Relevance of Health Knowledge in Reporting Maternal Health Complications and Utilization of Maternal Health Care in India

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Education has positive impact on health but education alone will not help in recognizing and reporting health problems and utilization of health care. Women need proper health knowledge to recognize health problems. This study assesses the level of health knowledge of women of age group 15-49 years and its systematic association with the reporting of maternal health problems and health care utilization by Indian women. Based on Indian Human Development Survey (IHDS-2005) data, a 'Health Knowledge Index' is constructed by using Principal Component Analyses (PCA) to understand how the level of women's health knowledge influences reporting of their own reproductive health. A huge variation has been found in reporting of maternal health problems and maternal health care utilization within same socio-economic groups by level of health knowledge. Increasing level of health knowledge is positively associated with reporting of greater pregnancy and post-natal complications by women. Higher is the level of health knowledge, greater is the level of ante-natal, institutional delivery and post- natal care seeking by women. Health education to women can help in improving their reporting of health problems and health care seeking.

Health knowledge is a relatively new concept in health promotion research. It is a much broader term than health literacy (Pfizer Inc., 1998). Rendering to WHO (1998), "health literacy implies the achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions" (Nutbeam,1998). Studies in a global context foster that health literacy skills are critically important for both health and health care. "Regrettably, several patients are with the most general and convoluted health care problems at greater risk for misunderstanding their diagnosis, medications and instructions on how to take care of their medical problems"(Parker, 2000). By improving people's access to health information, thereby health literacy is critical to maximize the capacity to use health care facilities (Nutbeam, 2008).

Health information and knowledge, regardless of education, can impact on reporting of health problems and decision making of women in seeking health care services (Ratzan, 2001; USDHHS, 2010; Jahan, 2000). A study by Moronkola and others (Moronkola, Ojediran &

Amosu, 2006) revealed that the impact of belief in personal and community health practices is very strong. Belief may not be true scientifically because it may make one rightly or wrongly access to health care. In the same study, authors also found that, reproductive health knowledge is important for women to understand the woman's health and well-being. Another study by Kickbusch and others also suggested "consequences of health knowledge include improved self-reported health status, lower health care costs, increased understanding of health problems, shorter hospitalizations, and less frequent use of health care services" (Kickbusch & Iona, 2001; Altindag, Cannonier & Mocan, 2010; Bhat et al., 2011).

In India, overall maternal health care utilization in terms of key indicators such as at least three ANCs and institutional deliveries is not satisfactory. Almost one out of every five women did not receive any ante natal care for their last birth which is very shocking. Though the percentage of births to ever married women that were delivered in health facilities increased steadily from 26 % in 1993 to 34% in 1997 and 41% in 2006, still it is substantially less compared to developed countries. Even in urban areas, despite the proximity of health care facilities such as ante-natal care, treatment seeking attitude even among educated women utilizing ANCs and institutional delivery is far below than expected levels (NFHS-3, 2005-06; Census, India, 2001). Further, such a trend could attributable to the low level of health knowledge among Indian women (Desai & Alva, 1998).

Though, identification of health problems and healthcare utilization largely depends on health beliefs and knowledge, but across the globe there are a few efforts to link health knowledge of women with their self reported health status and health care utilisation. Moreover, as per our knowledge, there is no study in India which examined health knowledge of women with their self reported health status and health care utilisation. Therefore, there is a need to address this issue in Indian context. Measuring the levels and pattern of health knowledge among Indian women helps in the formulation of health policies and planning. An assessment of

interaction among these three aspects namely; level of health knowledge, reporting of maternal health problems and utilization of medical care in Indian context is important for planning and preparing strategies to improve maternal health outcomes, thereby achieving Millennium Development Goals (MDG) by 2015.

With this back drop the study aims to assess the twofold objectives: first, whether reporting of women's health status is determined by the level of women's health knowledge. Second, the study assesses the disparity in utilization of maternal health care services by levels of health knowledge of women.

METHODS

Data

In the present study the authors have used information available in the Indian Human Development Survey (2005). IHDS is the collaborative project of researchers from the University of Maryland and National Council of Applied Economic Research (NCAER), New Delhi. For the first time, India Human Development Survey 2005 (IHDS) has provided information regarding women's health belief and practices. In IHDS, women in the age group 15-49 were asked to report their health beliefs, hygiene and sanitation practices along with regular maternal health information like prenatal, natal and postnatal complications and health care utilization (IHDS, 2005).

Sample Design

IHDS was administered to a nationally representative sample of 41,554 households located across all states and union territories of India with the exception of Andaman & Nicobar and Lakshadweep and covers urban as well as rural sample. One woman in reproductive age group (15-49 year) from each household is selected for the interview where information regarding

health knowledge and maternal health complications and health care utilization were asked (Desai et al., 2010).

Villages and urban blocks (comprising of 150-200 households) formed the primary sampling units (PSUs) from which the households were selected. The urban and rural PSUs were selected by means of a different sample design. In order to draw a random sample of urban households, all urban areas in a state were listed in the order of their size with a number of blocks selected from each urban area allocated based on Probability Proportional to Sizes (PPS). Once the number of blocks for each urban area was determined, the enumeration blocks were drawn randomly with the help of office of the registrar general of India. From each Census Enumeration Blocks (CEB) a complete household listing were conducted, and sample of 15 households was selected per block. For sampling purposes, some smaller states were combined with nearby larger states. The rural sample contains about half of the households that were interviewed initially by the National Council of Applied Economic Research (NCAER, New Delhi) in 1993-94 in a survey titled 'Human Development Profile of India' - HDPI (Shariff, 1999) and the other half of the samples were drawn from both districts surveyed in HDPI as well as from the districts situated in the states and union territories not covered in HDPI. The original HDPI was a random sample of 33,230 households, located in 16 major states, 195 districts and 1,765 villages. In states where 1993-94 survey was conducted, and re-contact details were available, 13593 households were randomly selected for re-interview in 2005 (Desai et al., 2010).

Variables

Predictor Variables: The critical predictor variable of this study is 'Health Knowledge'. A 'Health Knowledge Index' is constructed to understand how the level of women's health knowledge influences reporting of their own reproductive health, based on questions asked to women about their health believes, practices and reproductive knowledge and required the

respondents to rate each item as “true” or “false”. One scale (score) was awarded (equal weights) to each correctly answered item. A higher score means a higher level of knowledge. ‘Health Knowledge Index’ (HKI) scores are categorized into: no or low knowledge, medium knowledge and high knowledge. Principal Component Analysis (PCA) is used to construct HKI. HKI categories are formed: no or low knowledge, medium knowledge and high knowledge. Alpha test is used to test the internal consistency among the variables selected for computing health index.

The list of questions asked to women in relation to health knowledge is: Do you know in which part of the menstruation cycle a woman is least likely to get pregnant? Is it good to drink 1-2 glasses of milk every day during pregnancy? When you were pregnant, did you squeeze out milk from your breast to feed your child? Do men become physically weak even months after sterilization? Do you think that the first thin milk that comes out after a baby is born is good for the baby? Though, all these questions do not directly reflect knowledge of maternal health, but in the absence of direct data, they could be important proxies of reproductive health knowledge of a woman.

However, the authors have used several other predictor variables, which are re-coded for the purpose of analyses, and effective comparison of the results. They are: *Age group of women* (15-24, 25-34 and 35-49 years), *Place of residence* (rural, urban), *Literacy* (illiterate and literate), *Education level* in terms of completed years of schooling i.e. no education, primary (1-4years), upper primary and secondary (5- 10 years) and higher (above 10 years), *Religion* (Hindu, Muslim, Christian and Others includes Sikh, Buddhist, Jain, Tribal, Other, None), *Caste* (Scheduled Caste and Scheduled Tribe, Other Backward Caste and Others include Brahmin and others), *Wealth quintile* (lowest, second, middle, fourth and highest for poorest, poor, middle, rich and richest respectively).

Dependent Variables: Dependent variables used in the study, are also re-coded purposively, such as, *Antenatal check-ups* (no check up, less than three checkups and three and more check-ups), *Post-natal check-ups within two months of delivery* (no check up, check up within two months and check up after two months of delivery, for the last five years), *Place of delivery* (institutional and non institutional), *Pregnancy complications* (include night blindness, blurred vision, and convulsion, not from fever, excessive fatigue, anaemia and vaginal bleeding) and *Post natal complications* (include excessive vaginal bleeding and very high fever).

Statistical Analyses

The authors have performed the analysis of the study in two stages: First, differentials in health knowledge by background characteristics of women, such as age group of women, (demographic characteristic), place of residence, educational level of women, caste, religion, wealth quintile of women is assessed by using multinomial logistic regression. Further, MCA conversion model is used to convert beta coefficients to adjusted percentages. Second, effects of health knowledge on pregnancy complications, post delivery complications, ante-natal care, delivery care and post-natal care are assessed. Bivariate logistic regress is used to assess the effects of health knowledge on reporting of pregnancy problems and post natal complications, and ante-natal care, delivery care and post-natal care.

Logistic Regression Analysis: The logistic regression is commonly used when the independent variables include both numerical and nominal measures and the outcome variables (dependent variables) are binary or dichotomous. Advantage of logistic regression analysis is that it requires no assumption about the distribution of the independent variables and the regression coefficient can be interpreted in terms of odds ratio. Logistic regression model is commonly estimated by maximum likelihood function. For the dependent variables, logistic model takes the following general form:

$$\text{Logit } p = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots\ldots\ldots\ldots b_kx_k + e_k$$

$$\text{Log } p/1\text{-}p = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots\ldots\ldots\ldots b_kx_k + e_k$$

Where b_0 are intercepts and b_1, b_2, b_3 ,……b_k represents the coefficients of each of the predictor variables in the model while e_k is an error term. The natural logarithms of the odds of the outcomes are represented by e_k. Logistic regression model is applied to analyze the effect of selected socio economic factors on health knowledge of women. Binary logistic regression is used to estimate the adjusted effect of background characteristics as independent variables. The SPSS (18th version) statistical package is used for this purpose.

Multinomial Logistic Regression and MCA conversion model: In the present paper MCA conversion model is used to estimate adjusted percentage of health knowledge by background characteristics of women.

MCA multinomial analysis formulae=

$$Z_1 = Log\left(\frac{P_1}{P_3}\right) = a_1 + \sum b_{1j} * X_j$$

$$Z_2 = Log\left(\frac{P_2}{P_3}\right) = a_2 + \sum b_{2j} * X_j$$

And $P_1 + P_2 + P_3 = 1$

Where,

$a_{i\ i=1,2}$: constants

$b_{ij\ i=1,2;\ j=1,2\ldots n}$: multinomial regression coefficient.

P_1= Estimated probability of reporting no or low health knowledge by women aged 15 to 49 years.

P_2= Estimated probability of reporting medium health knowledge by women aged 15 to 49 years.

P_3= Estimated probability of reporting high health knowledge by women aged 15 to 49 years is the reference category.

For the sake of simplicity in the interpretation of results, multinomial logistic regression coefficients were converted into adjusted percentages. The procedure consists of following steps:

Step 1:

By using regression coefficient and mean values of independent variables, the probability was computed as:

$P_i = \frac{\exp(Z_i)}{\{1+\sum \exp(Z_i)\}}$, i=1, 2, 3 and $P_3 = 1- P_1 + P_2$ where Z was the estimated value of response variables for all categories of each variable.

Step 2:

To obtain the percentage values, the probability P was multiplied by 100.

Principal Component Analysis (PCA): It is a method that reduces data dimensionality by performing a covariance analysis between factors. In the present study, the authors have used PCA to compute health knowledge index from a set of questions based on health belief, sanitation practices and reproductive knowledge of women which is discussed in the constructed variables section. All the statistical analysis in this study is performed by using SPSS 19 and STATA 10 programs.

RESULTS

Women's health knowledge by their background characteristics

The level of woman's health knowledge is determined by her background characteristics. The results based on Multinomial logistic regression analysis reveals that, percentage of women with higher health knowledge is increasing with the succeeding age groups of women, which proves that, knowledge is the collection of experiences which grows with ages. From the results, it is also evident that the adjusted percentage of women with higher health knowledge (34%) is significantly greater in the urban area compared with the women in the rural area (33%).

By education, results show that highly educated women have significantly greater percentage (35%) belong to high health knowledge category than women with less education or no education category (32%). This indicates that education has a positive impact on enhancement of health knowledge level. Similarly, the percentage of women belongs to richest wealth quintile have higher health knowledge (37%) compared with women belong to poorest wealth quintile (30%). Among the religious groups, Muslim women have the lowest percentage of higher health knowledge than the other religious groups (Table 1).

Women's health knowledge versus reporting of pregnancy complications

The percentage of women of 15-49 years age groups by reported pregnancy complications, and post natal complications according to their health knowledge and background characteristics is shown in table 2. By health knowledge, the percentages of women reporting pregnancy complications are 46 and 50 among no or low and high health knowledge women respectively. This pattern indicates that higher is the level of health knowledge, greater is the reporting of pregnancy complications. Results also reveal that within the same socioeconomic status, such as rural place of residence, poor economic status and no education, the reporting of pregnancy complication increases with the increase in the level of health knowledge. This pattern is sustained among higher educated women. This indicates that education alone will not help in recognition and reporting of maternal health problems. The results of the logistic regression analysis on self reporting pregnancy complications by women, presented in the Table 3, indicated that the high health knowledgeable women are more likely to report pregnancy complications (OR=1.139, $p<0.05$), compared to women with no health knowledge (OR =1.000, $p<0.05$).

Table 2 also shows the percentage of women reporting the post natal complications by their health knowledge and background characteristics. The reporting of postnatal complication is observed to be increased with an increase in health knowledge, and such pattern is true for all

the socioeconomic groups. The result of logistic regression analysis also shows that women with higher health knowledge are more likely to report greater post natal complications (OR =1.378, $p<0.05$) than the women with no or low health knowledge (OR=1.000, $p<0.05$) after controlling other socioeconomic background characteristics (Table 3).

Women's health knowledge versus maternal health care utilization

Table 4 indicates that the percentage of women visiting for at least three antenatal check-ups is positively associated with their level of health knowledge. The percentages of women who had reported of receiving at least three antenatal check-ups for no or low, medium and high health knowledge groups are 52 %, 68% and 72% respectively. It is important to notice that by health knowledge of women, results indicate greater variation in receiving at least three antenatal cares among higher socio-economic groups than their counter groups. In the richest section of the society, percentage of women with high health knowledge who received at least three ante-natal check-ups is the highest (90%). Percentage of women, who received at least three ante-natal check-ups, is very less among poorest women (42%) with no or low health knowledge. The odds of logistic regression analysis (Table 5) also supports the fact that, women with medium (OR=1.581, $p<0.01$) and high (OR=1.434, $p<0.01$) health knowledge, are significantly more likely to receive at least three ante-natal check-ups as compared to women with no or low health knowledge.

Similar results are observed in case of institutional delivery coverage. More number of institutional deliveries is found among women having higher health knowledge (38 %, 57 % and 64 % for no or low, medium and high knowledgeable women respectively) across all the socioeconomic groups. Thus, within the socio-economic groups institutional deliveries vary considerably by health knowledge (Table 4).The richest (85%), Christian (92%) and highly educated (66%) women with high health knowledge received greater institutional delivery coverage. On the other hand, it is much lower among rural (38%), poorest (26%) and scheduled

caste and scheduled tribe (32%) women with no or low health knowledge. The odds ratio of logistic regression analysis further strengthen the evidence that women's health knowledge acts as a key predictor of reporting institutional delivery care received by them (Table 5). The result reveals that after controlling for other background characteristics, women having medium (OR=1.732, $p<0.01$) and high health knowledge (OR =1.430, $p<0.01$) are significantly more likely to receive institutional delivery care than those women having no or low health knowledge (OR =1.000, $p<0.01$).

Post natal check up within two months of delivery is very essential for the health of both mothers and children. The percentage of women received post natal checkups varies considerably with the level of health knowledge of women. Among women with no or low knowledge, post natal check up within two months of delivery is much lower (11%) than women with higher health knowledge (17%). Thus, results foster positive association between women's health knowledge and post natal care received by them. In rural areas, the percentage of women having high health knowledge, received post natal care is lower (16%) than urban women (17%). It is lowest among poorest women with no or low health knowledge (9%) and highest among richest women (21%) with high health knowledge. Thus, results foster positive association between women's health knowledge and post natal care received by them.

Logistic regression analysis shows significant impact of health knowledge on reporting post natal care, received by women. Women having medium (OR=1.910, $p<0.01$) and high health knowledge (OR=1.893, $p<0.01$) are significantly more likely to report of receiving post natal care than those women having no or low health knowledge (OR=1.000, $p<0.01$). Overall, both tri-variate and logistic regression analysis indicate that women's health knowledge is an influential predictor of reporting post natal check up received by them (Table 5).

DISCUSSION

A nuanced assessment of health knowledge and its effect on reporting of pregnancy complication and maternal health care utilization provides a number of intriguing findings. First, Women's health knowledge is varied by their education level, economic status and place of residence mainly. Second, the reporting of pregnancy complications and post-natal complications among women has been found increasing with the increasing level of health knowledge of women and such variations are greater among higher socio-economic groups. Similarly, authors have found positive association between women's health knowledge and maternal health care utilization. Women with higher health knowledge, found to receive at least three ante-natal checks ups; institutional delivery and post-natal check up within two months of delivery are high in proportion. However, women belong to higher advanced socioeconomic status, utilization of maternal health care services are found higher than the backward groups cannot be ignored. Hence, along with the other background characteristics of women, health knowledge also plays an influential role in utilization of health care services in India.

According to the authors, the present study is the first ever effort in India to deal with the women's level of health knowledge and its systematic association with reporting of maternal health problem and health care utilization. The concept of 'Health Knowledge' is operationalized, and the difference between health literacy and health knowledge are discussed. An index is constructed scientifically based on women's health practices, experiences and reproductive knowledge which show the different level of health knowledge. The effects of health knowledge on reporting of maternal health problems by women are evidentially discussed. Some interesting findings are emerged from the study are, even among educated women, improper health knowledge may exist which lead them to adverse health outcomes; highly educated and highly knowledgeable women report more about their health problems

(pregnancy complications and post-natal complications), seek more medical assistance and care such as ante-natal care, institutional delivery care and post-natal care.

Though there is no doubt in the fact that health knowledge is a critical determinant of health outcomes, and health knowledge has immense influence on women's reporting of their own health problems and health care seeking behaviour. Though, it is well accepted that there is a positive impact of education on health, still proper health knowledge is required to understand the health status and health related problems of individual, otherwise misconception may lead to the adverse health outcomes. Education makes woman knowledgeable, but earlier evidences in public health research notify that within educated persons, improper health conception exists (Glewwe, 1999; Lublock et al., 2008; Kendel, 1991; Phoxay et al., 2001; Chakraborty et al., 2003; Shewry et al., 1990). This is also evident from this study. So, educated women have good health, require less medical treatment, this conclusion cannot be drawn so easily.

CONCLUSIONS

The important implication emerged from the study are: i) simply improvement in literacy will not serve the purpose of health improvement for Indian women. Health education to women can help in improving their health awareness, and thus, reporting of their health outcomes related to pregnancy and post delivery health problems may be increased. Progress towards maternal health (MDG 5) can be possible through the proper utilization of maternal health care services i.e. ante-natal care, institutional delivery care and post natal care, and it would be possible when woman will be aware of their own health and proper utilization of health care services. ii) Priority should be set for greater funding for health promotion research as well as health services in the public sector, which remain underfunded, compared to the private sector in terms of training and pay for health care workers which will lead to improved access to health services by the poor and by those living in rural areas.

In this process, social equity with respect to distribution of facilities to gain health knowledge, medical assistance, and income in terms of affordability and exposure to mass media is very essential to be established.

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Table 1 Adjusted Percentage of Women Aged 15-49 Years by Health Knowledge and Background Characteristics, India, 2005

Background characteristics	Adjusted percentage of women by health knowledge			Sample of women
	No or low	Medium	High	
Age group (years)				
15-24®	39.1	27.7	33.2	21194
25-34	38.6	27.5	33.9	16480
35-49	40.1	26.4	33.4	18575
Place of residence				
Rural®	38.8	27.9	33.3	36064
Urban	40.6	25.3***	34.0*	20185
Education level				
No education®	40.7	27.0	32.4	20501
Primary	40.3	25.7	34.0	3881
Upper primary & secondary	38.4	27.3**	34.3***	22985
Higher education	36.6	28.8***	34.6***	8564
Wealth quintile				
Poorest®	44.9	25.0	30.1	7256
Poor	45.4	23.1	31.6	7139
Middle	40.9	26.1	33.1***	7802
Rich	37.1	28.7***	34.1***	8715
Richest	31.1	31.6***	37.3***	9803
Caste				
Schedule castes & Scheduled tribe ®	44.6	23.4	32.0	11772
Other backward Classes	40.0	26.7***	33.3***	16286
Others	33.6	31.4***	35.0***	13496
Religion				
Hindu®	39.7	26.6	33.7	33527
Muslim	41.6	28.0**	30.5***	4788
Christian	24.8	41.1***	34.1***	1376
Others	37.1	26.2	36.7**	16558
Total	39.3	27.2	33.5	56249

Note: [3]Health Knowledge Index is predicting women's Reproductive Health Status (Pregnancy Complications and Postnatal Complications). Total includes women with missing information on Wealth and Caste who are not shown separately;
***p<0.01; **p<0.05; *p<0.10, Reference categories are ® and No or Low Knowledge.

Table 2 Percentage of Women of Age Group 15 to 49 Years Who Experienced Any Pregnancy Complications and Post Natal Complications According to Health Knowledge of Women by their Back Ground Characteristics, India, 2005

Background characteristics	[1]Pregnancy complications(any)			Chi-square	[2]Post-natal complications(any)			Chi-square
	No or low knowledge	Medium knowledge	High knowledge		No or low knowledge	Medium knowledge	High knowledge	
Age group (years)				3.03				0.86
15-24	44.9	45.5	50.3		14.7	15.7	11.9	
25-34	44.7	42.2	49.4		9.4	10.9	15.4	
35-49	48.2	48.2	52.2		10.6	14.6	15.7	
Place of residence				0.33				0.03
Rural	45.4	45.5	51.1		12.1	14.3	14.1	
Urban	47.7	45.3	49.7		11.3	12.8	14.4	
Women's education				0.43				7.42 *
No education	47.2	46.5	48.2		13.3	16.5	15.1	
Primary education	43.9	42.8	58.7		10.5	6.6	11.1	
Upper primary & secondary	42.6	45.9	53.2		10.2	12.9	15.5	
Higher Education	53.9	42.8	46.6		9.8	13.5	7.2	
Wealth Quintile				10.61**				4.15
Poorest	44.7	47.8	54.9		10.9	13.7	18.1	
Poor	50.5	44.7	52.4		8.6	16.9	14.2	
Middle	45.0	46.8	55.9		10.1	11.7	10.1	
Rich	47.7	49.9	48.9		16.1	21.4	14.8	
Richest	42.4	39.3	43.7		16.7	5.5	11.9	
Caste				1.92				3.48
Schedule castes & Scheduled tribes	41.0	40.3	49.9		10.0	11.7	14.4	
Other Backward Classes	47.5	42.7	53.1		12.7	10.1	13.2	
Others	50.2	52.2	48.2		13.0	21.5	15.7	
Religion				18.99***				9.02**
Hindu	45.4	42.3	51.6		12.1	14.4	13.5	
Muslim	52.4	69.5	50.8		11.2	15.3	21.1	
Christian	31.3	45.3	31.6		2.0	0.5	0.0	
Others	40.2	31.7	43.2		11.5	12.9	15.8	
Total	46.5	45.4	50.4		11.7	13.55	14.25	

Note: [1]Pregnancy complications include Night Blindness, Blurred Vision, Convulsion not from fever, Excessive fatigue, Anaemia and Vaginal Bleeding.; Reference Period: Last five year preceding the survey. Total includes women with missing information on Wealth and Caste who are not shown separately.

[2] Post natal complications include Vaginal Bleeding and Very High Fever; Reference Period: last five years preceding the survey; Total includes women with missing information on Wealth and Caste who are not shown separately.

***p<0.01; **p<0.05; *p<0.10

Table 3 Results of Logistic Regression Analysis of Pregnancy Complications & Post-natal Complications Experienced by Women of Age Group 15-49 Years by their Health Knowledge and Background Characteristics, India, 2005

Background characteristics	Maternal health problems	
	Pregnancy complications Expβ (CIs of Exp β)	Post-natal complications Expβ (CIs of Exp β)
Health knowledge		
No or low®	1	1
Medium	1.057 (.930,1.202)	1.049(.749,1.468)
High	1.139**(1.013,1.280)	1.378**(1.032,1.841)
Age group (years)		
15-24 age ®	1	1
25-34 age	0.912(.805,1.034)	0.805(.581,1.115)
35-49age	1.007(.890,1.140)	0.937(.691,1.270)
Place of residence		
Rural ®	1	1
Urban	1.052 (.942,1.176)	1.144(.865,1.512)
Level of education		
No education ®	1	1
Primary education	0.978(.799,1.198)	0.567**(.322,1.001)
Upper primary & secondary education	0.957(.850,1.076)	0.756*(.563,1.016)
Higher education	0.956(.807,1.133)	0.678*(.435,1.055)
Wealth quintile		
Poorest ®	1	1
Poor	1.005(.851,1.187)	0.830(.564,1.221)
Middle	0.947(.803,1.118)	0.808(.548,1.191)
Rich	0.865*(.732,1.021)	0.910(.617,1.341)
Richest	0.781***(.662,.920)	0.622**(.404,.956)
Caste		
Scheduled caste & Scheduled tribe ®	1	1
Other backward class	1.096(.966,1.243)	1.101(.801,1.512)
Others	1.129*(.980,1.300)	1.449**(1.007, 2.086)
Religion		
Hindu ®	1	1
Muslim	1.303***(1.110,1.529)	1.252(.881,1.780)
Christian	0.875(.634,1.206)	0.000(0.0)
Other	1.318**(1.009,1.723)	1.276(.649,2.506)

Note: ®-Reference category of different characteristics; ***p<0.01; **p<0.05; *p<0.10

Table 4 Percentage of Women of 15-49 years Age Groups who Received Ante-natal Check up, Institutional Delivery and Post-natal Medical Care by their Health Knowledge and Other Background Characteristics, India, 2005

Background characteristics	At least three ante-natal check up			Chi-square	Institutional delivery			Chi-square	Post-natal check up (within two months of births)			Chi-square
	No /low knowledge	Medium knowledge	High knowledge		No/ low knowledge	Medium knowledge	High knowledge		No/ low knowledge	Medium knowledge	High knowledge	
Age group (years)				1.53				3.79				2.26
15-24	55.1	74.6	66.1		38.9	57.1	64.6		11.7	18.1	16.4	
25-34	52.7	67.8	64.4		41.0	53.9	64.1		12.1	16.2	16.7	
35-49	47.6	67.3	70.9		35.6	58.4	56.6		10.8	15.0	16.5	
Place of residence				0.29				2.02				5.45*
Rural	51.3	66.1	69.4		38.4	56.5	60.3		11.7	16.4	16.4	
Urban	53.4	70.8	73.8		38.0	57.0	67.3		11.0	16.9	17.3	
Women's education				1.03				4.25				16.30**
No education	50.7	70.5	67.8		40.3	55.6	61.8		12.0	15.4	16.2	
Primary education	57.4	69.4	60.4		46.0	54.4	55.2		14.4	16.9	13.1	
Upper primary & secondary education	53.7	70.6	67.8		35.0	57.0	62.1		10.5	17.8	17.6	
Higher education	47.0	70.1	67.7		36.4	60.7	65.6		9.9	16.9	17.1	
Wealth quintile				381***				705.15***				188.22***
Poorest	42.4	43.6	48.2		25.9	27.4	44.1		8.9	14.6	9.3	
Poor	44.2	60.0	43.6		26.5	36.8	42.0		10.3	14.7	11.3	
Middle	52.1	64.0	67.5		38.7	52.5	53.8		10.5	15.5	18.2	
Rich	53.5	76.2	77.2		42.9	68.7	70.0		13.7	17.3	17.3	
Richest	71.7	85.4	89.6		65.1	79.1	85.2		13.7	17.9	21.4	
Caste												
Schedule castes & Scheduled tribes	48.5	55.0	51.6	187.57***	31.9	43.7	47.2	356.17***	10.6	16.8	14.4	82.86***
Other backward classes	48.3	68.7	69.8		35.4	56.2	55.4		12.5	15.7	16.2	
Others	63.5	83.1	76.9		53.8	68.9	79.9		11.0	17.2	18.5	
Religion				25.73***				53.06***				39.96***
Hindu	52.7	67.5	66.7		39.1	56.2	59.2		11.5	14.9	15.8	
Muslim	49.2	80.9	70.5		38.3	54.0	66.7		13.0	24.1	24.9	
Christian	45.7	90.6	86.5		17.2	84.8	92.4		5.4	21.2	20.8	
Others	44.4	72.1	55.5		28.9	52.4	66.3		9.5	25.6	10.8	
Total	52.4	68.5	71.6		38.2	56.8	63.8		11.4	16.7	16.9	

Note: Reference Period: Last five year preceding the survey; Total includes women with missing information on Wealth and Caste who are not shown separately. *** $p < 0.001$, ** $p < 0.0.005$, * $p< 0.01$

Table 5 Results of Logistic Regression Analysis of Received Ante-natal Check-up, Institutional Delivery and Post-natal Check up by Women of Age Group 15-49 Years, by their Health Knowledge and Background Characteristics, India, 2005

Background characteristics	Ante-natal check-up Expβ (CIs of Expβ)	Institutional delivery Expβ (CIs of Expβ)	Post-natal check-up Expβ (CIs of Expβ)
Health knowledge			
No or low ®	1	1	1
Medium	1.581***(1.371,1.823)	1.732***(1.510,1.987)	1.91***(1.628,2.241)
High	1.434***(1.260,1.633)	1.430***(1.262,1.620)	1.893***(1.633,2.195)
Age group (years)			
15-24®	1	1	1
25-34	0.951(.826,1.094)	0.927(.810,1.061)	1.130(.964,1.324)
35-49	0.929(.810,1.067)	0.907(.795,1.036)	0.946(.810,1.104)
Place of residence			
Rural ®	1	1	1
Urban	0.965(.852,1.094)	0.894**(.793,1.008)	1.078(.936,1.242)
Level of education			
No education ®	1	1	1
Primary education	1.116(.893,1.395)	1.136(.913,1.414)	1.068(.830,1.376)
Upper primary & secondary education	1.056(.925,1.206)	1.003(.883,1.139)	0.928(.799,1.077)
Higher education	0.930(.769,1.125)	1.110(.923,1.334)	1.047(.843,1.299)
Wealth quintile			
Poorest ®	1	1	1
Poor	1.153(.967,1.375)	1.061(.885,1.272)	1.016(.821,1.257)
Middle	1.613***(1.353,1.924)	1.742***(1.463,2.076)	1.480***(1.199,1.828)
Rich	2.192***(1.831,2.625)	2.437***(2.044,2.906)	1.962***(1.588,2.424)
Richest	3.541***(2.943,4.261)	4.851***(4.052,5.809)	2.544***(2.065,3.135)
Caste			
Scheduled caste & Scheduled tribe ®	1	1	1
Other backward class	1.404***(1.224,1.611)	1.481***(1.294,1.695)	1.089(.928,1.277)
Others	1.923***(1.641,2.254)	2.469***(2.121,2.874)	1.520***(1.269,1.820)
Religion			
Hindu ®	1	1	1
Muslim	0.912(.762,1.091)	0.791***(.668,.938)	1.067(.827,1.306)
Christian	1.780***(1.182,2.681)	2.317***(1.562,3.435)	1.985***(1.275,3.093)
Other	1.310*(.965,1.777)	1.199(.893,1.612)	1.576**(1.104,2.251)

Note: ®-Reference category of different characteristics; ***p<0.01; **p<0.05; *p<0.1