

Indirect Cost of Institutional Delivery under Safe Motherhood Program in Pokhara MetropolitanPurnima Timilsina,¹ Nand Ram Gahatraj¹¹School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Nepal**ABSTRACT**

Introduction: Cost analysis can be an important element and it help to sort out important economic issues. The economic constraint is one of the factors that hinder service utilization among rural women attending urban health although there is Maternal Incentive Scheme, households often have to pay a too large share of the indirect costs of maternity services, or do not seek care because of it.

Methods: Cross sectional study design which is community based with quantitative method were used for this study to assess the indirect cost of institutional delivery under safe motherhood program in Pokhara Metropolitan from Jan 2019 to June 2019. Study population were the mothers who delivered at health facilities having safe motherhood program within the 6 months preceding the survey. Probability Proportional to size sampling method was adopted with face to face interview among the care takers of mothers. Reliability and validity was maintained by applying different strategies carefully developing tools, pretesting, double entry and validation. Data entry, management and analysis was done with Epi Data and SPSS (20 version) Software.

Results: In this study majority more than half (54.4%) of the mothers were between 25-34 years. Majority of the participants were male and nearly half of the respondents were belonged to Janajatis (51.5%). More than one fourth (29.6%) of the mothers were from the highest quintile. Median expenditure for indirect cost was NRs 4900 which ranges from NRs 500 to NRs 47000.

Conclusions: From the study we can conclude that existing Aama Surakshya Program can save only a few expenditure of mothers there should need to review this demand side financing scheme and also need to address the main barriers for service utilization i.e. indirect cost of institutional delivery.

Keywords: *Indirect cost, Institutional Delivery, Safe motherhood Program, Nepal*

INTRODUCTION

Maternal health is defined as health of women during pregnancy, childbirth and the postpartum period.¹ Maternal mortality is an issue of concern on the international health agenda, remains one of the most important public health problems in developing countries.² Maternal mortality and infant mortality are two major indicators for adequacy and utilization of health services and overall development of country. In Nepal MMR is 239 per 100,000 live births and infant mortality is 21 per 1000 live births.³ The institutional delivery play the important role to reduce the MMR and IMR. In Nepal according to NDHS 2016 rate of institutional delivery is 57% and delivery conducted by SBA is 58%. The major obstacle for institutional delivery is economic condition of the family and cost related to institutional delivery.⁴ The persistence of inequality in health within countries as well as within different socio-economic and demographic groups has led to the failure of reaching the target of Millennium Development Goal (MDG) to reduce the maternal mortality rate to 134 per 100,000 live births and thus was replaced by Sustainable Development Goal 3. As a part of the Sustainable Development Goals, between 2016 and 2030, the target is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births.⁵

In 2015 Nigeria and India are estimated to account for over one third of all maternal deaths worldwide with an approximate 58000 maternal deaths (19%) and 45000 maternal deaths (15%), respectively (World Health Organization and UNICEF, 2012). Out of all maternal deaths, 99 percent occur in developing countries.¹

Cost is defined as amount of resources used for some purposes and it is measured in monetary terms. Cost analysis can be an important element in setting levels of user fees and can help to sort out important economic issues.⁴ Basically, health services are financed in two main ways: through out of pocket user charges and from public expenditure. Only 6% of the national budget is allocated to health services in Nepal. People have to spend a large amount of money on health care from their pocket.²

Maternity care costs includes both direct and indirect cost. Direct costs include formal payments such as costs associated with, admission and registration, medical interventions, medications,

Correspondence: Purnima Timilsina, School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Nepal, Email: poornima.timilsina@gmail.com

any investigations and laboratory cost. Indirect costs include loss of cost due to hospital stay, manpower days lost and opportunity cost.^{2,6}

Even health services are provided at subsidized cost there are various factors that limit access to and utilization of services. Although there is Maternal Incentive Scheme, households often have to pay a too large share of the costs of maternity services, or do not seek care because of it.^{7,8} Hidden expenditure for pregnant women to attend urban hospitals during delivery can reflect the economic burden for pregnant women.⁹

A study conducted in India it showed that the median OOP was INR 700 (US\$ 11.48) which varied between INR 680 (US\$11.15) for normal delivery and INR 970 (US\$ 15.9) for complicated cases.¹⁰ Another study also revealed the OOP for delivery was US\$78 at public facilities.¹¹ From the recent national level statistics in India, it revealed that rural population spent on an average INR1587 (US\$ 26.0) and urban population INR 2117 (US\$ 34.7) to deliver at public facilities.¹⁰ A study from Bangladesh reported the expenditure for services at government health facilities to be US\$ 31.9 for a normal delivery and US\$ 117.5 for caesarean delivery.¹² A cross sectional study conducted in Nepal among to tertiary care hospitals it showed that the major contributor to hidden cost was food and drinking. Study found that for normal delivery and C-section, expenditures for food and drinking were 14,840.86 NRs (145.55 USD) and 20,340.38 NRs (199.49 USD).⁹ Although the Government has launched free maternity service in Nepal the free maternity service has high out-of-pocket expenditures and did not represent a system completely free of costs.¹³ Only the few study conducted in Nepal regarding the indirect cost of institutional delivery. This study helps to assess the indirect cost of institutional delivery under safe motherhood program in Pokhara Metropolitan.

METHODS

1. Study Design: Cross-sectional descriptive study design which was community based.
2. Study Site: 16 wards of the Pokhara Metropolitan.
3. Study Population: Study population were the mothers who delivered at health facilities having safe motherhood program within the 6 months preceding the survey.
4. Sample Size Determination:
5. The sample size was determined by using the following formula,

$$\text{Sample size } (n) = \frac{Z^2 pq}{d^2}$$

Where, Z= standard normal variate, with value 1.96 at 95% confidence interval

p= proportion of 87.5%= 0.875 (Total hospital based delivery

expenditure)⁹

q= 1-p; d= allowable error, 5%

Now,

$$n = \frac{Z^2 pq}{d^2}$$

$$n = \frac{1.96^2 \times 0.875 \times 0.125}{0.05^2}$$

$$0.05^2$$

$$n = 168.07 \approx 169$$

Total sample size was 169

5. Sampling Procedure: Probability proportional to size (PPS) sampling methods was adopted for the selection of sample.

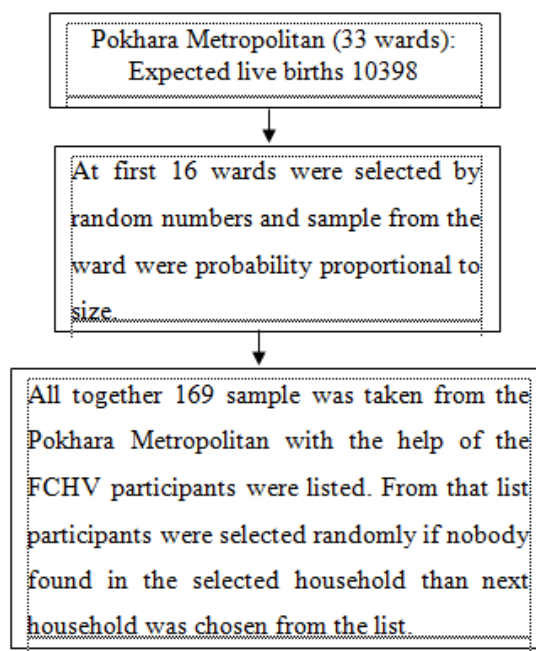


Figure 1: Sampling Procedures

5.1 Sample Size Distribution

Selected ward	Expected live births	Sample size
PMC 30	275	7
PMC-8	673	16
PMC-5	389	9
PMC-17	694	17
PMC-16	542	13
PMC-15	444	11
PMC-14	340	10
PMC-25	314	8
PMC-1	403	9
PMC-4	235	6
PMC-10	475	12
PMC-12	427	10
PMC-11	411	10
PMC-6	383	9
PMC-9	426	10
PMC-13	431	12
Total	6862	169

6. Selection Criteria:

6.1 Inclusion Criteria

Care takers of mother (having less than 6 months child) who dealt with financial expenditure for the delivery service at health facilities and willing to participant in this study.

6.2 Exclusion Criteria

Those care takers who were unable to answers the financial expenditure.

7. Reliability and Validity of study tools:

To ensure validity of the study, content validity was done by consulting with supervisor and by extensive literature review. Study tools was developed as per objectives of study. The reliability of tools was established by pretesting the tools among 10% of the sample size i.e. 34 in Tanahun District. Tools were developed in English language and translated into Nepali language.

8. Operational Definitions of Variables:

Institutional Delivery: Institutional delivery on this study is defined as childbirth at technology- equipped medical facilities under the supervision of medical staff.

Cost of institutional Delivery: Total expenditure made by women's at the time of delivery at health facilities. It also includes the out of pocket payment made by women's which includes both direct and indirect cost.

Direct Cost: Those direct cost beyond the safe motherhood program which includes only treatment related cost i.e. cost of medical supplies, cost of laboratory test, cost of video x-ray, cost related to blood transfusion.

Indirect Cost: Total cost which includes other than treatment related cost i.e. cost of transportation, cost of food and drinks, cost for child care and cost for clothes.

Care Taker: The person who directly deals with financial arrangement or management of delivered women at health facilities.

9. Data Collection:

Data were collected from the care takers of mother's who directly dealt with the financial expenditure so that all the necessary information related to cost can be gathered by using relevant schedule. Face to face interview was done among the care takers of mothers.

10. Ethical Considerations:

Ethical approval was obtained from Institutional Review Committee (IRC) of Pokhara University. Prior to data collection, written/verbal consent was taken from the participants explaining the research objectives, procedures, confidentiality and those contents attached to the questionnaire. Participant

confidentiality and privacy were ensure, and data were used only for the purpose of the study.

11. Data Entry and Analysis:

Field editing within the day of data collection was done. Data was reviewed and necessary solving of error was done immediately after the data collection. Data entry sheet was developed in EPIDATA version 3.1. Then data were entered in data sheet developed in EPIDATA and then exporting entered information to SPSS 20 software for analysis of data.

Descriptive analysis was done to the sociodemographic characteristics, facilities related characteristics, maternity related characteristics and cost related characteristics. For the cost median cost was calculated then categorized into two groups less than median and more than median. International Wealth Index was measured by 12 items. IWI score was calculated by computing the all twelve items. IWI score runs from 0 to 100, with 0 representing households having none of the assets and lowest quality housing and 100 representing households having all assets and highest quality housing.

RESULTS

Table 1: Socio-demographic characteristic of participants

Variables	Frequency	Percentage
Age of Mothers (in years)		
15-24	69	40.8
25-34	92	54.4
35+	8	4.7
Mean 25.83 $\pm$ 4.9, Min 16, Max 46		
Age of Participants(in years)		
15-24	23	13.6
25-34	100	59.2
35+	46	27.2
Mean 32.91 $\pm$ 9.22, Min 17, Max 67		
Sex of Participants		
Female	54	32
Male	115	68
Ethnicity		
Janajati	87	51.5
Brahmin/Chhetri	40	23.7
Dalit	39	23.1
Muslim	3	1.8
Education of Mothers		
Illiterate	7	4.2
Secondary level	63	37.5
Non formal study	4	2.4
Higher secondary level	36	21.4
Primary level	26	15.5
Bachelor	18	10.7
Master and above	14	8.3
Education of Husbands		

Illiterate	5	3
Non formal study	3	1.8
Primary level	23	13.7
Secondary level	72	42.9
Higher secondary level	36	21.4
Bachelor	17	10.1
Master and above	12	7.1
Occupation of Mothers (n=169)		
Housemaker	132	78.1
Agriculture	1	0.6
Teacher	3	1.8
Service	10	5.9
Business	14	8.3
Daily wage/labor	2	1.2
Others(Marketing, Accountant, Tailor)	7	4.1
Decision Taken on Medical Expenses by*		
Husband	120	74.1
Mother in law	17	10.5
Sisters	8	4.9
Sisters in law	6	3.7
From mothers side	10	6.2
Father in law	4	2.5
Mother, neighbor	3	1.9
Brothers	3	1.9
Brothers in law	1	0.6
Occupation of Husbands (n=169)		
Daily wage/labor	48	28.9
Foreign country	45	27.1
Driver	27	16.3
Business	22	13.3
Service	11	6.6
Painting	5	3
Agriculture	3	1.8
Teacher	3	1.8
Others(Private bank, Doctor)	2	1.2
No Occupation	3	1.8

Table 1 shows the socio-economic information. The mean age of the mothers was 25.83 years. Majority (54.4%) of the mothers were between 25-34 years. The majority nearly three fifth (59.2%) of the participant's age were between 25-34 years. Majority of the participants were male (68%). Nearly half of the respondents were belonged to Janajatis (51.5%) which was followed by Brahmin/Chhetri (23.7%). Nearly two fifth (37.5%) of the mothers were from the secondary level education and nearly half (42.9%) of their husbands were also from the secondary level education. Nearly four fifth (78.1%) of the mothers were housemaker and only few (5.9%) of the mothers had a services as their occupation. In majority (74.1%), husbands took decision on medical expenses. The (28.9%) of the husbands worked as daily wage/labor followed by working in foreign country (27.1%).

Table 2: Socio-economic status by IWI

IWI	Frequency	Percentage
Lowest	30	17.8
Second Quintile	20	11.8
Middle Quintile	36	21.3
Fourth Quintile	33	19.5
Highest Quintile	50	29.6

Table 2 shows that more than one fourth (29.6%) of the mothers were from the highest quintile, followed by the middle quintile (21.3%), fourth quintile (19.5%), lowest quintile (17.8%) and second quintile (11.8%).

Table 3: Maternity related information

Variables	Frequency	Percentage
Gravida		
<2	159	94.1
≥2	10	5.9
Parity		
1-2	162	95.9
3-4	7	4.1
Sex of Baby		
Male	95	56.2
Female	74	43.8
Mode of Delivery		
Normal	123	72.8
C-Section	46	27.2
Received safe motherhood incentives		
Yes	169(100)	100
No	0	0
Satisfied from safe motherhood incentives		
Yes	134	79.3
No	35	20.7

Table 3 shows the maternity related information. Majority (94.1%) of the mothers had less than 2 gravida and majority (95.9%) of the mothers had 1 to 2 parity. Among the newly born baby most of them were male (56.2%) followed by female (43.8%). Nearly three fourth (72.8%) of the women had a normal delivery followed by C-section (27.2%). Almost all (100%) of the mothers received safe motherhood incentives and most of the mothers (79.3%) were satisfied from the safe motherhood incentives.

Table 4: Health facilities related information

Explanatory Variables	Frequency	Percentage
From which facilities did you delivered		
Western Regional Hospital	95	56.2
Gandaki Medical College	43	25.4
Manipal Teaching Hospital	16	9.5
Matri Shishu Miteri Hospital	14	8.3
Sisuwa Aspathal	1	0.6

Transportation used to reached HF		
By taxi	141	83.4
By bus	10	5.9
On foot	6	3.6
By bike/Scooter	5	3
Own car	3	1.8
By Ambulance	2	1.2
Jeep/Van	2	1.2
Transportation used to return back from HF		
By taxi	155	91.7
Own car	5	3
By Ambulance	4	2.4
By bus	4	2.4
On foot	1	0.6
Type of Road Used to Visit Health Facility*		
Black Top Road	166	99.4
Gravel	2	1.2
Seasonal	2	1.2
Distance of HF from your home (minutes)		
<30	164	97
30-60	5	3
Mean 43.60, Min 5, Max 330, SD 42.71		

Table 4 shows that majority (83.4%) of the mothers used taxi as a means of transportation to reached health facilities and when return back from the health facilities the percentage of taxi used was increased to (91.7%). Almost all (99.4 %) of the mothers used black top road to visit HF. Nearly all (97%) of mothers required less than 30 minutes to reach HF from their home.

Table 5: Indirect cost expenditure for delivery care (NRs)

Variables	Frequency	Percentage
Transportation used to reach HF (n=154)		
<2000	151	98.1
≥2000	3	1.9
Median 500,Min 25, Max 7000, IQR=1700		
Transportation used to return back HF(n=163)		
<2000	156	95.7
≥2000	7	4.3
Median 900,Min 50, Max 7000, IQR=1650		
Food and Drinks (n=151)		
<3000	94	62.3
≥3000	57	37.7
Median 3000,Min 180, Max 20460, IQR=3500		
Newborn care (n=152)		
<2000	80	52.6
≥2000	72	47.4
Median 2000,Min 350, Max 8000, IQR=1038		

Table 5 shows that among those who used vehicles nearly all (98.1%) of the mothers in urban area spent NRs less than 2000 and those who spent greater than NRs 2000 were only few (1.9%) spent above NRs 2000. There was wide variation in the amount paid in transportation and it ranged from the NRs 25 to NRs 7000 with median expenditure of NRs 500 while to reached HF and the ranged changed to NRs 50 to 7000 with median 900 when returned back from the HF. There was also wide variation in the amount paid in food and drinks during stay at HF for delivery care ranged from NRs 180 to NRs 20460 with median expenditure 3000. For the newborn care expenditure was varied from NRs 350 to NRs 8000 with median NRs 2000.

Table 6: Indirect and direct cost expenditure for delivery care (NRs)

Characteristics	Expenditure (NRs)		
	Median	Min	Max
Total Direct Cost	2900	350	32050
Total Indirect Cost	4900	500	47000

Table 6 shows that total direct expenditure for delivery care ranged from NRs 350 to NRs 32050 with median expenditure NRs 2900 and indirect cost ranged from 500 to 47000 with median expenditure 4900.

Table 7: Total indirect expenditure for delivery care with explanatory variables

Explanatory Variables	Median expenditure in NRs (IQR)
Age of Mothers	
<25	5050(4150)
≥25	4830(4100)
Education of Mothers	
Illiterate	6000(2400)
Literate	4900(4400)
Mode of Delivery	
Normal	4600(3500)
Complicated	5650(6025)
Parity	
<2	4925(4303)
≥2	4400(2950)
Distance to Reached HF	
<30	4815(3688)
30-60	13150(23500)

Table 7 shows that the indirect cost expenditure for delivery care with explanatory variables. The indirect cost was higher in the mothers less than 25 years age in comparison with higher age mothers more than 25 years age. Indirect cost was higher in illiterate mothers than literate. Those mothers who had

complicated delivery incurred higher indirect cost than normal delivery. The indirect cost for less than two parity was higher than more than 2. Indirect expenditure was higher among the mothers who had longer distance to reached HF than the mothers with less than 30 minutes.

DISCUSSION

The study reveals that majority (54.4%) of the mothers age were between 25-34 years age and ranges from 16 to 46 years (mean 25.83 ± 4.9) which is similar to the study conducted in India where the age of the women ranged from 16 to 46 years (mean $\pm$ SD: 25.2 ± 5.3 years) 14. In the similar study done in India in 2016 shows that the mean age of the women's was 25 years and majority (98.1%) of the women were housewives. In our study (78.1%) of the mothers were housemaker. In the study majority of the mothers husbands work as a daily wages/labor which is similar from the study conducted in India majority of the mother's husbands were daily wage laborers.

Nearly four fifth (72.8%) of the women in the study had a normal delivery which is differ to the study conducted in India ¹⁰ majority (93%) of the mothers had normal delivery this might be due to differ in study setting. The study conducted in India ¹⁵ it was found that women in higher age groups have more chances of out of pocket expenditure in receiving delivery care with reference category (age ≤ 19). This might be as the age of the mothers are higher they knew about how to take care for their baby and things needed to care the baby so the indirect cost may increase in child care as age of the mothers increases.

Total expenditure for transportation varied from NRs 25 to NRs 7000 to reached HF with median expenditure NRs 500 whereas NRs 50 to NRs 7000 to return from HF with median expenditure NRs 900 the finding was different from the study ¹⁰ were total expenditure for transportation varied from INR 20 (US\$ 0.33) to INR 1634 (US\$ 26.79) with a median expenditure of INR 142.5 (US\$ 2.34) This might be in Nepal transportation cost may be higher in comparison to India and distance to HF is also higher in rural area so that transportation cost was higher.

CONCLUSION

This study only focus the indirect cost related to institutional delivery and not able to cover the cost related to antenatal care and informal payment made during delivery. Only few study conducted in Nepal related to cost of institutional delivery so this study will generate the evidence which will helps to better understanding of the effectiveness of safe motherhood program and its incentive. From this study we can concluded that the total median indirect cost of institutional delivery under safe motherhood program was found NRs 4900 with minimum NRs 500 and maximum NRs 4700.

ACKNOWLEDGMENT

We would like to express our sincere gratitude to all the participants for their kind cooperation and support. We would like to express our thank to faculty members of Master of Public Health Program for supporting and providing valuable suggestions and also thank to PU-IRC for ethical approval.

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