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Estimation of Risk Factors for Conducting Delivery at Home among Baiga Women in Madhya Pradesh: A Multinomial Logistic Regression Analysis

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Abstract: ***Background: Place of delivery at home is excessively affects the most backward vulnerable segment of population. Several studies have assessed the association between socio-demographic characteristics and home delivery but only a few have assessed the clean practices, delivery assistant and instrument used to cut the cord when delivery is conducted at home. Traditional birth attendance, cultural norms and believe can be responsible for poor health of mother and new born. Methodology: A survey of maternal health care was carried out in Baiga dominated Blocks namely Bajag, Samanapur & Karanjia in Dindori district of Madhya Pradesh state in central India during the period 2009 to 2010. Of 500 ever married women surveyed, 380 currently married women who had experienced maternity during last five years identified for antenatal, natal care practices. The data were collected by conducting interview with women at their residence by trained field investigator after obtaining informed written consent. Results: Out of 380 women 273(72%) women were taken at least one ANC checkups and delivered at different places. Age at delivery of first birth having observed 19 years. Most of child birth were conducted at home 350 (92%) and only 30 (8%) at health institution. Women illiteracy (OR=1.091, p<0.10), age at marriage before completing 19 years of age (OR=1.116, p<0.05) and low awareness on MCH issues (OR=1.915, p<0.05) were found significantly associated as risk factors to giving child birth at home. Additional, majority of delivery assisted by Untrained Dai (87.7%) in unhygienic condition. Conclusion: Women illiteracy, age at marriage (<19 years) and low awareness on MCH services were found risk factors for conducting delivery at home as it regard of poor health. The IEC campaign can strength to women and force to go Hospital for safe delivery.***

Keywords: Child birth at home, Clean practices, traditional norms, Vulnerable population, Tribal group, India

1. Introduction

Women living in rural part of India are considered a vulnerable group in terms of maternal and reproductive health, the tribal population inhabited in rural and dense forest areas may considered as much vulnerable on the subject matters. In rural areas the delivery at home remains the most common practice due to several reasons behind. The risk factors of home delivery need to identified in terms of effective reduction. Although India have high concentration of tribal population represents 8.6% of the total country population (Census, 2011). A 705 tribal group are identified across 30 states and 75 have identified as Particularly Vulnerable Tribal Group(PVTGs) and Baiga population in Madhya Pradesh is one of them. Conducting delivery at home is an major problem reflected to poor health of both mother and new born. In rural and tribal areas it was found unskilled birth attendants performed delivery unhygienic. The three important background characteristics of human affects to development and proper health care. *Socioeconomic Status (SES);* is measured combination of education, income & occupation. This is usually conceptualized as social standing or class of an individual / group. Low Socioeconomic status (SES) and its correlates, such as lower education, poverty & poor health, ultimately affect not only tribal population, its affects to all society. *Education;* especially the level of female education is generally considered a key factor to development and health care. in terms of a great influence on the proper use of maternal and child health care services as it enhances the knowledge & skills of the mother concerning the age at marriage, contraception, nutrition, prevention and treatment of diseases timely. *Standard of living;* It is measurement of how well off a group of people or an individual perceive themselves to be. Standard of living takes into account the quality of housing, medical care, education, transportation and entertainment opportunity. The standard of living is closely related to quality of life (http://www.yourdictionary.com/standard-of-living).These three *(SES, Education & Standard of living)* background characteristics in tribal society are poor. Therefore the present article was described the socio-demographic correlates with home delivery practices and barriers of maternal health care utilization among married women aged 15-49 years in tribal blocks in Dindori district. Without proper pregnancy care; not using maternal health care services in schedule time may chances of occurring disease during pregnancy and delivery is obvious directs as main reason of death of mothers. In this concern the studied found that about 80% of maternal deaths & 98% stillbirth had the caused by direct obstetric complications such as primarily haemorrhage, sepsis, complications, abortion, preeclampsia, eclampsia and prolonged and obstructed labour (Gabrysch S et al, 2009; PAI - MDGs, 2005; Turan JM et al, 2007; Stanton C et al, 2006;). Other study in Rajasthan reported about 20% pregnancy related deaths (Kirti Iyergar et al,

2009). Women of this Baiga tribe have low awareness and underutilization of MCH services due to wrong perception in relation to the pregnancy and safe delivery (D.Kumar, A.K.Goel et al 2016). The traditional practices in rural area revealed the most common reason for conducting the deliveries at home (S. S. Mumbare, 2011). The traditional culture and norms are common in tribal areas. Therefore, this required essential to find out the risk factors and its association with conducting delivery at home for consequences. In details, for the estimation of risk factors among conducted delivery at home were gathered through conducted individual interview method. The inclusion criteria were used: ever married women age between 15 to 49 years, who have given birth at home, available at the time of survey and willing to give consent. This is a part of the survey of utilization of maternal health care services, delivery characteristics from individuals was also investigated. So for this was opportunity to estimate the risk factors of conducted delivery at home in this disadvantaged tribal segment.

2. Methodology

A) Setting

The main area of habitation of Baiga population in Madhya Pradesh are Dindori, Mandala, Annuppur, Sidhi, Shahdol, Umaria, Jabalpur and Balahghat. About 2.7% Baiga population are consisting of the total tribal population of the M.P state (Census 2011). This study was conducted in Dindori district considering the determining the maternal health care utilization, operational feasibility, rapport with the community and to support by district authorities. Community based household survey done among Baiga by National Institute for Research in tribal Health(NIRTH) showed most of them lived in nuclear family, occupied in agriculture & labour works. Majority of family was illiterate and resided in mud made houses, huts with no separate kitchen in houses. The traditional norms and culture as tattooing or *godna* are in fashion of these Baiga women(http://intangibleheritage.intach.org/godna-tattoo-2016).

B) Study Area

Survey was conducted on maternal and child health care in three tribal Blocks namely Bajag, Samanapur and Karanjia in district Dindori of Madhya Pradesh during the period 2009 to 2010. These tribal blocks covers majority of such population situated in dense forest and hilly area. Some of villages of the areas only can approach by on foot after crossing the river/stream and hills.

C) Study Population

For the subject all women aged 15 to 49 years were identified for maternal health care practices such as antenatal care, natal and postnatal care, child immunization and to assess the women awareness on the issues. Assessing the risk factor for child birth occurred at home, women who had given birth during the last five years considered. All activities of delivered at home were investigated by conducting interview as per convenience of individuals after obtaining informed written consent.

D) Data Collection

The developed semi-structured, pre-coded, pre-tested questionnaire set was used for data collection. The data was collected by trained investigators through conducted interview at respondent (women) home in their local language in Hindi. The collected information was covers household identification, socioeconomic characteristics, antenatal, natal & postnatal care practices of respondents. In addition the data on child immunization care, family planning and women knowledge/perception regarding maternal health care services, available facility in their areas were also collected. The interview team (investigators) was supervised in terms of data quality and consistency by trained supervisors during data collection. All the filled forms/questionnaires checked for correctness and completeness before entering the data in computer.

E) Data Management and Statistical Analysis

The data entry was completed by using the Statistical Package for Social Sciences (SPSS/PC) version 20.0. Data entry field was developed with logical expression for minimize the error in data entry. The data were entered in the computer and after cleaning, validation analyse with SPSS software for the test results. A p-value of <0.05 was considered as statistical significant for the valuable outcomes.

F) Protection of Human Subject

This study was approved by Institutional Ethics Committee of National Institute for Research in Tribal Health (NIRTH), Indian Council of Medical Research, Jabalpur, Madhya Pradesh. After explaining the content of the study, each respondent gave informed written consent for the participation in the study. The illiterate women gave consent in the form of thumbing in the presence of family member and all responses were held in reserve confidential.

3. Results

1. Coverage of study population and sample:

A study was conducted in 24 villages of three tribal Blocks in the district Dindori of Madhya Pradesh in 2009 to 2010. For the determination of women risk among women who had not delivered at hospital and health institute. All individual of Baiga population 2258 of 460 households were surveyed with probability proportion to size (PPS) sampling procedure. Out of sample 500 ever–married women, 380 women who had experienced maternity during last five year & delivered at home were interviewed on the delivery care services and awareness. All women age 15 to 49 year were covered and investigated on delivery characteristics and pattern. The information regarding various clean practices and delivery assistant, instrument for cutting the cords for health care were collected from women. Among 380 delivery investigated, 30 (8%) deliveries were conducted at the health institution while remaining large 350 (92%) of deliveries were conducted at home. Among home delivery only 43 (12.3%) were assisted by ANM/LHV & trained Dai and remaining lot 307 (87.7%) assisted by untrained personnel (Figure-1).

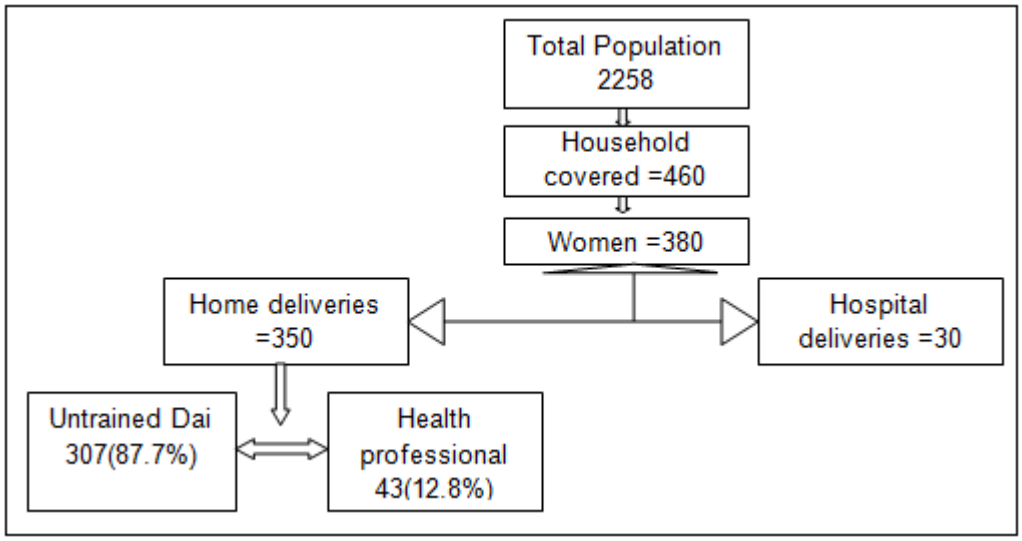

Figure 1: Outline of the delivery place & delivery assistant characteristics

2. Socio-demographic profile of study population

This is advantage to estimate background parameters of women who given child birth at home in this vulnerable segment. Majority of the women (73.7%) belonged in younger group in 15 to 29 years of age. Most of the women (86.9%) were illiterate and 85.1% were married before completing the 19 years of age. Based on maternal and child health care programme the every women need to get four ANC checkups and regular care. The study result found that majority of women (70.9%) were taken only one antenatal care checkups and remaining were without ANC checkups. It was found that only one-fourth women knew about the maternal health care services. This tribe have poor socio-economic profile with majority of living standard in nuclear family, occupied in labour/agricultural work, low literacy, no separate kitchen for cooking, etc (Table-1).

Table 1: Explanatory figures of Baiga women who given birth at home according with their socio-demographic characteristics during 2009 to 2010 in Dindori district Madhya Pradesh

Socio-demographic Characteristics of women	*Number of women*	*Marginal Percentage*
Women age;		
• Younger (15-29)	258	73.7
• Elder (35-49)	92	26.3
• Total	350	100.0
Women education;		
• Illiterate	304	86.9
• Literate	46	13.1
• Total	350	100.0
Age at marriage;		
• <19 Year	298	85.1
• >19 Year	52	14.9
• Total	350	100.0
At least one ANC check		
• Yes	248	70.9
• No	102	29.1
Knowledge of MCH services		
• Yes	89	25.4
• No	261	74.6
• Total	350	100.0

3. Risk of conducted home delivery

Table-2 represents that the adequate risk was estimated by statistical procedure and technique. The traditional birth practices were analyze to find out the outcomes of results. It is explained in three section below;

I. Clean practices for conducting delivery at home: Majority of the deliveries conducted after cleaning surface of room/place (98.9%) followed with hand wash with soap (96.9%), nail cutting, removing ring and bangles (80.0%) and checking the cord stump for bleeding (85.1%). It was found that 20.0% deliveries conducted and assisted unhygienic as without removing ring, bangles and nail cutting which leads the risk of mother and her new born along with about 15.0 deliveries completed without care of cord stump.

II. Assistant during home delivery: Most of the deliveries were conducted by untrained personnel/Dai (87.7%) and (8.0%) were by Trained Dai. It was found that only few 4.3% deliveries were conducted and assisted by health professional as ANM & LHV of their areas. So for the mother and her baby are at higher risk due deliveries assisted by untrained health professionals.

III. Instrument used to cut the cords: Large of the deliveries used instrument as blade to cut the cord (72.6%). Reaming of the deliveries (27.4%) used harmful instruments to cut the cord were found risk to mother and her new born babies. The harmful instruments were used to cutting the cord by *sickle* (4.9%), *Khapra* (7.4%) and *khapra with blade* means cord keep on khapra (mud made) as making base then used blade to cut the cords were found among this vulnerable tribe.

Table 2: Distribution of clean practices followed by the person conducting the delivery at home among Baiga tribe in Dindori district Madhya Pradesh

Home delivery characteristics	Number of delivery(n=350)	Marginal percent
Clean practices;		
• Clean surface;		
Yes	346	98.9
No	4	1.1
• Hand wash with soap		
Yes	339	96.9
No	11	3.1
• Nail cut, remove ring & bangle		
Yes	280	80.0
No	70	20.0
• Checked e cord stump for bleeding		
Yes	298	85.1
No	52	14.9
Assistant during delivery;		
• ANM/LHV	15	4.3
• Trained Dai	28	8.0
• Untrained Dai	307	87.7
Instrument used to cut the cord;		
• Blade	254	72.6
• Sickle	17	4.9
• Khapara	26	7.4
• Khapara with Blade	53	15.1

4. Determinants the risk factors for conducting delivery at home

To find out the risk factors associated and responsible to conduct the delivery at home (place of residence) done the Multinomial Logistic Regression analysis for the results. Consequently, for considered home delivery is dependent can be affected by independent variables as mother background characteristics; present age of mother (<30 years), age at marriage of mother (<19 years), education of mother as illiteracy, antenatal care at least one ANC checkups during pregnancy and knowledge of maternal health care services (MCH). The estimated risk were found illiteracy of mother (OR=1.091, p<0.10), age at marriage before completing the 19 Years of age (OR=1.116, p<0.05) and lower knowledge of MCH services(OR=1.915, p<0.05). Resulted the risk factors as illiteracy of mother, early age at marriage and low level of knowledge of MCH services were found significantly responsible for conducted delivery at home (Table-3). In addition for the estimation of risk due to assisted deliveries by untrained Dai with the characteristics of clean practices the data were analyze for the outcomes with the procedure of Binary Logistic Regression. The risk of conducting deliveries without nail cutting, removing rings & bangles by untrained Dai were found likely to higher (OR=1.624) as compare to assisted deliveries by health professional. After adjusted the factors of cleaning behaviours the two factors clean surface (AOR=1.133) & cutting the nail, removing ring, bangles (AOR=2.788) were found higher risk to initiating disease of both mother and new born baby (Table-4).

Table 3: Result of Multinomial Logistic Regression Analysis for the estimation of risk factors for conducting delivery at home (residence)

Independent variables	Exp(β)	95% Confidence Interval for Exp(β)	
		Lower Bound	Upper Bound
Younger age <30years	0.282	0.064	1.254
Age at marriage<19 Years	1.116*	0.308	4.036
Illiteracy of mother	1.091**	0.362	3.286
Antenatal checkups	0.442	0.145	1.348
Knowledge of MCH services	1.915*	0.760	4.823
Reference category is Institutional delivery			
** p<0.05; **p<0.10*			

Table 4: Results of estimated risk factors for deliveries conducted by untrained personnel's (Untrained Dai=1) with followed clean practices in comparison to health personnel's (ANM/LHV & Trained Dai=2) analyse by Binary Logistic Regression method

Clean (hygienic) practices for the conducting delivery at home	Odds Ratio {Exp(β)}	95% Confidence interval for odds ratio		Adjusted Odds Ratio {Exp(β)}	95% Confidence interval for adjusted odds ratio	
		Lower	Upper		Lower	Upper
Hand wash (Yes=1,No=2)	0.357	0.091	1.400	0.205	0.031	1.358
Clean surface (Yes=1,No=2)	0.414	0.042	4.077	1.133	0.067	19.077
Nail cut (Yes=1,No=2)	1.624	0.657	4.017	2.788	0.897	8.668
Check cord stump (Yes=1,No=2)	0.615	0.276	1.373	0.577	0.241	1.381

4. Discussion

The study tribe are identified as most backward population, women may suffering from the reproductive problems which occurred by given child birth at home are often in their poor socio-demographic conditions which poses a significant burden of illness. The customs and tradition, as opposed to cost, are the most common reason given for delivering at home (Das S, et al 2010). A large study covering most part of India showed that the odds of using skilled birth attendants at birth were considerably lower among tribal group than women belonging to non-tribal groups (Hazarika I, 2010). Similar study resulted from Jharkhand state found that home deliveries are common but there are large differences between 94% tribal group compared to 69% of the non-tribal groups (Agrawal PK et al 2010). Other study, Crape et al., (2007) investigated risk factors associated with stillbirths using personal interviews and medical records abstraction in a hospital-based case control study in Thai Nguyen Province, Vietnam and on the basis of findings suggest that improved maternal health education and care in all communities may reduce the burden of foetal loss. Our study found that about one-fourth of women had knowledge of the maternal health care services only not to delivered all at health institution considered lower, compared to the study conducted in North Ethiopia, reported one fourth of women to identify and mentioned place of delivery (M Hiluf et al 2008). Other study from West Bengal found less than one

fifth of women planned for institutional delivery (Mukhopadhyay et al.2014). So for identification of place of birth (health institution) had significant association with distance and time taken to reach PHC/CHC in rural area may due to this cause facility based health services are not accessible by pregnant women, which can resulted in choosing home as place of delivery. Along with not having knowledge of expected date of delivery and saving money for emergency care, this decreases the probability to reach the health facility on time or prior preparation for home deliveries in Particular Vulnerable Tribal Groups (PVTGS). A study from Burkina Faso reported more than four fifth of recently delivered women and three fifth of pregnant women planned for saving money for safe delivery and emergency care (Moran et al 2006). A study in rural setting in district Rewa, Madhya Pradesh found less than half of women to plan for saving money (Kushwaha et al 2014). More ever, this may helped to explained the study setting of this study among most backward segment, most of them were not in formal employment, they lived on forest based products and subsistence agriculture work; as income is not earned, saving money was too difficult in the existing situations.

5. Limitation of the Study

In this study the achievable constraint of the analysis was captures only the mothers who given child birth at home (residence) for risk estimation and does not consider women who delivered at health institution except the reference for compared. The data on clean practices characteristics collected using different questions for more memory bias from women who delivered at home. It is important to continue to develop the IEC model and methods to strengthen knowledge and attitudes on this vital topic.

6. Conclusions

The findings of this study shows that while there are several risk factors for conducting delivery at home that can be ascertained by generating awareness to promote institutional delivery especially among women and responsible family members for taking well decision. A responsible factors Illiteracy of women, early age at marriage and awareness on maternal health care services were found significantly associated with home delivery. The findings indicate the importance of improving current strategies and norms to covered all delivery under medical facility for better outcomes throughout the antenatal period. Home deliveries under the unskilled personnel is a major risk for both mother and newborn, as it regard of poor health also, which can strength families to poverty and traditional norms.

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