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"BEYOND AVAILABILITY: UNDERSTANDING THE HURDLES IN MATERNAL & CHILD HEALTH SERVICE UPTAKE IN RURAL KOLAR"

G. Mohan Babu[1*], Vishwas S [2]

[1*]Post Graduate, Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research (A Deemed to be University), Tamaka, Kolar, Karnataka, India.
[2]Associate Professor, Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research (A Deemed to be University), Tamaka, Kolar, Karnataka, India.

***Corresponding author:** Dr. G. Mohan Babu,
*E-mail: 95mohankot@gmail.com

ABSTRACT:
Background: Maternal and Child Health (MCH) care services are crucial for the survival and well-being of mothers and infants. Multiple factors contribute to delays in seeking and receiving adequate healthcare, resulting in high mortality rates. Understanding and addressing these barriers remains a critical focus of contemporary health programs.
Objectives: The study aimed to investigate barriers preventing MCH care service utilization among currently married women over 18 in rural Kolar.
Materials & Methods: The research targeted pregnant women or those with at least one child in the rural field practice area of Sri Devaraj URS Medical College, Kolar. Data collected between July and November 2023 were analyzed using MS Excel and SPSS V22.
Results: The cross-sectional study unveiled complex determinants of MCH service utilization. While institutional delivery rates were high at 91.5%, significant challenges emerged. Education was a critical predictor, with higher secondary educated participants showing 4.67 times higher pregnancy registration and 6.15 times higher HIV counselling odds compared to illiterate women. Early marriages (40% before 18 years) and limited health awareness were prominent issues. Occupation and marriage age significantly influenced healthcare engagement, with semi-professional workers and age above 18 marriages demonstrating improved service utilization.
Conclusion: The research revealed substantial gaps in MCH service utilization, primarily influenced by age at marriage, education, occupation, facility accessibility, cultural factors, and limited service awareness.

Keywords: Maternal Health,Rural Healthcare,Service Utilization, Women's Health, Reproductive Services, Healthcare Barriers

INTRODUCTION:

Maternal and Child Health(MCH) care services during pregnancy, childbirth and after delivery are important for the survival and well-being of both the mother and the infant. Antenatal care (ANC) could help minimize the health risks faced by mothers and their children through surveillance of the pregnancy and screening of complications.[1] Delivery at a health facility, with skilled medical attention and hygienic conditions, reduces the risk of complications and infections during labour and delivery.[2,3]

According to the evidence provided, in 2017, nearly 300 000 preventable deaths among motherly figures were reported. Nonetheless, maternal health is a serious health challenge faced by women even though important achievement has been recorded in terms of reducing global maternal deaths by 38% from 2000 and 2017.[4,5]

About 260 000 women died during and following pregnancy and childbirth in 2023. Approximately 92% of all maternal deaths occurred in low- and lower-middle-income countries in 2023, and most could have been prevented. According to the World Health Organisation (WHO) the main barriers to access maternal healthcare and contributing factors of maternal mortality are poverty, physical distance to healthcare service, lack of information on service availability and health risks, inadequate services and cultural beliefs and practice.[6]

The Reproductive and Child Health Programme established in India, has an objective of annually providing at least three antenatal check-ups that must entail; performing of weight and blood pressure check, examination of abdomen, vaccination against tetanus, iron and folic acid prophylaxis, and anaemia control as well. [7] Even though there has been a high growth in the provision of healthcare infrastructure, availability of door step services, and policy initiatives in India, disparities still exist in the MCH service access especially the rural India. The data of The National Family Health Survey (NFHS - 5) indicate that, 17 % of women got their first ANC visit at the fourth and fifth month of pregnancy, 7 % received initial ANC in the sixth month or afterward, and 6 % did not get an ANC visit. Compared to the percentage of rural women (55 percent), urban women have greater chances of making four or more ANC visits (69 percent). It is emphasized in NFHS-5, 2019-21 that although the rate of institutional delivery has accelerated, the level of antenatal care (ANC) visits, postnatal care (PNC) and immunization coverage has not improved well in most parts of the country particularly in the marginalized and rural areas.[8]

A previous study shows that even though there is an improvement in the area of antenatal care coverage in India, it is low in terms of quality as only 32 percent of mothers got a sufficient quality ANC in 2019-21. Important elements like Iron and Folic Acid tablet provision and counselling were found to be important barriers.[9]

Researches have shown that illiteracy, financial inabilities, lack of awareness and proximity to health care centers are other factors that contribute much to the utilization of the MCH services by the women.[10] Moreover the cultural norms and gender dynamics usually impose the limits on the freedom of women in their requests to receive healthcare services in a timely manner. Such patriarchal setup restricts women to have any independent health decisions, thus impacting the access of the required health services. There is the influence on choice-making by economic factors as well.[11] According to study, the delays in use of health care services are numerous, but the major three delays encountered include; delay in decision to seek care, delay in reaching care, delay in receiving adequate health care. The best thing that should be done in the health programs in the recent days is to address these delays.[12,13]

The determinants of MCH service utilization in rural setting are important in order to develop specific interventions. It also lays stress in emphasising on the primary level in terms of prioritising preventive care so as to enhance better overall health outcomes, since resource allocation in present times, favours the secondary care over the primary care in the rural parts which may not help in effective delivery of health care. Preventive care on the primary level can turn into the focus of healthcare policies in order to meet the needs of rural communities in a better way and eventually improve the overall health outcomes and equal access to maternal and child health services.[14,15]

In spite of many programs and crucial health care services being established, many factors leads to delays in service use, which in turn lead to high maternal mortality. The rural population of India still faces many barriers in utilising those MCH services. This study aims to explore the factors that delay maternal health service utilization services by currently married women aged above 18 years in rural Kolar.

OBJECTIVES:
To study the barriers in utilizing MCH care services by currently married women aged above 18 years in rural Kolar.

MATERIALS & METHODS:
The study was conducted as a cross-sectional investigation in rural areas of Kolar district, Karnataka, from July to November 2023. The sample size was calculated based on the percentage of mothers receiving Maternal and Child Health (MCH) services from skilled providers during antenatal care, as reported by NFHS-5 (2019–2021). Using the formula (4pq/d^2); (where p = 85.5% and d = 4%), and accounting for a 10% non-response rate, the final sample size was determined to be 340. Participants included married women aged above 18 years who were either pregnant or had given birth to at least one child and were residing in the field practice area of the Department of Community Medicine, Sri Devaraj URS Medical College, Kolar. Exclusion criteria applied to those who had not lived in the study area for at least six months. Data collection was carried out through house-to-house visits using a pretested, validated (content and language) semi-structured questionnaire administered via face-to-face interviews, each lasting no more than 15 minutes. It included sections on sociodemographic details (e.g., age, gender, education, income) and specific questions about telemedicine practices. Study was started after Institutional Ethics Committee approval. Informed written consent was taken from the participant before collection of data. Prior to participation, informed written consent was obtained. Confidentiality and Autonomy was maintained for study participants making participation in the interview voluntary.

STATISTICAL ANALYSIS:
Collected data were entered into Microsoft Excel and analyzed using SPSS version 22. Descriptive statistics (frequencies, percentages) summarized sociodemographic characteristics, awareness, and utilization of MCH services. Inferential statistics, including Chi-square tests and Binary logistic regression analysis were employed to examine associations between variables, with a p-value < 0.05 considered statistically significant. The study adhered to rigorous methodological standards, maintaining data integrity and ethical compliance throughout the research process.

RESULTS:

Table 1:Frequencytable showing theSociodemographic characteristics of study participants (N=340)

VARIABLES	CATEGORIES	FREQUENCY(%)
Age	18-30	220 (64.7)
	31-45	114 (33.5)
	46-60	2 (0.6)
	>60	4 (1.2)
Age at Marriage	<18	136 (40)
	18 and above	204 (60)
Religion	Hindu	329 (96.8)
	Christian	4 (1.2)
	Muslim	7 (2.1)
Socioeconomic Class	BPL	280 (82.4)

	APL	60 (17.6)

BPL – Below Poverty Line; APL - Above Poverty Line

Table – 2: Frequency table showing the utilization of MCH services among study participants:

MCH SERVICE UTILIZATION	CATEGORIES	FREQUENCY(%)
Gestational age at registration of pregnancy	<12 weeks	187 (55.0)
	13-24 weeks	78 (22.9)
	25-36 weeks	10 (2.9)
	Not Registered	65 (19.1)
HIV Counselling	Given	107 (31.5)
	Not given	133 (39.1)
	Don't Know	100 (29.4)
Facility Based Breast Feeding Initiation	< 1 hr	231 (67.9)
	1–24 hr	87 (25.6)
	>24 hr	22 (6.5)
Place of Delivery	Govt	257 (75.6)
	Private	54 (15.9)
	Home	29 (8.5)
Family Planning Services	Utilised	75 (22.1)
	Not Utilised	265 (77.9)

Fig -1: Education status of study participants (N=340)

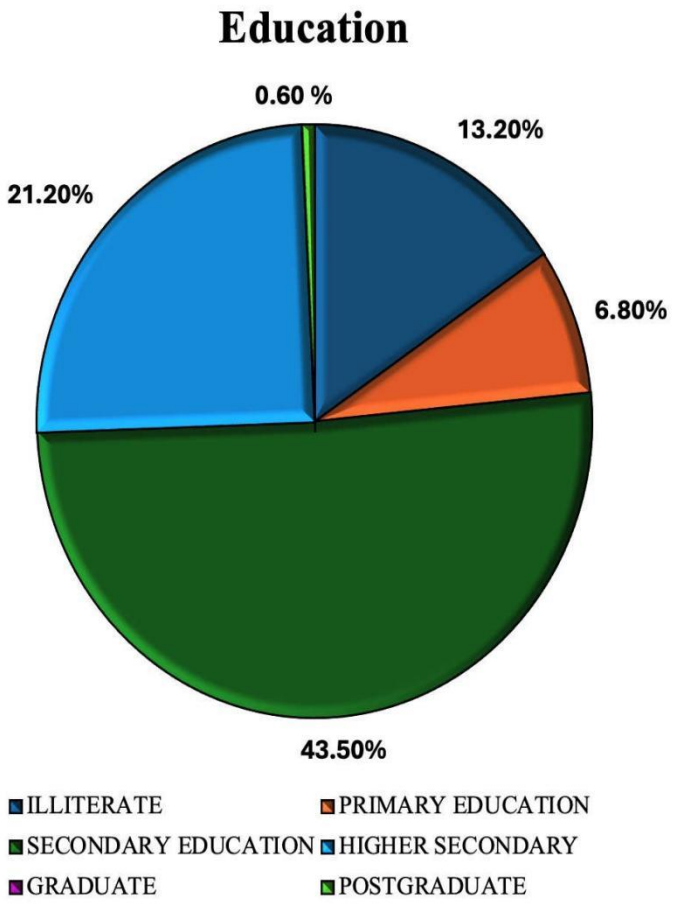

Fig -2 : Occupation status of study participants (N=340)

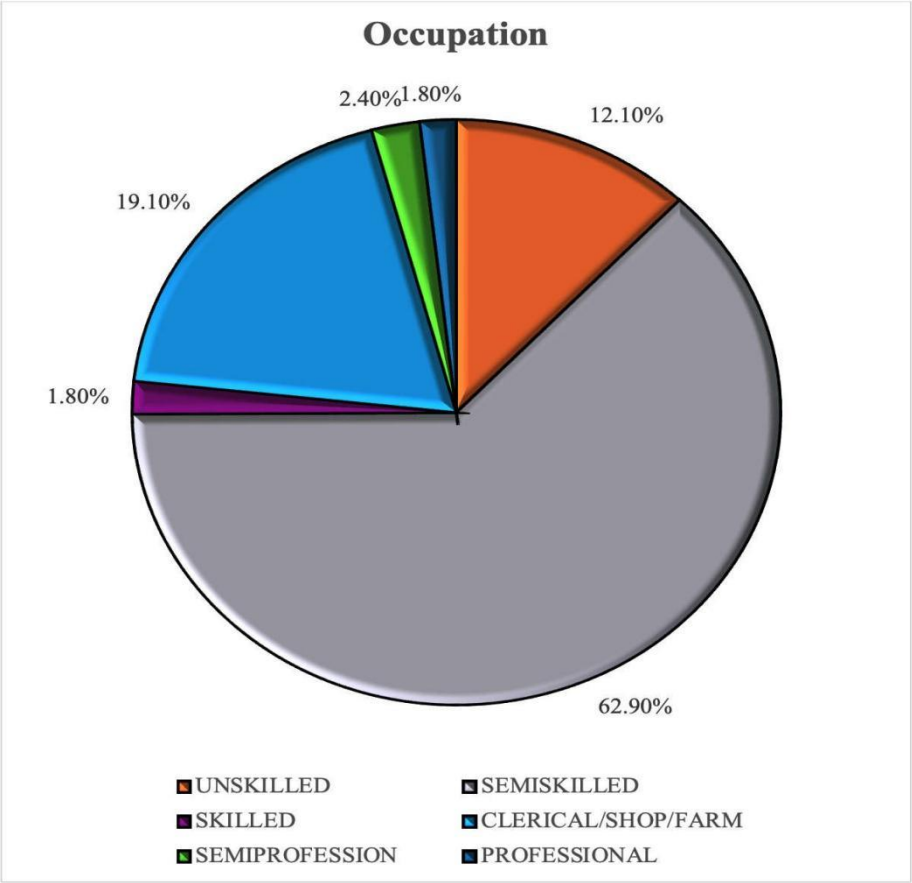

Fig-3: Awareness of study participants (N=340) regarding MCH

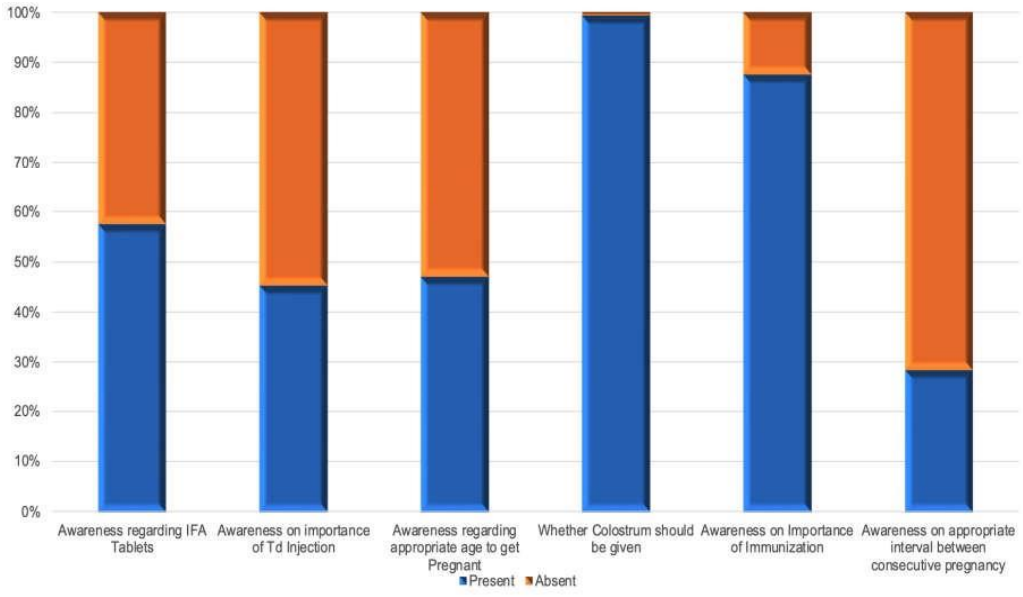

Table 3: Factors associated with utilisation of MCH services among study participants; N = 340 (BivariateAnalysis: Sociodemographic characteristics)

VARIABLES		Gestational age at registration of pregnancy				P Value	HIV Counselling			P Value	Facility Based Breastfeeding Initiation			P Value	Place of Delivery			P Value	Utilization of Family Planning services		P Value
		<12 weeks	13-24 weeks	25-36 weeks	Not Registered		Given	Not Given	Don't Know		<1 hr	1-24 hr	>24 hr		Govt	Private	Home		Yes	No	
AGE AT MARRIAGE	<18	61	36	2	37	0.002[a] *	28	52	56	0.001[a] *	81	48	7	0.004[a] *	94	22	20	0.003[a] *	33	103	0.423[a]
	18 and Above	126	42	8	28		79	81	44		150	39	15		163	32	9		42	162	
SEC	BPL	150	59	6	65	0.001[b] *	95	114	71	0.003[b] *	183	80	17	0.018[b] *	219	34	27	0.001[b] *	66	214	0.172[b]
	APL	37	19	4	0		12	19	29		48	7	5		38	20	2		9	51	
EDUCATION	ILLITERATE	17	11	4	13	0.001[b] *	5	19	21	0.001[a] *	32	13	0	0.171[b]	31	0	14	0.001[b] *	11	34	0.089[a]
	PRIMARY	8	6	0	9		4	8	11		16	7	0		16	3	4		4	19	
	SECONDARY	76	31	2	39		41	53	54		94	37	17		119	20	9		41	107	
	HIGHER SECONDARY	49	15	4	4		33	30	9		54	16	2		55	15	2		15	57	
	GRADUATE	35	15	0	0		22	23	5		33	14	3		36	14	0		4	46	
	POSTGRADUATE	2	0	0	0		2	0	0		2	0	0		0	2	0		0	2	
OCCUPATION	UNSKILLED	8	15	2	16	0.001[b] *	6	19	16	0.001[b] *	23	12	6	0.397[b]	27	2	12	0.001[b] *	18	23	0.003[b] *
	SEMISKILLED	142	35	8	29		72	89	53		149	52	13		159	44	11		37	177	
	SKILLED	2	4	0	0		4	2	0		6	0	0		2	0	4		2	4	
	CLERICAL/FARM	29	16	0	20		17	17	31		45	17	3		55	8	2		12	53	
	SEMIPROFESSION	4	4	0	0		6	2	0		4	4	0		8	0	0		4	4	
	PROFESSIONAL	2	4	0	0		2	4	0		4	2	0		6	0	0		2	4	

a – chi square P value; b – Fisher's exact P value; * - Significant (p<0.05). SEC – Socio Economic Class; BPL – Below Poverty Line; APL – Above Poverty Line.

Table 4: Factors associated with utilisation of MCH services among study participants; N = 340 (Bivariate Analysis: Awareness on MCH Services)

VARIABLES		Gestational age at registration of pregnancy				P Value	HIV Counselling			P Value	Facility Based Breastfeeding Initiation			P Value	Place of Delivery			P Value	Utilization of Family Planning		P Value
		<12 weeks	13-24 weeks	25-36 weeks	Not Registered		Given	Not Given	Don't Know		<1 hr	1-24 hr	>24 hr		Govt	Private	Home		Yes	No	
Awareness regarding IFA Tablets	Absent	78	28	4	34	0.259[a]	44	46	54	0.012[a] *	85	41	18	0.001[a] *	95	33	16	0.002[a] *	24	120	0.040[a] *
	Present	109	50	6	31		63	87	46		146	46	4		162	21	13		51	145	
Awareness on importance of TD Injection	Absent	89	57	4	36	0.002[a] *	44	74	68	0.001[a] *	118	52	16	0.082[a] *	138	28	20	0.264[a]	57	129	0.001[a] *
	Present	98	21	6	29		63	59	32		113	35	6		119	26	9		18	136	
Awareness regarding appropriate age to get Pregnant	Absent	79	51	4	46	0.001[a] *	62	53	65	0.001[a] *	116	59	5	0.001[a] *	138	26	16	0.735[a]	23	157	0.001[a] *
	Present	108	27	6	19		45	80	35		115	28	17		119	28	13		52	108	
Whether Colostrum should be given	No	2	0	0	0	1.0[b]	0	2	0	0.335[b]	2	0	0	1.0[b]	2	0	0	0.987[b]	0	2	0.607[b]
	Yes	185	78	10	65		107	131	100		229	87	22		255	54	29		75	263	
Awareness on Importance of Immunization	Absent	16	18	2	6	0.008[a] *	19	8	15	0.014[a] *	26	11	5	0.294[a]	32	8	2	0.576[a]	5	37	0.090[a]
	Present	171	60	8	59		88	125	85		205	76	17		225	46	27		70	228	
Awareness on appropriate interval between consecutive pregnancy	Absent	141	53	8	41	0.213[a]	77	99	67	0.457[a]	171	55	17	0.135[a]	177	47	19	0.021[a] *	56	187	0.487[a]
	Present	46	25	2	24		30	34	33		60	32	5		80	7	10		19	78	

a – chi square P value; b – Fisher's exact P value; * - Significant (p<0.05).

Table 5: Factors influencing the utilisation of MCH services among study participants; N = 340 (Binary Logistic Regression analysis : Sociodemographic characteristics)

VARIABLES		Pregnancy Registration			HIV Counselling			Facility Based Breastfeeding Initiation			Institutional Delivery			Utilization of Family Planning		
		B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value
AGE AT MARRIAGE	<18	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	18 and Above	.129	1.137	.718	.877	2.404	**.006***	.543	1.721	.057	1.195	3.304	**.001***	-.166	.847	.627
EDUCATION	ILLITERATE	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	PRIMARY	-.826	.438	.231	.874	2.396	.266	-.093	.911	.881	-.271	.763	.659	.146	1.158	.847
	SECONDARY	-.107	.899	.820	1.060	2.885	.061	-.678	.507	.116	.193	1.213	.664	.470	1.600	.333
	HIGHER SECONDARY	1.541	4.669	**.024***	1.816	6.147	**.002***	-.129	.879	.795	-.170	.844	.738	.186	1.205	.739
	GRADUATE	19.142	2.718	.997	1.773	5.891	**.007***	-.823	.439	.134	-.712	.490	.204	-1.821	.162	.058
	POSTGRADUATE	.928	2.529	1.000	24.112	2.869	.999	18.972	1.756	.999	-23.569	.000	.999	-18.697	.000	.999
OCCUPATION	UNSKILLED	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	SEMISKILLED	1.331	3.785	**.006***	.217	1.242	.691	.382	1.465	.368	.299	1.348	.491	-.900	.406	**.049***
	SKILLED	20.929	1.015	.999	2.088	8.066	.077	20.319	6.851	.999	-1.794	.166	.066	-.001	.999	.999
	CLERICAL/FARM	.540	1.715	.297	.261	1.298	.669	.628	1.873	.184	1.661	5.265	**.003***	-.940	.391	.084
	SEMIPROFESSION	17.701	4.047	.999	2.380	10.800	**.025***	-.909	.403	.317	21.187	1.166	.999	1.525	4.596	.183
	PROFESSIONAL	17.798	5.096	.999	-.776	.460	.481	.545	1.725	.605	20.326	6.372	.999	1.172	3.227	.357
SEC	BPL	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	APL	19.975	4.957	.997	-1.475	.229	**.001***	.745	2.105	.053	-.724	.485	**.035***	.119	1.126	.796

* - Statistically Significant (p<0.05). SEC – Socio Economic Class; BPL – Below Poverty Line; APL – Above Poverty Line.

Table 6: Factors influencing the utilisation of MCH services among study participants; N = 340 (Binary Logistic Regression analysis : Awareness on MCH Services)

VARIABLES		Pregnancy Registration			HIV Counselling			Facility Based Breastfeeding Initiation			Institutional Delivery			Utilization of Family Planning		
		B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value	B	Adjusted Odds Ratio	p Value
Awareness regarding IFA Tablets	Absent	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	Present	.677	1.968	**.023***	-.361	.697	.226	.826	2.285	**.002***	.829	2.291	**.005***	1.063	2.895	**.002***
Awareness on importance of TD Injection	Absent	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	Present	.047	1.048	.875	.720	2.054	**.016***	.157	1.170	.576	-.038	.963	.904	-1.285	.277	**.001***
Awareness regarding appropriate age to get Pregnant	Absent	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	Present	1.067	2.906	**.001***	-.625	.535	**.033***	.421	1.523	.133	-.160	.852	.601	1.216	3.375	**.001***
Awareness on Importance of Immunization	Absent	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
	Present	-.748	.473	.126	-.956	.384	**.016***	.233	1.262	.547	-.020	.981	.965	.519	1.681	.346
* - Statistically Significant.(p<0.05)																

Table 7 : Frequency table showing the significant barriers for MCH service utilization (N=340)

BARRIERS	FREQUENCY(%)
Illiteracy (Educational Barrier)	45 (13.2)
Unskilled Job (Occupational Barrier)	41 (12.10)
Early Marriage (<18 years age)	136 (40)
Awareness on MCH services	IFA Tablet – 144 (42.4)
	Td Injection – 186 (54.7)
	Pregnancy Age – 180 (52.9)
Hard Accessibility	105 (30.9)

In this study setting majority of participants were following Hindu religion (96.7%). Religion brings a gambit of cultures and practices pertaining to pregnancy, nutrition, and diet in pregnancy and child rearing. At the time of interview all participants were above 18 years of age. Majority of the participants were married above 18 years of age (60 %), however rest of them were married at less than 18 years age (40%), indicating that the child and teenage marriage was being practised even a decade before in the rural areas and is still a concern. Most of the study participants were BPL card holders (82.4%). (Table -1). Education is the key factor for improving quality of maternal health care and access and utilisation of ANC services. Educational level was above average in the rural area with 43.50% of the participants being passed of secondary education, even though there is rapid increasing civilization, there was still 13.2% of the participants being illiterate (Fig – 1). Among the study participants majority of the participants belonged to Semi Skilled occupation (62.90%) with most being homemakers classified under the category. The second being Shop workers and Farming (19.10%) (Fig – 2). Among the study participants 19.1% have not registered the pregnancy at a government hospital. Facility based Breast Feeding Initiation within one hour of delivery was reported among 67.9 % of the study participants. 75.6 % of the participants have delivered their babies in government hospitals and 15.9% in private hospitals, (out of which 78 % were Normal vaginal

deliveries and 22 % had undergone Cessarian section) and 8.5% of the participants had delivered in their home and of which 1.2% had delivered at home in the last five years. Among the participants majority of them have not followed contraceptive methods after delivery (77.9%) and among rest who followed, 15.58 % have undergone permanent sterilisation. 68.5 % (No & Don't Know) of the participants had not received HIV counselling (Table – 2). Also 30.9% of the participants reported hard accessibility to the utilisation of services. Cultural factors like withholding the colostrum was reported among 2% of the study participants.

On evaluating the awareness on MCH services, majority (54.7%) of them does not know the importance of Td injection. Among the study participants Colostrum feeding (whether it should be given) appears to have the highest awareness (nearly 100% "Present"). 87.6 % of the participants had awareness on Importance of Immunization. Awareness on IFA tablets (iron-folic acid) present among 57.6 % of the participants. Appropriate age for pregnancy and interval between pregnancies show significant gaps, with 52.9 % and 71.5 % of participants being unaware. ("Absent") (Fig – 3).

On Bivariate analysis there was an association between service utilisation and certain demographic characteristics like age at marriage, socioeconomic class, education and occupation which was statistically significant. Our study reports Early registration (<12 weeks) of pregnancy is more common among Women married at age ≥18 years (p=0.002); Higher education levels (secondary/higher secondary/graduate) (p=0.001), Semi-skilled and clerical occupations (p=0.001). Younger age of marriage, less-educated, or unskilled women may delay pregnancy registration. Higher uptake of HIV counselling is seen among women married at ≥18 years of age (p=0.001), APL (above poverty line) and educated groups (secondary & higher secondary) (p=0.001). Early initiation of Breastfeeding (<1 hr) is associated with Higher education (p=0.001) and skilled occupations (p=0.003). Delayed initiation (>24 hrs) is seen more in illiterate/unskilled groups (p=0.004). For the place of delivery Government facilities were preferred by BPL families (p=0.018) and secondary-educated women (p=0.001)*;* Private facilities *were u*sed more by APL/educated women. Higher Contraceptive use was seen among Skilled/semi-professional occupations (p=0.001) (Table – 3).

Service utilisation was also associated with awareness on certain MCH services as follows. Early ANC Registration (<12 weeks) was seen higher among women aware of IFA tablets (p=0.012) and Appropriate pregnancy interval (p=0.001). HIV Counselling Uptake was Associated with awareness of Td injection importance (p=0.001); awareness regarding appropriate age to get pregnant and awareness on importance of immunization (p = 0.001). Institutional Deliveries (Govt/Private) happened more likely if women knew about - Immunization importance (p=0.001); Pregnancy spacing (p=0.001). On contrary Home deliveries linked to lack of awareness (p=0.040). Early Breastfeeding Initiation (<24 hrs) is seen higher in women aware of IFA tablets and appropriate age to get pregnant (p=0.002). With Contraceptive Use there was no significance linked to awareness (p>0.05), suggesting there might be other barriers (e.g., access, cultural norms). Cultural factors did not have any significant association with the service utilisation (Table – 4).

On logistic regression analysis, the Odds of utilising the services increased with higher education status, Professional occupations and women getting married ≥18 years of age, which was statistically significant. The present study reported that participants with Higher Secondary Education (AOR=4.67*, p=0.024) are at 4.67 times higher odds of registering the pregnancy compared to illiterates. Participants with Semi-skilled Occupation (AOR=3.79*, p=0.006) have 3.79 times higher odds of registering the pregnancy compared to unskilled groups. The odds of HIV counselling uptake increases with Higher secondary education (AOR=6.15*, p=0.002) and Graduate Education (AOR=5.89*, p=0.007) compared to illiterates. Participants with semiprofessional occupation (AOR=10.8*, p=0.025) are at 10.8 times higher odds of HIV counselling uptake compared to unskilled groups. However participants belonging to Above poverty line(APL) are at 0.23 times lower odds of taking HIV counselling uptake compared to those falling under Below poverty line (BPL). Participants who got married at ≥18 years of age (AOR=3.3*, p=0.001) are at 3.3 times higher odds of delivering baby at institutions compared to those who got married at lesser age. Clerical workers and farmers (AOR= 5.27*, p=0.003) are at 5.27 times higher odds of delivering at institutions compared to unskilled workers (Table – 5).

Participants who are aware about IFA tablets (AOR=1.97, p=0.023) had 1.97 times higher odds of registering the pregnancy compared to those who are not aware. Participants who are aware about importance of TD injection (AOR= 2.05, p=0.016) had 2.05 times higher odds of HIV counselling uptake compared to those who are not aware. Awareness about the appropriate pregnancy age and importance of immunization (AOR= 0.54, p=0.033; AOR= 0.38, p=0.016) were negatively associated and were at lower odds of HIV counselling uptake. Participants who are aware about IFA tablets (AOR=2.29, p=0.005) had 2.29 times higher odds of delivering at instituitions compared to those who are not aware. Having awareness about IFA tablets (AOR=2.89, p=0.002) increased the odds of using family planning services by 2.89 times compared to those who are had not. Having awareness about the appropriate pregnancy age (AOR=3.38, p=0.001) increased the odds of using family planning services by 3.38 times compared to those who had not (Table – 6).

The comprehensive frequency table - 7 unveils critical barriers to Maternal and Child Health (MCH) service utilization among 340 participants, highlighting multifaceted challenges in healthcare access. Early marriage emerges as the most prominent barrier, with 40% of participants getting married before 18 years, potentially compromising their reproductive health opportunities. Awareness-related challenges are equally significant, with 42.4% lacking knowledge about IFA tablets, 54.7% uninformed about TD injections, and 52.9% unaware of appropriate pregnancy age leading to poor service uptake. Also structural barriers like illiteracy (13.2%) and unskilled employment (12.1%), further compounding service utilization challenges. Notably, 30.9% of participants reported hard accessibility as a substantial impediment to receiving MCH services.

DISCUSSION:

The present study reports a low awareness of pregnancy spacing (71.5% unaware) and TD injection importance (54.7%) which are critical for maternal and neonatal outcomes. While basic practices like colostrum is well-known, critical family planning aspects (pregnancy age/spacing) need targeted education. This is little less compared to a study done by Kuye-Kuku et al., where 66% of women unaware of TD injection. [16] Also 65.8% of women were not willing to adopt modern methods due to fear of side effects and lack of husband approval as reported by Sharma et al.[17]

Our study revealed that higher education, particularly secondary and higher secondary levels, significantly enhanced ANC registration (AOR=4.67), institutional deliveries (AOR=5.27), and HIV counselling (AOR=6.15). This finding aligns with multiple sub-Saharan African and lowmiddle-income country studies, such as Raru et al.'s multilevel analysis, which confirmed education as a critical determinant of maternal health service utilization. [18] Also a study done in Zambia says that higher educational attainment was associated with increased likelihood of attending at least four ANC visits, which is considered optimal by WHO standards.[19] In Ethiopia, maternal education demonstrated a significant positive correlation with institutional deliveries, with secondary and higher education substantially increasing the likelihood of institutional delivery (AOR = 3.44) and showing a clear spatial distribution pattern linked to educational attainment. [20] A previous study emphasized that educational attainment is a key factor in accessing HIV-related services, with educated women more likely to engage in health-seeking behaviors.[21]

Despite legal reforms,, our study reported that 40% of participants were child brides, perpetuating intergenerational health disparities. This aligns with evidence gathered by Gausman et al., stating that despite the decline from 49.4% in 1993 to 22.3% in 2021 for girls, certain states and Union Territories have experienced an increase in child marriage rates between 2016 and 2021. [22] With that being evident women married <18 years in the present study had lower odds of utilising the services reflecting limited autonomy and awareness. This aligns well with the study done by Kamal & Ulas, et al., which reports that child marriage significantly deters the use of maternal health care services, including ANC visits, institutional deliveries, and skilled birth assistance. This is evident across South Asian countries, including India, where child marriage is prevalent despite legal restrictions.[23]

Semi-skilled workers (62.9%) showed better service utilization in our study. This can be due to companies employing semi-skilled workers may provide health education and promotion programs, which increase awareness and encourage the use of MCH services. This is particularly evident in industrial areas where health promotion is integrated into workplace policies.[24,25]
However, BPL families (82.4%) relied more on government facilities (p=0.018), highlighting equity gaps in private healthcare access. This is in par with the previous study done by Daulat et al., which states that in India, socioeconomic factors such as education level, wealth status, and rural residency significantly influence the utilization of maternal and child health services. Higher education and wealth are associated with greater access to private healthcare, while poorer families rely more on public services.[10]
Awareness of IFA tablets doubled the odds of ANC registration (AOR=1.97) and institutional delivery (AOR=2.29). This suggests specific knowledge (e.g., anemia prevention) drives action more than general health literacy. This aligns with a previous study done by Adhila et al., which reports that regular ANC visits are crucial for monitoring pregnancy health and ensuring timely interventions. Women with knowledge of IFA supplementation are more likely to adhere to ANC schedules, with an AOR of 2.22 for regular visits. This adherence is linked to better health outcomes and increased likelihood of institutional delivery.[26]

In our present study regardless of being aware or unaware of the MCH services, nearly 78% of the study participants did not opt for any contraception after delivery suggests structural barriers (e.g., male opposition, supply shortages). Similar to this study, previous study found major factors behind this non-usage of contraception were to be social stigma, fear of adverse effects and cultural belief. Qualitative research is needed to explore these dynamics.[27]

Strengths and Limitations :
Strengths: The study provides a comprehensive analysis of maternal and child health services, highlighting a clear education-utilization association, identifying high-risk groups (illiterate women, un-skilled/semi-skilled workers), and proposing targeted interventions. **Limitations:** It lacks qualitative insights on contraceptive barriers, feasibility assessments for interventions, deeper private-sector analysis, and may have limited generalizability due to contextual factors.

CONCLUSION:

The study reveals a complex interplay of social, educational, economic, and awareness-related factors that significantly impede women's access to maternal healthcare services. The research underscores that MCH service utilization is not merely a healthcare issue, but a multifaceted social phenomenon deeply rooted in educational, economic, cultural, and awareness contexts. The findings highlight a strong education-utilization gradient, demonstrating that empowering women through education and socioeconomic support is crucial for improving maternal and child health outcomes, particularly among vulnerable populations like illiterate and unskilled workers. The high institutional delivery rates juxtaposed with low contraceptive uptake reveal deeper sociocultural and systemic barriers, including partner influence and postpartum access challenges. Recommendations include leveraging semi-skilled workers as change agents, enhancing community-level interventions through targeted health education, and utilizing ASHA workers for customized messaging on pregnancy spacing and MCH services. The study calls for comprehensive strategies such as adult literacy schemes, community-specific health communication, and strengthening private sector engagement for BPL families. While the research provides practical insights, it also acknowledges the need for feasibility assessments, deeper analysis of healthcare barriers, and contextual adaptations to ensure scalability. The ultimate goal is to create an integrated approach that addresses the multidimensional obstacles to MCH service utilization, focusing on early antenatal care registration, importance of nutritional supplements, immunization, and broader health awareness. By targeting community-level interventions, empowering young mothers, and addressing systemic barriers, the research aims to significantly improve health equity and service accessibility in rural healthcare settings.

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Nil.

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