



Study of Different Factors Associated with Completion of Continuum of Care for Maternal Health Services in Kaski District, Nepal

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Authors' contributions

This work was carried out in collaboration among all authors. Author UK designed the study, collected the data, performed the basic statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors HPK and RKY performed the statistical analysis and managed the analyses of the study. Authors RKY and UK managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: The continuum of care for maternal, newborn, and child health usually refers to the continuity of care throughout the pregnancy, childbirth and post-delivery period. It is an essential strategy to prevent maternal and neonatal deaths. The objective of this study was to identify the status and factors associated with completion of the continuum of care for maternal health services.

Materials and Methods: A community-based cross-sectional study was conducted among 372 women who had a child within one year. The data were collected through a face-to-face interview using pretested and structured Questionnaire. Univariate, bivariate, and multiple logistic analysis were carried out being based on the objectives of the study.

Results: The study found that about 75% of women completed the continuum of care for maternal

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health services. In multiple logistic regression analysis, women who had four or more antenatal visits (AOR: 18.00, 95% CI: 7.38-43.93) and advised for Postnatal care checkup (AOR=3.07, 95%CI: 1.49-6.32) were found statistically significant with the completion of continuum of care for maternal health services after adjustment of all variables.

Conclusion: It is concluded that the majority of the participants had completion of the continuum of care for maternal health services. Increment in the antenatal care visits and seeking of advice regarding postnatal checkup during pregnancy have positive influence in increasing the continuum of care completion rate. This has also been considered helpful in the achievement of the targets of all three components of maternal health services.

Keywords: Continuum of care; utilization; maternal health services; Nepal.

1. INTRODUCTION

The term “continuum of care” for maternal, newborn, and child health as defined by Kerber et al. usually refers to the continuity of care throughout the life cycle of adolescence, pregnancy, childbirth, post-delivery period, and childhood. An effective continuum of care is related to essential maternal, newborn, and child health packages [1,2].

In South Asia, 25% of women received a continuum of care in maternal health services. Whereas in Sub-Saharan Africa 14% of women were received all services [3]. Overall 47.5% of women had a completed continuum of care in Nepal [4]. The completion of CoC in maternal health services world wide ranges from 6.8- 60%. Higher completion of the continuum of care was reported in Cambodia [5]. Several studies show that completion of CoC was studied in Pakistan (27%), Ethiopia (9.1%), Ghana (8%), West Gojjam Zone Ethiopia (9.7%), Gamo Zone Southern Ethiopia (10%), Tanzania (10%), Bangladesh (30.7%), Lao PDR (6.8%), Egyptian (50.4%) and Enemay district northwest Ethiopia(45%) respectively [6–15].

This study has narrowed down to focus on three maternal health care services like Antenatal Care (ANC), Skilled Birth Attendant (SBA), and Postnatal Care (PNC) during the period from pregnancy to childbirth and postpartum period [16]. These maternal health services are one of the strategies to reduce both maternal and neonatal mortality. In developing countries, completion of the continuum of care in maternal health services is low [17]. 94% of all maternal deaths occur in low and lower-middle-income countries [18]. In Nepal, the maternal mortality ratio (MMR) is 239 death per 100,000 live births, which is still high relative to developed countries NDHS 2016 [19]. The Government of Nepal is committed to improving the maternal health

status and has targeted to reduce MMR to less than 70 per 100,000 live births by 2030 as mentioned in Goal No. 3 of the Sustainable Development Goals (SDG, 2015). It is very important to increase the continuum of care to achieve a sustainable developmental goal (SDG).

To this date, I did not find any study conducted on primary data of continuum of care on maternal health service. This study will identify the status and factors associated with the completion of the continuum of care in maternal health care services in the Kaski district which will be beneficial to shape the package of maternal health services in maternal health.

2. MATERIALS AND METHODS

A community-based cross-sectional study was conducted among women having a child less than one year in the Kaski district, Nepal between February to August 2020. A sample size of 372 was determined based on the sampling formula $n = [z^2pqN / d^2 (N-1) + z^2pq]$ with 95% Confidence Interval, 5% margin of error. The estimated live births of Kaski district is 12371, and prevalence of completion of CoC among women was 47.5% [4].

A multistage sampling method was used in this study. Among a total of 49 wards in one metropolitan and two rural municipalities of Kaski, 12 wards were chosen randomly. Out of the 12 wards, six wards from the metropolitan and six wards from the two rural municipalities were selected randomly and the required sample size was determined based on probability proportional to size (PPS) of the total expected live birth from selected wards. Required number of respondents were selected randomly. Continuum of care for maternal health was a dependent variable which was operationally defined as ANC 4 visit as per protocol, delivery

with SBA, one PNC visit within 24 hrs. Independent variables are as socio-demographic (age of mother, family type, family size, religion, ethnicity, household head, women education, husband education, women occupation, husband occupation, monthly income wealth quintile, women access to mass media), maternal and obstetric factors (number of childbirth, history of child death, birth order, mode of delivery, place of delivery, desire on pregnancy, knowledge on pregnancy danger sign, had four or more ANC visits, advice for PNC checkup), physical factors /access to health services (place of residence, mode of transportation, time to reach a health facility, distance to a health facility, enrollment in the health insurance scheme, women autonomy in health care).

The data collection tool was prepared in English and then translated into the Nepali language. Data were collected by a face-to-face interview through pretested and structured Questionnaires. To minimize the reporting bias, every participant was informed about the purpose of the study and ensured about maintaining the privacy and confidentiality of obtaining information. Validity was maintained by continuous expert opinion and through extensive literature review. Collected data were coded and entered in Epi Data and extracted into Statistical Package for Social Science (SPSS) for further analysis. Descriptive statistics were reported as percentages and frequencies. Also, the chi-square test was applied to find out the association between dependent and independent variables, and the odds ratio was obtained by binary logistic regression analysis to show the strength of association. The bi-variate logistic regression model was computed and P-value < 0.05 was considered as significant.

3. RESULTS

Table 1 shows the status of the complete continuum of care in maternal health. About three-fourth (75%) of respondents had completed the continuum of care for maternal health services.

Table 2 shows the socio-demographic information about participants. Out of 372 participants, more than one-third of participants (34.4%) were among the age group of 20-24 years, followed by 25-29 years (33.6%), 30-34 years (18%), and 35 years and above (5.9%) respectively. The mean age of participants was (25.93 years \pm 4.90) years with a minimum age

of 16 years and maximum age of 40 years. More than half of the participants (56.7%) belonged to the nuclear family. Similarly, the majority of participants (76.1%) had more than four family members and three fourth of the participants (75.4%) had a male as a household head. Likewise, more than one in four participants (27.3%) were Brahmin/ Chhetri followed by disadvantaged janajatis (24.5%). Majority of participants (86.3%) follow Hinduism. More than half of the participants (67.5%) had secondary and above education. More than two-thirds of the participant's husband (72.6%) had attended secondary and above education. Majority of the participants (85.3%) were homemaker. Nearly two fourth of participants (46.8%) belong to the richest wealth quintile followed by the fourth quintile (34.7%). Similarly, the majority of participants (94.6%) had access to mass media.

Table 3 shows the association of socio-demographic factors with the completion of the continuum of care in maternal health. The result shows that ethnicity ($\chi^2 = 8.608$, p-value = 0.003), religion ($\chi^2 = 6.370$, p-value = 0.012), women education ($\chi^2 = 11.751$, p-value = 0.003), husband occupation ($\chi^2 = 16.032$, p-value < 0.001) monthly household income ($\chi^2 = 9.112$, p-value = 0.003), wealth index ($\chi^2 = 22.123$, p-value, < 0.001) and access to mass media ($\chi^2 = 4.509$, p-value = 0.032) were significantly associated with completion of continuum of care in maternal health services.

Table 4 shows the association between maternal and obstetric factors and completion of the continuum of care for maternal health services. The result of the study showed that know the danger sign during pregnancy ($\chi^2 = 6.946$, p-value = 0.008), had four or more ANC visits ($\chi^2 = 72.724$, p-value < 0.001), mode of delivery ($\chi^2 = 6.958$, p-value = 0.008), advised for PNC checkup ($\chi^2 = 18.246$, p-value < 0.001) and family support ($\chi^2 = 4.211$, p-value = 0.040) were found statistically significant with completion of continuum of care.

Table 5 shows the association between physical factors/access to health services and completion of the continuum of care in maternal health services. Usual mode of travel ($\chi^2 = 8.841$, p-value = 0.003), distance to health facility ($\chi^2 = 4.881$, p-value = 0.027), women's autonomy ($\chi^2 = 7.806$, p-value = 0.005) and enrollment in health insurance scheme ($\chi^2 = 6.643$, p-value = 0.010) were found statistically significant with completion of continuum of care.

Table 1. Status of Completion of the continuum of care for maternal health services (n=372)

Dependent Variable (CoC)	Frequency (n=372)	Percentage (%)
4 ANC's as per protocol	293	78.8
Delivery by SBA	358	96.2
PNC visits within 24hrs	345	92.2
4 ANC's as per protocol and SBA	289	77.7
4 ANC's, SBA, and PNC within 24 hours of birth (CoC)	279	75.0

Table 2. Socio- demographic characteristics of respondents (n=372)

Variables	Frequency (n)	Percentage (%)
Age of mother (years)		
16-19	30	8.1
20-24	128	34.4
25-29	125	33.6
30-34	67	18.0
35 above	22	5.9
(Mean \pm SD, Min-Max)	(25.93 \pm 4.90, 16-40)	
Family type		
Nuclear	211	56.7
Joint	161	43.3
Family size		
<4 member of the family	89	23.9
\geq 4 member of the family	283	76.1
Household head		
Male	281	75.4
Female	91	24.5
Ethnicity		
Dalit	87	23.4
Religious minorities	13	3.5
Advantaged Janajatis	82	22.0
Disadvantaged Janajatis	91	24.5
Disadvantaged non Dalit Terai group	1	0.3
Brahmin/ Chhetri	98	27.3
Religion		
Hindu	321	86.3
Buddhism	24	6.5
Christian	13	3.8
Muslim	14	3.5
Mother's education		
No formal education	15	4.0
Basic education (1-8 Class)	106	28.5
Secondary and above	251	67.5
Mother's occupation		
Homemaker	318	85.5
Agriculture	5	1.3
Services	22	5.9
daily wage and labor	20	5.4
Own business	7	1.9
Husband's education		
No formal education	16	4.3
Basic education (1-8 Class)	86	23.1
Secondary education and above	270	72.6

Variables	Frequency (n)	Percentage (%)
Husband's occupation		
Agriculture	26	7.0
Services	63	16.9
Own business	69	18.5
Abroad work	82	22.0
Daily wage /labor	132	35.5
Household Monthly income		
NRs<30000	162	43.5
NRs ≥30000	210	56.5
(Median, Minimum-Maximum)		
(30000,10000-200000)		
Wealth quintile		
Poorest quintile	9	2.4
Second quintile	5	1.3
Middle quintile	55	14.8
Fourth quintile	129	34.7
Richest quintile	174	46.8
Mother's access to mass media		
Yes	352	94.6
No	20	5.4

Table 3. Association of socio-demographic factors with completion of the continuum of care for maternal health (n=372)

Variable	Completion of the continuum of Care (CoC)		Chi-square value	df	p-value
	Yes n (%)	No n (%)			
	279 (75.0)	93 (25.0)			
Ethnicity					
Disadvantaged ethnic group	125(68.3)	58(31.7)	8.608	1	0.003*
Advantage ethnic group	154(81.5)	35(18.5)			
Religion					
Hindu	248(77.3)	73(22.7)	6.370	1	0.012*
Non-Hindu	31(60.8)	20(39.2)			
Mother's education					
No formal education	8 (53.3)	7 (46.7)	11.751	2	0.003*
Basic education	70 (66.0)	36 (34.0)			
Secondary education and above	201 (80.1)	50 (19.9)			
Husband's occupation					
Informal occupations	164 (68.3)	76 (31.7)	16.032	1	<0.001*
Formal occupations	115 (87.10)	17 (12.9)			
Monthly income					
NRs <30000	109 (67.3)	53 (32.7)	9.112	1	0.003*
NRs ≥30000	170 (81.0)	40 (19.0)			
Wealth index					
Poorest	4 (44.4)	5 (55.6)	22.123	4	<0.001*
Second	2 (40.0)	3 (60.0)			
Middle	34 (61.8)	21 (38.2)			
Fourth	92 (71.3)	37 (21.7)			
Richest	147 (84.5)	27 (15.5)			
Access to mass media					
No	11 (55.0)	9 (45.0)	4.509	1	0.032*
Yes	268 (76.1)	84 (23.9)			

*statistically significant at the level of p-value <0.05

Table 4. Association of maternal and obstetric factors with completion of the continuum of care in maternal health services (n=372)

Variable	Completion of the CoC		Chi-square value	df	p-value
	Yes n (%)	No n (%)			
	279 (75.0)	93 (25.0)			
Know the danger sign during pregnancy					
Yes	146 (81.1)	34 (18.9)	6.946	1	0.008*
No	133 (69.30)	59 (30.7)			
Had four or more ANC visits					
No	10 (23.3)	34 (77.3)	72.724	1	<0.001*
Yes	269 (82.0)	59 (18.0)			
Mode of delivery					
Normal	188 (71.20)	76 (28.8)	6.958	1	0.008*
C- section	91 (84.3)	17 (15.7)			
Advised for PNC checkup					
Yes	130 (86.7)	20 (13.3)	18.246	1	<0.001*
No	149 (67.1)	73 (32.9)			
Family support					
Yes	255 (76.5)	78 (23.4)	4.211	1	0.040*
No	24 (61.5)	15 (38.5)			

*statistically significant at the level of p-value <0.05

Table 5. Association of physical factors/access to health services with the completion of continuum of care in maternal health (n= 372)

Variable	Completion of the CoC		Chi-square value	df	p-value
	Yes n (%)	No n (%)			
	279 (75.0)	93 (25.0)			
The usual mode of travel					
Walking / by foot	19 (54.3)	16 (45.7)	8.841	1	0.003*
By use of vehicles	260 (77.2)	77 (22.8)			
Distance to the health facility					
<3 km	34 (63.0)	20 (37.0)	4.881	1	0.027*
≥3 km	245 (77.0)	73 (23.0)			
Women's autonomy					
Yes	104 (83.9)	20 (16.1)	7.806	1	0.005*
No	175 (70.6)	73 (29.4)			
Enrollment in health insurance					
Yes	72 (85.7)	12 (14.3)	6.643	1	0.010*
No	207 (71.9)	81 (21.1)			

*statistically significant at the level of p-value < 0.05

Table 6. Factors associated with the completion of the continuum of care (CoC) in maternal health services

Variable	Completion of the CoC in Maternal Health Services					
	Unadjusted odd Ratio			Adjusted odd Ratio		
	UOR	95%CI	p-Value	AOR	95% CI	p-value
Ethnicity						
Disadvantaged ethnic group	Reference					
Advantaged ethnic group	2.04	1.26 - 3.30	0.004*	1.22	0.67-2.24	0.504
Religion						
Non-Hindu	Reference					
Hindu	2.19	1.17- 4.07	0.013*	1.72	0.75-3.91	0.197

Variable	Completion of the CoC in Maternal Health Services					
	Unadjusted odd Ratio			Adjusted odd Ratio		
	UOR	95%CI	p-Value	AOR	95% CI	p-value
Women education						
No formal education	Reference					
Basic education	1.70	0.57-5.06	0.340	1.56	0.40-6.06	1.562
Secondary and above	3.51	1.21-10.15	0.020*	1.64	0.42-6.29	0.470
Husband occupation						
Informal occupations	Reference					
Formal occupations	3.13	1.76-5.58	<0.001*	1.45	0.71-2.98	0.300
Access to mass media						
No	Reference					
Yes	2.61	1.04-6.51	0.040*	1.02	0.29-3.52	0.975
Monthly household income						
NRs <30000	Reference					
NRs ≥30000	2.06	1.28-3.32	0.003*	1.75	0.94-3.27	0.077
Wealth quintile						
Poorest	Reference					
Second	0.83	0.09-7.65	0.873	0.41	0.02-6.72	0.536
Middle	2.02	0.48-8.39	0.332	1.62	0.25-10.26	0.608
Fourth	3.10	0.09-12.22	0.104	1.98	0.32-12.22	0.461
Richest	6.80	1.71-26.98	0.006*	2.51	0.38-16.53	0.338
Know the danger sign during pregnancy						
No	Reference					
Yes	1.90	1.17-3.08	0.009*	0.94	0.49-1.78	0.849
Had four or more ANC visits						
No	Reference					
Yes	15.50	7.25-33.12	<0.001*	18.00	7.38-43.93	<0.001*
Advised for PNC check-up						
No	Reference					
Yes	3.18	1.84-5.50	<0.001*	3.07	1.49-6.32	0.002
Family support						
No	Reference					
Yes	2.04	1.02-4.08	0.043*	1.41	0.56-3.53	0.456
Mode of delivery						
Normal	Reference					
C- section	2.16	1.20-3.87	0.009*	1.84	0.90-3.74	0.090
The usual mode of travel						
Walking / by foot	Reference					
By use of vehicles	2.84	1.39-5.79	0.004*	1.91	0.47-7.75	0.365
Distance from HF						
<3km	Reference					
≥3km	1.97	1.07-3.63	0.029*	1.45	0.43-4.85	0.545
Women's autonomy						
No	Reference					
Yes	2.00	1.24-3.22	0.004*	1.20	0.58-2.49	0.618
Enrollment in health insurance						
No	Reference					
Yes	2.34	1.21-4.55	0.012*	1.40	0.59-3.28	0.439

*statistically significant at the level of p-value < 0.05

4. DISCUSSION

The study found that about three-fourth (75%) of respondents had completed the continuum of care (CoC) for maternal health services. However, analysis of NDHS (2016) data regarding CoC in maternal health services among women showed only 47.5% [4]. The difference in these two studies might be due to differences in the study setting and study participants. This study included women having less than one year of the child preceding the survey as study participants whereas NDHS, 2016 had included women having less than five years of children to gather maternal-child health information. The status of completed continuum of care was higher in this study compared to other studies conducted in different countries like Cambodia, Pakistan, Ethiopia, Egypt, Bangladesh, Ghana, South Africa, Tanzania, Laos, Africa Respectively [5–15,17]. The possible reason could be due to variation in study design and variation in the source of data and may also be due to regional differences in terms of health services accessibility and socio-economic aspects.

In bivariate analysis, the factors affecting completion of continuum of care shows statistical relationship with religion, ethnicity, education, occupation, wealth index, access to mass media, health insurance, women autonomy, mode of travel, distance from the health facility, family support, advised for PNC checkup, four or more ANC visits, mode of delivery, and family support.

In multiple logistic regression analysis, women who had attended four or more ANC visits and had received advice for PNC checkup were found significant factors for completion of the continuum of care in maternal health services [20].

Women who had four or more ANC visits were about eighteen (AOR: 18.00, 95% CI: 7.38-43.93) times more likely to completion of the continuum of care for maternal health services compared to women with less than four ANC visits which is similar with findings of study done in Nepal and Cambodia where women who had four or more ANC visits were more likely to CoC for maternal health services compared to women with less than 4ANC visits [5,21]. It may be because when women receive four or more ANC visits, they will be more informed about care during pregnancy and also the importance of

safe delivery from skilled birth attendants. Similarly, another finding reveals PNC checkup was about three (AOR=3.07, 95% CI: 1.49-6.32) times more likely to completion of CoC for maternal health services. The possible reason might be women attending ANC visits can get adequate advice for PNC checkup from health personnel which will help to develop willingness for PNC checkup. The limitation of the study was recall bias; women might forget about their ANC visits which can be minimized by seeking their ANC cards if possible.

5. CONCLUSION

The study shows a large proportion (75%) of women in Kaski district had completed the continuum of care for maternal health services. Women who had attended four or more ANC visits and received advice for PNC visits was found statistically significant with completion of continuum of care for maternal health services in multiple logistic regression analysis. It is recommended that the concerned health facility should provide adequate information and counselling on ANC visits, institutional delivery, and PNC visits to all the women in every visit.

ETHICAL APPROVAL AND CONSENT

This study was approved by the Public Health Program, School of Health and Allied Sciences, Pokhara University, and Ethical approval was obtained from the Nepal health research council (NHRC). Written approval for conducting the study was taken from local authorities like the Pokhara metropolitan, rural municipality. Informed written consent was obtained from each participant and confidentiality of the received information was maintained.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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