Upper caste	1.00		1.00	
Disadvantaged Indigenous	0.76	0.39-1.49	0.69	0.35-1.38
Dalit	0.30*	0.10-0.95	0.25*	0.08-0.82
Other	0.25	0.06-1.09	0.26	0.06-1.14
Education				
No education	1.00		1.00	
Primary (grade 0-5)	0.92	0.46-1.84	0.89	0.44-1.79
Secondary (6-10)	0.38*	0.15-0.94	0.36*	0.14-0.92
Higher (SLC and above)	0.66	0.25-1.77	0.66	0.24-1.80
2. Socio-economic status (wealth quintiles)				
Lowest	1.00		1.00	
Second	1.04	0.42-2.61	0.88	0.34-2.30
Middle	1.72	0.76-3.90	1.73	0.75-3.98
Fourth	4.14**	1.80-9.49	4.00**	1.73-9.28
Highest	3.37**	1.44-7.86	3.19**	1.34-7.58
3. Use of maternal health services				
Antenatal care				
From SBA	1.380	0.62-3.06	1.24	0.52-2.93
From other people	0.975	0.52-1.83	0.81	0.40-1.67
No one	1.000		1.00	
4. Mothers' knowledge of				
Cleanliness during delivery				
Know none of the cleans	0.15*	0.03-0.76	0.16*	0.03-0.86
Know 1-3 cleans	0.49*	0.28-0.84	0.55*	0.31-0.96
Know 4 or more cleans	1.00		1.00	
Timing of first breast feeding				
Immediately after birth	1.55	0.33-7.35	1.34	0.28-6.36
After the placenta is out	1.00	0.20-4.95	0.77	0.15-3.88
After bathing child/after 24 hours of birth	1.22	0.25-5.98	0.99	0.20-4.87
Do not know	1.00		1.00	
Timing of first bathing				
After 24 hours	5.56**	2.24-13.81	5.20**	2.06-13.11
Before 24 hours	0.18**	0.07-0.45	0.19**	0.08-0.50
Do not know	1.00		1.00	
Newborn danger signs				
Know none of the signs	6.07	0.54-67.98	6.59	0.58-75.17
Know 1-3 danger signs	1.15	0.65-2.05	1.31	0.72-2.37
Know 4-7 danger signs	1.00		1.00	
5. Advice from FCHV/Counselling from health worker				
FCHV's advice on newborn bathing				
Yes			3.01**	1.53-5.91
Did not meet FCHV			1.10	0.58-2.09
No			1.00	
Total sample			**812**	

*p<0.05, **p<0.01

In the full regression model the variables that were significant in the previous model continued to stay significant. See Table 6.26. When the confounding effects of other variables were controlled, dalit (OR 0.25, 95% CI 0.08-0.82) caste/ethnicity groups, and secondary education level (OR 0.37, 95% CI 0.14-0.94) were associated with decreased odds of demonstrating good newborn bathing. In addition, not knowing any of the items that should be kept clean during delivery (OR 0.16, 95% CI 0.03-0.86) and knowing 1 to 3 items that should be kept clean during delivery (OR 0.55, 95% CI 0.31-0.97) compared to having knowledge of four or more items that should be kept clean during delivery, and having incorrect knowledge of newborn bathing (OR 0.20, 95% CI 0.08-0.51) relative to having no knowledge of newborn bathing at all were also associated with decreased odds of adopting good newborn bathing practice.

The fourth and the highest SES were associated with quadrupled (OR 4.01, 95% CI 1.73-9.31) and triple (OR 3.40, 95% CI 1.37-8.43) increases in the odds of bathing the newborn after 24 hours of birth compared to the lowest SES. Similarly, if a woman had knowledge of the correct newborn bathing time, she had a five fold increase in the odds of bathing the newborn after 24 hours of birth (OR 5.32, 95% CI 2.10-13.48) compared to a woman who had no knowledge about newborn bathing at all. If a woman was advised by a FCHV during pregnancy on bathing time, she had a triple increase in the odds (OR 3.11, 95% CI 1.57-6.14) of bathing the newborn after 24 hours of birth.

Table 6.26: Odds ratio and 95% confidence interval for the effect of demographic/SES/use of maternal health services/ mothers' knowledge/advice from FCHV, exposure to media variables on delayed newborn bathing practice

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge/advice and counselling/exposure to media	
	OR	95% CI
1. Socio-demographic characteristics		
Age in years		
15-19	1.00	
20-34	0.69	0.34-1.40
35-49	0.74	0.25-2.15
Ethnicity		
Upper caste	1.00	
Disadvantaged Indigenous	0.69	0.34-1.37
Dalit	0.25*	0.08-0.82
Other	0.26	0.06-1.13
Education		
No education	1.00	
Primary	0.40	0.45-1.82
Secondary	0.37*	0.14-0.94
Higher	0.65	0.24-1.78

Independent variables	Socio-demographic/SES/use of maternal health services/ mothers' knowledge/advice and counselling/exposure to media	
	OR	**95% CI**
2. Socio-economic status (wealth quintiles)		
Lowest	1.00	
Second	0.89	0.34-2.35
Middle	1.71	0.73-3.96
Fourth	4.01**	1.73-9.31
Highest	3.40**	1.37-8.43
3. Use of Maternal services		
Antenatal care		
From SBA	1.24	0.52-2.96
From other people	0.80	0.38-1.66
No one	1.00	
4. Mothers' knowledge of		
Cleanliness during delivery		
Know none of the cleans	0.16*	0.03-0.86
Know 1-3 cleans	0.55*	0.31-0.97
Know 4 or more cleans	1.00	
Timing of first breast feeding		
Immediately after birth	1.33	0.28-6.35
After the placenta is out	0.76	0.15-3.86
After bathing child/after 24 hours of birth	0.98	0.20-4.87
Do not know	1.00	
Timing of first bathing		
After 24 hours	5.32**	2.10-13.48
Before 24 hours	0.20**	0.08-0.51
Do not know	1.00	
Newborn danger signs		
Know none of the signs	6.42	0.56-73.43
Know 1-3 danger signs	1.30	0.72-2.37
Know 4-7 danger signs	1.00	
5. Advice from FCHV/Counselling from health worker		
FCHV's advice on newborn bathing		
Yes	3.11**	1.57-6.14
Did not meet FCHV	1.11	0.59-2.11
No	1.00	
6. Exposure to Media		
Watched television at least once a week		
Yes	1.40	0.49-4.06
No	1.00	
Listened to radio at least once a week		
Yes	0.94	0.52-1.70
No	1.00	
Total sample		**812**

*p<0.05, **p<0.01

6.5 Conclusions

This study conceptualized that nine set of independent factors (socio-demographic, socio-economic, birth preparation, use of maternal health services, mothers' knowledge, advice from a FCHV and counseling from a health worker, exposure to media, cultural factors and health system factors) are associated with good newborn care practices (safe cord cutting, early breastfeeding and delayed newborn bathing). However, due to lack of data on cultural and health system factors, associations of only seven set of factors (socio-demographic, socio-economic, birth preparation, use of maternal health services, mothers' knowledge, advice from a FCHV and counseling from a health worker, and exposure to media) with the good newborn care practices were examined separately using logistic regression methods. Initially, simple logistic regression method was used to find out which of the independent factors are significantly associated with the outcome variables. In the next step of the analysis, associations between each of the seven variable set and the outcome variables were examined separately and hypotheses were tested. Finally, combined analyses of the variables were carried on in a step-wise manner following the conceptual framework of the study. A new variable set was added to the first variable set in each step of the analysis. The combined analysis of the independent variables examined the associations of each of the independent variables that were included in a model with each of the dependent variables, while controlling for the confounding aspects of other independent variables included in the model. Overall, the multiple regression analysis gave adjusted odds ratios and the confidence intervals. The multiple logistic regression analysis examined the associations of the independent variables with each of the dependent variables, while controlling for the confounding aspects of other independent variables.

The results of multiple regression analysis for the three good newborn care practices showed that of all the factors that were examined, socio-economic status was the only factor that had an impact on all the three practices when the confounding effect of other factors were controlled. Women belonging to the fourth and the highest wealth quintiles were more likely to demonstrate good newborn care practices.

The prime childbearing age (20-34 years) had a positive impact on safe cord cutting practice but had no impact on early breastfeeding and delayed bathing practices. Ethnicity also emerged as a predictor of good newborn care practices. The disadvantaged and 'other' caste/ethnicity groups had a negative impact on safe cord cutting. The dalit caste/ethnicity also had a negative

impact on delayed newborn bathing. The secondary education level had a negative impact on good bathing practice and receiving ANC from a SBA had a positive association with early breastfeeding.

The knowledge of early breastfeeding had a positive impact on early breastfeeding and knowledge of delayed bathing had a positive impact on delayed bathing. Not having knowledge of 'delivery cleans' was associated with decreased odds of delayed bathing. Receiving advice from a FCHV about delayed bathing was also associated with increased odds of demonstrating delayed bathing.

The coverage for SBA assisted deliveries was unacceptably low in the study areas; therefore, the variable had to be discarded in the analysis. Birth preparedness had significant negative association with early breastfeeding in the simple regression analysis but did not have an impact in the presence of other factors. Exposure to media was also negatively associated with good newborn care practices in simple regressions but had no impact in the presence of other stronger factors in the multiple regression models. Receiving advice from a FCHV and counseling from a health worker did not emerge as predictors of good newborn care practices in the presence of other stronger factors in the combined analysis of the variables.

CHAPTER SEVEN
Discussion and Conclusion

The study examined the patterns and determinants of three newborn care practices: safe cord cutting, early breastfeeding and delayed bathing in the rural areas of Nepal. The associations between the seven independent variable sets (socio-demographic, SES, use of maternal health services, birth preparation, mothers' knowledge, FCHV's advice and health worker's counselling, and exposure to media and the three outcome variables were examined separately. Interview data obtained from a household survey of 815 women aged 15-49 years who delivered a live baby at home in the one year period, February 2008-February 2009 in the VDCs of Sindhuli district were analysed. Univariate, bivariate and multivariate analyses were used to meet the study objectives. The findings of the study are discussed in this chapter along with their implications for newborn care policies and programs in Nepal. This chapter is divided into the following sections: a discussion of the sample and its characteristics, patterns and determinants of good newborn care practices, strengths and limitations of the study, policy implications and recommendations, and recommendations for future research, and summary and conclusions.

7.1 Discussion of the sample and its characteristics

7.1.1 Socio-demographic and socio-economic factors

Early marriage, pregnancy, and motherhood have been common phenomena for Nepalese women, particularly in the rural areas for a long time. However, data shows that the marriage age and the childbearing age for young women have risen in Nepal (MoHP, New ERA and Macro International Inc., 2007). In the study, three-quarters (75.1%) of the sample women were of prime childbearing age (20-34 years), and this distribution is similar to that of Nepal's national figure. In Nepal 73% of the total women in the reproductive age group who gave birth

during the five year period from 2001 to 2005 were of prime childbearing age (MoHP, New ERA and Macro International Inc., 2007). The proportion of women who gave birth before 20 years was lower in the current study than nationally. In the study, a considerable proportion (13.6%) of the women gave birth to the baby after 34 years. Data on fertility suggests that in rural Nepal getting pregnant later might not be attributed to late marriage but because women are having more children. Overall, the findings show that for the majority of the sample women, age at birth is what was expected.

Nepal's national level statistics show that there has been a remarkable improvement in fertility patterns over the ten year period from 1996 to 2006. For instance, the median age at first marriage for women increased from 16.4 to 17.2 years and the median age at first birth increased from 19.8 to 19.9 years, the total fertility rate declined from 4.6 to 3.1 per woman and the median interval between two pregnancies increased from 32.0 to 33.6 months (31.9 to 33.1 months for rural areas) (MoHP, New ERA, Macro International Inc., 1997; MoHP, New ERA, Macro International Inc., 2007). Age at marriage, age at first sexual intercourse, age at first pregnancy and birth, and birth interval are the proximate factors that impact on the healthy delivery of a baby and perhaps are also associated with newborn care behaviours. The improvement in the fertility patterns of Nepal is the result of the combined effort of the Nepal Government, external development partners, non-governmental organizations/international non-governmental organizations (NGOs/INGOs) and the private volunteer organizations (PVOs).

In the study sample, the proportion of upper caste/ethnicity group women was lower than that of the national figure and the proportion of disadvantaged indigenous women was higher than nationally. The combined proportion of disadvantaged indigenous and dalit caste/ethnicity groups of women in the study areas (78.5%) was higher than that in the Sindhuli district (66.8%) overall. This is because all the women in the sample were drawn from only the rural areas of the district. This greater proportion of disadvantaged and dalit caste/ethnicity women reflects the situation in rural areas throughout Nepal. A majority of the sample women (71.5%) were uneducated, and this proportion is higher than the national figure for women aged 15-49 years (53.1%). The highest proportion of sample women fell in the lowest 20% of the wealth quintile whereas nationally, the greatest proportion falls in the highest 20% of the wealth quintile (MoHP, New ERA and Macro International Inc., 2007). This indicates that the greater proportion of the sample women were poor compared to all Nepalese women aged 15-49 years.

Sindhuli is a hilly district, therefore, it could be likely that the people living there might be poorer than Nepalese women overall.

7.1.2 Use of maternal health services

In Nepal, coverage for the uptake of antenatal care (43.7%) and delivery services (18.7%) from a SBA is very low. In rural areas these figures are much lower (ANC from SBAs-37.5%, delivery from SBAs-14.3%) than in urban areas (ANC from SBAs-84.6%, delivery from SBAs-50.6%) showing the discrepancy and inequity in access to the SBA service between the areas (MoHP, New ERA, Macro International Inc., 2007). In the study areas, SBA coverage for both the uptake of ANC (16.9%) and delivery (0.2%) services is unacceptably low compared to the national data. The data also shows that there is a high drop off in the use of SBA services from ANC to delivery. The majority of those who met a SBA for ANC did not meet one for delivery. The role of a SBA in reducing maternal and newborn deaths and illness has already been recognized by the international community. Increasing the proportion of deliveries assisted by a SBA is also one of the key indicators of the MDG related to maternal health and the Nepal government is committed to meet it. Therefore, increasing the uptake of ANC from a SBA, minimizing drop offs and increasing the uptake of delivery services from a SBA are the keys to improving the maternal and newborn health in the rural areas of Nepal.

7.1.3 Birth preparedness

Birth preparedness is important in ensuring appropriate care during delivery. Birth preparedness helps to identify a SBA who might be available for pregnant women during delivery and also to manage transportation during emergencies, which is essential not only for maternal health but also for newborn health. Therefore, birth preparedness helps to reduce two of the 'three delays' in getting delivery services: delay in decision making and delay in reaching appropriate facilities. In Nepal, nearly half of the women who delivered at home did not prepare for birth at all, and this figure is lower in the rural than urban areas (MoHP, New ERA, Macro International Inc., 2007). Nevertheless, four-fifths of the sample women in this study made one or more preparations for birth which is an encouraging result. However, making only one of the birth preparations is not adequate to ensure a healthy delivery. In recent years, counselling about birth preparedness has been emphasized explicitly in every safe motherhood and newborn care program in Nepal, which may have had an impact on the high level of preparedness reported in the current study.

7.1.4 Mothers' knowledge

Overall, the mothers' knowledge of newborn care issues was not satisfactory in the sample population. A majority of women knew fewer than half of the items (1 to 3) that should be kept clean during delivery. Similarly, most knew only one to three newborn danger signs out of the seven. Knowledge of early breastfeeding was reported by about half of the women while knowledge of delayed bathing was reported by only one-fifth of the women. Studies conducted in other countries have already shown an association between maternal knowledge and child survival outcomes (Sharan, 2004; Senerath et al, 2007). If maternal knowledge of newborn care issues determined the newborn care behaviours in this study, the majority of the sample women did not have adequate knowledge of good newborn care practices, so their practices were likely to be poor.

7.1.5 Health workers' counselling and FCHVs' advice

Health workers' counselling has been recognized as an important factor influencing the healthy outcome of pregnancy and child survival (Baqui et al, 2006; Mannan et al, 2008). In Nepal, the FCHV programme is well recognized and FCHVs are found to have played an important role in educating pregnant women and mothers about safe motherhood and newborn care, amongst other activities. In the study, one-third (33.7%) of the sample women did not meet a health worker for ANC and nearly half (44.8%) did not meet a FCHV during their pregnancy, which is a very surprising finding. Overall, 28.7% of the sample women did not meet anyone during pregnancy. Sindhuli is a hilly district with ward-based FCHVs. Despite the presence of a FCHV in every ward of its VDCs, running out-reach clinics, and the presence of health facilities in all VDCs, a considerable segment of women did not meet FCHVs and health workers for antenatal care. These findings reflect the lack of access to FCHVs and health workers in the rural areas.

It clearly emerged from the study that FCHVs are not able to meet most pregnant women of their wards in Sindhuli district and the reasons for it could be multiple. It has been reported that the presence of FCHVs in the wards of rural Nepal is almost universal, 97% (FHD, New ERA & USAID, 2006). However, there is variation in the size of wards (number of households and women of childbearing age) which also means that there is a large discrepancy in the population covered and served by different FCHVs. Most evidence suggests that FCHV program coverage decreases rapidly with increased catchment population per FCHV. However, decline in coverage does not mean that there is a decline in the FCHVs' activity level. The available evidence shows that FCHVs may not automatically know about all pregnancies,

births, children, or other health issues in their area except for FCHVs with small catchment populations. Therefore, if they are to provide good service covering most pregnant women they need to be motivated to find those in need and families need to understand and expect their role as with the National Vitamin A program, which is one of the most successful public health programs of Nepal (FHD, New ERA & USAID, 2006).

Meeting a health worker for ANC services is also not universal in rural Nepal. In this study only two-thirds of the women met a health worker during pregnancy. The proportion of women meeting a SBA for ANC was less than a quarter. In Nepal the reasons for not meeting a health worker during pregnancy are: absence of health workers in the health facility, lack of equipment in health facilities, sex of the service provider, closure of the health facility, distance to the health facility, cost, behaviour of the health workers and not perceiving the importance of pregnancy services and lack of family support (Pradhan, 2007).

Though meeting a FCHV during pregnancy plays a crucial role in rural Nepal, it should not be considered as a substitute for meeting a health worker during pregnancy. FCHVs are cadres of volunteers who are selected locally at the ward levels and are trained to educate pregnant women and mothers on safe motherhood, family planning and child health issues and to distribute a few health commodities. They do not qualify as health workers. Therefore, meeting a FCHV does not ensure that a woman received comprehensive ANC services. The study found that 5% of the sample women met only a FCHV during their pregnancy which is really very concerning. Meeting a FCHV during pregnancy is important in rural Nepal especially for the re-supply of iron/folic acid tablets, identification of danger signs, birth preparation and nutrition education. Because national level data shows that only 26% of the rural women make four or more ANC visits to a health worker and nearly 45.6% make fewer than four ANC visits and 28.3% make no ANC visits at all, the importance of meeting a FCHV during pregnancy is even more crucial (MoHP, New ERA, Macro International Inc., 2007).

Not all the women who claimed that they met a FCHV and a health worker during their pregnancy reported that they were counselled on specific newborn care issues such as breastfeeding, newborn bathing and using the CHDK. Only about 10-25% of the women who claimed meeting a FCHV and health workers reported being advised or counselled on specific newborn care issues. These findings reflect the poor and inadequate quality of ANC and FCHV services in the communities of Nepal. This also shows the need for an audit of service delivery for ANC. An important aspect to improve maternal and newborn health in rural Nepal might be

to improve and increase the counselling services from health workers during ANC visits and that from FCHVs during mothers' group meetings and home visits.

7.1.6 Exposure to media

Electronic media are an important source of health information for people which increases their knowledge and awareness of health matters and which may assist in eventually changing their health perceptions and behaviours. Radio has been used by the National Health Education Information and Communication Centre (NHEICC) to disseminate health information in the rural areas of Nepal for a long time. More recently health related programmes have been produced and telecast from national television. In the study, more than four-fifths of the sample women did not watch television on a weekly basis; however two-thirds of them listened to radio on a weekly basis. Compared to the national overall figure, watching television occurred much less in the study areas, but listening to radio is nearly equal to the national figure. Nationally, the data also shows that the exposure to television and radio is much less for women compared to men. Owning a television and radio and women's ability to choose the programmes they wish to listen to or watch are important factors for the effectiveness of electronic media.

7.2 Patterns and determinants of good newborn care practices

The study aimed to understand the patterns and the determinants of good newborn care practices in the rural areas of Sindhuli district. Good newborn care practices that have been examined in this study are safe cord cutting, early breastfeeding and delayed bathing. The study conceptualised that good newborn care practices are associated with nine independent factors: i) socio-demographic factors, ii) socio-economic status, iii) use of maternal health services, iv) birth preparedness, v) mother's knowledge, vi) advice from a FCHV and counselling from a health worker, vii) health system factors, viii) exposure to media, and ix) cultural factors. However, owing to the lack of data on health system factors and cultural factors associations between only the seven sets of factors (socio-demographic factors, socio-economic status, use of maternal health services, birth preparedness, mother's knowledge, advice from a FCHV and counselling from a health worker and exposure to the media) and good newborn care practices were examined.

The distribution and determinants of safe cord cutting practice was studied for 803 of the sample women who either used an instrument from the CHDK, a new blade or a boiled blade to

cut the umbilical cord or used other instruments. The distribution and determinants of early breastfeeding was studied for 810 women who either breastfed their babies within the first hour of birth or after the first hour of birth and the distribution and determinants of delayed bathing was studied for 812 women who either bathed the baby after 24 hours of birth or before 24 hours after birth.

7.2.1 Safe cord cutting practice

In the study, safe cord cutting was defined as cutting the umbilical cord of the newborn baby with an instrument from the CHDK, a new blade or a boiled blade. It was found that 70.7% of the 803 women used a sterile instrument to cut the cord of their newborn baby which is lower than both national overall data (78.3%) and national rural data (77.1%). Of the three instruments, a new blade was the most commonly used instrument. Very few women (5.6%) used an instrument from the CHDK for cord cutting.

Tetanus and sepsis, resulting primarily from unhygienic deliveries and unsafe cord cutting and caring practices, are the two leading causes of maternal and neonatal deaths and illness in Nepal (Beun & Wood, 2003). To address the problem of unhygienic delivery practices and high perinatal infection in Nepal, Maternal and Child Health Products, Ltd (MCHP) made a disposable CHDK available in 1994. The CHDK is important for ensuring cleanliness during delivery at home and contains all the necessary items such as a blade, cord tie, plastic disc for safe cord care, plastic sheet for a clean delivery surface, soap for a clean hand wash and a pictorial instruction booklet for educating users on hand washing, immediate wrapping of the newborn, proper tying of the cord, early breastfeeding, and burial of the placenta. In Nepal, where deliveries mostly take place at home with the assistance of TBAs (*Sudenis*) and family members instead of a SBA, the use of the CHDK is crucial. The study showed that only 5.6% of the women who used a safe instrument for cord cutting used the CHDK. Other studies have reported that one important reason for the low use of the CHDK is the cost (Nepal Family Health Program, 2006). Families might not be willing to pay rupees 20-25 to buy a CHDK as a blade is quite a bit cheaper. Other reasons for not using a CHDK are: lack of awareness of the kit; unavailability of the kit, whereas a blade is readily available in all the local markets; the person assisting during delivery not bringing it, or the women and their families do not perceive its importance for cord cutting and delivery (NFHP, 2006). National level data show that only 17.6% of the babies born at home had their cord cut with an instrument from the CHDK (MoHP, New ERA, Macro International Inc., 2007).

Safe cord cutting was found to be related to two socio-demographic factors: mother's age and caste/ethnicity, when the confounding effect of other factors was controlled. Safe cord cutting was found to be most frequently demonstrated by women of prime childbearing age. It could be possible that women of prime childbearing age are more mature and are more enthusiastic to learn about modern health matters. Using a CHDK, a new and boiled blade for cord cutting could be considered a modern health practice. Thus, the prime childbearing aged women could have known of the importance of using those instruments for cord cutting. Therefore, they might have been more inclined towards using a safe instrument for cutting the cord of their newborn babies.

Safe cord cutting was also associated with caste/ethnicity. Women belonging to disadvantaged indigenous and 'other' caste/ethnicity groups were less likely to practice safe cord cutting compared to women belonging to the upper caste group. Other research has also showed that people coming from lower caste groups have unhygienic cord care practices (Sharan, 2004).

Nepalese society is predominantly a Hindu society and has a deep rooted caste system where Brahmin, Chhetris and Thakuris are considered as 'pure' and knowledgeable and are the mainstream or dominant group culturally. Thus, they belong to the upper caste group, whilst on the other hand ethnic groups which maintain a cultural, social and linguistic identity distinct from the mainstream or dominant culture are the indigenous people. These indigenous people are socio-economically disadvantaged and have not been able to move into the mainstream of development. Therefore, they are categorised as 'disadvantaged indigenous castes'. Dalits occupy the lowest position in the Nepalese caste system and are considered impure and should not be touched by the upper caste groups (untouchables) (CMIASP, 2004). In the study, the majority of the women were from disadvantaged indigenous caste groups. In addition, most were not educated and were poorer relative to other castes/ethnicities. Therefore, it is likely that they are not aware of health matters or could not afford to visit health facilities where they could have received information related to safe cord cutting. Thus, a majority of them did not demonstrate safe cord cutting. The caste/ethnicity group 'other' included castes such as Newars, Telis and Gurungs, which comprise a minority group in the study district. The women of this caste/ethnicity group are also the indigenous people but they are relatively advantaged compared to the other indigenous people. Therefore, from these results it could be assumed that the reason the indigenous people (both disadvantaged indigenous and advantaged indigenous) who primarily have unsafe cord cutting behaviours compared to the upper caste/ethnicity group

people, is the lower education level and lack of awareness of health matters. Another reason for the poor cord cutting practices in those groups of people could be the associated cultural beliefs and traditions that forbid them from cutting the cord using a safe instrument.

A qualitative study on cord care practice has shown that the type of instrument used for cord cutting also depends on the person assisting during delivery (NFHP, 2006). Usually, the person who assists the delivery cuts the umbilical cord of the newborn. In rural Nepal, as the majority of the deliveries are assisted by TBAs and elderly female family members, the type of instrument used for cord cutting depends upon their knowledge and beliefs. It is reported that among Brahmin/Chhetri (upper caste/ethnicity) women, the cord is usually cut by family members (NFHP, 2006). As Brahmin/Chhetris are also more educated, they might know the importance of using safe instruments, and therefore be more inclined towards using them for cord cutting. In other castes/ethnicities, usually the TBAs cut the cord. As most of the TBAs are not Trained Traditional Birth Attendants (TTBAs), they might not understand the importance of using safe instruments for cord cutting, therefore they are more likely to use other instruments. This information is immensely important to safe motherhood and newborn health programmers as it helps them to identify the ethnic groups in the community whose practices are poor and thus helps to develop appropriate strategies to improve their practices. Including TBAs in the safe motherhood and newborn care programs and training them might be one important approach to improve newborn care practices as the vast majority of the deliveries occur at home with the assistance of TBAs, instead of SBAs.

Socio-economic status emerged as a strong predictor of safe cord cutting. When the confounding effects of other factors were controlled, women who belonged to the fourth and the highest wealth quintiles had increased odds of cutting the cord with a safe instrument. Women who are wealthy may be more inclined to use safe instruments for cord cutting because they possess the ability to buy the CHDK or a new blade. Using the CHDK or a new blade/boiled blade could be considered a relatively modern practice and it might be that the wealthier women are more inclined towards adopting such practices, therefore they would cut the cord using an instrument from the CHDK, a new blade or a boiled blade. A similar association between socio-economic status and hygienic cord care was also found by Sharan (2004) in the study conducted in the rural areas of India. This finding also reinforces that improving the economic status of families is important for improving health behaviours and outcomes. This finding is important for programmers and policy makers as it provides direction

to them in designing integrated programs, which include components that help to improve their economic status together with health activities.

Receiving ANC during pregnancy is important not only for ensuring a healthy pregnancy outcome but also for ensuring safe newborn care practices. In the study, receiving ANC services from health workers (other than SBAs) was positively associated with safe cord cutting practice when socio-demographic, socio-economic, use of maternal health services and mothers' knowledge variables were regressed. However, this association did not exist when variables related to counselling from health workers and advice from FCHVs and exposure to media were introduced. In the study, the coverage of ANC from a SBA and coverage of SBA assisted deliveries were low. Among those women who used a safe instrument for cord cutting, only one-fifth received ANC from a SBA and only two women received the assistance of a SBA for delivery. Since the coverage of SBA assisted deliveries was very low, the variable had to be discarded in the multivariate analysis. Unexpectedly, the uptake of delivery services from a SBA did not emerge as a predictor of safe cord cutting, possibly because of its very low coverage that could not determine its effect on safe cord cutting practice.

Having knowledge of the items that need to be kept clean during delivery might make women realise the importance of using a safe instrument for the newborn's umbilical cord cutting. The descriptive statistics showed that fewer than one-third of the women who used a safe instrument for cord cutting had good knowledge (knew four or more delivery cleans) of 'delivery cleans' and among those women who had good knowledge of delivery cleans, three-quarters demonstrated safe cord cutting, which is higher than for those women who did not have any knowledge of delivery cleans. The chi-square test found that the knowledge of delivery cleans is significantly associated with safe cord cutting practice. However, surprisingly, in the full regression model, mothers' knowledge of 'delivery cleans' did not appear as an explanatory variable of safe cord cutting in the presence of other stronger factors. FCHVs' advice and health workers' counselling for using the CHDK also did not emerge as predictors of safe cord cutting. Similarly, birth preparedness and exposure to media also did not emerge as predictors of safe cord cutting in the presence of other variables.

7.2.2 Early breastfeeding practice

Early breastfeeding is important because a baby's suckling reflex is strongest and the baby is more alert, within the first hour of birth. (Widstrom et al, 1990; Renfrew & Lang, 1998). Early

breastfeeding also helps babies to get enough colostrum, which is the first and very nutritious breast milk. Other benefits of early breastfeeding include greater bonding and communication between mother and the baby. In the study areas, nearly half (46.7%) of the studied women demonstrated early breastfeeding while the remaining half (53.3%) did not. In the rural areas of Nepal it is quite a common practice to give prelacteal feeds such as honey, sugar and *ghee* to the newborn babies instead of colostrum. In Hindu culture, colostrum is regarded as unholy and sucking colostrum is believed to make babies sick (McKenna and Shankar, 2009). Therefore, breastfeeding is delayed for several days. However, there has been a great increase in early breastfeeding practice in the recent years. Nationally, in 1996 only 18.2% of the women breastfed their babies within an hour of birth which increased to 35.4% in 2006 (MoHP, New ERA, Macro International, 1997; MoHP, New ERA, Macro International, 2007). Despite the remarkable increase in the proportion of women breastfeeding their babies during the first hour of birth over the ten year period, the coverage is still not satisfactory.

The descriptive statistics revealed that in the study areas, the pattern of early breastfeeding practice was quite different from safe cord cutting and delayed bathing practice among caste/ethnic groups. Safe cord cutting and delayed bathing practices were better among the upper caste/ethnicity group, but early breastfeeding practice was better among other caste/ethnicity groups. The descriptive analysis showed that a smaller proportion of women from the upper caste/ethnicity group breastfed their babies during the first hour compared to 'other' and disadvantaged indigenous caste/ethnicity groups of women. However, multivariate regression analysis did not find caste/ethnicity as a predictor of early breastfeeding. Overall, the socio-economic factors did not determine good breastfeeding practice in this study.

The descriptive results showed that early breastfeeding practice is poorer among the upper caste/ethnicity group than the disadvantaged indigenous caste/ethnicity group. Nevertheless, the multivariate regression analysis results did not find an impact of caste/ethnicity on early breastfeeding practice. Though the results did not find a significant association between caste/ethnicity and early breastfeeding, a study reports that breastfeeding is delayed for few days among the upper caste (Brahmins and Chhetris) group babies because of the practice of prelacteal feeds (McKenna, & Shankar, 2009). The prelacteal feeding of substances such as honey, sugar water, jaggery or *ghee* which are considered pure in Hindu society is more preferred as the first feed for newborns by Brahmins/Chhetris. McKenna, & Shankar (2009) in their systematic review of the literature report that upper caste/ethnicity group women and their families are more aware of Hindu culture and beliefs. According to these beliefs, giving

prelacteals to the newborn has positive effects on the baby's gastrointestinal and genitourinary systems. Prelacteals, such as honey and *ghee,* are thought to evacuate meconium, reduce colic, and act as a laxative. Discarding colostrum is thought to "purify the tubules" of the mother's mammary glands. Delay in breastfeeding and the interim feeding of prelacteals are reported in early Brahminical literature. Because of such a long cultural and historic tradition, these practices are deeply rooted in the Hindu belief system and are still practised today. Colostrum is also discarded because of a belief that its thickness and viscosity make it difficult for the newborn to swallow. There are also beliefs that the first breast milk is "stale," or "old" from being stored in the breasts for the duration of the pregnancy. Therefore, the breasts must be washed and colostrum should be discarded for the first day until "true milk" comes in (McKenna, & Shankar, 2009).

Early breastfeeding practice was also associated with SES. Those women who were in the fourth and the highest wealth quintiles had increased odds of breastfeeding babies within the first hour of birth indicating that socio-economically advantaged women might be more aware of the benefits of early breastfeeding and therefore were more inclined towards breastfeeding their babies early.

Among the women who breastfed their child within the first hour of birth, 70.9% used ANC services but the proportion of women who received ANC services from a SBA was low, only 22%. Descriptive data also show that a greater proportion of women using ANC services from a SBA (60.6%) breastfed their baby early compared to women using ANC services from other providers (46.1%) or not using ANC at all (40.4%). Antenatal visits provide pregnant women with opportunities to increase their knowledge of good newborn care practices. It is recommended that pregnant women should receive ANC from a SBA at least four times during their pregnancy under normal circumstances. However, in rural Nepal, coverage of ANC from a SBA is low, mainly because of lack of access to SBA services. Moreover, pregnant women might not know who the SBAs are in their community and might also be unaware of the benefits of receiving ANC from them or could not differentiate between a SBA and other health workers.

The impact of the uptake of ANC services from a SBA in demonstrating early breastfeeding has clearly emerged from the study. Women who received ANC services from a SBA had increased odds of breastfeeding their babies within the first hour of birth compared to women who did not receive ANC services from anyone. Women who received ANC services from a

SBA might have had the importance and benefits of breastfeeding babies explained early, thus they tended to practise early breastfeeding more frequently compared to women who did not receive ANC at all. A similar association between breastfeeding practice and having antenatal care service was also found by Sharan (2004) in rural India. Therefore, increasing the uptake of ANC services from a SBA is likely to improve breastfeeding practice.

The Nepal Government's MoHP has realised the important role of SBAs in reducing maternal and neonatal morbidity and mortality. Therefore, it formulated the national policy on SBAs in 2006. The implementation and enforcement of the policy becomes very important if Nepal is to meet the MDGs related to child and maternal mortality. To meet these goals, it is essential to improve the quality of maternal health services and to increase the coverage of skilled attendance at birth. To increase the skilled attendance at birth there is a need to increase the uptake of ANC services from SBAs. Increasing the uptake of ANC services from a SBA not only contributes to reduce maternal and neonatal morbidity and mortality but also helps to improve the practice of early breastfeeding.

Having correct knowledge of early breastfeeding was found to have a positive impact on early breastfeeding practice. This relationship is direct. If a woman knew the advantages of putting the baby to the breast within the first hour of birth, she was more likely to breastfeed her baby during the first hour of birth. Mothers' knowledge of early breastfeeding is a very important predictor of good breastfeeding practice because from the multivariate analysis results, it has also emerged that the knowledge factor has played an intermediate role where association of early breastfeeding did not appear directly with independent factors such as ethnicity, SES and the use of ANC services.

The gap between mothers' knowledge of early breastfeeding and demonstrating early breastfeeding has also emerged from the descriptive analysis. About half of the women who had good knowledge of breastfeeding did not report early breastfeeding. This also reveals that early breastfeeding practice is determined by more than one factor. There is interaction of various factors in determining early breastfeeding practice, where mothers' knowledge is the intermediate one. Early breastfeeding practice was not associated with mothers' knowledge of other newborn care issues.

The study found that receiving ANC from a SBA is positively associated with early breastfeeding practice. However, surprisingly the study did not find the impact of a health

worker's counselling on early breastfeeding. Therefore, from these results it could be said that meeting a SBA during pregnancy is important for demonstrating early breastfeeding irrespective of receiving counselling from the ANC provider. Women might learn about the importance of early breastfeeding from posters displayed at the health facility or from the other persons at the health facility. Therefore making a visit to a health facility during pregnancy is of the utmost importance. Receiving advice from a FCHV during pregnancy also did not have any impact on early breastfeeding practice. Only 25.6% of the women who met a FCHV and demonstrated early breastfeeding were advised by the FCHV on early breastfeeding. Therefore, these findings again raise concern about the coverage and quality of FCHV services in the rural areas of Nepal.

FCHVs' advice on breastfeeding, health workers' counselling on breastfeeding, birth preparedness, and exposure to media were not associated with early breastfeeding practice when the confounding effects of other factors were controlled.

7.2.3 Delayed newborn bathing

A newborn baby should not be bathed until 24 hours after birth. Bathing babies early can increase the risk of hypothermia, and if the baby is of low birth weight the risk is even greater. Hypothermia is one of the major causes of mortality among newborns. A study conducted in a hospital in India shows that 9.6% of the total neonatal deaths were due to hypothermia (Kaushik et al, 1998). Compared to safe cord cutting and good breastfeeding, good bathing was demonstrated by the smallest proportion of the women. Only 16.6% of the women whose data were analysed bathed their babies after 24 hours of birth. Nationally, only 9.3% of the babies were bathed after 24 hours of birth; therefore, delayed newborn bathing is not a common practice throughout Nepal (MoHP, New ERA, Macro International Inc., 2007).

There are cultural beliefs associated with newborn bathing. In Nepal, bathing a baby soon after birth is widely prevalent because the baby's body is coated with vernix, which is considered dirty. Therefore, bathing a baby soon is a custom followed to purify the baby (Gurung, 2008). People also fear that if the baby's skin is not cleaned soon, the baby will get skin infections. In rural Nepal, usually the TBAs assist deliveries and some of them believe that immediate newborn bathing is also required to protect the baby from cold. Usually, babies are bathed with lukewarm water after cord cutting and cleaning the spot within half to one hour of duration. Breastfeeding is also not initiated until the baby is bathed (Gurung, 2008).

It has been reported that in Southern Nepal, babies require year-round thermal care because mild or moderate hypothermia is nearly universal, with a substantially higher risk in the cold season (Mullany, et al, 2010). One of the important approaches to reduce the risk of hypothermia and improve thermal care for newborn babies is to delay their first bath. Research on community, household, and caretaker practices associated with hypothermia can guide behavioural interventions to reduce risk.

The descriptive analysis showed that good newborn bathing was greatest (63%) among the disadvantaged indigenous caste/ethnicity group women compared to other caste/ethnicity groups which is primarily because the proportion of disadvantaged indigenous caste/ethnicity women was very high in the sample population. Within the different caste groups, a greater proportion of women from the upper caste group (29.6%) practised delayed newborn bathing compared to other caste groups. Out of all dalit caste/ethnicity group women, only 6.1% adopted delayed newborn bathing. The multivariate analysis confirmed that women belonging to dalit caste/ethnicity group were less likely to bathe their babies after 24 hours of birth compared to the upper caste/ethnicity group women. This finding is not quite unexpected because in Nepalese society caste/ethnicity is often associated with greater levels of knowledge and purity. Compared to other caste groups, people belonging to the upper caste/ethnicity group are more educated, and hence might be more knowledgeable. Thus, they might have understood the benefits of bathing babies a day after birth whereas dalit women are mostly uneducated, therefore, are less aware of the importance of delaying newborn bathing. Therefore, they bathed babies within 24 hours of birth. The cultural beliefs associated with birth and newborn bathing might have been more frequent among the dalit caste/ethnicity group women, therefore, they bathed their babies within 24 hours of birth.

Maternal education has a strong influence on the utilisation of maternal health services and child survival. Educated women are more likely to break away from tradition to utilize the modern means of safeguarding their own health and that of their children, are better able to utilize the available services in their community to their advantage and seek quality health services (Caldwell & Caldwell, 1988; Magadi et al, 2000 & Barrera, 1990). Therefore, it could be expected that the women who attained secondary or higher education level are more inclined towards using modern health facilities and services and thus become more aware of the importance of delayed newborn bathing and demonstrate good newborn bathing. However, Nepal's national data for newborn bathing and level of education shows that the proportion of babies bathed after 24 hours of birth is greatest among uneducated women and lowest among

the higher level educated women. In this study, among all the women who demonstrated good newborn bathing, the greatest proportion was uneducated. The descriptive statistics also showed that nearly half of the higher level educated women bathed their babies after 24 hours of birth while between only 12 to 23% of women who were uneducated, or primary or secondary level educated bathed their babies after 24 hours of birth indicating that there might be a positive relationship between higher education and good bathing practice. Nevertheless, in the multivariate analysis, the higher education level did not emerge as a positive predictor of good bathing, possibly because of the low proportion of higher level educated women in the sample population (5.5%) and therefore a lack of statistical power to determine the association. Surprisingly, the secondary education level emerged as a negative predictor of good bathing practice in the analysis. The results thus indicate that beliefs associated with early newborn bathing might be prevalent among the educated people too. A study conducted by Baqui et al (2006) in rural Uttar Pradesh of India also found a negative impact of secondary and higher level education on thermal care practice for newborns.

Delayed newborn bathing was also related to the SES of the women. Women who were in the fourth and the highest wealth quintiles were more likely to bathe their baby after 24 hours of birth. The explanation for this relationship is the same as that for the relationships between SES and safe cord cutting and early breastfeeding practices. The richer women might be more inclined towards using modern health services where they learn about the importance of delaying bathing. Thus, they are more inclined towards bathing baby after 24 hours of birth.

Mothers' knowledge of 'delivery cleans' and newborn bathing was also related to good newborn bathing practice. As might be expected, if women had knowledge of correct newborn bathing time, they were more likely to bath their newborns after 24 hours of birth. Women were also more likely to demonstrate good newborn bathing if they had knowledge of things that needed to be kept clean during delivery. This association indicates that there might be a positive relationship between knowledge of 'delivery cleans' and knowledge of correct bathing time. Thus, if women had knowledge of 'delivery cleans' they were also likely to demonstrate good newborn bathing.

In rural areas of Nepal, FCHVs play a vital role in providing information related to family planning, safe motherhood, and child health, particularly in the places where access to health workers and facilities are limited or difficult. In this study good bathing practice was also associated with advice provided by FCHVs on newborn bathing during pregnancy. This

relationship is direct. In the villages, FCHVs organise meetings with pregnant women and new mothers on a monthly basis where they discuss issues related to safe motherhood and newborn care. FCHVs also make home visits to pregnant women and new mothers. Therefore, those women who are visited by FCHVs and are advised by them on newborn bathing become more aware of the importance of bathing the newborn at least 24 hours after birth. Thus, they are more inclined towards bathing the baby after a day of birth.

Though the use of ANC services was not associated with delayed newborn bathing in the full regression model, it was found to be positively associated with good newborn bathing practice when socio-demographic, SES and use of ANC service variables were regressed. However, it could not retain its significance when variables related to knowledge; counselling and advice, and exposure to media was introduced. Good bathing practice was also not related to birth preparedness and exposure to media.

It has been documented that bathing newborns soon after birth increases the risk of hypothermia. Neonatal hypothermia is recognized as one of the contributing factors to neonatal mortality and morbidity, but data are largely lacking from developing countries where the majority of high-risk neonates are born. Nepal is one of the countries which have a high neonatal mortality rate by world standards and currently the neonatal mortality rate of Nepal is 33 per 1,000 live births. In urban areas the rate is 25 per 1,000 live births and in the rural areas it is 40 per 1,000 live births (MoHP, New ERA, Macro International Inc., 2007). Therefore, this study by identifying the determinants of good newborn bathing practice will help the safe motherhood and neonatal health programmers to design programs and strategies to minimize or remove the barriers and promote the enhancing factors associated with good newborn bathing practice. The cultural beliefs associated with the need to bathe baby soon after birth are difficult to modify as they have been practiced for a long time and are deeply rooted in the minds of rural Nepalese families. For instance the result of this study has already showed the high prevalence of bathing newborn soon after birth among the educated women too, which might be because of the belief and desire to remove vernix completely to keep the baby clean and pure. However, other factors that determine delayed bathing could be changed with less effort. Therefore, improving SES and increasing the knowledge of women and their family members of newborn bathing time and the possible risk of hypothermia might be more effective approaches to modify newborn bathing behaviours.

7.3 Strengths and limitations of the study

This research aimed to examine and understand the factors that were related to good newborn care practices. A strength of the study was that it was able to meet its aim and the objectives and provided an understanding of the different factors that determine the newborn care practices at household level. A second strength is that this research is a population based study; therefore the result could be generalized to a larger population. The study has also identified the areas, which should be focused on by the MoHP of Nepal, the external development partners, NGOs/INGOs and PVOs to improve the newborn care practices and the overall health status of the newborns. A strength of the thesis overall is that it provides a wider picture of the status of newborns in different parts of the world.

There are several limitations to this study. The first limitation is that the study has used secondary data of the CB-MNH baseline survey conducted in the Sindhuli district of Nepal, so some of the important variables or data that were not part of the baseline study that could be important in the analysis of newborn care were not available. For example, the research could not study the relationship of good newborn care practices with parity, health system factors, and cultural factors. Secondly, this study did not provide the qualitative perspectives on the patterns and the relationships of the determinants of the newborn care practices which, if available, could have made the study more complete and relevant. The qualitative findings would have also helped to illuminate the quantitative results. The third limitation is that the information on newborn care practices has been collected from mothers who delivered 12 months preceding the survey date (February 2009). Hence, there could be some recall bias that affected the quality of data. Fourth, the questionnaire administered to the respondents included questions on their background, FCHV services, maternal health, and immediate newborn care and health, making the questionnaire quite long. The length of the questionnaire could have produced respondent fatigue, compromising the quality of the data collected. In addition, it is also likely that due to the long and sequential nature of the study questionnaire that begins from antenatal care and birth preparation and ends at newborn care practices and post partum family planning, the interviewers' might have unknowingly influenced a change in the very study parameters (knowledge, attitude and practices), which is another limitation of the study.

7.4 Policy implications and recommendations

Based on the study findings and the discussion and keeping the limitations in mind, the study highlights the following policy implications and recommendations.

- The women belonging to the fourth and the highest wealth quintiles had increased odds of demonstrating good newborn care practices. This finding reinforces that improving the economic status of families is important to improve the health behaviours and status. This is an important finding for programmers and policy makers as it provides direction to them in designing integrated programs, which include components that help to improve economic status together with improving health status.

- It is recommended that pregnant women should receive ANC from a SBA at least four times during their pregnancy under normal circumstances and their deliveries should be assisted by a SBA. In the study, the coverage of ANC and delivery from a SBA are unacceptably low. In Nepal, lack of access to SBA services and the unequal distribution of SBAs are the main reason for the low utilization of SBA services. Moreover, pregnant women might not know who the SBAs are in their community and might be unaware of the benefits of receiving ANC from them. Realising the important role of SBAs in reducing maternal and neonatal mortality and morbidity, the MoHP in 2006 formulated the national policy on SBA. In 2005, a maternity incentive scheme was already adopted to increase the demand for maternity services along with a focus on improving access to such services. In 2009, the Nepal government in a bid to meet the MDGs made delivery and management of obstetric complications free of cost in all public health facilities. The implementation and enforcement of those policies are essential to meet the MDGs related to maternal and child health. Therefore, it is important for safe motherhood and newborn health that programmers monitor its implementation. An audit of service delivery areas and research is recommended to understand why SBA services are unacceptably low even after several policy initiatives have been implemented.

- The results of the study confirmed that correct maternal knowledge of good newborn care practices has a positive impact on those practices. In rural Nepal,

immediate newborn care practices such as cord cutting, bathing baby, and helping mothers in putting baby to the breast are usually performed by the person assisting during the delivery. Therefore, good newborn care practices also depend on the knowledge of person assisting the delivery. In rural Nepal, the vast majority of the deliveries occur at home, and are mostly assisted by TBAs and elderly females, instead of a SBA. Therefore, one important approach for programmers to improve the newborn care practices in the rural areas is to include TBAs and elderly household females in their training programs to increase their knowledge.

- About half of the sample women did not meet FCHVs during their pregnancy. In addition, more than three-quarters of the women who met FCHVs during their pregnancy reported being not counselled on specific newborn care issues. These findings reflect the lack of access to FCHV services and the low efficiency of the FCHVs in educating all the pregnant women they visit in the communities of Nepal. The role of FCHVs in educating pregnant women and mothers on family planning, safe motherhood and child health and distribution of family planning and child health commodities is considered important in the rural areas of Nepal where access to health facilities is difficult or limited. Nepal has nearly 50,000 FCHVs in its 75 districts. FCHVs are volunteers and most of the public health programs of Nepal are dependent upon them to deliver the services at grassroots levels. The MoHP of Nepal has provided various basic and refresher training to FCHVs from time to time to refresh and upgrade their knowledge and skills. Local governments have also made attempts to support FCHVs in several ways. Yet, the supports are not adequate and more needs to be done to keep up the spirit of voluntarism among those cadres of health workers. The reproductive health programmers need to understand the reasons the FCHV are not able to reach all the pregnant women of their catchment area, so as to improve the health status of pregnant women, mothers and newborns. If FCHVs' are to provide good service they need to be motivated to find women and mothers in need and the families also need to understand and expect their role.

- Cultural factors have been important in interpreting the results of this study. For instance, bathing the newborn soon after birth was perceived important to 'purify' the baby. Prelacteal feeds were given to the baby as the first feed instead of colostrum because colostrum was perceived as 'dirty' and not good for the baby.

Cultural reasons are probably hard to modify in practice. Programmers should be able to distinguish which of the factors are easily modifiable and which are not. Improving the economic status of families and increasing their knowledge are the factors that are likely to be changed with less effort than the cultural beliefs. Therefore, it is recommended that programmes should prioritize which factors are to be addressed in the short term and which in the long term for the better health of newborn babies.

7.5 Recommendations for future research

- Newborn care issues have been a relatively new research topic in Nepal but have increased when it was realised by the international community that the proportion of newborn deaths constitute such a high portion of the infant and the under five years mortality. Without a substantial decrease in the mortality and morbidity of newborns, the child health indicators cannot be improved. There have been a few research studies on some of the areas of newborn health such as the determinants of newborn care practices, mortality, and morbidity and future research on newborn health should focus on the interrelationships between different factors associated with newborn care practices. The literature reviewed for the present study showed that there is a lack of international literature that examined the associations of newborn health with caste/ethnicity, maternal birth preparedness, and exposure to media. Therefore, it is suggested that future research on newborn health should look into such relationships.

- Qualitative studies provide a different perspective on the newborn health issues and help to understand cultural perspectives and the reasons newborn care practices are different among the caste/ethnic groups. In this research cultural factors have been important in interpreting some of the key results. For instance, early breastfeeding was less common among the upper caste/ethnicity group women owing to the associated cultural practice of prelacteal feeds, and delayed newborn bathing practice was less common among the dalits caste/ethnicity group women because of the belief that vernix is impure, so the baby should be bathed soon after birth to make him/her ‘pure’. Despite being an important factor in explaining the newborn care practices, there has been little research into the cultural perspectives of newborn care. Therefore, it is suggested that qualitative studies be conducted

among different caste/ethnicity groups of women, and rural and urban women to develop better insight into the customs and traditions related to newborn care practices. Understanding of the cultural beliefs is essential for long term interventions in newborn health.

- Maternal services and newborn care practices are related. Therefore, more exploratory research on the low utilization of ANC, delivery, SBA and FCHV services are recommended, which might help newborn health programmers and policy makers in designing maternal and newborn health programs and formulating plans.

7.6 Summary and conclusion

This study explains the multi-factorial nature of three newborn care practices: safe cord cutting, early breastfeeding and delayed bathing. The study conceptualised that good newborn care practices are associated with nine independent factors: i) socio-demographic factors, ii) socio-economic status, iii) use of maternal health services, iv) birth preparedness, v) mother's knowledge, vi) advice from a FCHV and counselling from a health worker, vii) health system factors, viii) exposure to media, and ix) cultural factors. However, owing to the lack of data on health system factors and cultural factors associations between only the seven sets of factors (socio-demographic factors, socio-economic status, use of maternal health services, birth preparedness, mother's knowledge, advice from a FCHV and counselling from a health worker and exposure to the media) and good newborn care practices were examined.

Methodologically, univariate, bivariate and multivariate methods were employed to meet the objectives of the research. The univariate analysis was carried out to see the frequency distribution, means and variances of the variables. Cross-tabulation was carried out between independent variables and each of the good newborn care practices separately to examine how the good newborn care practices are spread according to the independent factors. Chi-square tests were also carried out to find out whether there are significant differences in the three newborn care practices by the independent factors. Multivariate analysis was carried out in a step-wise manner. As the three dependent variables had dichotomous outcomes, the binary logistic method was used. Initially, a simple logistic regression method was employed to select the variables that were significantly associated with each of the outcome variables. The variables that were not significant in the simple logistic regression were discarded. In the

multiple regression method, firstly all the variables that constituted a variable set were examined to see whether they were associated with the outcome variables and hypotheses tested. After that a set of new variables was added as blocks in a step-wise manner to the first variable set to calculate the adjusted odds ratios and confidence intervals. At the end a full regression model was examined with all variable sets which tested the associations of the independent variables with each of the three dependent variables separately, while controlling for the confounding aspects of the other independent variables. The odds ratios thus obtained compare individuals who differ in the characteristics of interest and have the values of all other variables constant.

In the study, safe cord cutting was demonstrated by more than two-thirds, early breastfeeding by about half and delayed bathing by less than one-fifth of the studied women. The multivariate regression showed that the good newborn care practices are determined by age, SES, education, caste/ethnicity, use of ANC services from a SBA and mothers' knowledge of newborn care issues and FCHV's advice.

Amongst all the independent factors that were examined, SES was the only factor that was associated with all three newborn care practices. Wealthy women were more inclined towards demonstrating good newborn care. Safe cord cutting practice was directly related to the ability of women to buy the CHDK or a new blade, whereas early breastfeeding and delayed bathing practices had an indirect relationship with women's economic status. There might have been other factors such as knowledge, receipt of ANC services, receipt of counselling from health workers and advice from FCHVs that meditated the relationship and women's ability to go to health facilities and meet health workers where they get information about good newborn care practices. Safe cord cutting was significantly greater among women aged 20-34 years, indicating that women of prime childbearing age are more enthusiastic to learn health matters and thus demonstrate good newborn practices. Caste/ethnicity also emerged as an important determining factor of safe cord cutting and good newborn bathing. Using ANC services from a SBA also had a positive impact on early breastfeeding practice. Maternal knowledge was also associated with early breastfeeding and good bathing practice. FCHV's advice on newborn bathing also had a positive impact on good newborn bathing practice.

The uptake of ANC services from SBAs emerged as a predictor of early breastfeeding practice. However, skilled attendance at birth did not emerge as a predictor of any of the newborn care practices as the coverage was unacceptably low in the study areas. This finding indicates that

meeting a SBA during pregnancy is more important for demonstrating early breastfeeding regardless of their presence during delivery.

The low utilization of SBA service for both ANC and delivery is one of the important findings of the study. Newborn health and maternal health are very much related and to meet the MDG of reducing maternal mortality ratio by three-quarters between the years 1990 and 2015 the SBA assisted delivery should be increased from the current 18.7% to 60% by the year 2015 (National Planning Commission and United Nations, 2005). The main reason for the low utilization of SBA services for delivery is due to the unavailability and unequal distribution of the SBAs (NPC & UN, 2005). Therefore, the findings of this study also highlight the lack of access to SBA services in rural areas of Nepal.

The study also found lower coverage of FCHV services. About half of the sample women did not meet a FCHV during pregnancy and more than three-quarters of those who met a FCHV did not receive advice on specific newborn care practices. In Nepal nearly 50,000 FCHVs are serving as an important source of health information for the pregnant women and mothers of their communities. FCHVs are volunteers who are selected locally at ward levels. They do not qualify as health workers but they have been an important agent to link government health services with communities, especially in the areas where access to health facilities is difficult or limited. FCHVs are present in all rural wards, stable in their jobs, reasonably representative of the people they serve, and motivated to work. However, there is a need for continued support from government and other sectors to boost their spirit of voluntarism and increase service coverage. Therefore, the programmes that mobilize these FCHVs need to provide incentives and other support for them. Pregnant women, new mothers and the communities also need to understand and expect their role.

In conclusion, despite remarkable decline in the infant mortality and under five mortality rates in Nepal from 79 to 48 per 1000 live births and from 118 to 61 per 1000 live births respectively over the ten year period from 1996 to 2006, the state of the newborn is still poor. Nepal's neonatal mortality rate is the third highest in the world (Saving Newborn Lives, n.d.). The current neonatal mortality rate of Nepal is 33 per 1,000 live births. Neonatal mortality has continued to increase as a percentage of overall neonatal mortality and now accounts for more than 60 percent of all deaths in infancy. Any further reduction in infant mortality in Nepal is thus dependent to a great extent on saving more newborn lives. One of the key contributing factors in newborn mortality is the poor newborn care practices (SNL, n.d.). Therefore,

understanding the factors that determine the good newborn care practices and acting upon those factors to modify the bad newborn care practices into good becomes essential in order to meet the MDG target related to child mortality and improving the health of all children.

REFERENCES

Aday, L. A. & Andersen, R. (1974). A framework for the study of access to medical care. *Health Serv.Res., 9*, 208-220.

Ahmed, S., Sobhan, F., Islam, A., & Barkat-e-Khuda (2001). Neonatal morbidity and care-seeking behaviour in rural Bangladesh. *J.Trop.Pediatr., 47*, 98-105.

Andersen, R. M. (1995). Revisiting the behavioural model and access to medical care: does it matter? *J.Health Soc. Behav., 36*, 1-10.

Baqui, A. H., Williams, E. K., Dramstadt, G. L., Kumar, V., Kiran, T. U., Panwar, D. et al (2006). Newborn care in rural Uttar Pradesh. *Indian J Pediatr 2007; 74 (3)*: 241-247.

Bari, W., Chowdhury, R., Islam, M, Chakraborty, N., & Akhter, A. (2002). The differentials and determinants of perinatal mortality in rural Bangladesh. *The European Journal of Contraception and Reproductive Health Care*; 7: 216-222.

Barrera, A. (1990). The role of maternal schooling and its interaction with public health programs in child health production. *Journal of Development Economics, 32,* 69-91.

Bennett, L., Dahal, D.R. & Govindasamy, P. (2008). Caste, ethnic and regional identity in Nepal: Further analysis of the 2006 Nepal demographic and health survey. Calverton, Maryland, USA: Macro International Inc.

Beun M. H. & Wood, S.K. (2003). Acceptability and use of clean home delivery kits in Nepal: a qualitative study. *J Health Popul Nutr* Dec;21(4):367-373

Blair, R. C. & Taylor, R. A. (2008). *Biostatistics for health sciences*. Pearson Education Inc., New Jersey.

Caldwell, J. C. (1986). Routes to low mortality in poor countries. *Population and Development Review, 12,* 171-220.

Caldwell, J. & Caldwell, P. (1988). *Women's position and child mortality and morbidity in less developed countries.*

Central Bureau of Statistics (2001). *Population Census 2001, National Report*. National Planning Commission, Secretariat, Government of Nepal.

Claeson, M. & Waldman, R. J.(2000). The evolution of child health programs in developing countries from targeting diseases to targeting people. *Bull.World Health Organ, 78,* 1234-1245.

Cleland, J. G. & Van Ginneken, J. K. (1988). Maternal education and child survival in developing countries: the search for pathways of influence. *Soc.Sci.Med., 27*, 1357-1368.

Community Managed Irrigated Agriculture Sector Project (CMIASP) [2004*]. CMIASP – Supplementary Appendix J* 22 October 2004. Retrieved 24 January 2009 from http://www.adb.org/Documents/Supplementary-Appendixes/33209/Supplementary-Appendix-J.pdf

Darmstadt, G. L., Syed, U., Patel, Z. & Kabir, N (2006). Review of domiciliary newborn care practices in Bangladesh. *Journal of Health, Population, and Nutrition*. 24(4):380-393.

Department of Health Services (2006). *Annual Report 2004/2005*. His Majesty's Government of Nepal. Ministry of Health and Population. Department of Health Services, Kathmandu, Nepal

Family Care International, (n.d.). Birth Preparedness: An Essential Part of ANC Counselling. Family Care International. 588 Broadway, Suite 503, New York, NY 10012. Retrieved 20 January 2008 from http://www.familycareintl.org/issues/sm_skilled_care.php

Family Health Division (FHD), (2004). *National neonatal health strategy*. Family Health Division, Department of Health Services, Ministry of Health, January 2004.

FHD, New ERA & USAID (2006). *An Analytical Report on National Survey of Female Community Health Volunteers of Nepal*. Kathmandu, Nepal: Family Health Division, New ERA and USAID.

Fariyal, F. F., Tazeen, S. A., Jill, M. D. & Mohammad, H. R. (2004). Newborn care practices in low socioeconomic settlements of Karachi, Pakistan. Social Science & Medicine. Volume 60, Issue 5, March 2005, Pages 911-921.

Giashuddin, M. S. & Kabir, M. (n.d.). *Income Inequality and Child Survival in Bangladesh*. Retrieved 18 March 2009 from http://paa2009.princeton.edu/download.aspx?submissionId=90113

Gurung, G. (2008). Practices on immediate care of newborn in the communities of Kailali district. *Nepal Medical College Journal*. 10(1):41-44.

Holman, D. J. & Grimes, M. A. (2001). Colostrum feeding behaviour and initiation of breast-feeding in rural Bangladesh. *J.Biosoc.Sci.,* 33, 139-154.

Hoque, A. & Selwyn, B. J. (1996). Birth Practice patterns in urban slums of Dhaka, Bangladesh, Women Health, 24, 41-58

Hosmer, D.W. & Lemeshow, S. (1989). *Applied Logistics Regression*. New York: John Wiley & Sons.

Hotchkiss, D. R. (2001). Expansion of rural health care and the use of maternal services in Nepal. *Health Place., 7,* 39-45.

Ibrahim S. A., Babiker A. G., Amin I. K., Omer, M. I., Rushwan, H. (1994). Factors associated with high risk of perinatal and neonatal mortality: an interim report on a prospective community-based study in rural Sudan. Paediatrics and Perinatal Epidemiology. *1994 Apr; 8(2)*:193-204

Kaushik, S. L., Parmar V. R., Grover N., and & Kaushik R. (2008). Neonatal mortality rate: Relationship to birth weight and gestational age.

Kippenberg, R., Lawn, J., Darmstadt, G., Begkoyian, G., Fogstad, H, Walelign, N, &Paul, V. (2005). Neonatal survival 3: Systematic scaling up of neonatal care in countries. *The Lancet 2005; Vol* 365:1087-98

Kumar, R., Singh, M. M., & Kaur, M. (1997). Impact of health centre availability on utilisation of maternity care and pregnancy outcome in a rural area of Haryana. *J.Indian Med.Assoc., 95,* 448-450

Magadi, M. A., Madise, N. J. & Rodrigues. R. N. (2000). Frequency and timing of antenatal care in Kenya: explaining the variations between women of different communities. *Social Science and Medicine, 51(4),* 551-561.

Mannan, I., Rahman, S. M., Sania, A., & Seraji, H. R. *e*t al. (2008). Can early postpartum home visits by trained community health workers improve breastfeeding of newborns? Journal of Perinatology. Vol. 28, Iss. 9; pg. 632, 9 pgs

Marsh, D., Darmstadt, G., Moore, J., Daly, P., Oot, D., & Tinker, A., (2002). Advancing newborn health and survival in developing countries: A conceptual framework. *J Perinatol* 2002;22 :572-576.

Mauch, J.E. & Park, N. (2003). *Guide to the successful thesis and dissertation: A handbook for students and faculty*. (fifth ed).

McKenna K. M. & Shankar, R. T. (2009). Practice of prelacteal feeding to newborns among Hindu and Muslim families). *J Midwifery Women's' Health*. 2009; 54 (1):78-81.

McDivitt, J., Zimicki, S., Hornik, R. & Abulaban, A. (1993). The Impact of the Healthcom Mass Media Campaign on Timely Initiation of Breastfeeding in Jordan. Studies in Family Planning, Vol. 24, No. 5 (Sep. - Oct., 1993), pp. 295-309

Ministry of Health and Population (MoHP) [Nepal], New ERA & Macro International Inc. (2007). *Nepal Demographic and Health Survey 2006.* Kathmandu, Nepal: Ministry of Health and Population, New ERA and Macro International Inc.

Ministry of Health (MoH) [Nepal], New ERA & Macro International Inc. (1997). *Nepal Family Health Survey 1996.* Kathmandu, Nepal: Ministry of Health and Population, New ERA and Macro International Inc.

Mosley, W. H. (1984). Child survival: research and policy. *Population and Development Review, 10,* 3-23.

Mosley, H. & Chen, L. (1984). An Analytical Framework for the study of child survival in developing countries. *Population and Development Review, Vol. 10, Supplement: Child Survival: Strategies for research (1984),* pp. 25-45.

Mullany, L.C., Katz, J., Khatry, S.K., LeClerq, S.C., Darmstadt, G.L., & Tielsch, J.M. (2010). Incidence and Seasonality of Hypothermia Among Newborns in Southern Nepal. *Arch Pediatr Adolesc Med.* 2010;164(1):71-77.)

National Planning Commission (NPC) [HMG Nepal] and United Nations (UN) (2005). Nepal Millennium Development Goals: progress report 2 0 0 5. National Planning Commission, His Majesty's Government of Nepal and United Nations Development Program, United Nations House, Kathmandu, Nepal.

Nepal Family Health Program (NFHP) [2006]. *A study on cord care practices in Bardiya district of Nepal.*

Nepal Family Health Program (NFHP), United States Aid for International Development (USAID), & Iohn Hopkins Bloomberg School of Public Health (JHBSPH) [2007]. Community-Based Maternal and Neonatal Care Program (CB-MNC). *Summative Report on Program Activities and Results in Banke, Jhapa and Kanchanpur districts from September 2005 – September 2007.*

Obimbo, E., Musoke, R. N., & Were, F. (1999). Knowledge, attitudes and practices of mothers and knowledge of health workers regarding care of the newborn umbilical cord. East African Medical Journal. *1999 Aug;76(8)*:425-9.

Osrin, D., Tumbahangphe, K. M., Shrestha, D., Mesko, N., Shrestha, B. P., Manandhar, M. K. et al (2002). Cross sectional community-based study of care of newborn infants in Nepal. *BMJ, 325*, 1063

Pallant, J. (2007). *SPSS survival manual. A step by step guide to data analysis using SPSS for windows,* third ed. Open University Press, Maidenhead, Berkshire, England.

Population Reference Bureau & Save the Children (2006) The Maternal–Newborn–Child Health, Continuum of Care: A Collective Effort to Save Lives. Policy perspectives on newborn health, March 2006

Pradhan, S. (2007). *Utilization of antenatal care services in the health facilities: A Case Study on Dhalkebar and Basahaiya VDC of Dhanusha District of Nepal* . Kathmandu, Nepal.

Renfrew, M.J., Lang, S. (1998). Early versus delayed initiation of breastfeeding. In: The Cochrane Library [on CD-ROM]. Oxford: Update Software;1998.

Save the Children (2006). *State of the world's mothers 2006. Saving the lives of mothers and newborns.* Washington.

Saving Newborns Lives (SNL) [2001]. State *of the world's newborn: Nepal.* Save the Children. Washington.

Saving Newborns Lives (SNL) [n.d.]. State *of the world's newborn: Nepal.* Saving Newborn's Lives. Save the Children. Retrieved 21 May 2009 from http://www.savethechildren.org/publications/technical-resources/saving-newborn-lives/country-documents/Nepal-Exec-Summary.pdf

Senarath, U., Fernando, D., Vimpani, G., & Rodrigo, I. (2007) Factors associated with maternal knowledge of newborn care among hospital-delivered mothers in Sri Lanka. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Volume 101, (8), 823-830.

Shakya, K. & McMurray, C. (2001). Neonatal mortality and maternal health care in Nepal: searching for patterns of association. *J.Biosoc.Sci., 33,* 87-105.

Sharan, M. (2004). *Determinants of safe motherhood and newborn care behaviours in rural India.*

Stockwell, E.G., & Goza, F. W. (1996). Racial differences in the relationship between infant mortality and socioeconomic status. Biosoc Sci. Jan;28(1):73-84.

Thapa, N., Chongsuvivatwong, V., Geater, A. F., Ulstein, M., & Bechtel, G. A. (2000). Infant death rates and animal-shed delivery in remote rural areas of Nepal. *Soc.Sci.Med., 51,* 1447-1456.

Thapa, N., Chongsuvivatwong, V., Geater, A.F., Ulstein, M., & Bechtel, G. A. (2000). High-risk childbirth practices in remote Nepal and their determinants. *Women Health, 31,* 83-97.

United Nations Development Program (UNDP) (2004). *Nepal Human Development Report. Empowerment and poverty reduction.* UNDP, Kathmandu, Nepal

United Nations Development Program (2000). Millennium Summit. Retrieved February 12, 2009 from http://www.un.org/millenniumgoals/bkgd.shtml

Valley Research Group & Nepal Family Health Program (2007). *Survey Results for Community-Based Maternal Neonatal Care.*

Valley Research Group (VaRG) & Nepal Family Health Program (NFHP) [2005a]. Nepal Family Health Program mid term survey.

Valley Research Group (VaRG) & Nepal Family Health Program (NFHP) [2005b]. *A study on Radio Listener' Group in Banke, Dhanusha and Mahottari districts.*

Valley Research Group (VaRG), Nepal Family Health Program (NFHP), & United States Aid for International Development (USAID) (2007). Survey results for community-based maternal neonatal care. VaRG, NFHP, & USAID, Kathmandu, Nepal.

Valley Research Group (VaRG), Nepal Family Health Program-II (NFHP-II), & United States Aid for International Development (USAID) [2009] Baseline survey for CB-MNH program in Sindhuli district (data tables).

Van den Broeck, J., Eeckels, R., & Massa, G. (1996). Maternal determinants of child survival in a rural African community. International Journal of Epidemiology. 1996 Oct;25(5):998-1004.

Warner, R.M. (2007). Applied statistics: from bivariate through multivariate techniques. Sage Publications, Inc., California.

Widstrom, A.M., Wahlberg, V., Matthiesen, A.S., Eneroth, P., Uvnas-Moberg, K., Werner, S., et al. (1990). Short-term effects of early suckling and touch of the nipple on maternal behavior. Early Hum Dev 1990; 21:153-63.

World Health Organization (1996). Essential newborn care: a report of a technical working group. Gneva.

World Health Organization (2004). Making pregnancy safer: the critical role of the skilled attendant. A joint statement by WHO, ICM and FIGO. Retrieved August 14, 2008 http://www.who.int/making_pregnancy_safer/documents/92415916692/en/index.html , accessed

Yadav, S. (2007) Newborn care: traditional practices in Nepal. Student BMJ 2007;15:293-336 September ISSN 0966-6494

Yunis, K., Beydoun, H., Khogali, M., Alameh, M. & Tamim, H. (2003). Low socio-economic status and neonatal outcomes in an urban population in a developing country. The Journal of maternal-Fetal & Neonatal Medicine; 14: 338-343.

APPENDICES

Appendix A

Safe cord cutting, early breastfeeding and delayed newborn bathing practices by the study variables

	Independent Variables	Safe cord cutting		Early breastfeeding		Delayed bathing	
		N	%	N	%	N	%
1	**Socio-demographic characteristics**						
	Age in years						
	15-19	59	10.4	40	10.6	22	16.3
	20-34	451	79.4	292	77.2	101	74.8
	35-49	58	10.2	46	12.2	12	8.9
	Ethnicity						
	Upper caste	121	21.3	60	15.9	40	29.6
	Disadvantaged Indigenous	342	60.2	260	68.8	85	63.0
	Dalit	79	13.9	35	9.3	6	4.4
	Other	26	4.6	23	6.1	4	3.0
	Education						
	No education	384	67.6	273	72.2	71	52.6
	Primary	86	15.1	45	11.9	27	20.0
	Secondary	57	10.0	34	9.0	15	11.1
	Higher	41	7.2	26	6.9	22	16..3
2	**Socio-economic status (wealth quintiles)**						
	Lowest	112	19.7	71	18.8	16	11.9
	Second	93	16.4	67	17.7	14	10.4
	Middle	114	20.1	74	19.6	28	20.7
	Fourth	113	19.9	83	22.0	31	23.0
	Highest	136	23.9	83	22.0	46	34.1
3	**Use of maternal health services**						
	Antenatal care						
	From SBA	114	20.1	83	22.0	39	28.9
	From other people	296	52.1	185	48.9	70	51.9
	No one	158	27.8	110	29.1	26	19.3
	Delivery services						
	Attended by SBA	2	.4	2	.5	2	1.5
	Attended by others	537	94.5	353	93.4	131	97.0
	No one	29	5.1	23	6.1	2	1.5
4	**Made preparation for birth**						
	Yes	482	84.9	335	88.6	120	88.9
	No	86	15.1	43	11.4	15	11.1
5	**Mothers' knowledge of newborn care issues**						
	Cleanliness during delivery						
	Know 1-3 cleans	366	64.4	266	70.4	62	45.9
	Know 4 or more cleans	167	29.4	108	28.6	71	52.6
	Do not know any of the cleans	35	6.2	4	1.1	2	1.5

Independent Variables	Safe cord cutting		Early breastfeeding		Delayed bathing	
	N	%	N	%	N	%
Time of first bathing						
After 24 hours	131	23.1	86	22.8	98	72.6
Before 24 hours	403	71.0	268	70.9	28	20.7
Do not know	34	6.0	24	6.3	9	6.7
Time of first breast feeding						
Immediately after birth	263	46.3	231	61.1	78	57.8
After the placenta is out	114	20.1	65	17.2	32	23.7
After bathing child / After 24 hours of birth	184	32.4	75	19.8	22	16.3
Do not know	7	1.2	7	1.9	3	2.2
Newborn danger signs						
Know 1-3 danger signs	437	76.9	273	72.2	77	57.0
Know 4 or more danger signs	128	22.5	101	26.7	57	42.2
Do not know any of the signs	3	0.5	4	1.1	1	0.7
6 Advice from a FCHV and counselling from a health worker						
FCHV's advice on using a CHDK						
Yes	69	12.1	49	13.0	36	26.7
No/Don't Know	266	46.8	181	47.9	57	42.2
Did not meet FCHV	233	41.0	148	39.2	42	31.1
FCHV's advice on newborn bathing						
Yes	83	14.6	55	14.6	49	36.3
No/Don't Know	252	44.4	175	46.3	44	32.6
Did not meet FCHV	233	41.0	148	39.2	42	31.1
FCHV's advice on early breastfeeding						
Yes	91	16.0	59	15.6	41	30.4
No/Don't Know	244	43.0	171	45.2	52	38.5
Did not meet FCHV	233	41.0	148	39.2	42	31.1
Health worker's counselling on using a CHDK						
Yes	51	9.0	40	10.6	26	19.3
No/Don't Know	359	63.2	228	60.3	83	61.5
Did not meet FCHV	158	27.8	110	29.1	26	19.3
Health worker's counselling on breastfeeding						
Yes	82	14.4	46	12.2	34	25.2
No/Don't Know	328	57.7	222	58.7	75	55.6
Did not meet FCHV	158	27.8	110	29.1	26	19.3
7 Exposure to Media						
Watched television at least once a week						
Yes	39	6.9	27	7.1	14	10.4
No	529	93.1	351	92.9	121	89.6
Listened to radio at least once a week						
Yes	363	63.9	228	60.3	95	70.4
No	205	36.1	150	39.7	40	29.6
Total	**568**	**100**	**378**	**100**	**135**	**100**

Appendix B

Safe cord cutting, early breastfeeding and delayed newborn bathing practices according to the categories of independent variables

Independent Variables	Safe cord cutting		Early breastfeeding		Delayed bathing	
	N	%	N	%	N	%
1 Socio-demographic characteristics						
Age in years						
15-19	59	65.6	40	43.5	22	23.9
20-34	451	74.8	292	48.1	101	16.6
35-49	58	52.7	46	41.4	12	10.8
Ethnicity						
Upper caste	121	91.0	60	44.4	40	29.6
Disadvantaged Indigenous	342	64.0	260	48.2	85	15.7
Dalit	79	79.8	35	35.7	6	6.1
Other	26	70.3	23	60.5	4	10.5
Education						
No education	384	66.6	273	47.2	71	12.2
Primary	86	75.4	45	38.8	27	23.1
Secondary	57	83.8	34	49.3	15	21.7
Higher	41	93.2	26	56.5	22	48.9
2 Socio-economic status (wealth quintiles)						
Lowest	112	61.9	71	38.8	16	8.7
Second	93	60.4	67	43.5	14	9.1
Middle	114	69.1	74	44.8	28	16.8
Fourth	113	74.3	83	53.9	31	20.1
Highest	136	90.1	83	53.9	46	30.1
3 Use of maternal health services						
Antenatal care						
From SBA	114	83.8	83	60.6	39	28.7
From other people	296	74.7	185	46.1	70	17.4
No one	158	58.3	110	40.4	26	9.5
Delivery services						
Attended by SBA	2	100	2	100	2	100
Attended by others	537	71.4	353	46.5	131	17.2
No one	29	59.2	23	46.9	2	4.1
4 Made preparation for birth						
Yes	482	70.9	335	48.6	120	17.4
No	86	69.9	43	35.5	15	12.3
5 Mothers' knowledge on						
Cleanliness during delivery						
Know 1-3 cleans	366	70.0	266	44.1	62	11.7
Know 4 or more cleans	167	75.6	108	53.5	71	31.7
Do not know any of the cleans	35	59.3	4	80.0	2	3.3
Timing of first bathing						
After 24 hours	131	81.9	86	52.1	98	59.8
Before 24 hours	403	69.7	268	46.3	28	4.8
Do not know	34	52.3	24	36.4	9	13.6

	Independent Variables	Safe cord cutting		Early breastfeeding		Delayed bathing	
		N	%	N	%	N	%
	Timing of first breast feeding						
	Immediately after birth	263	72.7	231	62.8	78	21.1
	After the placenta is out	114	74.5	65	41.9	32	20.8
	After bathing child / After 24 hours of birth	184	68.1	75	28.1	22	8.2
	Do not know	7	38.9	7	35.0	3	15.0
	Newborn danger signs						
	Know 1-3 danger signs	437	70.3	273	43.8	77	12.3
	Know 4 or more danger signs	128	72.7	101	55.5	57	31.3
	Do not know any of the signs	3	60.0	4	80.0	1	20.0
6	**Advice from a FCHV and counselling from a health worker**						
	FCHV's advice on using a CHDK						
	Yes	69	84.1	49	59.0	36	43.4
	No/Don't know	266	73.1	181	49.5	57	15.6
	Did not meet FCHV	233	65.3	148	41.0	42	11.6
	FCHV's advice on newborn bathing						
	Yes	83	81.4	55	53.4	49	47.6
	No/Don't know	252	73.3	175	50.6	44	12.7
	Did not meet FCHV	233	65.3	148	41.0	42	11.6
	FCHV's advice on breastfeeding						
	Yes	91	81.3	59	52.2	41	36.3
	No/Don't Know	244	73.1	171	50.9	52	15.5
	Did not meet FCHV	233	65.3	148	41.0	42	11.6
	Health worker's counselling on using a CHDK						
	Yes	51	92.7	40	72.7	26	47.3
	No/Don't know	359	75.3	228	47.2	83	17.2
	Did not meet FCHV	158	58.3	110	40.4	26	9.5
	Health worker's counselling on breastfeeding						
	Yes	82	86.3	46	47.4	34	35.1
	No/Don't know	328	75.1	222	50.3	75	17.0
	Did not meet FCHV	158	58.3	110	40.4	26	9.5
7	**Exposure to Media**						
	Watched television at least once a week						
	Yes	39	92.9	27	62.8	14	32.6
	No	529	69.5	351	45.8	121	15.7
	Listened to radio at least once a week						
	Yes	363	73.9	228	45.8	95	19.1
	No	205	65.7	150	48.1	40	12.7
	Total	**568**	**70.7**	**378**	**46.7**	**135**	**16.6**

Appendix C

Odds ratio and 95% confidence interval for the effect of socio-demographic variable on good breastfeeding practice

	OR	95% CI
1. Socio-demographic characteristics		
Ethnicity		
Upper caste	1.000	
Disadvantaged Indigenous	1.165	0.797-1.702
Dalit	0.694	0.407-1.185
Other	1.917	0.920-3.992
Total sample	**810**	

*p<0.05, **p<0.01

Appendix D

Odds ratio and 95% confidence interval for the effect of advice from a FCHV and counselling from a health worker variables on early breastfeeding practice

Advice from a FCHV/Counselling from a health worker	OR	95% CI
FCHVs' advice on breastfeeding		
Yes	1.06	0.71-1.73
Did not meet FCHV	0.75	0.53-1.08
No	1.00	
Health workers' counselling on breastfeeding		
Yes	1.068	0.63-1.81
Did not meet health worker	1.25	0.86-1.81
No	1.00	
Total sample	**810**	

*p<0.05, **p<0.01

Appendix E

Community Based-Maternal and Newborn Health (CB-MNH) Baseline Survey Questionnaire

COMMUNITY-BASED MATERNAL AND NEWBORN HEALTH (CB-MNH)
BASELINE SURVEY QUESTIONNAIRE: JANUARY 2009
(MOHP/NFHP II/VaRG)
QUESTIONNAIRE FOR RECENTLY DELIVERED WOMEN

Form No.				

District:……	
Name of VDC ……	
Ward Number ……	
Village name ……	
Cluster Number. ……	
Household Number. ……	
Name of the household head ……	
Name of the respondent ……	

	INTERVIEWER VISITS		
	1	**2**	**3**
DATE [DD/MM/YY]	/ /	/ /	/ /
INTERVIEWER'S NAME:			
RESULT			
NEXT VISIT : DATE [DD/MM/YY]	/ /	/ /	
TIME			

***RESULT CODES:**

1 = Interview completed 2 = Respondent refused to be interviewed 3 = Time and date set for later	4 = Respondent not at home 5 = Other (specify): _____

INTRODUCTION AND CONSENT

Namaste! My name is _____. I am from ....., which is conducting a study for the Ministry of Health and Population/Government of Nepal. The MOHP has been helping pregnant women, mothers, and newborns in this district with the objectives of improving maternal and child health status. We are here to find out about the health of mothers and newborns to help you and your community to keep mothers and children healthy. We would very much appreciate your participation in this survey. This information will help the MOHP to improve its program in the districts. The survey usually takes around one hour. I assure you that your name will not be shared with anyone else and your answers to my questions will be combined with answers from many other people so that no one will know that the answers you give me today belong to you. Your privacy is protected, and I assure that your answers will be kept confidential.

Your participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, we hope that you will participate in this survey since your views are important. May I proceed with the questions?
RESPONDENT AGREES TO BE INTERVIEWED…… 1 RESPONDENT DOES NOT AGREE TO BE INTERVIEWED….. 2 → END INTERVIEW & THANK THE RESPONDENT

Check **Q106, Q108, Q111, Q112, Q113, Q115, & Q116**: enter in the table the line number, name and the survival status of each birth from Magh 2064 or later, ask questions about the last birth.

QA	Line number from 106	Last birth _____
QB	Name and survival status from 108, 111 and 115	Name _____ Living……1 Dead……..2 Still birth……..3
QC	Age from 112	Age of [NAME] months
QD	Age at death from 113	Age of [NAME] when he/she died months:_____ If less than one month in Days:_____
QE	From 116 (pregnancy loss after 7 months or more)	Stillbirth ☐

Section 1: Respondent's Background

***Interviewer*: "Now I would like to ask some questions about you and your household."**

Q. #	Question	Codes	Go to Q
101	In what month and year were you born?	Month [__ _ | __ _] Year [_ __ | _ __] Don't know month ……. 98 Don't know year ……..98	
102	How old are you?	Age in completed years . [___ | ___]	
103	Have you ever attended school?	Yes.....1 No.....2	→106
104	What is the highest class you completed?	Grade……	☐☐
105	**(Interviewer: Check Q. 104)**	Grade 5 or below.....1 Grade 6 and above.....2	→107
106	Now, I would like you to read out loud as much of this sentence as you can. *"Churot khanu ramro bani hoina"* **(Show card to the respondents)**	Can not read at all.....1 Able to read only parts of sentence.....2 Able to read whole sentence.....3	
107	What is your caste or ethnicity? **(Write caste in space provided. Do not fill box)**	_____ Caste/Ethnicity	☐☐
108	Do you read from a newspaper or magazine almost every day, at least once a week, less than once a week or not at all?	Almost every day.....1 At least once a week.....2 Less than once a week.....3 Not at all.....…….. 4	

Q. #	Question	Codes	Go to Q
109	Do you watch television almost every day, at least once a week, less than once a week, or not at all?	Almost every day..... 1 At least once a week..... 2 Less than once a week ..... 3 Not at all 4	
110	Do you listen to the radio almost every day, at least once a week, less than once a week, or not at all?	Almost every day..... 1 At least once a week..... 2 Less than once a week ..... 3 Not at all 4	

Section 2: Respondent's Background (Socioeconomic status)

***Interviewer*: "Now I would like to ask some questions about your household."**

Q. #	Question	Codes	Go to Q
201	Does your household have the following items? **(READ ALL)**		
		Yes / No	
	1 Electricity	1 / 2	
	2 Bicycle	1 / 2	
	3 Motorcycle	1 / 2	
	4 Telephone/mobile phone	1 / 2	
	5 Television	1 / 2	
	6 Radio	1 / 2	
202	What is the main source of drinking water for members of your household?	**Piped water** • Piped into house/yard/plot …….. 1 • Public / neighbor's tap …… 2 **Dug well** • Well in house/yard/plot ……..…. 3 • Public/neighbor's well …… 4 **Tube well/borehole** • Tube well in yard/plot ……. 5 • Public/neighbor's tube well ……... 6 **Surface water** • Spring/kuwa ……... 7 • River/stream/pond/lake …….. 8 • Stone tap/dhara …….. 9 Other, specify: _____ 10	
203	What type of toilet facilities does your house have? **RECORD OBSERVATION**	Flush toilet …… 1 Traditional pit toilet ……. 2 Ventilated improved pit latrine …… 3 No facility / bush / field …… 4 Other, specify: ……..…… 5	
204	Main material of the floor **RECORD OBSERVATION**	Earth/mud/dung …… 1 Wood planks …… 2 Linoleum / carpet ……. 3 Ceramic tiles, marble chips …….. 4 Cement ……. 5 Other, specify: _____ 6	
205	Main material of the roof **RECORD OBSERVATION**	Thatch …… 1 Metal …….. 2 Tiles/Khapada …… 3 Cement ……... 4 Stone... ……... 5 Other, specify: _____ 6	
206	Main material of the walls	Bamboo with mud …….. 1	

Q. #	Question	Codes	Go to Q
	RECORD OBSERVATION	Bamboo with cement……..….2 Adobe ……. 3 Unfinished wood …… 4 Cement ……... 5 Bricks ……. 6 Cement blocks …… 7 Wood planks ……... 8 No walls ……... 9 Other, specify: _____ 10	

Section 3: FCHV Services: General and Antenatal

Interviewer: "Now I would like to ask you some questions about your FCHV and the services she provides to pregnant women."

Q. #	Question	Codes	Go to Q.
301	Do you know the FCHV who serves in your area? **Prompt: *"Do you know the woman who gives out vitamin A to children under five in your area twice a year"***	Yes……..1 No……..2 Don't know ……... 8	→308 →308
302	What is her ethnicity? **(Write caste in space provided. Do not fill box)**	☐☐ Caste/Ethnicity	

303	Please tell me which of the following kinds of help or services does your FCHV provide? **(READ ALL RESPONSES)**	Yes	No	DK	
	1. Health information including mothers groups?	1	2	8	
	2. Provide advice to pregnant women?	1	2	8	
	3. Provide advice to post-partum mother?	1	2	8	
	4. Provide advice regarding newborn?	1	2	8	
	5. Provide advice and treatment regarding children's diarrhea?	1	2	8	
	6. Provide advice and treatment regarding children's respiratory infection (including pneumonia)?	1	2	8	
	7. Supply condoms and pills?	1	2	8	
	8. Vitamin A for mother / child?	1	2	8	
	9. Provide HIV/AIDS/STI information?	1	2	8	

304	Did you meet the FCHV in your community for services or advice during your last pregnancy?	Yes ..... No.....	→ 308
305	How many times did you meet with your FCHV during your last pregnancy <u>outside of the mothers group</u> to receive services or advice?	# of times: …….. ☐☐ Don't know ……. 98	

306	Did your FCHV discuss specific plans for any of the following with you during your last pregnancy? (READ ALL RESPONSES)	Yes	No	DK	
	1. Delivery at a health facility	1	2	8	
	2. Identifying/using a skilled birth attendant?	1	2	8	
	3. Emergency transport for delivery?	1	2	8	
	4. Finances for delivery care?	1	2	8	
	5. About source/place of Emergency Obstetric Care?	1	2	8	
	6. Identify person to accompany mother in emergency?	1	2	8	

Q. #	Question	Codes			Go to Q.
307	Did you receive advice from your FCHV on any of the following topics during your last pregnancy? **(READ ALL RESPONSES)**	Yes	No	DK	
	1. Seek ANC from health worker?	1	2	8	
	2. Take rest and avoid heavy work?	1	2	8	
	3. Proper, balanced diet?	1	2	8	
	4. Avoid alcohol and smoking during pregnancy?	1	2	8	
	5. Tetanus toxoid vaccination?	1	2	8	
	6. Obtain iron tablets?	1	2	8	
	7. Obtain deworming tablets	1	2	8	
	8. Financial preparation for your delivery?	1	2	8	
	9. Identifying emergency transport options?	1	2	8	
	10. Danger signs for pregnant woman?	1	2	8	
	11. Use Clean Home Delivery Kit?	1	2	8	
	12. Deliver in clean, light surface/room?	1	2	8	
	13. Danger signs during delivery?	1	2	8	
	14. Make post-natal visit to a health facility or outreach clinic?	1	2	8	
	15. Danger signs for postpartum woman?	1	2	8	
	16. Use family planning following delivery?	1	2	8	
	17. Anyone touching newborn to wash hands with soap and water first	1	2	8	
	18. Wrap the newborn in a clean and dry cloth?	1	2	8	
	19. Do not bathe the newborn within 24 hrs.?	1	2	8	
	20. Keep the newborn's cord dry and clean (do not apply anything)?	1	2	8	
	21. Breastfeed the newborn within 1 hr. after birth?	1	2	8	
	22. Continue exclusive breastfeeding?	1	2	8	
	23. Danger signs in newborn?	1	2	8	
	24. Skin to skin contact?	1	2	8	
	25. Personal hygiene of mother?	1	2	8	
308	Is there a mothers group in your area?	Yes ..... No..... Don't know ……..……8			→ 311 → 311
309	Did you attend the mothers group meeting during your last pregnancy?	Yes ..... No.....			→ 311
310	How many times did you attend the mothers group when you were last pregnant?	Number of times: …….. ☐☐ Don't know ……. 98			
Interviewer: "Now I would like to ask you some questions about Primary Health Care Outreach Clinics"					
311	Have you heard of the Primary Health Care Outreach Clinic (PHC/ORC)?	Yes……..……1 No……..……..2			→ 401
312	What date of month PHC/ORC is scheduled in your area? (Record "1" for correct answer and "2" for incorrect answer)	Date: ____ ____ Don't know …….. 98 SUPERVISOR FILLS OUT: →			☐

Q. #	Question	Codes		Go to Q.
313	Did you use the Primary Health Care Outreach Clinic at any time before or following your most recent delivery for any of the following services? **(READ ALL RESPONSES)**	Yes	No	
	1. Antenatal care?	1	2	
	2. Postnatal care for mother?	1	2	
	3. Care for newborn child?	1	2	
	4. Family planning information or services?	1	2	
		1	2	

Section 4: Antenatal Care

Interviewer: "Now, I would like to ask you some questions about when you were pregnant prior to your most recent delivery."

Q. #	Question	Codes	Go to Q.
401	Did you see anyone for antenatal care for the pregnancy prior to your most recent delivery?	Yes ..... 1 No 2	→409
402	Whom did you see? **Ask: "*Anybody else?*" Continue until no further answers.** (CIRCLE ALL RESPONSES GIVEN)	Doctor ..... 1 Nurse/ANM ..... 2 HA/AHW ..... 3 MCHW ..... 4 VHW ..... 5 FCHV ..... 6 TBA ..... 7 Other (specify) _____ 8	→ 405
403	How many times did you receive antenatal care from a health worker during the pregnancy prior to your most recent delivery?	Number of times ____ ____ Don't know 98	
404	How many months pregnant were you when you **first** received antenatal care from a health worker for the pregnancy prior to your most recent delivery?	Number of months ____ Don't know 98	

405	As part of your antenatal care during the pregnancy prior to your most recent delivery, were any of the following done at least once? **(Read each service, circle appropriate response)**	Yes	No	DK	
	1. Was your abdomen examined?	1	2	8	
	2. Did you receive iron tablets?	1	2	8	
	3. Did you receive deworming tablets?	1	2	8	
	4. Did you receive TT vaccination?	1	2	8	
	5. Was your weight measured?	1	2	8	
	6. Was your blood pressure measured?	1	2	8	
	7. Did you give a blood sample?	1	2	8	

Q. #	Question	Codes	Go to Q.
406	Who are the people who accompanied you at least one time to your antenatal care? **Ask: "*Anybody else?*" Continue until no further answers.** **(CIRCLE ALL RESPONSES GIVEN)**	Husband……..…….....……1 Mother-in-law . . . ……...….....2 Father-in-law……..…..3 Mother……..…..... …….4 Other family member……..... 5 Friend / Neighbor ……..…...6 Other (specify)_____7 Nobody (went alone) ……..…97 Don't know.....98	
407	Where did you receive antenatal care for your most recent antenatal care visit? **If source is hospital, health center, or clinic, write the name of the place. Probe to identify the type of source and circle the appropriate code to the right.** _____ **Name of place**	Hospital..... PHCC..... Health post..... Sub-health post ..... PHC/OR clinic ..... Pvt. Hospital/Clinic/N. Home ..... Pharmacy ..... FCHV..... TBA ..... Other (specify) _____1 Don't know_____9	

408	During any of your antenatal care visits with health workers during your pregnancy prior to your most recent delivery, were you counseled on: **(READ ALL RESPONSES)**				
		Yes	No	Don't know	
	1. Financial preparation for your delivery?	1	2	8	
	2.Identifying emergency transport options?	1	2	8	
	3. Arranging for blood in case of emergency?	1	2	8	
	4. Tetanus toxoid vaccination?	1	2	8	
	5.Danger signs during pregnancy?	1	2	8	
	6. Delivery in a suitable health facility?	1	2	8	
	7. Use of CHDK?	1	2	8	
	8. All who touch the newborn need to wash hands with soap and water first?				
	9. Immediate drying and wrapping of the newborn?	1	2	8	
	10. Breastfeeding immediately after birth?	1	2	8	
	11. Care of the newborn , particularly cleanliness, avoiding chilling, and immediate breastfeeding?	1	2	8	
	12. Family planning?	1	2	8	

409	Did you discuss planning for your delivery with your husband while you were pregnant?	Yes.....1 No.....2	
410	Did you receive tetanus toxoid injection when you were pregnant prior to your most recent delivery?	Yes.....1 No.....2 Don't know ……8	→ 412 → 412
411	How many times did you receive immunization against tetanus (TT) during	Number of shots ☐ Don't know.....8	
412	Were you given or did you buy any iron/folic acid tablets when you were pregnant prior to your most recent delivery? **(SHOW IRON TABLETS.)**	Yes.....1 No.....2 Don't know ……8	③415 ③415

Q. #	Question	Codes	Go to Q.
413	During the whole pregnancy, for how many days did you take the iron/folic tablets?	Number of days….. ☐☐☐ Don't know……..… 998	
414	Where did you obtain the iron/folic acid tablets? **If "FCHV" is not mentioned, then prompt *"Did you receive iron/folic acid tablets from the FCHV?"*** **(CIRCLE ALL RESPONSES GIVEN)**	Hospital ..... 1 PHCC..... 2 Health post..... 3 Sub-health post ..... 4 PHC/OR clinic..... 5 Pvt. Hospital/Clinic/N. Home..... 6 Pharmacy ..... 7 FCHV ..... 8 Other (specify) _____ _____9	
415	When you were pregnant, did you receive deworming tablets?	Yes..... 1 No ..... 2 Don't know …….……..8	
416	When you were pregnant, did you eat less than usual, about the same amount as usual, or more than usual?	Less than usual ..... 1 Same as usual ..... 2 More than as usual..... 3 Don't know..... 8	
417	When you were pregnant, did you receive less care and support than usual, about the same care and support as usual, or more care and support than usual from your family members?	Less than usual ..... 1 Same as usual ..... 2 More than as usual..... 3 Don't know..... 8	③419 ③419 ③419
418	What types of care/support did you receive from your family members? **Probe: "*Any other*?"** (CIRCLE ALL RESPONSES GIVEN)	Given more food to eat..... 1 Given more nutritious food to eat..... 2 Advised for more rest ..... 3 Reduced heavy load..... 4 Advised/accompanied for physical check-up ..... 5 Other (specify) _____ 6	

419	Please tell me where you should go for health services if you have danger signs while you are pregnant? **(CIRCLE ALL RESPONSES GIVEN)**		Hospital ..... 1 PHCC..... 2 Health post..... 3 Sub-health post ..... 4 PHC/OR clinic..... 5 Pvt. Hospital/Clinic/N. Home..... 6 Other (specify)_____ 7 Don't know …….. 98		
420	**What are the symptoms during pregnancy indicating the need to seek immediate care?** **Ask: "*Any others?*" Continue until no further answers.** **(CIRCLE ALL RESPONSES GIVEN)**		Vaginal bleeding (any amount) ..... 1 Severe lower abdominal pain..... 2 Severe headache ..... 3 Convulsion..... 4 Blurred vision and swelling of hands and face ..... 5 Other (specify) _____ 6 Don't know..... 98		
421	When you were pregnant, did you experience any of the following problems at anytime? (Read out all responses one after another) **(Record all responses accordingly.)**			Yes	No
	1	Blurred vision?		1	2

	2	Severe lower abdominal pain?	1	2		
	3	Severe headache?	1	2		
	4	Convulsion?	1	2		
	5	Swelling of the hands, body or face?	1	2		
	6	Any vaginal spotting or bleeding?	1	2		
	7	None of the above	7	→ 501		
422	What did you do or whom did you consult for the problems that you stated above? **Prompt: "anything else?"** **(CIRCLE ALL RESPONSES GIVEN)**	**Traditional treatment at home……. 1** Given medicine at home ……. 2 Hospital ……..…. 3 PHCC /HP/ SHP ……..…... 4 Pvt. Hospital/Clinic/N. Home……. 5 **Bought medicine from pharmacy …... 6** Consulted FCHV ……..... 7 Consulted MCHW ……..…. 8 Consulted a TBA …… 9 Consulted other HW …….. 10 Consulted dhami / jhankri …….. 11 Consulted relative/neighbor/friend ….12 Other (specify)_____ 13 Nothing ……... 97				
Section 5: Delivery Care						

Interviewer: "Now, I would like to ask you some questions about your most recent delivery."

Q. #	Question	Codes	Go to Q.
501	Who assisted with your most recent delivery? **Prompt: "*Anybody else*?"** **(CIRCLE ALL RESPONSES GIVEN)**	Doctor……1 Staff Nurse . . . ……...……...2 ANM……...……..... 3 MCHW……...……4 HA ……..5 AHW / CMA ……...…. ……6 VHW.....……7 TBA…….....…...8 FCHV……..……9 Relative/Friend ……..10 Other (specify)_____11 Nobody …….. 97	
502	When you were in labor were you given an intravenous drip?	Yes……..……..…1 No……..……..2 Don't know……..8	→ 504 → 504
503	If yes, was there any medication put into the drip?	Yes……..……..…1 No……..……..2 Don't know……..8	
504	Who else was present at the delivery outside the room where the delivery took place? **Prompt: "*Anybody else*?"** **(CIRCLE ALL RESPONSES GIVEN)**	TBA…….....1 FCHV……..……2 Friends/Neighbors.....……3 Mother-in-law.....……..…4 Father-in-law.....……5 Husband...…….……6 Mother...……7 Father.....……...……8 Other relative …….…... 9 Other (specify)_____10 Nobody …….. 97 Don't know/can not remember.....98	

Q. #	Question	Codes	Go to Q.
505	Where did you give birth in your most recent delivery? **If source is hospital, health center, or clinic, write the name of the place. Probe to identify the type of source and circle the appropriate code to the right.** _____ NAME OF PLACE	Hospital ..... 1 PHCC..... 2 Health post..... 3 Sub-health post ..... 4 Pvt. Hospital/Clinic/N. Home..... 5 Your home …….…. 6 Other home …….…. 7 Other (specify) _____ .8	→ 508 → 508 → 508
506	Had you planned during your pregnancy to deliver in a health facility or did you start to deliver at home and then decide to go the health facility because of some problem occurring during your labor or delivery?	Planned to go during pregnancy ……. 1 Started to deliver at home ……..…. 2 Other (specify) _____ 3	
507	Was your child delivered by caesarean section? **Prompt: Ask "*did a doctor cut open your abdomen to deliver the baby?*"**	Yes…….....….1 No…….....…..2	→ 515
508	Was it an instrumental delivery? **(Prompt: Ask "*Was the baby delivered with the help of machine or instruments*?")**	Yes……..……..….1 No……..……..…..2 Don't know…….…..8	

509	Was the baby born head first or did other parts of the body, including the placenta, come out first?	Head first …….. 1 Other parts of body …… 2 Don't know …….. .8			
510	Within the first hour after the delivery, did a health worker give you an injection either in the thigh or buttock or medication by intravenous drip?	Yes…….1 No……..2 Don't know……..…….8			
511	Did you bleed a lot more than normal immediately following the birth of your baby ?	Yes…….1 No……..2 Don't know……8			
512	How many cloths did you use to absorb the blood during the first 24 hours after your baby was born?	# of cloths: ____ Don't know/can't remember ……. 98			→ 514
513	Was it more than two cloths?	Yes……1 No…….…...2 Don't know/ can not remembers..……8			
514	Now I am going to ask you some questions regarding how you felt immediately following the delivery:	Yes	No	DK	
	1. In the first 6 hours following delivery, did you feel faint or dizzy?	1	2	8	
	2. In the first 6 hours following delivery, did you actually faint or lose consciousness?	1	2	8	
	3. In the first six hours following delivery, did you experience shivering?	1	2	8	
	3a. (if yes) for how many hours? (don't know = 98)				
	4. In the first six hours following delivery, did you experience nausea?	1	2	8	
	4a. (if yes) for how many hours? (don't know = 98)				

	5. In the first six hours following delivery, did you experience fever?	1	2	8	
	5a. (if yes) for how many hours?				
	6. In the first six hours following delivery, did you have a diarrhea?	1	2	8	
	6a. (if yes) how many times? (don't know = 98)				

Interviewer: "Now I'd like to ask you some questions about delivery services in your community."

515	Who should be present at birth to help deliver the baby safely? **Ask: "*Anybody else who could be suitable instead?*" Continue until no further responses.** **(CIRCLE ALL RESPONSES GIVEN)**	Doctor……..1 Staff Nurse . . . ……...……2 ANM…..……...……..…..…. 3 MCHW…….……..…4 HA ……...5 AHW/ CMA ……...…… ……6 VHW.....……7 TBA…….....8 FCHV……...…9 Relative/Friend.....…….…..10 Other (specify)_____11	
516	Please tell me the name and location of a health facility in your community where you can go to deliver your child as well as its location. Location: _____ **Confirm the type of health facility and**	Hospital..... PHCC..... Health post..... Sub-health post ..... PHC/OR clinic..... Pvt. Hospital/Clinic/N. Home.....6 Other (specify) _____ 7 Don't know ……..… 98	
517	In your opinion, what things need to be kept clean during childbirth? Probe: "Any other?" (CIRCLE ALL RESPONSES GIVEN)	Clean nails ..... Clean hands..... Blade..... Surface on which cord is cut..... Surface on which newborn is placed.....5 Thread..... Perineum..... Mother's clothes …….....… 8 Clothes for wrapping baby.....9	
518	What are the signs/symptoms during labor indicating the need to seek immediate care? Probe: "Any other?" (CIRCLE ALL RESPONSES GIVEN)	Labor longer than 8 hours..... Appearance of baby's hand first ..... Appearance of baby's leg first..... Appearance of umbilical cord first ..... Excessive bleeding before or after delivery..... Convulsion..... Other (specify)..... Don't know	

519	During your delivery, did you experience any of the following problems at anytime? (Read out all responses one after another.) **(Record all responses accordingly)**		Yes	No	
	1	So much bleeding that it wet your clothes and you feared it was life threatening?	1	2	
	2	Convulsions?	1	2	
	3	Prolonged labor (>12 hours)?	1	2	
	4	The baby's hand, leg or cord came out first ?	1	2	
	5	None of the above		7	→ 524

520	What did you do or whom did you consult for the problems that you stated above? **Prompt: *"anything else?"*** (CIRCLE ALL RESPONSES GIVEN)	**Traditional treatment at home ……..…. 1** Given medicine at home ……. 2 Hospital ……..….. 3 PHCC /HP/ SHP …….. 4 Pvt. Hospital/Clinic/N. Home ……. 5 **Bought medicine from pharmacy ……..…. 6** Consulted FCHV ……. 7 Consulted MCHW ……..… 8 Consulted a TBA ……..... 9 Consulted other HW ……. 10 Consulted dhami / jhankri …… 11 Consulted relative/neighbor/friend …….. 12 **Other (specify) _____…....13** **Nothing ……... 97**		
Interviewer: "Now I would like to ask you some questions regarding whether or not you were referred for any of these problems."					
521	Did a health worker refer you or advise you to go to a health facility for treatment for any of the problems that you mentioned above (Q519)?	Yes……1 No……..2 Don't know…….. .8			→ 524 → 524
522	After you were advised to seek care, did you go to any health facility?	Yes……1 No……..2			→ 524
517	In your opinion, what things need to be kept clean during childbirth? Probe: "Any other?" (CIRCLE ALL RESPONSES GIVEN)	Clean nails 1 Clean hands 2 Blade 3 Surface on which cord is cut 4 Surface on which newborn is placed.....5 Thread 6 Perineum 7 Mother's clothes …….....…. 8 Clothes for wrapping baby.....9 Other (specify) 10 Don't know 98			
518	What are the signs/symptoms during labor indicating the need to seek immediate care? Probe: "Any other?" (CIRCLE ALL RESPONSES GIVEN)	Labor longer than 8 hours 1 Appearance of baby's hand first 2 Appearance of baby's leg first 3 Appearance of umbilical cord first 4 Excessive bleeding before or after delivery 5 Convulsion 6 Other (specify) 7 Don't know 98			
519	During your delivery, did you experience any of the following problems at anytime? (Read out all responses one after another.) **(Record all responses accordingly)**			Yes	No
	1	So much bleeding that it wet your clothes and you feared it was life threatening?		1	2
	2	Convulsions?		1	2
	3	Prolonged labor (>12 hours)?		1	2
	4	The baby's hand, leg or cord came out first ?		1	2
	5	None of the above			7 → 524

520	What did you do or whom did you consult for the problems that you stated above? **Prompt: *"anything else?"*** (CIRCLE ALL RESPONSES GIVEN)	**Traditional treatment at home ……..…. 1** Given medicine at home …… 2 Hospital …….. 3 PHCC /HP/ SHP …….. 4 Pvt. Hospital/Clinic/N. Home ……. 5 **Bought medicine from pharmacy ……..…. 6** Consulted FCHV ……. 7 Consulted MCHW ……..… 8 Consulted a TBA ……... 9 Consulted other HW ……. 10 Consulted dhami / jhankri …… 11 Consulted relative/neighbor/friend …….. 12 **Other (specify) _____…...13** **Nothing ……... 97**	

Interviewer: "Now I would like to ask you some questions regarding whether or not you were referred for any of these problems."

521	Did a health worker refer you or advise you to go to a health facility for treatment for any of the problems that you mentioned above (Q519)?	Yes……1 No……..2 Don't know…….. .8	→ 524 → 524
522	After you were advised to seek care, did you go to any health facility?	Yes……1 No……..2	→ 524

523	Where did you go?	Hospital ..... 1 PHCC ..... 2 Health post ..... 3 Sub-health post..... 4 PHC/ORC..... 5 Pvt. Hospital/Clinic/N. Home ..... 6 Pharmacy..... 7 Other (specify)_____8 Don't know/don't remember .....…... 98	
524	In the past three months, have you seen, heard, or read anything about importance of delivering in a suitable health facility on the radio or television or in the newspaper or anywhere else?	Yes……..…….....……..1 No…….....……..2	→ 526

525	Please tell me where you saw or heard a message on importance of delivering in a suitable health facility. **Prompt: *"anywhere else?"* until no more responses. Circle appropriate responses in <u>Unaided</u> column. Then read out any remaining media sources using the sentence: "Did you hear anything about importance of delivering in a suitable health facility through (media source)?" If respondent answers "yes", circle "2" in <u>Aided</u> column. If respondent answers "no", circle "3" in <u>Unexposed</u> column.**	Media source	Unaided	Aided	Unexposed	
		1. FCHV flip chart	1	2	3	
		2. From FCHV	1	2	3	
		3. From TBA	1	2	3	
		4. From a health worker at the health facility	1	2	3	
		5. Community groups	1	2	3	
		6. Posters, pamphlets, leaflets	1	2	3	
		7. Newspaper	1	2	3	
		8. Radio	1	2	3	
		9. TV	1	2	3	
		10. Others (specify) _____				

526	Have any friends, family members or other acquaintances spoken with you informally during the past two months about importance of delivering in a suitable health facility?	Yes……..……..……..1 No……..…..2	

Section 6: Misoprostol and Post-Partum Hemorrhage

Interviewer: "Now, I would like to ask you some questions about bleeding after childbirth."

Q #	Questions	Response	Skip
	Obstetric History		
601	During your pregnancy prior to your last delivery, did you receive any information about bleeding after childbirth?	Yes ..……..… 1 No …...…….. 2 Don't know/don't remember ……. 8	 → 604 → 604
602	What information did you receive about bleeding after childbirth? **(Prompt: "Did you receive any other information?")**	Can cause death ……..… 1 Go to health facility promptly ….. 2 Get help from health worker ……. 3 Other (specify) _____ 4	
603	Please name all the sources from which you learned about bleeding after childbirth. **Prompt:** ***"Did you receive any other information?"*** **(CIRCLE ALL RESPONSES GIVEN)**	Radio … ..... 1 Television … ……. 2 Pamphlet/flyer … …….. 3 Poster … ……..…….. 4 FCHV… ..... 5 Women's group … ……..... 6 Health worker… ..... 7 Health facility … ……..……. 8 Neighbor/family/friend/ relative… 9 Other (specify) _____ 10	
604	During your pregnancy prior to your last delivery, did you receive any information about a medicine that can be taken to reduce bleeding after childbirth?	Yes ..……..… 1 No …...…….. 2 Don't know/don't remember. …… 8	

Section 7: Post-Partum Care

Interviewer: "Now, I would like to ask you some questions about your health after your most recent delivery."

Q. #	Question	Codes	Go to Q.
Interviewer: ***"I would like to begin by asking you some questions about your FCHV and the postnatal services she provides."***			
701	At the time of delivery or in the early days after the delivery did you receive a visit from the FCHV?	Yes .....1 No .....2 Do not know FCHV .....3 Don't know 8	 →707 →707 →707
702	How long after the delivery did that visit happen ?	Days..... ☐☐	
703	Did the FCHV make any other visits over the following days and weeks	Yes .....1 No .....2 Don't know 8	 →707 →707
704	When did she make the second visit ?	Days..... ☐☐	

Q. #	Question	Codes			Go to Q.
705	Did the FCHV make third visit over the following days and weeks?	Yes ..... 1 No ..... 2 Don't know 8			 →707 →707
706	When did she make the third visit?	Days.....			
707	What services, help or advice did your FCHV provide you or your newborn during the one month following your last delivery? **(READ ALL RESPONSES)**	Yes	No	DK	
	1. Diagnose or treat illness in the newborn?	1	2	8	
	2. Provide vitamin A for mother?	1	2	8	
	3. Provide vitamin A for the newborn				
	4. Provide iron tablets for mother?	1	2	8	
	5. Check to see if the mother had a delivery- related problem (e.g. Infection, continuing bleeding)?	1	2	8	
	6. Make referral to health service provider?	1	2	8	
	7. Advice or help with birth registration?	1	2	8	
708	Did you receive advice from your FCHV on any of the following topics during the one month following your last delivery? **(READ ALL RESPONSES)**	Yes	No	DK	
	1. Take rest/avoid heavy work?	1	2	8	
	2. Post natal visits to a health facility or outreach clinic?	1	2	8	
	3. Diet?	1	2	8	
	4. Breastfeeding counseling?	1	2	8	
	5. On care of the newborn, notably avoiding infection by cleanliness and avoiding chilling?	1	2	8	
	6. Post-partum danger signs for mother?	1	2	8	
	7. Danger signs for newborn?	1	2	8	
	8. Iron tablets?	1	2	8	
	9. Family planning?	1	2	8	
Interviewer: "Now I am going to ask you some more detailed questions about the postnatal care that you received."					
709	**Check Q N. 505:** Place of delivery _____ **NAME OF PLACE**	Hospital ..... 1 PHCC ..... 2 Health post ..... 3 Sub-health post ..... 4 Pvt. Hospital/Clinic/N. Home ..... 5 Your home ……6 Other home ……..... 7 Other(specify)_____ 8			→711
710	**FOR BIRTHS IN OWN/OTHER HOME, ASK:** After [NAME] was born and the health care provider, FCHV or traditional birth attendant left your home, did any health care provider check on your health? **Note: For women with a stillbirth, ask:** "After you lost your baby, and the health care provider, FCHV or traditional birth attendant left your home, did any health	Yes……..…… 1 No……..…… 2			→712 →712

Q. #	Question	Codes	Go to Q.
711	**FOR BIRTHS IN HEALTH FACILITY, ASK:** Before you were discharged, did any health care provider check on your	Yes…… 1 No.…… 2	
712	How many times did a health professional check on your health within six weeks after birth?	# of times: …….. ☐☐ Zero times…… ……...97 Don't know …….. 98	→720
713	How long after delivery did the first check up take place? IF ON THE DAY OF DELIVERY RECORD "00".	DAYS ..... ☐☐ Don't know…..……98	
714	Who checked on your health at that (FIRST) time? **PROBE FOR MOST QUALIFIED PERSON.** **(If circled 6, 7, or 8 in Q714; ask Q710 & Q711 again)**	Doctor .....1 Nurse/ANM .....2 HA/AHW .....3 MCHW .....4 VHW .....5 FCHV .....6 TBA ……..…….. 7 Other (specify) _____ 8 Don't know / don't remember ……...98	
715	**Interviewer: Check question Q 712 and circle below:** More than one postnatal check up for mother ..... Postnatal check up only once.....		→718
716	How long after delivery did the **second** check up of your health take place? IF LESS THAN ONE WEEK, RECORD DAYS.	DAYS ..... 1 ☐☐ WEEKS..... 2 ☐☐ Don't know……..…...…… .98	
717	Who checked on your health at that (SECOND) time? **PROBE FOR MOST QUALIFIED PERSON.**	Doctor .....1 Nurse/ANM .....2 HA/AHW .....3 MCHW .....4 VHW .....5 FCHV .....6 TBA ……..…….. 7 Other (specify) _____ 8 Don't know / don't remember ……...98	
718	Where did these checks take place? **Prompt: *"Anywhere else?"*** **(CIRCLE ALL RESPONSES GIVEN)**	Hospital…….……..……1 PHCC……..…...2 HP……..…..…3 SHP……...…..….4 Private Hospital/clinic/N. Home…….5 NGO clinic…….……..6 PHC / ORC ……..…7 Home …… 8 Other (specify)_____….9	
Interviewer: "Now I am going to ask you some questions regarding care that you may have received at a health facility following your delivery."			
719	**Which of the following activities were conducted by the health worker during your postnatal checkup within six weeks after delivery? (READ ALL)**		

Q. #	Question	Codes				Go to Q.
			Yes	No	DK	
	1 Examination of abdomen?		1	2	8	
	2 Internal examination?		1	2	8	
	3 Asked if you had excessive bleeding / severe abdominal pain?		1	2	8	
	4 Counseled you about Family Planning?		1	2	8	
	5 Counseled you about breastfeeding?		1	2	8	
	6 Counseled you about immunization?		1	2	8	
	7 Provided advice on newborn care?		1	2	8	
720	After your most recent delivery, for about how many days did you take iron or folic tablets? **(Show iron tablets) (If not taken at all enter '000')**	Number of days…….. Don't know…….……98				
721	In the first 42 days after delivery, did you receive a Vitamin A dose like this? **(Show Vitamin A capsule)**	Yes…….....……1 No……..…….....……..2				
722	What are the symptoms of the mother indicating the need for her to seek immediate health care during the six weeks after delivery? **(Ask: "*Anything else?*" Continue until no further answers.)** **(CIRCLE ALL RESPONSES GIVEN)**	**HIGH FEVER…….. 1** Pain in lower abdomen or smelling vaginal discharge…….. 2 Excessive bleeding……..... 3 Severe headache……. 4 Convulsion and fit…….. 5 Others (Specify)_____ 6 Do not know…….…. 98				
723	Following your delivery, did a health worker or FCHV counsel you on the following maternal danger signs or issues? **(READ ALL)**					
			Yes	No	DK	
	1 High fever?		1	2	8	
	2 Severe lower abdominal pain?		1	2	8	
	3 Smelly discharge?		1	2	8	
	4 Excessive bleeding?		1	2	8	
	5 Severe headache?		1	2	8	
	6 Convulsions?		1	2	8	
	7 Breast problems?		1	2	8	
	8 Where to go for services?		1	2	8	
724	During the first six weeks after your most recent delivery, did you eat less than usual, about the same amount as usual, or more than usual?	Less than usual.....1 Same as usual.....2 More than as usual .....3 Don't know 8				
725	During the first six weeks after your most recent delivery, did you receive less care and support than usual, about the same care and support as usual, or more care and support than usual from your family members?	Less than usual.....1 Same as usual.....2 More than as usual .....3 Don't know. 8				③ ✗⇨✗ ③ 727 ③ 727
726	What types of care/support did you receive from your family members? **Probe: *"Any other?"*** **(CIRCLE ALL RESPONSES GIVEN)**	Given more food to eat .....1 Given more nutritious food to eat .....2 Advised for more rest.....3 Reduced heavy load .....4 Advised/accompanied for check-up.....5 Other (specify)_____ 6				

Q. #	Question	Codes	Go to Q.
727	How many days after delivery did you start working outside your home?	Number of days…….. ☐☐☐ Not yet started to work outside home...996 Don't know……..…998	→729
728	Who usually took care of your new born while you were away or at your work outside home?	Mother in Law .....1 Father in law .....2 Husband .....3 Mother/father .....4 Sister in law .....5 Son/daughter .....6 Other(specify)_____..... 7	
729	Please tell me where you would go for health services if <u>you</u> have danger signs during the six weeks after you have delivered. **(CIRCLE ALL RESPONSES GIVEN)**	Hospital.....1 PHCC.....2 Health post .....3 Sub-health post .....4 PHC/OR clinic .....5 Pvt. Clinic/n. Home.....6 Other(specify)_____ .....7 Don't know ……. 98	
730	During the six weeks following your most recent delivery, did you experience any of the following problems at anytime? (Read out all responses one after another) **(Record all responses accordingly)**		

			Yes	No	
	1	So much bleeding that it wet your clothes and you feared it was life threatening?	1	2	
	2	High fever?	1	2	
	3	Severe lower abdominal pain?	1	2	
	4	Convulsions?	1	2	
	5	None of the above		7	→ 801

731	What did you do or whom did you consult for the problems that you stated above? **Prompt: *"Anything else?"*** **(CIRCLE ALL RESPONSES GIVEN)**	**Traditional treatment at home …….... 1** Given medicine at home ……. 2 Hospital …… 3 PHCC /HP/ SHP …….. 4 Pvt. Hospital/Clinic/N. Home ……. 5 **Bought medicine from pharmacy……. 6** Consulted FCHV ……..… 7 Consulted MCHW ……8 Consulted a TBA ……..… 9 Consulted other HW …….. 10 Consulted dhami / jhankri …….. 11 Consulted relative/neighbor/friend …. 12 Other (specify)_____.....13 Nothing …….... 97	
<u>Interviewer</u>: "Now I would like to ask you some questions regarding whether or not you were referred for any of these problems."			
732	Did a health worker refer you or advise you to go to a health facility for treatment for any of the problems that you mentioned above (Q730)?	Yes……1 No……..2 Don't know……8	→ 801 → 801

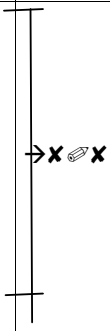
Q. #	Question	Codes	Go to Q.
733	After you were advised to seek care, did you go to any health facility?	Yes ..... 1 No 2	→ 801
734	Where did you go?	Hospital ..... 1 PHCC ..... 2 Health post ..... 3 Sub-health post..... 4 PHC / ORC..... 5 Pvt. Hospital/Clinic/N. Home ..... 6 Pharmacy..... 7 Other (specify) _____ 8 Don't know/don't remember 98	

Section 8: Post-Partum Family Planning and Birth Spacing

Interviewer: "Now, I would like to talk about family planning – the various ways or methods that a couple can use to delay or avoid a pregnancy."

Q. #	Question		Codes		Go to Q.
801	Which family planning ways or methods have you heard about? **(For methods not mentioned spontaneously, ask:)** Have you ever heard of (METHOD)? (Interviewer: Circle code "1" for each method mentioned spontaneously. Then proceed down the column, reading the name and description of each method not mentioned spontaneously. Circle code "1" if method is recognized, and code "2" if not recognized.)				
	READ DESCRIPTION OF EACH METHOD		**Yes**	**No**	
	1	FEMALE STERILIZATION: Women can have an operation to avoid having any more children.	1	2	
	2	MALE STERILIZATION: Men can have an operation to avoid having any more children.	1	2	
	3	PILL: woman can take a pill every day to avoid becoming pregnant.	1	2	
	4	IUD: Women can have a loop or coil placed inside them by a doctor or a nurse.	1	2	
	5	INJECTION: Women can have an injection by a health provider that stops them from becoming pregnant for one or more months.	1	2	
	6	NORPLANT: Capsule to be inserted into women's arm. It prevents pregnancy for seven years.	1	2	
	7	CONDOM: Men can put a rubber sheath on their penis before sexual intercourse.	1	2	
	8	PERIODIC ABSTINENCE: Couples can avoid having sexual intercourse on certain days of the month when the woman is more likely to become pregnant.	1	2	
	9	WITHDRAWAL: Men can be careful and pull out before climax.	1	2	

Q. #	Question	Codes	Go to Q.		
802	Have you done something or used any method to delay or avoid getting pregnant at any time after your most recent delivery?	Yes ..... 1 No..... 2	→804		

Q. #	Question	Codes	Go to Q.
803	What was the first method you used after the delivery?	Female Sterilization …… 1 Male Sterilization …… 2 Pill …… 3 IUD …… 4 Depo-Provera …… 5 Norplant …… 6 Condom …… 7 Periodic abstinence …… 8 Withdrawal …… 9 Other (specify) _____ 10	
804	Are you currently pregnant?	Currently pregnant…… 1 Not pregnant / unsure..... 2	→ 808
805	Are you or your husband currently doing something or using any method to delay or avoid getting pregnant?	Yes..... 1 No..... 2	→ 807
806	Which method are you using?	Female Sterilization …… 1 Male Sterilization …… 2 Pill …… 3 IUD …… 4 Depo-Provera …… 5 Norplant …… 6 Condom …… 7 Periodic abstinence …… 8 Withdrawal …… 9 Other (specify) _____ 10	
807	Can you tell me what is (are) the reasons that you are not currently using a family planning method? Probe: "Any other?" (CIRCLE ALL RESPONSES GIVEN)	Not available….. 1 Not available nearby 2 No one at health facility 3 Spouse did not like 4 Family members did not like 5 Provider behavior not good 6 Want more children 7 Hysterectomy 8 Religion 9 Confused about method 10 Was not satisfied using it 11 Health/fertility concerns 12 Inconvenient to use 13 Infrequent sex 14 Husband away from home 15 No resumption of menses 16 Child too small 17 Side effects 18 Other (specify)_____ 19	
808	Did a health worker counsel you on birth spacing or Family Planning at any time following your most recent delivery?	Yes 1 No 2	→

Q. #	Question	Codes	Go to Q.
809	How many weeks following your most recent delivery were you counseled on birth spacing and Family Planning for the first time?	# of weeks: _____ _____ Don't know …….. 98	
810	Who counseled you at that time?	Doctor ..... 1 Nurse/anm ..... 2 Ha/ahw ..... 3 Mchw ..... 4 Vhw..... 5 Other (specify)_____ .....6 Don't know / don't remember 98	
811	Did your FCHV provide you with family planning information and services following your most recent delivery?	Yes ..... 1 No..... 2	→
812	How many days after your recent delivery for the first time did FCHV provide you with family planning information and services?	Days.....	
813	What type of information and services related to family planning did she provide you following your most recent delivery? Probe: "Anything else?" (CIRCLE ALL RESPONSES GIVEN)	fp counseling..... 1 Gave condoms..... 2 Gave pills ..... 3 Referred for FP services..... 4 Other (specify)_____..... 5	

Section 9: Immediate Newborn Care

Interviewer: "Now, I would like to ask you some questions about the care of your child after delivery."

Q. #	Question	Codes	Go to Q.
901	**Interviewer: Check question QB and confirm that recently delivered child was a live birth**	Yes……1 No……..2	→ 924
Interviewer: "Now, I would like to ask you some specific questions pertaining to the baby immediately following the delivery."			
902	Was a Clean Home Delivery Kit used during delivery? **(Show CHDK)**	Yes……1 No……..2 Don't know……..8	→ 907

Q. #	Question	Codes	Go to Q.
903	What instrument was used to cut the cord?	New Blade..……..……1 Boiled Blade …….2 Unboiled used blade…….3 Knife……..4 Grass Cutter (hansiya)……...5 Weapon (khukuri)……6 Scissor……..…..7 Other (specify) _____.....8 Don't know ……..98	
904	Was the instrument used to cut cord boiled prior to use?	Yes .....1 No .....2 Don't Know/Can't Remember.....…8	
905	What was used to tie the cord?	New ties …… 1 Boiled string or thread …….. 2 Unboiled used string or thread ……..…. 3 Other (specify)_____.....4 Don't know ……..……..8	
906	On what surface was the cord cut on?	Plastic disc..……..……..……1 Metal coin.. ……..……...2 Wood……..……..……...3 Other (specify)_____....4 Nothing...……7 Don't know…….....8	
907	Did the person who handled the baby, assisting with the delivery, washed hands with soap and water first?	Yes ……...…1 No ……..……...…2 Don't know ……8	
908	Did anybody apply anything on the stump after the baby's cord was cut?	Yes ……...…1 No ……..……...…2 Don't know ……8	→ 910 → 910
909	What did they apply ? **(Prompt: "*Anything else*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Oil…….……1 Ash…….……..2 Sindoor…….……3 Ointment/powder……..……4 Animal dung……...……..5 Turmeric/turmeric powder……...….6 Ghyu …… 7 Other (specify) _____ 8 Don't know……..98	
910	If a special medicine were available for preventing infections of the cord stump, do you think you would want to use it?	Yes ……...…1 No ……2 Don't know.....……8	
911	Was your baby wiped off/dried before the placenta was delivered?	Yes ……..…1 No ……2 Don't know…....……8	
912	Was your baby wrapped in cloth or put on mother's body and covered with cloth before the placenta was delivered?	Yes ……1 No……..2 Don't know…....……..….8	
913	What was the condition of the cloth, which was used for wrapping the baby? **(Probe: "*Anything else*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Clean cloth. …… 1 Dry cloth. ……... 2 New cloth…. ……..……. 3 Used cloth…. …… 4 Wet cloth……..5 Other (specify)_____.....6 Don't know ...…… 8	

Q. #	Question	Codes	Go to Q.
914	Where was the baby placed before the placenta was delivered?	On the floor …… 1 On the cot ……... 2 Beside or on the mother's body…….. 3 With someone else ……. 4 Other (specify) _____ 5 Don't know …… 8	
915	How long after birth was your baby bathed for the first time?	Within 1 hour …… 1 2-24 hours …… 2 After 24 hours …….. 3 Don't know.....….8	
916	Did you ever breastfeed (NAME)?	Yes……1 No……..2	→ 924
917	How long after birth did you first put (NAME) to the breast?	During the first hour after delivery.….1 More than 1 hour. ..……..…2 Don't know……...…8	
918	Did you give (NAME) the first liquid (*begauti*) that came from your breasts?	Yes……1 No……..2	
919	In the first three days after birth was (NAME) given anything to drink other than breast milk?	Yes……....……1 No……....……..…..2	
920	**<u>Interviewer</u>: Check question <u>QB</u> and confirm that respondent has a live infant aged less than one year of age**	Yes……....……..…1 No……....……..…..2	→ 924
921	Are you still breastfeeding (NAME)?	Yes……1 No……..2	→ 923

Interviewer: "Now I would like to ask you about liquids (NAME) drank yesterday during the day and at night. Did (NAME) drink:" (READ ALL)

922			YES	No	
	1	Plain water?	1	2	
	2	Honey?	1	2	
	3	Non-breast (animal) milk?	1	2	
	4	Infant formula?	1	2	
	5	Expressed breastmilk?	1	2	
	6	Fruit juice?	1	2	
	7	Daal?	1	2	
	8	Yogurt or mohi?	1	2	
	9	Tea?	1	2	
	10	Ghyu?	1	2	
	11	Did you feed your baby any liquids using a bottle?	1	2	
	12	Did you give any other liquids (specify) _____?	1	2	

Interviewer: "Now I would like to ask you about the food (NAME) ate yesterday during the day and at night, either separately or combined with other foods. Did (NAME) eat....? (READ ALL)

			YES	No	
	13	Jaulo?	1	2	
	14	Lito?	1	2	
	15	Biscuits?	1	2	
	16	Noodles?	1	2	
	17	Fruits?	1	2	
	18	Vegetables?	1	2	
	19	Bread?	1	2	
	20	Bhaat?	1	2	
	21	Meat, fish or eggs?	1	2	

Q. #	Question	Codes	Go to Q.
	22 Did you give any other solids (specify) _____?	1 2	
923	At how many completed months of age did you first start giving food or drink other than breastmilk to your baby?	# months: ____ ____ Baby exclusively breastfed until now .. 95 Don't know …….. 98	
924	Please tell me when should a newborn child be bathed after the birth?	Immediately after the birth……..1 Within 24 hours after birth……..2 After 24 hours after birth...…….3 Should not be bathed...…….4 Other (specify) _____... 5 Don't know……..……8	
925	Please tell me when should a newborn child be breast fed for the first time after the birth?	Immediately after the birth…….1 After the placenta is out.....……2 After bathing the new born……..3 After 24 hours after birth.....……..4 Other (specify) _____ .. 5 Don't know……..……8	

Section 10: Newborn Care During First Month

Interviewer: "Now, I would like to ask you some questions about the health of your child during the month after your most recent delivery."

Q. #	Question	Codes	Go to Q.
1001	What are the symptoms of *the infant within one month after delivery* indicating the need to seek immediate health care? **(Prompt: "*Any other symptoms*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Poor sucking or not able to …… 1 Fast breathing ……..…… 2 Severe chest indrawing.....3 Hypothermia…….....…. .4 Fever.....5 Difficult to wake/lethargic/unconscious....6 Pustules on skin 1 large or more than 10 small ones…… ...…..7 Severe umbilical infection redness of skin the cord/ foul smelling discharge OR bleeding from the cord…….....8 Other (specify) _____..... 9 Don't know…….....98	
1002	**Interviewer: Check questions QB, QD and QE and circle appropriate code** Baby still alive……..……...1 Baby born alive, then died at 2+ months……..……..….2 Baby born alive, then died at 0-1 months……..……..…3 Baby still born…….……4		→ 1021 → 1101
Interviewer: "I would like to start by asking you some detailed questions about the postnatal care that your most recently delivered child received."			
1003	During the first four weeks or one month after your most recent delivery, did a health professional or FCHV check on your newborn's health?	Yes……..…….…… ….1 No……..…….....…… …..2	→ 1009
1004	How many times new born's health was checked within four weeks or one month after the delivery?	Times ☐☐	

Q. #	Question	Codes	Go to Q.
1005	How many days after birth was the baby checked for the first time by a health worker or FCHV? **(Write "00" if same day of birth)**	Number of days: [ ][ ] (if 4+ days) → 1007 Don't know ……..… 98	
1006	Who checked on your newborn's health at that time? **(Ask: "*Anybody else?*" Continue until no further answers.)** **(CIRCLE ALL RESPONSES GIVEN)**	Doctor ..... 1 Nurse/ANM ..... 2 HA/AHW ..... 3 MCHW ..... 4 VHW ..... 5 FCHV ..... 6 TBA ……..…….. 7 Other (specify) _____ 8 Don't know / don't remember ..……98	
1007	**<u>Note to interviewer</u>: compare responses to 1003 - 1006 with the responses to 712-714 and confirm that any discrepancies between care provided to mother and newborn are accurate.**		
	<u>Interviewer</u>: "*Now I am going to ask you some detailed questions about the postnatal care that your newborn received between four days up to four weeks after the birth.*"		
	Whether or not the baby was checked by health professional or FCHV **between four days and four weeks** after birth?	Number of times: [ ][ ] → (if 0 times) ……..... 97 1009 Don't Know ……..…… 98	
1008	Who checked on your new born's health between **four days and four weeks** after birth? **(Ask: "*Anybody else?*" Continue until no further answers.)** **(CIRCLE ALL RESPONSES GIVEN)**	Doctor .....1 Nurse/ANM .....2 HA/AHW .....3 MCHW .....4 VHW .....5 FCHV .....6 TBA …….. 7 Other (specify) _____ 8 Don't know / don't remember ……98	

1009 Prior to or following your delivery, did a health worker or FCHV counsel you at any time on the following newborn issues? **(READ ALL)**

		Yes	No	DK	
1	Keeping the baby warm by immediately drying and wrapping and keeping in contact with mothers body?	1	2	8	
2	Breastfeeding within the first hour of delivery and continuing exclusively?	1	2	8	
3	**NEWBORN DANGER SIGNS (E.G. FAST BREATHING,**	1	2	8	
4	Cord care?	1	2	8	
5	Need to avoid chilling, especially of very small baby?	1	2	8	
6	Immunization?	1	2	8	
7	Hand washing with soap and water before touching/handling the baby?	1	2	8	

1010	Did your child receive a Vitamin A capsule in the Kartik distribution?	Yes…….……..……. 1 No……..……..……..... 2 Don't know ……..…..…..……. 8	

Q. #	Question	Codes	Go to Q.
1011	Did (NAME) receive a BCG vaccination against tuberculosis, that is, an injection in the right arm that usually causes a scar?	Yes……. 1 No……. 2 Don't know ……. 8	
1012	Did your newborn experience any of the following health problems at anytime in the first four weeks following delivery? **(Read out all responses one after another and Record all responses accordingly.)**		

			Yes	No	
	1	Fever?	1	2	
	2	Feeding problem?	1	2	
	3	Trouble breathing?	1	2	
	4	Fast breathing?	1	2	
	5	Chest-in-drawing?	1	2	
	6	Drowsy?	1	2	
	7	Abdominal tenderness?	1	2	
	8	Convulsions?	1	2	
	9	Persistent vomiting?	1	2	
	10	Unconscious?	1	2	
	11	Red/discharging eye?	1	2	
	12	Skin pustules?	1	2	
	13	Skin around cord red?	1	2	
	14	Felt cold?	1	2	
	15	None of the above		7	→ 1021

1013	How many days old was your child at that time?	Write in days ……..…. ☐☐ Don't know ……..…. 98	
1014	What did you do or whom did you consult for the problems that you stated above? **(Prompt: *"Anything else?"*** **(CIRCLE ALL RESPONSES GIVEN)**	**Traditional treatment at home ……..…. 1** Given medicine at home ……..…. 2 Hospital …… 3 PHCC /HP/ SHP …….. 4 **Pvt. Hospital/Clinic/n. Home ……. 5** **Bought medicine from pharmacy ……. 6** Consulted FCHV …….. 7 Consulted MCHW …… 8 Consulted a TBA …….. 9 Consulted other HW ……... 10 Consulted dhami / jhankri …….. 11 Consulted relative/neighbor/friend ……. 12 **Other (specify)_____ 13** Nothing ……... 97	→ 1020
Now I'd like to ask you some questions about the first time that your child was sick.			
1015	How long was your child sick before you sought medical help for the **first**	Write in days ……. ☐☐ Don't know ……. 98	

Q. #	Question	Codes	Go to Q.
1016	Whom did you go to **first** for this health problem?	Doctor …… 1 Nurse …… 2 ANM …….. 3 HA …… 4 AHW/CMA…… 5 MCHW …… 6 VHW …… 7 FCHV …… 8 TBA …… 9 Family member …… 10 Friend/Neighbors …… 11 Private practitioner …… 12 Medical shop …… 13 Traditional healer …… 14 Other (specify) _____ 15	
1017	**Check Q1014, and circle below** Sought care from a health facility (Q1014= 3, 4 or 5)……1 Not sought care from a health facility……..2		→ **1020**
1018	If care was sought from a health facility, was the child admitted?	Yes…….....……..……1 No……..…….....……..2	→ **1021**
1019	I understand that your child was not admitted but that you visited a health facility. Please specify the number of	Number of visits: ☐☐	→ **1021**
1020	Why didn't you seek care for any of your child's health problems from a health facility? **(CIRCLE ALL RESPONSES GIVEN)**	Not felt necessary …… 1 No reliable service …… 2 Financial problem …… 3 Health service not easily accessible 4 Don't know where to go …… 5 Don't have friend to go …… 6 Didn't have any health problems … 7 Others (Specify) _____ ..8 Don't know …….. 98	
1021	Was your child weighed at any time after birth?	Yes……..……1 No……..……..2 Don't know …….. ..8	→ 1026 → 1026
1022	When was your baby [NAME] weighed the **first time** after birth?	Within 24 hours …… 1 1-2 days……..……2 3 days……..3 After 3 days ……4 Don't know……..8	
1023	Where was the baby weighed?	Hospital..... 1 PHCC..... 2 Health post..... 3 Sub-health post..... 4 Pvt. Hospital/Clinic/N. Home..... 5 Your home ……..…6 Other/FCHV home …… 7 Other, specify: _____ 8	

Q. #	Question	Codes	Go to Q.
1024	Who weighed the baby?	Doctor…….....……..1 Staff Nurse . . . …….……..…….....2 ANM…….……..... 3 MCHW……..……...…….…4 HA ……..……..…..5 AHW / CMA ……....….. ……..……6 VHW.....……..……..……7 FCHV…….……8 Other (specify):_____9	
1025	How much did [NAME] weigh? RECORD WEIGHT IN KILOGRAMS FROM HEALTH CARD, IF AVAILABLE.	KG FROM CARD □.□□ KG FROM RECALL □.□□ DON'T KNOW…….99.988	
1026	When your child was born, was s/he very large, larger than average, average, smaller than average, or very small?	Very large …….. 1 Larger than average …….. 2 Average …….. 3 Smaller than average …….. 4 Very small …….. 5 Don't know ……..…..… 8	→ 1033 → 1033 → 1033 → 1033
1027	Because your baby was small, did you receive extra visits from a health worker or FCHV?	Yes…… 1 No…… 2 Don't know…….……8	
1028	What advice did health worker or FCHV give when your baby [NAME] was smaller than other babies? **Probe:** ***What else advice?*** (Multiple Response)	Frequent breast feeding.....1 Keep baby warm..... 2 Newborn danger signs..... 3 Repeatedly weigh baby…..... 4 Repeated visit to health facility or health worker ..... 5 Other (specify)_____ _____…...6 No advice.....……97 Don't know.....….....98	
1029	Because your baby was small, was [NAME] referred to a health facility?	Yes…… 1 **No…… 2**	→1031
1030	Did you take the baby to health facility?	Yes……..……1 No...……..……..2	
1031	Because your baby was small, did you give extra care to your baby?	Yes…… 1 **No…… 2**	→1033
1032	What extra care did you give to your baby? **(CIRCLE ALL RESPONSES GIVEN)**	More frequent breastfeeding…… 1 Skin-to-skin care…….. 2 Fed by cup or spoon……3 Other, Specify: _____4	
1033	Following your last delivery, did the health worker or FCHV talk about "keeping the baby in skin-to- skin contact with the mother?"	**Yes……..1** No……...2	

Q. #	Question	Codes	Go to Q.
1034	Was the baby placed in SKIN-to-SKIN contact in the first 24 hours after delivery?	Not at all …… . .1 A little (up to 2 hours total)…… 2 Moderate amount (between 2 to 5 hours total)…… … 3 A lot (more than 5 but less than 12 hours)…….. 4 Most of the time (day & night, more than 12 hours)……..5	

Section 11: Birth Preparedness

Interviewer: "Now, I would like to ask you some questions about how you prepared for the arrival of your child."

Q. #	Question	Codes	Go to Q.
1101	During your last pregnancy did you make any preparations for your delivery?	Yes ……..……1 No …….. 2	→ 1103
1102	What preparations did you make for the delivery? **(Prompt: "*Did you do anything else to prepare*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Financial ……... 1 Transport …… 2 Food ……... 3 Identification of skilled birth attendant... 4 Identification of facility ……..… 5 Blood ……. 6 Clean delivery kit..……..... 7 Clothes for new born.....8 Other (specify) _____ 9	
1103	During your last pregnancy did you arrange for a place to deliver your child?	Yes ……..…..…… 1 No …….. 2	→ 1105
1104	Where did you arrange to deliver your child?	Hospital ..... Primary health care center..... Health post ..... Sub-health post..... Private Hospital/clinic /N. home ..... NGO clinic ……. 6 At home _____ Other (specify) _____	
1105	Did you make any preparation for care of the mother and newborn during the first month following the delivery?	Yes ……..…..…… 1 No …….. 2	→ 1107
1106	What preparations did you make for care of the mother and newborn during the first month following the delivery? **(Prompt: "*Did you do anything else to prepare*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Financial ……... 1 Identification of health worker …..….. 2 Identification of facility ……..… 3 Blood ……. 4 Other (specify) _____ 5	
1107	Did you make any preparation for emergencies during pregnancy, delivery, or after delivery?	Yes ……..…..…… 1 No …….. 2	→ End

Q. #	Question	Codes	Go to Q.
1108	What kind of preparations did you make? **(Prompt: "*Did you do anything else to prepare*?")** **(CIRCLE ALL RESPONSES GIVEN)**	Financial …….... 1 Transport …… 2 Identification of health worker …..…..... 3 Identification of facility ….……..…..… 4 Blood ……..…….. 5 Other (specify) _____ 6	

Thank you for your time and cooperation in answering my questions. The information that you have provided will help us to improve the health of women and children throughout Nepal.