Original Article

Utilization of Maternal Health Services among the Rural Women and their Predictors: An Evidence from Auraiya District of Uttar Pradesh

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Abstract

Background: Maternal mortality is a great global health issue. Though in past decades there has been good progress in bringing down MMR but the progress occurred at slower pace. Many of these deaths can be avoided if there is increase in utilization of maternal health services by women.

Methods: A community based cross-sectional study was conducted to find out the pattern of utilization of maternal Health services and the predictors of it among women in the rural areas of Auraiya District.

Results: There was a high level of ANC service utilization, with most women adhering to recommended visit schedules, initiating care early, and receiving appropriate supplementation and immunizations. Women had strong preference for institutional deliveries, particularly at CHCs, and a high prevalence of skilled birth attendance. Women's education, Husband's education, Religion, Social class, husband's occupation, monthly income, age at marriage, interval between births, status of pregnancy, and history of still birth had significant association with antenatal services utilization. caste, occupation of the mother, age at first pregnancy showed a significant impact on the utilization of intranatal services. Women's education, social class, monthly family income, family structure, age at the time of marriage, birth order, status of pregnancy, and history of abortion was strongly associated with postnatal care utilization.

Conclusion: Overall, there was a high level of maternal health services utilization indicating that the government programmes are effective in increasing the utilization of Antenatal and intranatal services utilization.

Keywords: Maternal health services, utilization, CHC, UP.

Introduction/ Back ground

Since the establishment of the Sustainable Development Goals in 2015 globally there is slight decrease in maternal deaths from 309300 in 2016 to 287000 in 2020.[1] As per UN report 24000 deaths occurred in india. India is the major contributor of maternal deaths after Nigeria. India contributed for 8.36% of global maternal deaths (UN 2020)[2].

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Maternal Mortality Ratio (Maternal deaths per 100,000 live births) of India has dropped from 212 in 2007[3] to 97 in 2018-20[4]. Within India there is disparity in MMR across states, seven states Kerala, Tamilnadu, Telangana, Gujrat, Maharashtra, Andhra Pradesh and Karnataka have achieved the Sustainable Development Goal of MMR below 70[5,6,7]. But in some of the states like Assam, UP, and Madhya Pradesh MMR is very high. In Uttar Pradesh it is very high so it's very challenging to achieve the targets laid by SDG 3.1.Aim of the SDG 3.1 is to reduce the MMR less than 70 by 2030 and no country should have MMR more than 140.

In India 37 percent of mothers received minimum of 4 ANCs in 2005-06[8], compared to 58.4 percent in 2019-21 (NFHS-5)[9], leaving approximately half of pregnant mothers with inadequate antenatal care. According to HMIS 2017-2019 Maternal Mortality Ratio of Auraiya district is 344 per 100,000 live births that is one of the large contributors of maternal deaths in UP[10,11].

Mixed method study conducted by Bhushan H et al[12] reported that the rapid decline in MMR in India is associated with increase in coverage of maternal health services.

Material and Methods

A community based cross-sectional study was conducted to assess the utilization and the predictors of utilization of maternal health services.

Sampling methods, techniques and size:

Multistage sampling a combination of cluster sampling and random sampling was used. In the Auraiya district there are 7 Community Health Centres. In the first stage 5 villages within 5 km area served by the each CHC were selected by simple random sampling. Finally, List of women who gave birth within one year was collected from ASHA and then random sampling technique was undertaken. Sample size was calculated using the following formula:

$$n= Z_{1-\alpha/2^2}P\ (1-P)/d^2$$

Data was collected from 420 mothers using structured questionnaire after taking informed consent. Utilization of Antenatal services categorized into two. Women who had utilized minimum of four visits, minimum one TD injection, and 100 or more iron-folic acid tablets were defined as having utilized. For Intranatal services mothers who had institutional delivery in presence of skilled birth attendant was considered as having utilized intranatal services. For postnatal services mothers who had attended minimum one follow up visit in the health facility is defined as having utilized postnatal services.

Chi square test and binary Logistic regression was used to find out the predictors of the utilization at 0.05 level of significance.

Results

Table 1: Percentage and frequency distribution of Study Subjects by their ANC Services Utilization

N=420

ANC services utilization		Frequency (f)	Percentage (%)
Antenatal checkup	No	1	0.2
	Yes	419	99.8
Frequency of Antenatal visits	0	1	0.2
	1	2	0.5
	2	12	2.9
	3	111	26.4
	>= 4	294	70.0
First time visit (Trimester)	No visit	1	0.2
	3rd trimester	21	5.0
	2nd trimester	24	5.7
	1st trimester	374	89.0
Total no of iron and folic acid tablets taken	< 100	82	19.5
	≥100	338	80.5
TD injections	Taken	420	100
	Not Taken	0	0.0

Table 2: Percentage and frequency distribution of Study Subjects by their Intranatal Services Utilization

N=420

Delivery services utilization		**Frequency (f)**	**Percentage (%)**
Place of Delivery	PHC	1	0.2
	CHC	343	81.7
	District Hospital and other government hospitals	14	3.3
	Medical College	6	1.4
	Private	46	11
	Home delivery	9	2.1
	Ambulance delivery	1	0.2
Presence of skilled birth attendant during Intranatal period.	Yes	412	98.1

Table 3: Percentage and frequency distribution of Study Subjects by their PNC services utilization

N=420

PNC services utilization		**Frequency (f)**	**Percentage (%)**
Postnatal care visit to the health facility within 42 days after child birth.	No	193	46.0
	Yes	227	54.0
If yes, then Purpose of visit	Self	67	29.8
	Child	109	48.4
	Self & Child	49	21.8
Visited by nurse or health worker	Yes	419	99.8
	No	1	0.2
Frequency of visiting by ANM	No visit	1	0.2
	1 - 2 times	271	64.5
	≥3 times	148	35.2
Consumed IFA tablets by 42 days of delivery	No	25	6.0
	Yes	395	94.0

Table 4: Chi square showing Association between Antenatal services utilization and Reproductive and obstetric factors

N = 420

Obstetric Characteristics		**Antenatal**				**Significance**	
		Utilization		**Non-Utilization**		**chi sq**	**p-value**
		f	**%**	**f**	**%**		
Age at marriage (in years)	< 20 yr	17	4.04	19	4.52	3.98	0.045
	20 - 29 yr	246	58.57	138	32.85		
Age at first pregnancy	<19 yrs and ≥30 yrs	260	61.90	153	36.42	1.1877	0.275
	20 - 30 yrs	3	0.71	4	0.95		

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Birth order	One	107	25.95	74	17.7	1.3111	0.519
	Two	97	23.09	53	12.61		
	Three or more	59	14.04	30	7.14		
Interval between births	≤24 months	65	27.31	49	20.58	5.904	0.015
	> 24 months	88	36.97	34	14.28		
Status of pregnancy	Unwanted	252	60	144	34.28	0.87	0.002
	Wanted	11	2.61	13	3.09		
History of abortion	Yes	4	3.33	2	0.47	0.0425	0.8364
	No	259	61.66	155	36.90		
History of stillbirth	Yes	1	0.23	6	1.42	7.1045	0.0076
	No	262	62.61	151	35.95		
History of neonatal death	Yes	1	0.23	3	0.71	2.4416	0.118
	No	262	62.61	154	36.66		

Table 5: Chi square showing Association between Intranatal services utilization and obstetric factors

N = 420

Obstetric Characteristics		**Intranatal**				**Significance**	
		Utilization		**Non-Utilization**		**chi sq**	**p-value**
		f	**%**	**f**	**%**		
Age at marriage (in years)	< 20 yr	31	7.38	2	0.27	1.6632	0.1971
	20 - 29 yr	378	90	9	2.14		
Age at first pregnancy	<19 yrs and ≥30 yrs	4	0.95	1	0.23	5.9938	0.0143
	20 - 30 yrs	405	96.4	10	2.38		
Birth order	One	179	42.61	4	0.95	0.3519	0.8364
	Two	147	35	4	0.95		
	Three or more	85	20.23	3	0.71		
Interval between births	≤24 months	111	46.63	2	0.27	1.034	0.3092
	> 24 months	120	28.57	5	1.19		
Status of pregnancy	Unwanted	386	91.90	10	2.38	0.1988	0.6557
	Wanted	23	5.47	1	0.23		
History of abortion	Yes	6	1.42	0	0	0.163	0.6864
	No	403	0.95	11	2.61		
History of stillbirth	Yes	7	1.6	0	0	0.191	0.6621
	No	402	95.71	11	2.61		
History of neonatal death	Yes	4	0.95	0	0	0.109	0.7413
	Yes	405	96.42	11	2.61		

Table 6: Chi square showing Association between Postnatal services utilization and Reproductive and obstetric factors

N=420

Obstetric Characteristics		Postnatal				Significance	
		Utilization		Non- Utilization		chi sq	p-value
		f	%	f	%		
Age at marriage (in years)	< 20 yr	30	7.1	6	1.4	13.59	0.0002
	20 - 29 yr	197	46.90	187	44.52		
Age at first pregnancy	<20or>30yrs	3	0.71	3	0.71	0.0402	0.8411
	20 - 30 yrs	224	53.33	190	45.23		
Birth order	One	119	28.33	64	15.23	20.16	0.000045
	Two	76	18.09	74	17.61		
	Three or more	32	7.6	55	13.09		
Interval between births	≤24 months	53	22.22	61	14.52	3.5973	0.057873
	> 24 months	174	41.42	132	31.42		
Status of pregnancy	Unwanted	206	49.04	190	45.23	11.46	0.0007
	Wanted	21	5	3	0.71		
History of abortion	Yes	6	1.4	0	0	5.175	0.0229
	No	221	52.61	193	45.95		
History of stillbirth	Yes	4	0.95	3	0.71	0.027	0.8695
	No	223	54.76	190	45.23		
History of neonatal death	Yes	1	0.23	3	0.71	1.383	0.236
	No	226	53.80	190	45.23		

Table 7: Binary Logistic Regression Model Showing Relation of Utilization of ANC Services with Demographic Predictors

N=420

Dependent Variable: Utilization of ANC Services						
Predictors	**B**	**SE**	**p-value**	**OR**	**95% C.I. for OR**	
					Lower	**Upper**
Women's education			0.042			
High school and above	0.07	0.65	0.909	1.08	0.30	3.87
Middle	-0.05	0.67	0.942	0.95	0.26	3.52
Primary	-0.49	0.72	0.494	0.61	0.15	2.50
Literate but below primary	-1.50	0.73	0.040	0.22	0.05	0.93
Illiterate	**Ref. Group**					
Husband's education			0.807			
High school and above	0.60	0.71	0.396	1.82	0.46	7.31
Middle	0.31	0.74	0.673	1.37	0.32	5.85
Primary	0.66	0.81	0.414	1.93	0.40	9.36
Literate but below primary	0.00	0.95	0.997	1.00	0.16	6.44
Illiterate	**Ref. Group**					
Religion: Hindu wrt Muslim	-0.78	0.50	0.117	0.46	0.17	1.22

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Social class			0.010			
SC	1.20	0.36	0.001	3.31	1.62	6.77
ST	0.80	0.73	0.273	2.23	0.53	9.32
OBC	0.65	0.34	0.057	1.92	0.98	3.77
General	**Ref. Group**					
Occupation of mother			1.000			
Daily Wager	20.87	high	0.999	large	0.00	-
Govt Employee	19.34	high	0.999	large	0.00	-
Housewife	**Ref. Group**					
Occupation of husband			<0.001			
Unemployed	-0.57	1.15	0.619	0.56	0.06	5.39
Daily Wager	0.12	0.92	0.897	1.13	0.18	6.88
Farmer	-1.35	0.88	0.128	0.26	0.05	1.47
Private employee	-0.88	0.88	0.318	0.41	0.07	2.34
Self employed	0.24	1.17	0.839	1.27	0.13	12.71
Govt Employee	**Ref. Group**					
Monthly family income			0.126			
Rs 4000 or below	-0.70	0.32	0.031	0.50	0.26	0.94
Rs 4001-6000	-0.13	0.41	0.750	0.88	0.39	1.96
Rs 6001-8000	-0.33	0.53	0.537	0.72	0.26	2.04
Rs 8000 above	**Ref. Group**					
Family structure: Nuclear wrt Joint	0.00	0.26	0.993	1.00	0.60	1.67
Constant	1.41	1.12	0.207	4.10		

Table 8: Binary Logistic Regression Model Showing Relation of Utilization of Intranatal Services with Demographic Predictors

N = 420

Dependent Variable: Utilization of Intranatal Services						
Predictors	**B**	**SE**	**p-value**	**OR**	**95% C.I. for OR**	
					Lower	**Upper**
Women's education			0.270			
High school and above	2.87	1.64	0.081	17.64	0.70	442.44
Middle	2.01	1.63	0.217	7.46	0.31	181.78
Primary	0.63	1.72	0.712	1.89	0.07	54.55
Literate but below primary	1.82	1.81	0.313	6.19	0.18	214.12
Illiterate	**Ref. Group**					
Husband's education			0.530			
High school and above	-2.04	2.00	0.309	0.13	0.00	6.60
Middle	-1.66	2.19	0.448	0.19	0.00	13.88
Primary	-0.88	2.42	0.717	0.42	0.00	47.39
Literate but below primary	-3.22	2.11	0.126	0.04	0.00	2.48
Illiterate	**Ref. Group**					
Religion: Hindu wrt Muslim	-17.37	Large	0.998	0.00	0.00	

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Social class			0.073			
SC	-0.86	1.24	0.490	0.42	0.04	4.84
ST	-2.29	1.48	0.122	0.10	0.01	1.84
OBC	1.37	1.48	0.356	3.93	0.21	71.89
General	**Ref. Group**					
Occupation of mother			0.053			
Daily Wager	-4.30	1.78	0.016	0.01	0.00	0.44
Govt Employee	-0.72	Large	1.000	0.49	0.00	
Housewife	**Ref. Group**					
Occupation of husband			0.703			
Unemployed	0.89	Large	1.000	2.43	0.00	
Daily Wager	-14.46	Large	0.999	0.00	0.00	
Farmer	-16.55	Large	0.999	0.00	0.00	
Private employee	-16.57	Large	0.999	0.00	0.00	
Self employed	-17.07	Large	0.999	0.00	0.00	
Govt Employee	**Ref. Group**					
Monthly family income			0.566			
Rs 4000 or below	-1.08	1.22	0.374	0.34	0.03	3.69
Rs 4001-6000	-0.22	1.68	0.898	0.81	0.03	21.57
Rs 6001-8000	-1.89	1.52	0.213	0.15	0.01	2.95
Rs 8000 above	**Ref Group**					
Family structure: Nuclear wrt Joint	-1.14	0.86	0.187	0.32	0.06	1.74
Constant	38.67	Large	0.998	Large		

Table 9: Binary Logistic Regression Model Showing Relation of Utilization of Postnatal Services with Demographic Predictors

N = 420

Dependent Variable: Utilization of Postnatal Services						
Predictors	**B**	**SE**	**p-value**	**OR**	**95% C.I. for OR**	
					Lower	**Upper**
Women's education			0.255			
High school and above	0.67	0.54	0.217	1.95	0.68	5.63
Middle	0.88	0.56	0.118	2.41	0.80	7.25
Primary	0.05	0.61	0.931	1.05	0.32	3.49
Literate but below primary	0.47	0.61	0.440	1.60	0.49	5.26
Illiterate	**Ref. Group**					
Husband's education			0.551			
High school and above	-0.26	0.59	0.654	0.77	0.24	2.44
Middle	-0.04	0.62	0.950	0.96	0.28	3.27
Primary	-0.26	0.70	0.713	0.77	0.20	3.04
Literate but below primary	1.22	0.95	0.199	3.40	0.53	21.90
Illiterate	**Ref. Group**					
Religion: Hindu wrt Muslim	0.28	0.39	0.474	1.32	0.62	2.82

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Caste			0.018			
SC	-0.92	0.35	0.008	0.40	0.20	0.79
ST	-0.18	0.78	0.813	0.83	0.18	3.83
OBC	-0.32	0.34	0.343	0.73	0.37	1.41
General	**Ref. Group**					
Occupation of mother			0.748			
Daily Wager	0.98	1.28	0.446	2.65	0.22	32.63
Govt Employee	19.84	28166.17	0.999	415484739.51	0.00	
Housewife	**Ref. Group**					
Occupation of husband			0.884			
Unemployed	0.08	0.97	0.936	1.08	0.16	7.21
Daily Wager	-0.23	0.73	0.749	0.79	0.19	3.30
Farmer	-0.42	0.70	0.553	0.66	0.17	2.60
Private employee	-0.12	0.70	0.866	0.89	0.23	3.49
Self employed	0.00	0.87	0.999	1.00	0.18	5.45
Govt Employee	**Ref. Group**					
Monthly family income			0.444			
Rs 4000 or below	-0.07	0.30	0.806	0.93	0.51	1.68
Rs 4001-6000	0.41	0.40	0.296	1.51	0.70	3.30
Rs 6001-8000	0.35	0.46	0.440	1.42	0.58	3.49
Rs 8000 above	**Ref. Group**					
Family structure: Nuclear wrt Joint	1.03	0.25	<0.001	2.80	1.71	4.57
Constant	-0.03	0.93	0.977	0.97		

Note: The coefficients for other groups are interpreted relative to the reference group.

Results and Discussion

Predictors of the utilization of maternal health services:

Antenatal Services:

Women's Education

Compared to illiterate women, those who were literate but below primary education had significantly lower odds of utilizing ANC services

Social Class

Social class showed a significant association with ANC service utilization. Women from Scheduled Castes were more likely to utilize ANC services compared to the General category

Occupation of the Husband

Husband's occupation was significantly associated with ANC utilization. Wives of Farmers were 74% less likely and private employees 59% less likely to use ANC services compared to government employees.

Monthly Family Income

Families earning Rs. 4000 or below had significantly lower odds of utilizing ANC services compared to families earning above Rs. 8000

Intranatal:

- Daily wagers had significantly lower odds of utilization to use intranatal services compared to housewives. Daily wage mothers face extreme barriers to intranatal service utilization.

Postnatal:

- Women from nuclear families were almost three times more likely to utilize postnatal services compared to those from joint families.

- Scheduled Caste women were significantly less likely to utilize postnatal services compared to the general class

Discussion

The findings of the study revealed that, 99.8% of the women attended antenatal visits out of which 70% attended all the four recommended visits. 89.0% of women-initiated care in the 1st trimester which aligns with the global recommendations. These findings are higher than those reported by Singh et al., where 83% of the women accessed ANC services, and only 61% attended three or more visits. Similarly, **Roy S et al**.[13] found that only 38.3% of the mothers attended at least 4 ANC visits, highlighting the gap in ANC coverage in different settings. The higher ANC coverage in the current study could attributed to increased awareness, improved healthcare access, and strengthened maternal health programs.

The findings of the study align with the study by **Emelumadu et al.[14],** which reported high utilization of both antenatal and intranatal services. The positive association found between service satisfaction and utilization suggest that quality of care and patient experience plays a significant role in encouraging women to seek maternal health services. Similarly in current study, the strong preference for CHC based deliveries and skilled birth attendance may reflect confidence in the quality of care provided at these facilities.

The study revealed that within 42 days postpartum, 54.0% of the women visited health facility. This highlights an encouraging level of PNC utilization. Compared to **Singh et al**[15] and **Wu Y et** al[16] who reported lower PNC utilization rates of 26% and 28.42% respectively. The higher PNC attendance in this study could be attributed to increased accessibility, and enhanced health education efforts during ANC visits.

Additionally, this study found that woman's education, occupation, social class, husband's occupation, monthly family income, and family structure are significant predictors of maternal health services utilization. These findings are consistent with the **Iyaniwura and Yussuf[17],** who reported a positive association between education and ANC utilization. Educated women are more likely to be aware of the importance of maternal healthcare and seek timely services.

Conclusion

Overall, there was a high level of ANC service utilization, with most women adhering to recommended visit schedules, initiating care early, and receiving appropriate supplementation, immunizations, had strong preference for institutional deliveries, particularly at CHCs, and a high prevalence of skilled birth attendance, demonstrating adherence to safe delivery practices indicating that the government programmes are effective in increasing the utilization of Antenatal and intranatal services utilization.

Within 42 days postpartum, 54.0% of women visited a health facility.So, there is need to sensitize the mothers and their families regarding importance of the PNC services to increase utilization of PNC services.

Based on the findings of the study there are some recommendations to improve maternal care and align with SDG 3.1:

- Implementation of community outreach program to identify and support women who delay ANC and regarding risk of home deliveries.
- Flexible clinical hrs for ANC services for women who have daily responsibilities.
- Basic obstetrical and neonatal training of traditional birth attendants and ambulance staff.
- Digital tracking system to identify and follow up with women.

Ethical Clearance: IRB for protection of human subjects, IIHMR University JaipurIORG0007355 OMB No-0990-0279 IRB 00008833 Date: 28.07.23

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