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Original Research Paper

Does Media Exposure Affect the Utilization of Maternal Health Care Services? A Query from a Nationally Representative Survey of India

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Abstract

Maternal Health Care (MHC) is very essential for improvement in the health status of the mother and children. The present study attempts to show the role of mass media on the utilization of MHC services in India. The entire study depends on secondary data collected from the National Family Health Survey (NFHS-4, 2015-16). Initially, the data has been analyzed by some descriptive statistics and for the proper depiction of the result, binary logistic regression has been conducted. The unadjusted odds ratio (UOR) has shown media exposure positively and significantly associated with the utilization of the majority of MHC services. The adjusted odds ratio has a less effective association with the MHC services compare to the unadjusted odds ratio. Other controlling variables including maternal age, age at marriage, birth order, education, caste, religion, wealth index, place of residence, and the region has also affect the health care services.

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1 INTRODUCTION

Maternal Health Care (MHC) is now a vital global phenomenon that needs more attention for all countries which working towards achieving Millennium Development Goals (MDG) started in 2015 (Singh *et al.*, 2012). The proper treatment-seeking behaviour during pregnancy reduces not merely maternal mortality but in addition newborn health as well as neonatal mortality (Islam *et al.*, 2018; Yadav *et. al.*, 2020). In India, it is found that maternal mortality (167/100000 live births) and infant mortality (37/1000 live births) due to maternity causes at the time of delivery is high compare to developed nations (Mishra and Ramanathan, 2002; Ahankari *et al.*, 2008; Thind *et al.*, 2008). Media which is also known as the fourth state of a country has a crucial role in highlighting and creating proper awareness's and perceptions and policy implications on maternal health care issues (Nwagbara, 2017; Zamawe *et al.*, 2015). A journalist, as well as health journalist, can easily hold the public perceptions on the governmental role for maternal health care, realistic picture of caretaking by mothers, different barriers like lack of care center, transportation and the condition of care, nutrition and hygiene of an area (Acharya *et al.*, 2015; Gugsa *et al.*, 2016). Media exposure is the strong communicative channel which increase the awareness and proper utilization of required maternal health care services as well as public health issues with the proper use of television, radio, and newspapers (Odesanya *et al.*, 2015; Zamawe *et al.*, 2015). All countries have been initiated different awareness programs and policies to reduce the maternal as well as neonatal mortality. India also adopted the various policies and programs for the progress of not only maternal health and child health but also public health; as a result, there was a tremendous

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growth on the care of health-seeking behaviour among women aged 15-49 years (NFHS-4 report). WHO recommended that every woman has to receive at least 4 ANC visits during pregnancy; it can reduce the various complications. In India, the share of women received at least 4 or more ANC visits was 77% in NFHS-3 (2005-06) which now at 84% in NFHS-4 (2015-16), and 79% women received antenatal care from a skilled health provider in NFHS-4; 59% of women received their first ANC visit during the first trimester of pregnancy. Another important treatment-seeking behaviour is to take all the ANC components i.e. weight measure, blood pressure check-up, urine sample test and abdominal examine. In this case the scenario of India quite satisfactory i.e. pregnant women are more likely to have their weight measured (91%), their blood pressure measured (89%), and a blood sample was taken (87%), urine sample was taken for 88 per cent of women and 89 per cent of women had their abdomen examined whereas there also some unsatisfactory aspect i.e. to take iron and folic acid (IFA) tablets for at least 100 days (30%) or to take an intestinal parasite drug (18%) (NFHS-4, 2015-16). The present study attempted to show the role of mass media exposure on the utilization of MHC services among Indian women aged 15-49 years who had at least one live birth preceding 5 years of the survey.

2 METHODOLOGY

2.1 Data

The present work has been complete with the assist of secondary data composed from National Family Health Survey-4 in India which has been conducted in 2015-16 over 601509 households, 699686 women aged 15-49 years with a response rate of 97%, and 112122 men aged 15-54 years with a response rate of 92% (Paul and Chouhan, 2019; Barman *et al*., 2020). The present study extracted relevant data from the Demographic Health Surveys (DHS) program into STATA version 12.1. The data was processed using the weights of each sample (Paul, 2020). The variables with multiple categories were recoded into different groups. In this study, we have used the data on 190898 ever-married women aged 15-49 years who had at least one live birth in the last 5 years preceding the survey (Paul, 2020; Barman *et al*., 2020).

2.2 Outcome Variables

In the present work, the utilization of MHC services has been discussed in three phases' i.e. antenatal care (ANC), delivery care and postnatal care (PNC) wherein antenatal care five outcome variables have been selected i.e. received ANC, at least 4 ANC visit as per the recommendation of World Health Organization, proper timing of first ANC visit which has been considered as the timing of first ANC within the first trimester (Barman *et al*., 2020; WHO, 2016), skilled health personnel for ANC where skilled health personnel has been considered as antenatal care by doctor/nurse/auxiliary nurse midwife and taking at least 2 or more tetanus toxoid injection as per WHOs recommendation (Barman *et al*., 2020). In delivery care, place of delivery i.e. either institution or home and the presence of skilled birth attendant during delivery is very important for the safe delivery for newborn baby and also for the maternal mortality due to maternity cause. Skilled birth attendant may reduce the risk of delivery complications. According to NFHS skilled birth attendant are called as doctor and nurse. Final phase i.e. postnatal care also important aspect of MHC services which is not only helpful for mother but also both mother and newborn baby. In postnatal care variable, PNC within 42 days of delivery has been taken for consideration. For the multivariate analysis (binary logistic regression), all the outcome variables has been coded as '1' if 'yes' and '0' if 'no' for the proper depiction of the results.

2.3 Explanatory Variable

Media exposure of the women has been considered as the index of three main variables i.e. listening to the radio (yes or no), watching television (yes or no) and reading newspaper (yes or no) from the NFHS-4 which was conducted in 2015-16 in India (NFHS, 2015-16). After compositing all the three variables, media exposure variable has been created which was categorized into three categories i.e. no exposure (those women who were not involved with these three media exposure variables), partial exposure (those women who were involved with any two of these three media exposure variables) and full exposure (those women who were strongly involved with radio, television and newspaper) (Barman *et al*., 2020).

2.4 Study Covariates

Different socio-demographic and economic variables have been considered as covariates in the present study to show the determining effect on the utilization of maternal health care services except for media exposure i.e. age of the respondents which has been categorized into three categories i.e. 15-24 years, 25-34 years and 35-49 years, age at marriage (< 18years and 18 or > 18 years), birth order (1, 2, 3 and 4 or 4 +), caste (SC, ST, OBC and Others), religion (Hindu, Muslim, Christian and Others), women's education (illiterate, primary, secondary and higher), place of residence (urban and rural), wealth index (poorest, poorer, middle, richer and richest), and region (north, central, east, north-east, west and south) has been considered to show the adjusted odds ratio (controlled for maternal age, age at marriage, birth order, caste, religion, education, wealth index, place of residence and region) between media exposure and utilization of maternal health care services (Barman *et al*., 2018; Barman *et al*., 2020).

2.5 Statistical Analyses

For the proper depiction of the results, we have used Chi-square as bivariate analysis and binary (1, 0) logistic regression as multivariate analysis to show the

exact association between media exposure and different treatment-seeking behaviour during pregnancy and child birth. Binary logistic (0, 1) regression also has done where dependent variables (MHC indicators) has been coded '0' (No) and '1' (Yes) to find the unadjusted odds ratio (UOR) which tell us the role of a particular independent variable on the particular dependent variable and adjusted odds ratio (AOR) (where other independent variables were controlled) which tell us the combined effect of all the independent variables (explanatory variables and study covariates) on the particular dependent variable (outcome variables) (Barman *et al*., 2018).

3 RESULTS

Table 1 shows the respondent's individuals (maternal age, age at marriage, birth order) and socio-cultural characteristics (education, caste, religion, wealth index, place of residence, region) in India where most (46.9%) of the respondent's education were secondary level and 27.6% were illiterate, 55.9% respondents have belonged from the age group 25-34 years and 37.6% were being married at <18 years old (Barman *et al*., 2018). Most of the respondents (45.3%) were from the other backward classes (OBC) group and about 45% of respondents belonged from a poor family who is inhabited rural areas (70.2%) (Barman *et al*., 2018). This table (Table 1) emphasizes on the weighted distribution of the respondents by their nature of exposure to mass media. Only 9 to 20% of respondents were listening to the radio whereas up to 75% respondents by their different backgrounds read the newspaper but in the case of watching television, the proportion was high compare to radio and newspaper. Education and poverty play a vital role for the associated with mass media (Table 1); with the increase of education and wealth, the percentage of women also increased who have engaged with any mode of mass media (radio, television and newspaper) mass media (Table 1).

Table 2 depicts the different individuals and socio-cultural characteristics of the respondents by their utilization of maternal health care services (MHC indicators) in India (Barman *et al*., 2018) which undoubtedly assured that the full exposure respondents were more advanced in terms of taking different maternal health care services i.e. received antenatal care (89.4%) [χ^2=1.3e+04 and p=0.000], at least 4 ANC (63.8%) [χ^2=1.6e+04 and p=0.000], ANC visit within first trimester (67.4%) [χ^2=1.5e+04 and p=0.000], skilled health personnel for ANC (88.6%) [χ^2=1.6e+04 and p=0.000], taking 100 or more IFA tablets (42.35%) [χ^2=3.3e+03 and p=0.000], taking 2 or more TT injections (81.7%) [χ^2=1.8e+03 and p=0.000], institutional delivery (92.9%) [χ^2=1.2e+04 and p=0.000], skilled birth attendance for delivery (93.3%) [χ^2=1.2e+04 and p=0.000] and PNC within 42 days of delivery (77.4%) [χ^2=7.9e+03 and p=0.000] than the no exposure women. The women who were married at 18 or above age, higher educated women were more superior in the consumption of all MHC services in India. It was found that in case of religious view, the Muslim women were far behind in terms of utilization of MHC services compare to the Hindu women; similarly the lower utilization of MHC services was found among rural women compare to urban women. Economic condition plays a significant role for the utilization of required MHC services. It was found that the poorest women were very far from the proper utilization of all the MHC services than the richer and richest women (Table 2) (Barman *et al*., 2018).

Table 1. Individual and socio-cultural characteristics of ever-married women aged (15-49) years who had at least one live birth in the last 5 years (2015-2016)

Independent variables	Media exposure			Weighted % (n)
	Listening radio	Watching television	Reading news paper	
Mass media exposure				
No exposure				24.6 (49374)
Partial exposure				67.7 (126910)
Full exposure				7.7 (14614)
Maternal age				
15-24 years	13.1 (8489)	73.7 (44340)	33.5 (19924)	34.7 (62082)
25-34 years	14.3 (16370)	72.6 (76866)	37.3 (38140)	55.9 (107500)
35-49 years	13.6 (3443)	55.7 (12381)	25.2 (5599)	9.4 (21316)
Age at marriage				
<18 years	12.0 (8543)	61.8 (41586)	22.3 (14639)	37.3 (66425)
18 or 18+ years	15.1(19341)	77.9 (89688)	43.7 (48446)	62.7 (121205)
Birth order				
1	15.2 (10212)	80.2 (48602)	45.3 (26958)	33.6 (61807)
2	14.5 (9526)	77.8 (47471)	39.8 (23824)	34.5 (62484)
3	12.5 (4561)	64.6 (21352)	25.0 (8383)	16.6 (33064)

4 <	10.6 (4003)	44.9 (16162)	11.8 (4498)	15.3 (33543)
Women's education				
Illiterate	9.4 (5679)	41.9 (23131)	0.7 (382)	27.6 (55165)
Primary	11.3 (3205)	66.3 (17438)	12.9 (3714)	13.5 (26712)
Secondary	14.7 (14778)	84.2 (73954)	48.9 (42935)	46.9 (88871)
Higher	23.2 (4640)	94.7 (19064)	83.1 (16632)	12 (20150)
Caste				
SC	12.9 (4442)	69.6 (24069)	27.9 (9372)	21.99 (35170)
ST	12.3 (5582)	59.3 (24132)	20.9 (10283)	10.7 (37889)
OBC	13.7 (9834)	70.7 (51556)	35.8 (24856)	45.3 (74060)
Others	14.7 (6251)	80.3 (28548)	47.1 (16903)	22 (35888)
Religion				
Hindu	14.1 (19165)	72.5 (97849)	35.4 (45866)	79.4 (138343)
Muslim	12.6 (5263)	62.1 (17585)	28.2 (7829)	16.2 (29309)
Christian	15.2 (2630)	81.1 (11642)	49.9 (6643)	2.1 (15202)
Others	10.8 (722)	92.3 (5114)	53.3 (2614)	2.3 (5650)
Wealth Index				
Poorest	10.2 (4704)	29.4 (13981)	7.7 (3457)	23.4 (46782)
Poorer	12.1 (6242)	63.9 (27700)	19.2 (8457)	21.2 (43739)
Middle	13.6 (6353)	85.1 (32596)	34.2 (13327)	19.9 (38393)
Richer	15.4 (5617)	94.1 (31231)	51.4 (17083)	19 (33312)
Richest	19.6 (5386)	97.5 (28079)	75.1 (21339)	16.6 (28772)
Place of residence				
Urban	16.6 (7881)	90.3 (43017)	53.3 (25435)	29.72 (47833)
Rural	12.6 (20421)	63.4 (90570)	27.1 (38228)	70.2 (143065)
Region				
North	13.6 (6116)	81.2 (28783)	40.1 (14313)	13.2 (36079)
Central	13.2 (6756)	61.5 (33731)	26.9 (14255)	25.7 (52952)
East	12.7 (4676)	54.3 (20047)	23.0 (9021)	25.4 (39243)
North-East	13.4 (5725)	64.8 (21143)	26.4 (10357)	3.9 (28825)
West	13.8 (1581)	83.8 (11308)	45.3 (5609)	13.1 (13892)
South	16.5 (3448)	94.0 (18575)	52.6 (10108)	18.7 (19907)

Table 2. Percentage (weighted) distribution of individuals and socio-cultural characteristics of women (15-49 years) by the different maternal health care indicators of India (2015-16)

Independent variables	Received ANC	At least 4 ANC visit	ANC visit within 1st trimester	Received ANC from SHP	Taking 100 IFA tablets
Maternal age					
15-24 years	85.7	53.3	60.4	82.1	29.73
25-34 years	82.8	52	59.4	79.6	31.63
35-49 years	71.1	39.1	47.2	66.9	24.61
Chi-square; p-value	1.6e+03; 0.000	590.59; 0.000	1.7e+03; 0.000	1.4e+03; 0.000	141.56; 0.000
Age at marriage					
<18 years	77.3	41.9	50.8	72.5	22.54
18 or 18+ years	86.5	57.5	64	84	35.48
Chi-square; p-value	3.8e+03; 0.000	5.8e+03; 0.000	4.6e+03; 0.000	4.4e+03; 0.000	1.9e+03; 0.000
Birth order					
1	89.2	61.6	66.5	87	35.97
2	86.2	56.6	62.6	83.3	34.51
3	78.5	42.8	52.6	73.8	24.71
4 or 4+	65.2	25.5	38.9	59.3	14.53
Chi-square; p-value	8.2e+03; 0.000	9.8e+03; 0.000	9.6e+03; 0.000	8.8e+03; 0.000	2.1e+03; 0.000
Women's education					
Illiterate	67	28	41.2	60.6	15.68

Primary	82	45.4	53.8	77.3	23.72
Secondary	89.3	61	65.7	87.1	35.77
Higher	93.7	72.9	76.4	93.8	50.06
Chi-square; p-value	1.2e+04; 0.000	1.7e+04; 0.000	1.5e+04; 0.000	1.5e+04; 0.000	5.1e+03; 0.000
Caste					
SC	81.6	48.7	55.1	77.5	28.6
ST	79	45.6	53.5	72.9	26.81
OBC	81.5	48.2	58.5	78.2	30.24
Others	87.2	60.6	65.2	85.5	34.4
Chi-square; p-value	1.9e+03; 0.000	2.9e+03; 0.000	2.3e+03; 0.000	2.3e+03; 0.000	396.87; 0.000
Religion					
Hindu	82.8	50.8	58.6	79.3	30.76
Muslim	79.9	48.8	56.5	77	24.66
Christian	85.9	62.1	65	84.2	46.74
Others	94.9	69.9	73.2	92.8	43.06
Chi-square; p-value	1.2e+03; 0.000	837.10; 0.000	1.4e+03; 0.000	842.68;0.000	621.18; 0.000
Wealth Index					
Poorest	64.7	25	37.7	57.1	14.43
Poorer	81.2	44.4	52.5	76.2	23.17
Middle	88	57.2	63.2	85.6	32.77
Richer	91.1	65.8	69.9	90.4	39.57
Richest	93.9	73.1	77.4	94.1	48.23
Chi-square; p-value	1.4e+04; 0.000	2.1e+04; 0.000	1.8e+04; 0.000	1.9e+04; 0.000	6.2e+03; 0.000
Place of residence					
Urban	89.7	66.4	69.1	89.1	40.84
Rural	79.7	44.8	54.2	75.1	25.86
Chi-square; p-value	2.6e+03; 0.000	5.9e+03; 0.000	3.8e+03; 0.000	3.9e+03; 0.000	1.8e+03; 0.000
Region					
North	87	50.2	65.4	84.7	29.44
Central	77.9	31.8	50.1	73.2	17.25
East	73.7	41.6	46.9	67.9	19.64
North-East	85.5	48.3	56	81.8	30.55
West	89.6	71.7	69.8	87.4	39.49
South	93	77.8	74.2	93	56.82
Chi-square; p-value	5.5e+03; 0.000	1.8e+04; 0.000	7.4e+03; 0.000	7.5e+03; 0.000	9.2e+03; 0.000
Mass media exposure					
No exposure	64.7	24.4	38.1	57.6	14.26
Partial exposure	88.5	59.5	65.1	86.1	34.79
Full exposure	89.4	63.8	67.4	88.6	42.35
Chi-square; p-value	1.3e+04;0.000	1.6e+04;0.000	1.5e+04;0.000	1.6e+04; 0.000	3.3e+03; 0.000

Independent variables	Taking 2 or more tetanus toxoid injection	Institutional delivery	Skilled birth attendant	PNC within 42 days of delivery
Women's education				
Illiterate	77.6	63.4	66.7	54.8
Primary	82.8	75.3	78.0	64.9
Secondary	85.0	89.2	89.9	75.1

Higher	87.4	96.9	96.5	82.9
Chi-square; p-value	2.3e+03; 0.000	1.6e+04; 0.000	1.5e+04; 0.000	7.8e+03; 0.000
Maternal age				
15-24 years	83.9	84.3	85.6	70.4
25-34 years	83.2	81.3	82.8	69.6
35-49 years	78.1	68.6	71.3	60.8
Chi-square; p-value	627.98; 0.000	2.3e+03; 0.000	2.0e+03; 0.000	640.30; 0.000
Age at marriage				
<18 years	81.8	74.1	76.6	62.9
18 or 18+ years	84.0	86.0	86.9	73.6
Chi-square; p-value	1.5e+03; 0.000	4.0e+03; 0.000	3.7e+03; 0.000	3.3e+03; 0.000
Birth order				
1	86.6	91.0	91.1	75.5
2	83.1	84.6	86.0	72.1
3	81.8	73.9	76.9	63.7
4 or 4+	75.9	59.5	63.2	53.7
Chi-square; p-value	2.8e+03; 0.000	1.4e+04; 0.000	1.2e+04; 0.000	5.0e+03; 0.000
Caste				
SC	82.4	80.3	81.8	68.7
ST	79.0	70.0	72.4	63.7
OBC	82.8	82.2	83.5	68.8
Others	85.4	85.5	87.1	73.2
Chi-square; p-value	1.6e+03; 0.000	5.3e+03; 0.000	4.5e+03; 0.000	1.8e+03; 0.000
Religion				
Hindu	83.1	82.9	84.0	69.7
Muslim	82.1	71.9	75.2	63.1
Christian	79.6	81.1	82.6	74.5
Others	86.5	92.6	94.2	84.7
Chi-square; p-value	1.9e+03; 0.000	4.9e+03; 0.000	3.7e+03; 0.000	1.8e+03; 0.000
Wealth Index				
Poorest	78.2	61.1	64.4	52.2
Poorer	82.3	76.8	79.1	64.5
Middle	83.7	86.6	87.7	73.8
Richer	84.6	91.7	92.4	78.5
Richest	87.6	96.1	96.0	82.1
Chi-square; p-value	2.1e+03; 0.000	1.8e+04; 0.000	1.7e+04; 0.000	1.0e+04; 0.000
Place of residence				
Urban	84.4	90.3	91.1	76.4
Rural	82.4	77.3	79.2	65.9
Chi-square; p-value	473.73; 0.000	4.2e+03; 0.000	4.0e+03; 0.000	1.9e+03; 0.000
Region				
North	83.5	85.4	87.7	72.2
Central	82.7	73.4	74.2	62.3
East	86.1	72.2	76.6	60.6
North-East	81.5	71.2	73.6	61.8
West	81.5	91.1	90.5	78.3
South	78.0	95.9	95.5	82.5
Chi-square; p-value	1.8e+03; 0.000	9.4e+03; 0.000	7.9e+03; 0.000	5.1e+03; 0.000
Mass media exposure				
No exposure	77.8	62.5	65.8	51.6
Partial exposure	85.0	86.6	87.6	74.5
Full exposure	81.7	92.9	93.3	77.4
Chi-square; p-value	1.8e+03; 0.000	1.2e+04; 0.000	1.2e+04; 0.000	7.9e+03; 0.000

The state-wise media exposure of women of 15-49 years is given in table 3. Here it indicates that the national average of three media coverage's like no exposure, partial exposure and full exposure were 24.62%, 67.22%, and 7.66%, respectively. In the case of state-wise comparison Bihar (57.08 %) has a maximum number of women with no media exposure followed by Jharkhand (44.71 %) and Uttar Pradesh (39.48 %). Other hands in case of partial and full media exposure have recorded from Andhra Pradesh (93.24 %) and Manipur (44.62 %) (Table 3).

Table 4 depicts state-wise various maternal health care practices of women between the age group of 15-49 years. Here three variables under maternal health care are taken like full ANC (Antenatal Care), institutional delivery, PNC within 42 days of delivery etc. (Barman *et al*., 2018). In the case of national level antenatal care, the performance was overall poor only 19.49% women received full antenatal care. Among the UT's Lakshadweep performed best with 63.74 % and among the states, Kerala stood first with 59.74 %. Here in institutional delivery national average was 81.12 %. The most important thing is except Nagaland (35.67 %)

Table 3. Women age 15-49 years who had a live birth in the five years (2015-16)

States/Union Territories	Media exposure		
	No exposure	Partial exposure	Full exposure
Andaman and Nicobar Island	5.89	89.41	4.71
Andhra Pradesh	3.67	93.24	3.08
Arunachal Pradesh	23.52	72.86	3.62
Assam	37.67	57.3	5.04
Bihar	57.08	36.71	6.20
Chandigarh	4.63	84.3	11.07
Chhattisgarh	15.86	77.97	6.17
Dadra and Nagar Havel	26.27	71.58	2.15
Daman and Diu	12.41	86.18	1.41
Goa	2.7	83.75	13.54
Gujarat	15.85	79.56	4.59
Haryana	10.6	82.06	7.33
Himachal Pradesh	5.26	80.12	14.62
Jammu and Kashmir	17.58	66.55	15.87
Jharkhand	44.71	50.91	4.37
Karnataka	7.26	78.63	14.11
Kerala	2.03	83.45	14.52
Lakshadweep	6.74	87.07	6.20
Madhya Pradesh	26.64	64.39	8.98
Maharashtra	11.46	76.1	12.44
Manipur	7.89	47.48	44.62
Meghalaya	19.89	69.84	10.27
Mizoram	4.37	84.06	11.57
Nagaland	33.43	63.21	3.36
Delhi	5.03	74.6	20.38
Odisha	22.09	74.36	3.54
Puducherry	1.97	72.41	25.62
Punjab	4.1	92.03	3.87
Rajasthan	26.57	68.8	4.63
Sikkim	6.87	80.61	12.52
Tamil Nadu	1.85	81.4	16.75
Tripura	12.87	85.13	2.00
Uttar Pradesh	39.48	55.89	4.62
Uttarakhand	9.88	82.8	7.32
West Bengal	19.91	75.76	4.33
Telangana	6.99	84.85	8.16
India	24.62	67.72	7.66

Table 4. Women of 15-49 years who had a live birth in the five years preceding the survey by the different maternal health care indicators in India (2015-16)

States/Union Territories	Full ANC	Institutional delivery	PNC within 42 days of delivery
Andaman and Nicobar Island	50.46	96.37	77.76
Andhra Pradesh	42.83	92.53	85.46
Arunachal Pradesh	3.34	55.46	35.29
Assam	17.7	73.15	62.43
Bihar	3.08	66.18	48.56
Chandigarh	33.97	92.66	91.15
Chhattisgarh	20.54	72.78	74.13
Dadra and Nagar Havel	30.93	89.43	78.81
Daman and Diu	26.38	91.54	65.55
Goa	59.13	98.29	92.58
Gujarat	28.36	89.91	70.7
Haryana	18.66	83.53	73.42
Himachal Pradesh	29.74	78.24	80.37
Jammu and Kashmir	24.71	87.06	78.35
Jharkhand	7.69	64.06	52.35
Karnataka	29.74	94.59	67.75
Kerala	59.74	99.89	89.33
Lakshadweep	63.74	99.15	92.68
Madhya Pradesh	10.75	82.32	59.42
Maharashtra	29.29	91.56	82.09
Manipur	32.25	72.77	69.15
Meghalaya	18.98	54.78	66.96
Mizoram	32.93	81.67	68.75
Nagaland	2.19	35.76	25.16
Delhi	35.58	87.04	67.62
Odisha	21.99	86.59	82.3
Puducherry	51.13	99.87	92.94
Punjab	29.22	92.1	90.9
Rajasthan	9.05	85.76	66.55
Sikkim	38.35	95.01	80.36
Tamil Nadu	39.65	99.16	87.09
Tripura	7.27	82.57	65.34
Uttar Pradesh	5.72	69.93	61.64
Uttarakhand	10.92	71.98	61.79
West Bengal	20.39	77.56	71.35
Telangana	39.45	92.37	86.31
India	19.49	81.12	69.04

majority of the states and UT's recorded got institutional delivery. In the case of Postnatal Care (PNC), national average was 69.04 %. Among the states and UT's Goa (92.58 %) and Pondicherry (92.94 %) performed the best (Table 4).

Based on figure 1 and table 5 has prepared to show the status of 15-49 years of women's media exposure status and other maternal health care outcomes. Here the percentage outcomes have divided into five categories based on their percentage value. So based on their value total of five categories have been extracted, low, low to medium, medium, medium to high, and high. In the case of the media exposure, maximum concentration of states has found in the low and low to medium category. Only a few concentrations have got from the medium to high category or high (Manipur) (Table 5, Figure 1).

Just like the women's exposure to media, women's maternal health care practices like ANC, institutional delivery, and PNC are in five categories like low, low to medium, medium, medium to high, and high. In the case of the ANC care also very few states have placed in the medium to high and high category (Telangana, Andhra Pradesh, Puducherry, Tamil Nadu, Sikkim, Goa, Kerala, Lakshadweep, Andaman and Nicobar). Even in the other two care practices also the only few states like, Kerala, Goa, Lakshadweep, Puducherry, Tamil Nadu, Andhra

Prdesh, Telangana, Punjab show better outcomes. But the most unfortunate matter is maximum of the states like Assam, Jharkhand, Bihar, Uttar Pradesh, Madhya Pradesh, Uttarakhand, Nagaland, Arunachal Pradesh etc. show very poor outcomes in terms of maternal health care outcomes (Table 5, Figure 2, 3 and 4).

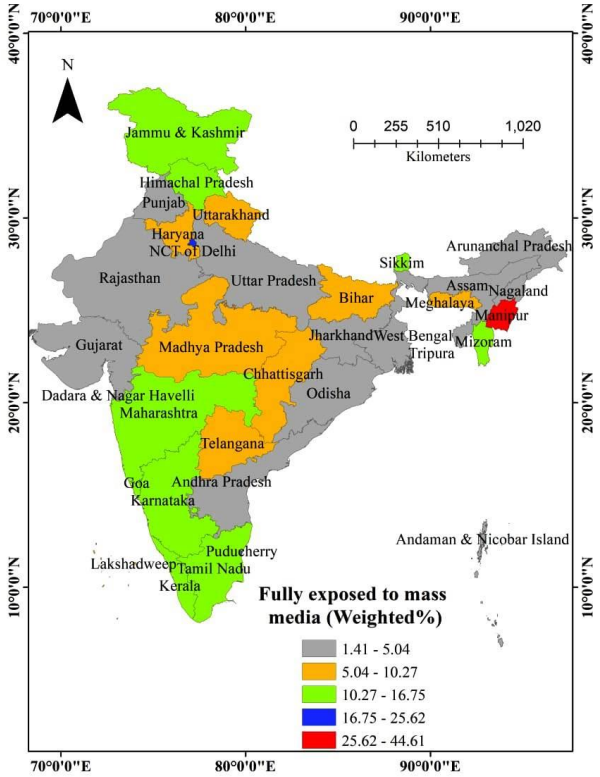

Figure 1. Women's (15-49 years) fully media exposure

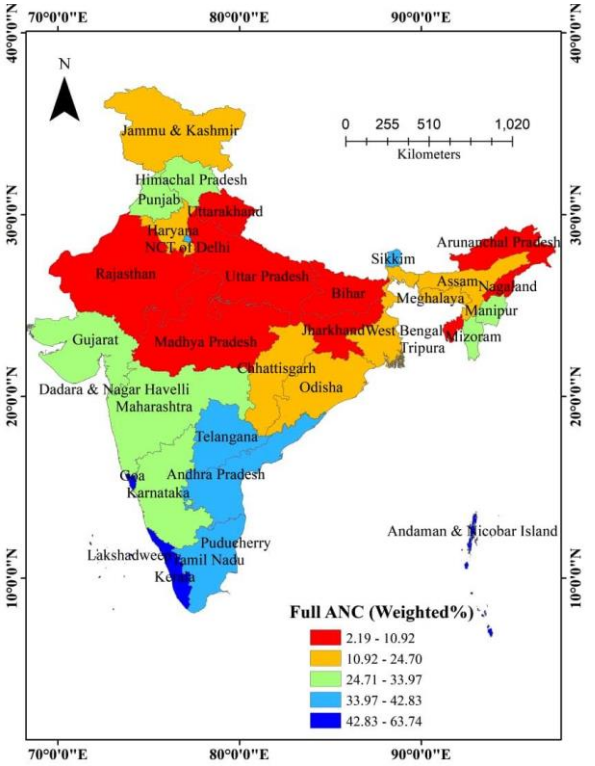

Figure 2. women's (15-49 years) ANC care

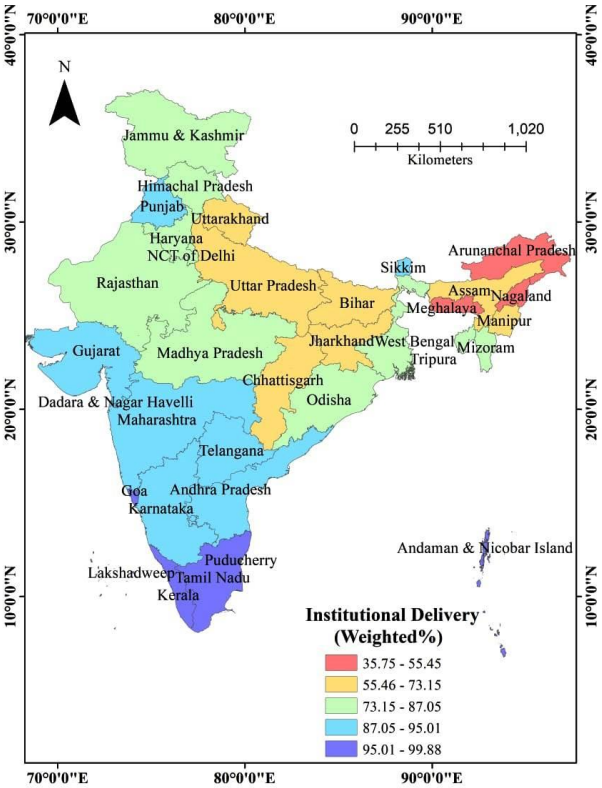

Figure 3. Women's (15-49 years) institutional delivery

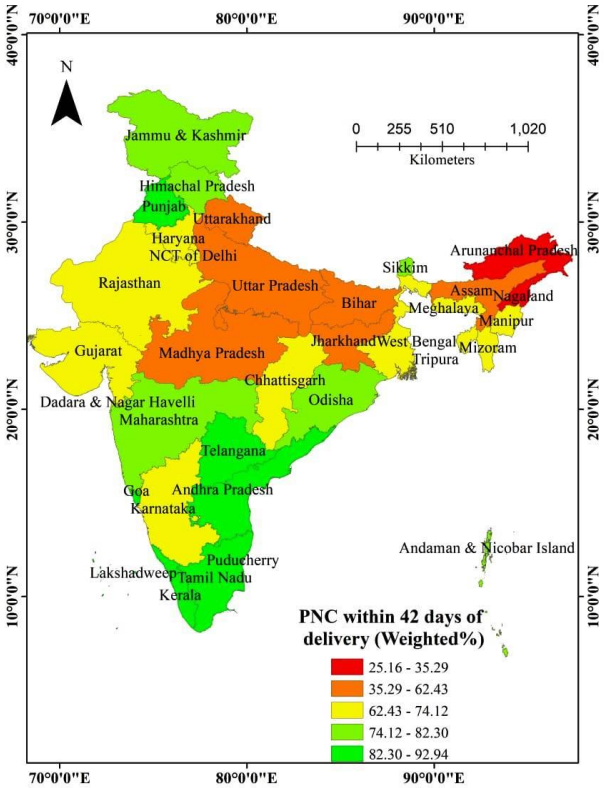

Figure 4. Women's (15-49 years) PNC

Table 5. State wise distribution of 15-49 years women's fully media exposure and maternal health care outcomes in India (2015-16)

Status of women's media exposure and maternal health care	Low	Low to medium	Medium	Medium to high	High
Exposure of Mass Media	Punjab, Rajasthan, Gujarat, Uttar Pradesh, Jharkhand, West Bengal. Odisha, Andhra Pradesh, Arunachal Pradesh, Assam, Nagaland, Tripura, Andaman and Nicobar	Uttarakhand, NCT-Delhi, Madhya Pradesh, Chhattisgarh, Telangana, Bihar, Meghalaya	Jammu and Kashmir, Himachal Pradesh, Dadra and Nagar Haveli, Maharastra, Goa, Karnataka, Tamil Nadu, Kerala, Pondicherry, Lakshadweep, Sikkim, Mizoram	NIL	Manipur
Full ANC	Uttarakhand, Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, Jharkhand, Arunachal Pradesh, Nagaland, Tripura	Jammu and Kashmir, NCT-Delhi, Haryana, West Bengal, Chhattisgarh, Odisha, Assam, Meghalaya	Himachal Pradesh, Punjab, Gujarat, Dadra and Nagar Haveli, Maharashtra, Karnataka, Manipur, Mizoram	Telangana, Andhra Pradesh, Pondicherry, Tamil Nadu, Sikkim, Goa	Goa, Kerala, Lakshadweep, Andaman and Nicobar
Institutional delivery	Arunachal Pradesh, Meghalaya, Nagaland	Assam , Manipur, Bihar, Jharkhand, Chhattisgarh, Uttar Pradesh, Uttarakhand,	Jammu and Kashmir, Himachal Pradesh, NCT-Delhi, Haryana, Rajasthan, Madhya Pradesh, West Bengal, Mizoram,	Sikkim, Punjab, Gujarat, Dadra and Nagar Haveli, Maharashtra, Karnataka, Telangan, Andhra Pradesh	Pondicherry, Tamil Nadu, Kerala, Goa, Lakshadweep, Andaman and Nicobar
PNC	Nagaland, Arunachal Pradesh,	Assam, Jharkhand, Bihar, Uttar Pradesh, Madhya Pradesh, Uttarakhand	NCT-Delhi, Haryana, Rajasthan, Gujarat, Karnataka, Chhattisgarh, West Bengal, Meghalaya, Mizoram, Manipur,	Jammu and Kashmir, Himachal Pradesh Dadra and Nagar Haveli, Odisha, Sikkim, Maharashtra, Andaman & Nicobar	Kerala, Goa, Lakshadweep, Pondicherry, Tamil Nadu, Andhra Pradesh, Telangana, Punjab,

Table 6 shows the result of binary logistic regression model (unadjusted odds ratio or UOR) and found the effects of media exposure on the utilization of MHC services. There were high likelihood (Unadjusted odds ratio) of taking all the maternal health care services i.e. ANC [UOR: 5.240; 95% CI: 4.939 - 5.561 and p<0.01], at least 4 ANC visit [UOR: 5.965; 95% CI: 5.731 - 6.208 and p<0.01], ANC within 1st trimester [UOR: 2.176; 95% CI: 2.078 - 2.278 and p<0.01], two or more TT injection [UOR: 1.645; 95% CI: 1.566 - 1.728 and p<0.01], ANC from SHP [UOR: 5.789; 95% CI: 5.484 – 6.112 and p<0.01], taking 100 or more IFA tablets [UOR: 2.976; 95% CI: 2.846-3.111 and p<0.01], institutional delivery [UOR: 6.048; 95% CI: 5.710 – 6.406 and p<0.01], SBA for delivery [UOR: 6.273; 95% CI: 5.904–6.666 and p<0.01] and PNC within 42 days of delivery [UOR: 3.278; 95% CI: 3.142 – 3.420 and p<0.01] among the women who were full exposed with mass media than the women who were not exposed with any kind of mass media communication (Saikia and Singh, 2009). Adjusted odds ratio (AOR) (Table 7) were less i.e. ANC [AOR: 1.535; 95% CI: 1.432 - 1.644 and p<0.01], at least 4 ANC visit [AOR: 1.756; 95% CI: 1.672 - 1.845 and p<0.01], ANC within 1st trimester [AOR: 1.194; 95% CI: 1.131 - 1.260 and p<0.01], two or more TT injection [AOR: 1.056; 95% CI: 0.995 - 1.121 and p<0.01], ANC from SHP [AOR: 1.536; 95% CI: 1.442 - 1.636 and p<0.01], taking 100 or more IFA tablets [AOR: 1.263; 95% CI: 1.196-1.335 and p<0.01], institutional delivery [AOR: 1.485; 95% CI: 1.386 - 1.591 and p<0.01], SBA for delivery [AOR: 1.562; 95% CI: 1.455 - 1.677 and p<0.01] and PNC within 42 days of delivery [AOR: 1.481; 95% CI: 1.409 - 1.558 and p<0.01] compare to unadjusted odds ratio because in adjusted odds ratio show the combining effect of other determining factors (maternal age, age at marriage, birth order, women's education, caste, religion, wealth index, place of residence and region) including mass media which tell us that not only mass media but also there were other determining factors which also affect the proper utilization of treatment-seeking behaviour during pregnancy and child birth among the Indian mothers of 15-49 years.

Table 6. Result of binary logistic regression model (Unadjusted odds ratio) for the association between mass media exposure and the utilization of maternal health care services among the 15-49 years women in India (2015-16)

Independent variables	Received ANC	At least 4 ANC	ANC within 1st trimester	2 or more TT injection	100 or more IFA tablets
Media exposure					
No exposure	1.00	1.00	1.00	1.00	1.00
Partial exposure	3.840***	3.880***	1.788***	1.739***	2.169***
	(3.744 - 3.937)	(3.789 - 3.973)	(1.743 - 1.835)	(1.694 - 1.784)	(2.105-2.234)
Full exposure	5.240***	5.965***	2.176***	1.645***	2.976***
	(4.939 - 5.561)	(5.731 - 6.208)	(2.078 - 2.278)	(1.566 - 1.728)	(2.846-3.111)
Log-likelihood	-82603.199	-122685.68	-94354.46	-87112.492	-92013.747
Chi-square	11846.09	16152.1	2164.25	1734.07	3440.89
Pseudo R2	0.0669	0.0618	0.0113	0.0099	0.0184
Observation	189044	189044	156755	189566	142036

Independent variables	SHP at ANC	Institutional delivery	SBA at delivery	PNC within 42 days of delivery
Media exposure				
No exposure	1.00	1.00	1.00	1.00
Partial exposure	3.945***	3.245***	3.224***	2.466***
	(3.853 - 4.038)	(3.170 - 3.322)	(3.148 - 3.302)	(2.413 - 2.519)
Full exposure	5.789***	6.048***	6.273***	3.278***
	(5.484 - 6.112)	(5.710 - 6.406)	(5.904 - 6.666)	(3.142 - 3.420)
Log-Likelihood	-94078.492	-94974.448	-91440.993	-118009.58
Chi-square	14510.84	11332.26	10832.25	7631.21
Pseudo R2	0.0716	0.0563	0.0559	0.0313
Observation	190898	190337	190898	190898

ANC= Antenatal care, TT= Tetanus toxoid, SHP= Skilled health provider, PNC= Postnatal care, SBA= Skilled birth attendant, 95% Confidence interval in parentheses; *** p<0.01, ** p<0.05, * p<0.1= Reference category,

Table 7. Result of binary logistic regression model (Adjusted odds ratio) for the association between mass media exposure and the utilization of maternal health care services among the 15-49 years women in India (2015-16)

Independent variables	Received ANC	At least 4 ANC	ANC within 1st trimester	2 or more TT injection	100 or more IFA tablets
Media exposure					
No exposure	1.00	1.00	1.00	1.00	1.00
Partial exposure	1.755***	1.698***	1.189***	1.355***	1.163***
	(1.699 - 1.813)	(1.647 - 1.751)	(1.151 - 1.228)	(1.309 - 1.402)	(1.120-1.208)
Full exposure	1.535***	1.756***	1.194***	1.056**	1.263***
	(1.432 - 1.644)	(1.672 - 1.845)	(1.131 - 1.260)	(0.995 - 1.121)	(1.196-1.335)
Log-likelihood	-72570.075	-104099.53	-86893.576	-78382.037	-80525
Chi-square	20523.3	37385.54	5867.59	6905.92	13994.07
Pseudo R2	0.1239	0.1522	0.0327	0.0422	0.0799
Observation	177646	177646	147491	178156	132311

Independent variables	SHP at ANC	Institutional delivery	SBA at delivery	PNC within 42 days of delivery
Media exposure				
No exposure	1.00	1.00	1.00	1.00
Partial exposure	1.681***	1.286***	1.306***	1.427***
	(1.632 - 1.732)	(1.247 - 1.327)	(1.266 - 1.347)	(1.388 - 1.467)
Full exposure	1.536***	1.485***	1.562***	1.481***
	(1.442 - 1.636)	(1.386 - 1.591)	(1.455 - 1.677)	(1.409 - 1.558)
Log-likelihood	-81736.489	-77725.97	-76017.546	-104608.41
Chi-square	26234.22	32187.05	28356.21	15200.81
Pseudo R2	0.1383	0.1715	0.1572	0.0677
Observation	179288	178773	179288	177079

ANC= Antenatal care, TT= Tetanus toxoid, SHP= Skilled health provider, PNC= Postnatal care, SBA= Skilled Birth Attendant, 95% Confidence interval in parentheses; *** p<0.01, ** p<0.05, * p<0.1 = Reference category

Adjusted model controlled for maternal age, age at marriage, birth order, women's education, caste, religion, wealth index, place of residence and region.

4 DISCUSSION

The present study shows the impact of media exposure (listening to the radio, watching television and reading newspaper) (Fatema and Lariscy, 2020) on the utilization of maternal health care services (received ANC, frequent use of ANC, the timing of 1st ANC visit, SHP for ANC, two or more TT injection, 100 or more IFA tablets, institutional delivery, delivered by SBA and PNC within 42 days of delivery) among the Indian women of 15-49 years. There were significant variations in the likelihood of taking all the MHC services. Though mass media was an important determining factor with some other factors (age, age at marriage, birth order, women's education, caste, religion, place of residence, wealth index and region) (Chandhiok *et al.*, 2006; Yadav *et al.*, 2016) important to control the utilization of MHC services. They are more understood with the help of table 3 (unadjusted odds ratio) and 4 (adjusted odds ratio) (Adogu *et al.*, 2014; Duong *et al.*, 2004; Navaneetham and Dharmalingam, 2002; Vidler *et al.*, 2016). There was a significant association between media exposure and the utilization of MHC services in India which also found in different countries over the world i.e. Kenya, Malawi (Zamawe *et al.*, 2015), Nigeria (Nwagbara, 2017), Uganda (Asp *et al.*, 2014), Nepal (Acharya *et al.*, 2015), Bangladesh (Gugsa *et al.*, 2016) and so on. In India, the women who were fully exposed to all the media device (listening to the radio, watching television and reading newspapers) were more likely to receive all the MHC services than the partial or no exposure women (Bhatia and Cleland, 1995). This may be probably due to fully exposed women were more aware and conscious about the treatment-seeking behaviour with the help of news, programs and advertisement from radio, television and newspaper compare to the women who were not associated with any kind of this news, programs and advertisement and also any information regarding their treatment-seeking behaviour at the time of pregnancy (Acharya *et al.*, 2015; Odesanya *et al.*, 2015). Many previous studies found that the women who were not exposed with mass media or partially exposed with mass media, they were mostly illiterate or low educated, belongs to rural areas with poor economic background, having no decision making power about her family as well as her life. They were not aware of the modern treatment-seeking behaviour and how to utilize the maternal health care

services (Abor *et al*., 2011; Adogu *et al*., 2014; Furuta and Salway, 2006; Joshi *et al*., 2014; Mehari and Wencheko, 2013; Somefun and Ibisomi, 2016). From this point of view not only mass media but also there were many other factors like education, birth order, age at marriage, economic condition, place of residence and decision-making power also control the utilization of maternal health care services among Indian women (Bloom *et al*., 2001; Saha *et al*., 2013; Shariff, 2002; Vidler *et al*., 2016). This study gives the message that the improper utilization or poor utilization of MHC services among reproductive women leads to the increase of maternal as well as neonatal mortality which is one of the most crucial demographic problems in India (Bhatia and Cleland, 1995). So not only government but also different NGOs and educated people and health workers like ASHA (Accredited Social Health Activist) have to take the responsibility to increase the awareness about the availability, accessibility and importance of utilization of MHC services among the mothers mainly rural mothers whose are resided in very remote areas which may reduce the risk of mothers and newborn life.

5 CONCLUSION

Our results show the significant role of media exposure i.e. listening to the radio, watching television and reading newspapers on the enhancement of taking treatment during pregnancy and childbirth, increase the preparedness of childbirth and as well as reduce maternal mortality and newborn death. In India, the availability and accessibility of MHC services are not bad (Irene, 2015; Barman *et al*., 2020) but they're also found huge differences in the likelihood of taking all the necessary care due to their differences in education, awareness, religious custom, economic constrain as well as the degree of media exposure which play a significant role to aware about the different treatment-seeking behaviour among the women as well as human beings by different program and campaign. In mainly rural India, a some households having television, read the newspaper which is very essential now a day's not for only health issues but also different aspects of mankind. Therefore, Indian government should make policies and programs to increase the awareness and activeness about their different health-seeking behaviour through increasing the rate of education and mass media exposure and also govern the different news channels to initiate some daily programs on the health issues which may reduce not only maternal as well as newborn mortality, the incidence of diseases also.

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ABBREVIATIONS

ANC: Antenatal Care; **MHC**: Maternal Health Care; **NFHS**: National Family Health Survey; **PNC**: Postnatal Care; **TT**: Tetanus Toxoid.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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