Womens Status, Household Structure and the Utilization of Maternal Health Services in Haryana (India)

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Abstract: In developing world, women suffer from complications of pregnancy and delivery and maternal health care service utilization is much below the acceptable level. Maternal and child welfare goals couldnt be achieved without improving the status of women in the family and society as well. An effort has been made in this study to assess the effect of womens status, and household structure on utilization of maternal health care services in Haryana.

Methods:- Data was taken from the third round of National Family Health Survey (NFHS-III) which is a national representative survey of women in the 15-49 years age groups. The sample used for this study comprised those women who had at least one birth in five year prior to the survey. To estimate the effect of the womens status and household structure variables on maternal health service utilization three outcome variables were used which were use of antenatal care services, place of delivery and use of assistance during delivery by health professional. Moreover, dichotomous variable i.e. place of residence was used to control for the accessibility and availability of maternal health services. Logistic regression technique was practiced to estimate models of the outcome variables. Separate models were also done for the urban and rural women since this group differs in many ways. In addition to this a probability model was done to estimate the probability of use of the services by selected variables from the logistic regression model.

Result:- The result showed that only 34% of the women births in India take place in health facilities while 66% received assistance during delivery from skilled provider. Utilization of maternal health services was significantly low among rural women as compared to their urban counterparts. In the logistic regression model educational status of the mother, maternal autonomy and household wealth were found to be strong indicators of utilization of maternal health care services in Haryana. Antenatal care use was found to be a strong indicator of place of delivery and received assistance during delivery by a skilled provider. Women with secondary/higher level of education have substantially higher probabilities of receiving assistance from a modem source at delivery compared with women with primary education.

Conclusion:-To increase womens utilization of basic health care services and improve maternal health in Haryana some crucial steps should be taken on educating women and strengthening antenatal care services. Great attention should be given to the most vulnerable group of women in the state this includes those who are living in rural areas with no education and in the low economic status group.

Keywords: Antenatal care, delivery assistance and place of delivery

1 Introduction

Safe motherhood is a moral, social and economic investment that must be given international priority. Everyday about 800 women die due to pregnancy related complications worldwide and 99% of them occur in low and middle income countries [21]. More than half of these occur in sub-Saharan Africa and one third in South Asia. Due to various interventions in maternal health care services, maternal death has been halved worldwide between 1990 and 2010 but it is still unacceptably high in many low- and middle-income countries [21].

In developing countries maternal and child mortality continues to be a major health problem. The World Health Organization (WHO) has estimated that 358,000 maternal deaths occur annually in the world, 99% of them in developing countries [20]. Indias maternal mortality is an estimated 167 deaths per 100,000 live births, according to a WHO estimate in 2013. Several of the national socio-demographic goals for 2010 specified by the policy pertain to safe motherhood

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(NPP-2000). Its efforts mainly through the adoption of the National Rural Health Mission in 2005 (now expanded country-wide across rural and urban areas through the National Health Mission) have speeded up progress in maternal health but while the maternal mortality target is likely to be achieved the Millennium Development Goals [19]. Hence, achieving the MDG goal on maternal health requires providing high-quality pregnancy and delivery care, including essential obstetric care, and improving womens sexual and reproductive health [21].

2 Literature review

Previous studies explored the relationship between socio-demographic variables and the utilization of ANC services and obstetric care. The use of ANC services were found higher among the women of younger age group than the older age group [18,8,6]. Maternal education has also been shown repeatedly to be positively associated with the utilization of maternity care services [1,15].

In this paper, factors influencing the under-utilization of maternal health services among women in Haryana are investigated. Haryana is in closer proximity to achieving the MDG target, owing to the high utilization of maternal health services. Particular focus is given in the article to womens status and household structure, while controlling for the accessibility factor. Studies also portrays that pregnancy and childbirth are all too often a cruel and harsh lived experience for women, particularly the poor and women in rural areas [12,16,15].

Womens low social status, lack of knowledge about illness and lack of awareness about obstetric/gynaecological danger signs, lack of decision making power and inability to pay for services also play a significant role in the underutilization of existing maternal health service [11,13,17].

It has been argued that changes in womens status have been the key to differentiate the behavior of those seeking modern health care from those following traditional practices [7]. In general, women with low status are less likely to use modern facilities, whereas women with higher status take the initiative in seeking care for themselves and their children [2,3]. It has also been pointed out that difference in household characteristics influence the utilization of maternal health services [22]. This is partly because, in developing countries, the decision to use any kind of health care for women is made at the household level. These two aspects of potential users of services are integrated into a single study and the effects examined of womens status and household structure on the utilization of maternal health services in Haryana.

3 Data Source and Methods

This study uses data third round of National Family Health Survey [9], which was conducted by International Institute for Population Sciences, Mumbai and ORC Macro International in 2005-06. The sampling frame for the NFHS-III was the 2001 population census. The survey uses a two-stage cluster sampling design in which clusters are selected at the first stage followed by households. NFHS-III collected data from a nationally representative sample of 109,041 households, 124,385 women age 15-49, and 74,369 men age 15-54. The survey collected detailed information on womens background characteristics, fertility, family planning, and maternal healthcare behaviors including use of antenatal, delivery, and postnatal care. The study was carried out on a sample of 1,256 women in the age group 15-49 years by using NFHS-III data in Haryana.

3.1 Dependent variables

Study analyses the utilization of mainly three types of maternal health care services: antenatal care, delivery at health facility and professional assistance at delivery. The dependent variables are dichotomous variables in nature indicating the use or non-use of these maternal health services.

Antenatal care indicates if the women have at least one ANC visit during her pregnancy (coded as 1); otherwise, it was coded as 0.

Place of delivery indicates whether the place of delivery was at health facility included government hospitals, private hospitals and NGO/trust (coded as1); if the place of delivery was home coded as 0.

Professional assistance at delivery indicates the women delivered by skilled provider include doctor, ANM/nurse/midwife/LHV, and other health personnel. If the delivery assistance received by health professional is considered as professional assistance (coded as 1) otherwise no professional assistance (coded as 0).

3.2 Independent Variables

To assess womens status and household characteristics, some proxy variables were used. Four variables womens education, her occupation, cash income and autonomy were used as indicator of womens status.

The womens education measures the level of education that a woman has completed and categorized as no education, primary education and secondary/higher education. Women occupation of women indicates whether the woman is currently employed in any type of work in last 12 months. It is dichotomous variable: not currently working (code as 0) and currently working (coded as 1). Cash income is the variable that indicates whether the woman received payment in cash and both cash and in-kind for their work. Women who are not working and those who are working but not earning any cash are placed in the no cash income category (coded as 0), while the women who are earning cash for their work are placed in the cash income category (coded as 1). Decision-making by women is a composite score of four variables related to womens decision-making power in the household. The decision making variables were given code 1 for women who have decision-making autonomy and 0 otherwise.

Two measure household characteristics are also included in this study. Family structure is a proxy indicator for a nuclear and non nuclear (extended) type of family structure. Nuclear family are households comprised of a married couple or a man or a woman living alone or with unmarried children (biological, adopted, or fostered) with or without unrelated individuals coded as 1, otherwise 0. The wealth index of the household is composite measure of 33 assets and housing characteristics. The wealth index is categorized as poorer (coded as 0), middle (coded as 1) and richer (coded as 2).

3.3 Control Variable

The dichotomous variable, place of residence is used as control variable in this study. Previous studies show that the maternal health services are more accessible in urban areas as compared to rural areas.

In the study, the relationships are examined between these selected indicators and womens utilization of maternal health services. The analysis is based on survey data for a large national sample of Indian women. First, it is hypothesized that the higher the womens status, the greater is the utilization of maternal health services. It is also hypothesized that women from a nuclear household structure have greater autonomy compared with women from the traditional extended/joint family structure and are therefore more likely to seek care. The hypotheses are tested while controlling for the availability of services.

4 Results

Table 1 presents the description of dependent variables with separate statistics of rural-urban samples. Sample shows that 89.5% women received antenatal care from health professional in Haryana. Table shows the distribution was uneven between urban and rural women where only 26.7% of the rural women delivered child in health facility whereas 64.0 % of their urban counterparts delivered in health facility. Table also shows that 61.9% of rural women and 79.2% of urban women have received assistance during delivery from health professional.

Table 2 shows the descriptive statistics of both women and household characteristics. Women education, occupation, cash income and autonomy are used as proxy variable to measure womens status. Urban sample shows that the majority of women (71.2%) have secondary/higher education. 46% of the women living in rural area have no education, only 11.9% and 9.1% of the women have primary education in rural and urban areas respectively. Currently working women are women who were working in the 12 months preceding the survey. Sample shows that most of the women in rural (73.5%) and urban (87.5%) areas were not currently working, however only 23.6% of women currently working in

Table 1. Descriptive statistics of dependent variables, Haryana					
Variable	**Depiction**	**Rural**	**Urban**	**Total**	**No. of women**
Antenatal care	Received antenatal care service from health professional[1] at least once during pregnancy				
No		12.2	4.9	10.5	90
Yes		87.8	95.1	89.5	769
Place of delivery	Delivery at home vs. health facility[2]				
Home		73.3	36.0	65.4	822
Health Facility		26.7	64.0	34.6	434
Delivery Assistance	Received assistance during delivery from health professional (Doctor, nurse or midwife)				
No		38.1	20.8	34.0	297
Yes		61.9	79.2	66.0	576

[1] health profession includes doctor, ANM, nurse, midwife, or LHV
[2] health facility includes Govt. hospitals, private hospitals, or NGO/trust

Table 2. Descriptive statistics of independent variables, Haryana				
	Rural	**Urban**	**Total**	**No. of women**
Women Education				
No Education	46.0	19.7	40.4	508
Primary Education	11.9	9.1	11.3	142
Secondary/Higher	42.1	71.2	48.2	606
Women Occupation				
Not Currently Working	73.5	87.5	76.4	960
Currently Working	26.5	12.5	23.6	296
Cash Income				
Cash income	31.1	20.8	29.0	152
No Cash income	68.9	79.2	71.0	1104
Women Autonomy				
No	35.3	26.1	33.7	364
Yes	64.7	73.9	66.3	892
Household Structure				
Nuclear	38.9	44.8	40.1	451
Non Nuclear	61.1	55.2	59.9	673
Wealth Index				
Poorer	26.3	1.9	21.2	266
Middle	28.4	14.0	25.4	319
Richer	45.3	84.1	53.4	671

totals. Table 2 also shows that about one-third (31.1%) and one-fifth (20.8%) of women earned cash income for their work in rural and urban areas respectively in rural and urban areas respectively. Women autonomy is the composite score of three variables related to womens decision-making power in the household. Rural women were less likely to autonomous as compared to their urban counterparts. Urban sample shows that 73.9% of the women have decision making autonomy in the household and 64.7% of rural women have autonomy.

Measures of household characteristics are also included in this study by using two variables: household structure and wealth index. Table 2 shows that 61.1% of the rural women living in non- nuclear/extended residence, however 44.8% of the urban women living in nuclear residence. Table 2 also portrays that 53.4% of the total women belongs to richer household and most of women belongs to richer (84.0%) household than middle (14.0%) and poorer (1.9%) in urban area. Likewise, rural sample shows that most of the women (45.3%) belong to richer wealth quintile and only 26.3% of them belong to poorer wealth quintile.

4.1 Multivariate logistic regression analysis

Results of the logistic regression analyses predicting the utilization of maternal health services using various independent variables related to the womens status and household structure is covered in this section. Three separate models for three dependent variables (antenatal care, place of delivery and professional assistance at delivery) were fitted for all women of the selected rural and total samples.

4.1.1 Use of antenatal care

Table 3 below shows result of logistic regression model predicting use of antenatal care services. Net effect of each variable on the status of use of antenatal care services is shown in the model.

The result showed that rural women with no education were less likely to receive antenatal care from a health professional as compared to their counterparts who have primary education (OR=2.76) and secondary/higher education (OR= 4.79) while controlling all the other variables. However no statistically significant result was found for the women work status and cash earn of the women. The odds of using antenatal care service was about four times higher if the woman has decision making autonomy as compared to those with no autonomy both rural and total sample (OR=3.86 for rural sample, OR=3.89 for total sample).
 Of the household-level characteristics, the wealth status of the household has positive and significant impact on the use of antenatal care; however, no significant result was found in case of extended/non nuclear household on the use of antenatal care services. Table 3 also shows that the women from richer wealth class were about four times more likely to receive antenatal care services compared to their poorer counterparts (OR=4.89 for rural sample and 4.02 for total sample).

4.1.2 Place of delivery

The result of the logistic regression model predicting place of delivery is shown in table 3. With respect to women characteristics, women education has a positive and significant affect on the place of delivery at the time of child birth. Women whose educational level was secondary/higher had higher odds of institutional delivery when compared to those with no education (OR=3.55 for rural sample and OR=4.28 for total sample). The other women characteristics, women occupation, cash income and autonomy have no significant association with the place of delivery.

Likewise use of antenatal care services, place of delivery has no significant association with household structure. However, household wealth was also related with institutional delivery, the result shows a statistical significance for women in the richer and middle wealth group (OR=3.02 for rural sample and OR=3.90 for urban sample) and (OR=1.57 for urban sample) respectively.

4.1.3 Assistance during delivery

Result shows the assistance by professional health provider during delivery is presented in table 5. Women and household characteristics that influence assistance during delivery were analyzed in the model.

The result of multivariate analysis showed that the women who have secondary/higher education had two times higher odds of delivering with assistance by professional health provider (OR=2.34 for rural sample and OR=2.65 for total sample) as compared to those women who have no education. Similarly, women autonomy has a significant impact on assistance during delivery. Rural women who have decision-making autonomy in the household were 1.53 times more likely to deliver at a health facility compared with their counterparts who have no autonomy in decision making. The logistic regression result for the rural and total sample showed no statistical significance for the relation between women occupation and assistance during delivery. Household wealth was also related with assistance during delivery, the result shows a statistical significance for women in the richer wealth group (OR=2.05 for rural and 2.39 for total sample).

Table 3. Logistic regression results for use of antenatal care, Haryana		
	Rural	**Total**
Women Education		
No Education [R]	1.00	1.00
Primary Education	2.76*	2.81*
Secondary/Higher	4.79***	6.60***
Women Occupation		
Not Currently Working [R]	1.00	1.00
Currently Working	1.99	1.61
Cash Income		
Cash income [R]	1.00	1.00
No Cash income	3.98	2.89
Women Autonomy		
No [R]	1.00	1.00
Yes	3.86***	3.89***
Household Structure		
Nuclear [R]	1.00	1.00
Non Nuclear	0.840	0.750
Wealth Index		
Poorer [R]	1.00	1.00
Middle	1.420	1.320
Richer	4.89***	4.02***

Level of significance: *p≤ 0.05; ** p≤ 0.01; *** p≤ 0.001
[R] Reference category

Table 4. Logistic regression results for place of delivery, Haryana		
	Rural	**Total**
Women Education		
No Education [R]	1.00	1.00
Primary Education	1.84*	2.27***
Secondary/Higher	3.55***	4.28***
Women Occupation		
Not Currently Working [R]	1.00	1.00
Currently Working	1.000	0.870
Cash Income		
Cash income [R]	1.00	1.00
No Cash income	1.310	1.130

4.2 Result for calculations of Predicted probabilities of use of maternal health services

4.2.1 Influence of place of residence, education and wealth index on the use of antenatal care services

Predicted probabilities of antenatal care utilization were calculated using two independent variables and one controlled variable that showed strong effect in the logistic regression model. A separate logistic regression model was fitted using these three variables by taking antenatal care use as an outcome variable. Then the probability was calculated as follows.

Logit (probability of use of antenatal care) = 0.298 +0.728X1+ 0.577X2+ 0.219X3 Where, X1= Educational level of the women, X2=Wealth index and X3=place of residence. The B coefficients for each variable were taken from the logistic regression model output. The results of predicted probability calculation are shown in Fig. 1.

As shown in the Fig 1, the probability of using antenatal care increases with increasing wealth index and increase in women education. The result shows a different pattern by combined measures of educational status and place of residence.

Women in lowest wealth index group with no education and living in rural area showed a lowest probability of use of antenatal care services (1/1+e-(0.298+0*0.728+0*0.577+1*0.219) which was 0.68 or 67% followed be those with

Table 4 Cont'd		
	Rural	**Total**
Women Autonomy		
No [R]	1.00	1.00
Yes	0.880	1.080
Household Structure		
Nuclear [R]	1.00	1.00
Non Nuclear	1.030	0.990
Wealth Index		
Poorer [R]	1.00	1.00
Middle	1.550	1.57*
Richer	3.02***	3.90***

*Level of significance: *p≤ 0.05; ** p≤ 0.01; *** p≤ 0.001*
[R] *Reference category*

Table 5. Logistic regression results for professional assistant at delivery, Haryana		
	Rural	**Total**
Women Education		
No Education [R]	1.00	1.00
Primary Education	1.190	1.510
Secondary/Higher	2.34***	2.65***
Women Occupation		
Not Currently Working [R]	1.00	1.00
Currently Working	1.360	1.280
Cash Income		
Cash income [R]	1.00	1.00
No Cash income	1.500	1.410
Women Autonomy		
No [R]	1.00	1.00
Yes	1.53*	1.66**
Household Structure		
Nuclear [R]	1.00	1.00
Non Nuclear	1.080	0.930
Wealth Index		
Poorer [R]	1.00	1.00
Middle	1.460	1.400
Richer	2.05***	2.39***

Level of significance: *p≤ 0.05; ** p≤ 0.01; *** p≤ 0.001
[R] Reference category

primary education and living in the rural areas.

Women in the richer wealth quintile living in urban with secondary/higher education seem to have highest probability using antenatal care. The highest probability of use of ANC was observed for women living in the urban area, with secondary/higher education and in the richer wealth quintile group ($1/1+e-(0.298+0.728*2+0.577*2+0.219*1)$) which was 0.98 or 98% followed by those with primary education and in the richer wealth group.

4.2.2 Influence of place of residence, use of antenatal care services and education on using assistance during delivery

The predicted probabilities for assistance during delivery are calculated by three variables: place of residence, use of antenatal care and womens education. As these variable showed a strong association in the logistic regression model.
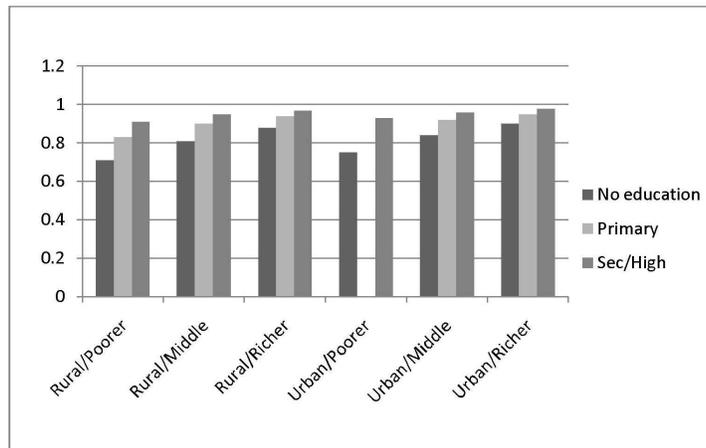
Figure 1. Predicted probability of use of antenatal care by place of residence, educational status of the women and wealth index in Haryana.
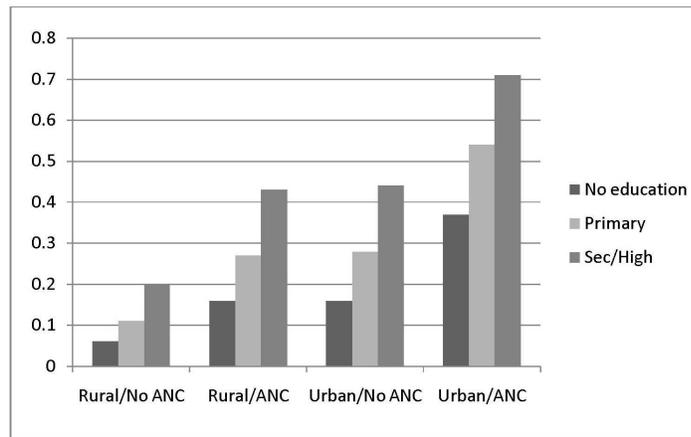

Figure 2. Predicted probability of assistance during delivery by use of antenatal care, educational status of the women and place of residence in Haryana.

Predicted probability was calculated as follows:

Logit (probability of assistance during delivery) = -2.654 + 0.447*X1 + 3.043*X2 +0.547*X3

Where, X1= Educational status of the women, X2=Antenatal care use and X3=Place of residence. The B coefficients for each variable were taken from the logistic regression model output. The results of predicted probability calculation are shown in Fig. 2. Fig 2 shows that urban women who received antenatal care were more likely to delivery with health professional assistance and from these women those with secondary/higher education showed the highest use. Women in this group were 0.71 or 71% (1/1+e-(-2.654+0.447(2)+3.043*(1)+0.547(0))) more likely to deliver with assistance. Likewise rural women with no access to antenatal care service and with no education showed the lowest probability (1/1+e-(-2.654+0.447(0)+3.043(0)+0.547(1))) which is 0.06 or 6% of delivering with assistance from health professional.

5 Discussion and conclusions

A total of 5024 women were included in this study to examine the eects of womens status and household level characteristics on maternal health care utilization behavior in Haryana.

Results show that education of women has a signicant positive relationship with use of antenatal care services, place of delivery and professional assistance at delivery. Educated women were more likely to realize the benets of using maternal health services; therefore, they are more likely to use the services [1,2].

The study shows that the utilization of maternal health services is very low in rural area, as previously documented in the studies [12,15,16]. The reason for the low levels of utilization of maternal health services among rural women is that they have less access of maternal health services. Therefore, by improving educational opportunity and running awareness program among rural women may have larger impact on health services utilization.

The nding of well-built autonomy eect is consistent with ndings from the previous studies in the research world [2,3]. The explanation is that women autonomy enhances the decision making capability about their own health. The study also identied wealth index as a key factor that have important inuence on utilization of maternal health services in Haryana. Most of the previous ndings are consistent with the studies [7].

Women occupation and her cash earn have no signicant association with the use of maternal health care services utilization. In addition, women autonomy in decision making was also found to be strongly related with the utilization of antenatal care and professional assistance during delivery.

In terms of household-level characteristics, household wealth status was found to be signicant in predicting utilization of maternal health care services. However, household structure was signicantly related to the utilization of prenatal care. In addition, use of antenatal care services was found to be a positive and signicant predictor of use of professional assistance during delivery.

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