

Original Research Article

STUDY ON UTILIZATION OF ANTENATAL SERVICES AND OUT OF POCKET EXPENDITURE FOR DELIVERY CARE IN TIRUVALLUR DISTRICT

Meera S¹, Manobharathi M², Vishnupriya S³, Saravanakumar P⁴

¹Assistant Professor, Department of Community Medicine, Government Tiruvallur Medical College, Tamilnadu, India

²Assistant Professor, Department of Community Medicine, Government Mohan Kumaramangalam Medical College, Salem, Tamilnadu, India

³Assistant Professor, Department of Community Medicine, Government Karur Medical College, Tamilnadu, India

⁴Professor, Department of Community Medicine, Madras Medical College, Chennai, Tamilnadu, India

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Corresponding Author:

Dr. Meera S,

Assistant Professor, Department of Community Medicine, Government Tiruvallur Medical College, Tamilnadu, India.

Email: meerapaedics@gmail.com

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ABSTRACT

Background: Maternal health refers to the health of women during pregnancy, childbirth, and the postnatal period. Antenatal care is crucial to reduce Maternal Mortality Ratio (MMR) and Infant Mortality Ratio (IMR). Though maternal healthcare services in India are provided free of cost for delivery care in public health institutions, many Indian families still face significant out-of-pocket (OOPE) expenditure. Out of pocket expenditure on health care services is a significant factor in determining the institutional facility for ante-natal and delivery care in India. The objective is to assess the utilization of antenatal health services by mothers residing in the study area and the factors determining the utilization of antenatal health services by mothers. To assess the Out-of-Pocket Expenditure incurred by mothers and the factors influencing it while accessing institutional delivery services.

Materials and Methods: A community based cross sectional study was conducted among 280 mothers with a living child within 12 months of age residing in Minjur, Rural field practice area. The study duration was from January 2021 to March 2022.

Results: Mean age of the study participants was 25 ± 3.9 years. 54.3% of mothers have studied above high school level. The proportion of mothers received full antenatal care was 85.7%. A multiple logistic regression analysis showed that time of registration of pregnancy ($P < 0.05^*$), distance between residence and nearest health facility ($P < 0.01^*$) had significant association with full antenatal care. Medical expenditure during delivery was incurred only by mothers delivered at private sector which was around Rs.52272 $\pm$ Rs.34916.08 (Mean $\pm$ SD). Non-medical expenses incurred by all the mothers which was around Rs.2052 $\pm$ 1366.68 (Mean $\pm$ SD).

Conclusion: Majority of the mothers have utilized most of the maternal health services. Mothers who got delivered at private sector have spent a huge amount as out of pocket expenditure. Hence the mothers can be educated and motivated during their antenatal visits through positive reinforcement to utilize the maternity health services provided for free of cost at Government sector.

Keywords: Out of pocket expense, Antenatal care, risk factor.

INTRODUCTION

Maternal health refers to the health of women during pregnancy, childbirth, and the postnatal period and is a key indicator of a nation's healthcare system.^[1] Every stage of pregnancy should be a positive experience, ensuring that both the mother and her

newborn achieve the best possible health and well-being. The World Health Organization (WHO) envisions a world in which every pregnant woman and newborn receives quality care throughout pregnancy, childbirth, and the postnatal period.^[2] Antenatal care (ANC) plays a vital role in improving maternal and neonatal health by facilitating early

detection and management of pregnancy-related complications, promoting healthy practices, and ensuring timely referral when required. Adequate utilization of antenatal care contributes significantly to reducing the Maternal Mortality Ratio (MMR) and Infant Mortality Ratio (IMR).^[3] One of the Sustainable Development Goals (SDG 3) aims to ensure healthy lives and promote well-being for all, with a target of reducing the global maternal mortality ratio to less than 70 deaths per 100,000 live births by 2030.^[4]

According to national guidelines, full antenatal care comprises at least four antenatal visits, consumption of a minimum of 100 Iron and Folic Acid (IFA) tablets, and receipt of at least one tetanus toxoid (TT) injection during pregnancy.^[4] Essential antenatal services include early confirmation and registration of pregnancy, regular antenatal visits, tetanus immunization, IFA supplementation, routine laboratory investigations, blood pressure monitoring, weight assessment, and screening for high-risk pregnancies.^[5] Timely and complete utilization of these services is essential for improving maternal and neonatal outcomes. Investment in maternal and child health is a cost-effective strategy that not only safeguards the health and well-being of women and children but also contributes to poverty reduction, improved productivity, and sustainable economic development. However, financial barriers continue to limit access to quality maternal healthcare, particularly in low- and middle-income countries such as India.^[6]

Although maternal healthcare services, including delivery care, are provided free of cost in public health institutions in India under various government initiatives, many families continue to incur substantial out-of-pocket expenditure (OOPE). These expenses remain an important barrier to accessing timely and appropriate maternal healthcare services.^[7] Out-of-pocket expenditure is one of the major sources of healthcare financing in India, accounting for more than 72% of total health expenditure.^[8]

Out-of-pocket expenditure during pregnancy and childbirth includes both medical and non-medical costs. Medical expenditure comprises expenses related to hospital admission, consultation fees, laboratory investigations, drugs and medicines, blood transfusion, caesarean section, and other treatment-related procedures. Non-medical expenditure includes transportation, food, accommodation for attendants, and other incidental expenses incurred during the period of hospitalization. The total expenditure for delivery is calculated by combining both medical and non-medical expenses.^[9]

Hence this study was planned to assess the utilization of essential antenatal services and the associated financial burden which will provide valuable evidence for strengthening maternal healthcare services and reducing economic barriers to care.

Objectives

1. To assess the utilization of antenatal health services by mothers residing in the study area.
2. To find out the factors determining the utilization of antenatal health services by mothers.
3. To assess the Out-of-Pocket Expenditure incurred by mothers and to find out the factors influencing it while accessing institutional delivery services.

MATERIALS AND METHODS

A community based Cross sectional study was conducted at Minjur, Rural Health Training centre attached to Government Stanley Medical College Hospital between January 2021 to March 2022. The study population included those mothers with a living child who got delivered between January 2021 to December 2021 in the study area.

Mothers with a living child within 12 months of age and who are residents of the village for at least one year or more were included in the study. Mothers who were not available in their houses even after 2 visits and those who were not willing to participate in the study were excluded.

The study protocol was reviewed and approved by the institutional Ethics Committee of Government Stanley Medical College and Hospital, Chennai. Written informed consent was obtained from all participants before enrolment in the study. Data was collected by face to face interview using pre-tested semi-structured questionnaire, which was based on the Women's questionnaire of the National Family Health survey-4 which includes sociodemographic details, Antenatal care details like time of registration of pregnancy, utilization of antenatal health services and out of pocket expenditure incurred during the time of delivery.

Among 1114 mothers who got delivered, 280 mothers were selected by simple random sampling method. The sample size was calculated based on prevalence of full antenatal care at 79% by Edward et al,^[10] with absolute precision of 5 at 95% Confidence level.

Data analysis was done using Statistical Software SPSS version 23. All Continuous variables were expressed as Mean and Standard Deviation and Median and Interquartile range respectively. All Categorical variables were expressed as frequencies and proportions. Chi square test was used as test of significance for categorical data. Crude (unadjusted) and adjusted odds ratio and their Confidence interval were calculated to assess the estimate of risk. The variables which were found to be statistically significant by univariate analysis was further subjected to multivariate logistic regression analysis. A p value of less than 0.05 was considered as statistically significant.

RESULTS

The mean age of the study participants was 25 ± 3.9 years. 133 (47.5%) mothers came under 18-24 years of age; 111 (39.6%) came under 25-30 years; 35

(12.5%) mothers were more than 30 years of age. 128(45.7%) of the women had completed up to high school. The median (IQR) family income was Rs.20000 (15000 – 25000), with the minimum and maximum of Rs.4000 and Rs.1,00,000 respectively. The religion most practiced was Hinduism (90%)

with the minority groups constitutes around 10%. 148(52.9%) of the mothers belongs to middle class, 88(31.4%) mothers belong to lower middle class. Upper class constitutes 34(12.13%) of mothers and 10(3.57%) belongs to upper middle class.

Table 1: Characteristics of Antenatal care among the study participants(n=280)

S.NO.	Characteristics	Category	Frequency (%)
1.	Desire for pregnancy	Planned	256 (91.4%)
		Unplanned	24 (8.6%)
2	Parity Index during antenatal period	Primigravida	169 (60.4%)
		Mothers with one living children	79 (28.2%)
		Mothers with more than one living children	32 (11.4%)
3.	Time of Registration	Early (within 12 weeks)	211 (75.4%)
		Late (more than 12 weeks)	69 (24.6%)
4.	Total no of AN visits	≥ 4 visits	274(97.9%)
		< 4 visits	6(2.1%)
5.	Total no of IFA tablets consumed	< 100 tablets	38(13.57%)
		≥ 100 tablets	242 (86.43%)
6	Received minimum one Tetanus Toxoid Injection	Yes	280 (100%)
		No	-
7.	History of Abortions	Yes	86 (30.7%)
		No	194 (69.3%)
8.	High risk Pregnancy	Yes	155 (55.4%)
		No	125 (44.6%)
9	Distance between residence and nearest health care facility	≤5 km	206 (73.6%)
		>5 km	74 (26.4%)

Among the study participants, 256(91.4%) had planned their pregnancy, 211(75.4%) registered their pregnancy within 12 weeks of gestation (early registration). Majority of the mothers (97.9%) attended more than four antenatal visits. 238(85%) mothers consumed more than 100 Iron and Folic Tablets (IFA) during their antenatal period. 206(73.6%) were located within 5km from nearest health care centre (Subcentre, PHC, Government Tertiary care hospital, Private Hospitals). Utilization of antenatal services is assessed in terms of full antenatal care. Full antenatal care includes minimum four antenatal visits (97.9%), consumption of minimum 100 IFA tablets (86.43%) and minimum one Tetanus Toxoid injection (100%) given during

antenatal period The proportion of mothers utilized full antenatal care was 85.7% with 95%CI :(81.4 - 90).

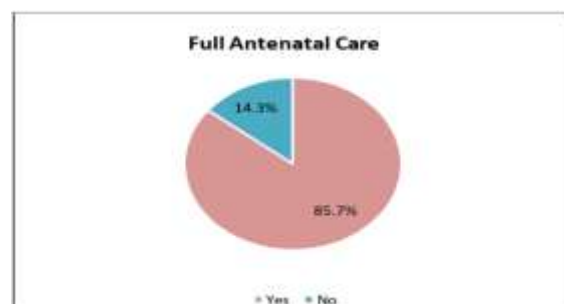


Figure 1: Full Antenatal Care.

Table 2: Delivery details of the study participants

S.no.	Parameters	Category	Frequency	Percentage
1	Mode of delivery	Vaginal delivery	170	60.7%
		LSCS	110	39.3%
2	Place of delivery	Primary health centre	61	21.8%
		Government Taluk Hospital	45	16.1%
		Government Tertiary care Hospital	130	46.4%
		Private nursing home	36	12.8%
		Private Multi Speciality Hospital	8	2.9%
3	Mode of Transport	108 ambulance	57	20.4%
		Public transport	4	1.4%
		Private ambulance	7	2.5%
		Private transport	202	72.1%
		Self	10	3.6%
4	Number of days of hospital stay	≤ 5 days	131	46.8%
		>5 days	149	53.2%

170(60.7%) mothers delivered through vaginal delivery and 110(39.3%) delivered through LSCS (Lower Segment Caesarean Section). 202(72.1%) mothers used private transport for reaching the maternity centre from their house for delivery. Only

57(20.4%) utilized free 108 ambulance service for reaching the maternity centre.149(53.2%) mothers stayed in hospital for more than 5 days during the time of delivery.

Table 3: Out of Pocket Expenditure (OOPE) for delivery care among the study participants

Component	Frequency	Mean $\pm$ SD	MEDIAN $\pm$ IQ
Medical expenditure	44	Rs.52272 $\pm$ Rs.34916.08	Rs.45000 $\pm$ 30000
Non-medical expenditure	280	Rs.2052.03 $\pm$ Rs.1366.68	Rs.1590 $\pm$ 1365

Medical expenditure calculated only for 44 mothers who got delivered in private sector since they alone incurred it. Unlike the medical expenses, non-medical expenses were spent by all mothers

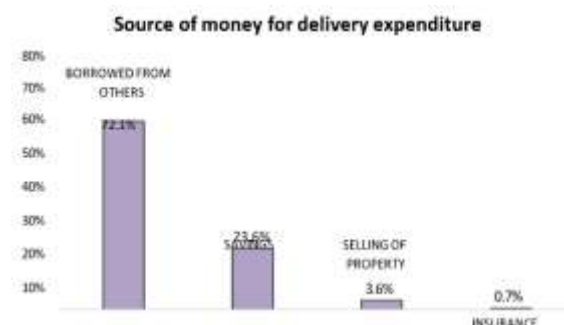
irrespective of their place of delivery. Non-medical expenditure spent by the study participants comes around Rs.1590 $\pm$ 1365(Median $\pm$ IQR).

Table 4: Delivery expenses incurred by mothers at Public and Private health care hospitals

OOPE		PUBLIC(n=236)	PRIVATE(n=44)
Medical expenditure	Mean $\pm$ SD	-	Rs.52272 $\pm$ Rs.34916.08
Non-medical expenditure	Mean $\pm$ SD	Rs.1922.07 $\pm$ Rs.1183.4	Rs.2736.8 $\pm$ Rs.2200
Total cost	Mean $\pm$ SD	Rs.1922.07 $\pm$ Rs.1183.4	Rs.55021.8 $\pm$ Rs.35230.1

44(15.7%) mothers who got delivered in private sector spent around Rs.52272 $\pm$ Rs.34916.08 (Mean $\pm$ SD) as medical expenditure during their delivery. Non-medical expenditure spent by the study participants comes around Rs.2052.03 $\pm$ Rs.1366.68(Mean $\pm$ SD).

Majority of the study participants 202(72.1%) opted borrowing of money from others (Friends, Relatives, Lenders) to compensate the untoward expenses happened during the time of delivery. 66(23.6%) utilized their savings amount during their delivery time. 10(3.6%) opted for selling their property to overcome the delivery expenses.

**Figure 2: Source of expenses for delivery.****Table 5: Analysis of Full Antenatal care with selected factors by Multivariate Logistic Regression**

Factors	Category	Total	Full Antenatal Care		Unadjusted Odds Ratio with 95%CI	P value	Adjusted Odds Ratio with 95%CI	P value
			Yes	No				
Maternal Age at childbirth	≤ 30 years	245	214 (87.3%)	31 (12.7%)	2.39 (1.02,5.57)	0.04*	1.11 (0.39,3.07)	0.84
	>30 years	35	26 (74.3%)	9 (25.7%)				
Time of Registration	Early	211	192 (91%)	19 (9%)	4.42 (2.20,8.88)	$<0.05^*$	4.45 (2.11,9.36)	$<0.05^*$
	Late	69	48 (69.6%)	21 (30.4%)				
Distance between residence and nearest health care Facility	Within 5 km	206	183 (88.8%)	23 (11.2%)	2.37 (1.19,4.75)	$<0.01^*$	2.63 (1.23,5.58)	$<0.01^*$
	More than 5 km	74	57 (77%)	17 (23%)				
Desire for Pregnancy	Yes	256	224 (87.5%)	32 (12.5%)	3.50 (1.39,8.83)	$<0.05^*$	2.53 (0.85,7.53)	0.09
	No	24	16 (66.7%)	8 (33.3%)				

The table shows that factors like distance between residence and nearest health facility ($p < 0.01^*$), time of registration ($p < 0.05^*$) were statistically significant after logistic Regression. However the

factors like maternal age, desire for pregnancy were not statistically significant after multivariate logistic regression.

Table 6: Association of OOPE (Non-medical expenses) with selected factors by Multivariate Logistic regression

Factors	Category	Total	Non-medical Expenses		Unadjusted Odds Ratio with 95%CI	P-Value	Adjusted Odds Ratio with 95%CI	P-value
			$>$ Rs.1590	$\leq$ Rs.1590				
Maternal Age at Childbirth	>30 years	35	24 (68.6%)	11 (31.4%)	2.27 (1.07,4.84)	0.03*	1.6 (0.64,4.0)	0.31
	≤ 30 years	245	120 (49%)	125 (51%)				
High risk pregnancy	Yes	155	98 (63.2%)	57 (36.8%)	2.95 (1.81,4.81)	$<0.05^*$	2.38 (1.3,4.34)	0.005*
	No	125	46 (36.8%)	79 (63.2%)				
Duration of	More than 5 days	149	114 (76.5%)	35 (23.5%)	10.97 (6.29,19.13)	$<0.05^*$	11.86 (6.47,21.73)	$<0.05^*$

Hospital Stays	Within 5 days	131	30 (22.9%)	101 (77.1%)				
Place of delivery	Private	44	30 (68.2%)	14 (31.8%)	2.29 (1.16,4.54)	0.01*	4.4 (1.89,10.26)	0.001*
	Government	236	114 (48.3%)	122 (51.7%)				

The table shows that factors like High-risk pregnancy ($p < 0.005^*$), place of delivery ($p < 0.00^*1$), duration of hospital stay ($p < 0.05^*$) were statistically significant after multivariate logistic regression.

DISCUSSION

Majority of the study participants had utilized most of the antenatal services. Mother and Child Protection Card (MCP) were present in all the study participants (100%). This was in consistence with NFHS 4 Tiruvallur District factsheet,^[11] which found that MCP was present in 98.3% of mothers during their survey. 211(75.4%) of the mothers registered their pregnancy within 12 weeks of gestation (early registration of pregnancy). This was in accordance with NFHS 4 Tiruvallur District factsheet,^[11] where 73.6% mothers registered within 12 weeks of gestation.

In the present study, weight, blood pressure, abdominal examination was done in each antenatal visits for all mothers (100%); blood sample, urine sample collected at least for once in all mothers (100%). High risk pregnancy was encountered in 155(55.4%) mothers during their antenatal period. This was in accordance with the study conducted in Kanchipuram district by Danasekaran R et al., among 284 mothers, where 50.7% had high risk pregnancy.^[12] 240(85.7%) of mothers received full antenatal care in our study. Similarly, a study conducted by Edward et al in rural area near Chennai found that the proportion of mothers with Full antenatal care was 79%.^[10] In DLHS-4,^[11] the proportion of mothers in Tiruvallur who had minimum four antenatal visits was 91.6% whereas in our study it was 97.9%.

Better antenatal care in our study could be due to factors like availability, accessibility, and affordability of many health care facilities (Public and Private) located in and around the study area. Conditional cash transfer schemes introduced by the Government which work as a supporting factor making it mandatory for all mothers to utilize the basic and essential antenatal health services. Effective outreach services offered by the RHTC and Community field workers (VHN, Anganwadi workers) in the area. Higher Female literacy rate in Tiruvallur district (85%) as per DLHS-4,^[11] which facilitates the better knowledge of the mothers regarding the proper utilization of antenatal health services and its benefits both for the mother and the foetus.

Mothers who register their pregnancy within 12 weeks of gestation (early) registration have higher opportunity for utilizing antenatal services. The current study showed that mothers with early registration of pregnancy had 4.45 higher odds of

having full antenatal care compared to mothers with late registration of pregnancy by multivariate analysis [Adjusted OR:4.45; 95% CI: 2.11-9.36]. Similarly, a study done by Roy MP et al also found that early registration had significantly higher odds of having full antenatal care than women with late registration [Adjusted OR: 2.82 with 95% CI: 1.49-5.34].^[9]

Mothers whose residence located closer to the health centre tends to utilize the antenatal services efficiently. The current study showed that mothers whose residence within 5 kms from nearby health centre had 2.63 times higher odds of having full antenatal care compared to mothers whose residence more than 5kms by multivariate analysis [Adjusted OR:2.63;95%CI:1.23,5.58]. This was in accordance with the study conducted by Konlan KD et al., in Ghana found that women living at a shorter distance of within 5 kms had significantly higher odds of having full antenatal care.^[13]

Out of 280 mothers, 236(84.3%) mothers got delivered in Government sector while 44(15.7%) mothers got delivered in private sector. Among the study participants, 170(60.7%) mothers delivered through Normal Vaginal Delivery and 110(39.3%) delivered through caesarean section. Only 57(20.4%) mothers utilized 108 transport for reaching the health care centre during delivery. Majority of them, 184 (82.5%) told that they were not willing to avail 108 services. Hence health education regarding the feasibility, accessibility of utilizing 108 services have to be strengthened.

Medical expenses were spent only by 44 (15.7%) study participants who got delivered in private sector. Mothers who got delivered in Government sector did not spend for medical expenses. Mothers who got delivered in private sector spent around Rs.52272 $\pm$ 34916.08 (Mean $\pm$ SD) during the time of hospital stay for medical expenses. Unlike the medical expenses, non-medical expenses were spent by all mothers irrespective of their place of delivery. Non-medical expenses incurred by the study participants comes around Rs.2052.03 $\pm$ 1366.68 (Mean $\pm$ SD).

In public health facility, total cost spent by mothers was around Rs.1922.07 $\pm$ Rs. 1183.4 (Mean $\pm$ SD). Similarly in a study done by Tellis SB et al., in Dakshina kannada, Bangalore found that mean expenditure for delivery care was Rs.2875(14). Mothers delivered in private sector spent around Rs.55021 $\pm$ Rs.35230.1 (Mean $\pm$ SD) as total cost for delivery which was much higher compared to public health facility. Majority of the study participants 202(72.10%) opted borrowing of money from others (Friends, Relatives, Lenders) to compensate the untoward expenses happened during the time of delivery in this study. 66(23.6%) utilized their savings amount during their delivery time, 10(3.6%)

opted for selling their property to overcome the delivery expenses. Less than 1% opted for insurance coverage to compensate their delivery expenses in the current study.

Mothers who got delivered in private sector had significantly 4.4 times higher odds of OOE for non-medical expenses compared to mothers delivered in Government sector [Adjusted OR:4.4,95%CI:1.89,10.26]. Similarly in a study done by Niharika Mahajan et al., observed that mothers delivered in private sector had significantly higher odds of expenditure compared to mothers delivered in public sector,^[15] [Adjusted OR:8.542, 95% CI:3.1, 23.48].

In the current study, mothers who stayed for more than or equal to five days in hospital during delivery time had 11.86 times significantly higher odds of non-medical expenses compared to mothers who stayed for less than five days [Adjusted OR:11.86, 95%CI:6.47, 21.73]. High risk mothers incurred higher non-medical expenses compared to normal mothers during delivery. In the current study, high risk mothers had 2.38 times significantly higher odds of non-medical expenses compared to normal mothers [Adjusted OR:2.38, 95% CI:1.3, 4.34].

CONCLUSION

The current study shows that majority of the mothers have utilized most of the maternal health services. Among the 280 mothers, 85.7% received full antenatal care. Mothers who got delivered at private sector have spent a huge amount as out of pocket expenditure. Hence the mothers can be educated and motivated during their antenatal visits through positive reinforcement to utilize the maternity health services provided for free of cost at Government sector.

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