Utilization of Maternal and Child Health Care Services and Its Linkages with Maternal Deaths in India

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Abstract

Reducing maternal mortality has been a crucial international development priority in all developing nations including India. The paper is an attempt to explore the status of maternal health and utilisation of maternal health care services among maternal deaths reported households in India and its regions. District Level Household and Facility Survey- 2007-08 data reiterates that maternal deaths are significantly high in rural areas especially in high focus northern states like Uttar Pradesh, Bihar. Religion-wise differentials in maternal death was not pronounced but scheduled caste and scheduled tribe have reported more number of maternal deaths in comparison to other than scheduled caste/tribe women. Results show a clear inverse relationship between the economic status and maternal deaths. There is a wide disparity in maternal mortality ratio within various regions in India with highest as 390 in Assam and lowest as 81 in Kerala per one lakh live births. Most of the deaths were reported during pregnancy (56 percent). Analysis reveals that contraceptive coverage in households reported maternal deaths is very low. Moreover in the same household the usage of modern methods of contraception is also low this is clearly indicative of the low coverage of birth spacing methods that exposed women to repeated unwanted births hence, increasing risk of maternal morbidity and mortality. Further, utilization of health care services is also low among households reported maternal deaths.

Key words: Maternal Deaths; District Level Household and Facility Survey- 2007-08; India; Utilization of Health Care Services

Introduction

Reducing maternal mortality has always been a crucial international development priority in all developing nations including India. The Millennium Development Goals (MDG) calls to reduce Maternal Mortality by three fourth between 1990 and 2015. World Health Organization estimated a total of 287,000 maternal deaths globally in the year 2010. It is also observed that two regions, namely Sub-Saharan Africa (56%) and Southern Asia (29%) together accounted for 85 percent of the global burden of maternal deaths (245,000) in the year 2010. At the country level, India has the

highest estimated number of maternal deaths in the world, that is, 56,000 maternal deaths which is equivalent to 19 percent of total maternal deaths [1].

The issue of maternal deaths in India gets magnified due to soaring population. Each year in India, roughly 30 million women experience pregnancy and 27 million have a live birth. Of these, over 100,000 maternal deaths and one million newborn deaths occur annually. Almost 15 percent of all deaths among women in reproductive age group are pregnancy related and moreover, maternal mortality has a significant negative impact on the Gross Domestic Product (GDP) of the country [2].

The National Family and Health Surveys (NFHS-I and NFHS-II), Sample Registration Surveys (SRS), National Sample Surveys estimates and estimates by others shows that there has been a decline in maternal mortality over the years [3,4]; however the rate of decline varies according to states [5]. The maternal mortality rate (MMR) was as high as 1355 in 1960, which gradually came down to 540 in 1998-99 (NFHS-II).

Various healthcare programmes ranging from Reproductive and Child Health (RCH)-I and II, National Rural Health Mission (NRHM), Janani Suraksha Yojana (JSY), Chiranjeevi Yojana are implemented even then MMR has been gradually declining and the Millennium Development Goals of achieving a MMR of less than 100 per one Lakh live births by 2015 is still far. Among all the programs JSY is one of the important programs implemented in 2005, covering all India with the objective of reducing maternal and neo-natal mortality by promoting institutional delivery among the poor pregnant women.

According to WHO-haemorrhage, eclempsia, obstructed labour (five Percent), sepsis (11 Percent) and abortion (eight Percent) have been identified as major direct causes of maternal mortality while indirect causes like anaemia, jaundice, heart problems, and violence against women also contribute to maternal deaths [6,7]. Anaemia, tuberculosis, malaria and viral hepatitis have been recognised as some of the indirect causes of maternal deaths [8]. To this human immunodeficiency virus/acquired immune deficiency syndrome has recently been identified as another indirect cause of maternal death.

Maternal outcomes-pregnancy and pregnancy related complications are impacted by intermediate and distant determinants. Intermediate determinants include health behaviour, reproductive behaviour, access to healthcare, health status of woman etc [9]. The socioeconomic and cultural factors are the distant determinants. Lack of access to Emergency Obstetric Care has been one of the important reasons for high preventable maternal mortality which is explained by ‘Three Delays’ [10]. The first delay is a delay in making decision to seek medical help (this includes

identification of symptoms indicating high risk by the mother, family etc.) the second delay is in accessing healthcare, that is, reaching the health facility (distance and transport); and the third delay refers to delay in receiving adequate care (owing to shortage of skilled staff, healthcare facilities like blood bank etc.). Study shows that maternal health is largely influenced by contextual factors like poverty, socio-cultural related factors like adolescent marriage, large family size norms which encourage frequent and closely spaced pregnancies, nutrition and lack of awareness of health care and long periods of physical activity. Literature suggests that the main determinants of maternal mortality was the overall standard of maternal care provided by birth attendants and poverty and associated malnutrition played little part in determining the rate of maternal mortality [11].

Some of the reasons for high maternal mortality are low contraceptive prevalence rate, high fertility rate and high prevalence of anaemia among women that exposes them to risk of maternal mortality. Study based on developing countries has given the evidence that use of contraception is a substantial and effective primary prevention strategy to reduce maternal mortality [12]. The study on India (2013) showed a positive association between the antenatal care during pregnancy and institutional delivery [13]. There is evidence showing a strong positive association between level of care obtained during pregnancy and the use of safe delivery care which explains why antenatal care (ANC) could be associated with reduced maternal mortality [14]. A study by Researcher (1991) shows that use of health professional at the time of delivery reduces the risk of maternal mortality and morbidity [15].

A study gives an insight that there is a difference in pattern of utilization of health care service by different sections of population [16]. It reveals that majority women had at least one ANC consultation during their most recent fertile pregnancies, proportion of hospital delivered was less and majority of institutional deliveries took place in private facility. Also, marked imbalance was found between antenatal and postnatal care as less than one- fifth of the mothers had post natal checkups. There was a significant association of the educational levels, religion and economic status, on the use of maternal health services.

The purpose of this paper is to explore the extent and distribution of maternal deaths according to the background characteristics of the households reported a maternal death from the recently released District Level Household and Facility Survey-III (2007-08) data. The study aims to describe the extent of maternal mortality attributed to pregnancy and child birth and to contextualize the maternal deaths within socio-economic and programmatic scenario (like NRHM) in India. In addition, an attempt has been made to understand the healthcare seeking behaviour and utilisation of ever-married women in reproductive age group (15-49 years) of the households reported maternal deaths as these being the proximate determinants of maternal deaths.

Methodology

Definitions of Maternal Death

World Health Organization defines 'Maternal Death' as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. However, to facilitate the identification of maternal deaths in circumstances in which cause of death attribution is inadequate, a new category has been introduced. Pregnancy-related death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Data

In order to achieve the proposed objectives this study has used District Level Household Survey (DLHS)-III (2007-08) data. DLHS-III is a household survey at the district level designed to provide information on family planning, maternal and child health, reproductive health of ever married women and adolescent girls, utilization of maternal and child healthcare services at the district level for India. In addition, DLHS-III also provides information on new-born care, postnatal care within 48 hours, and role of health workers- ASHA in enhancing the reproductive and child health care and coverage of Janani Suraksha Yojana (JSY). An important component of DLHS-III is the integration of Facility Survey of health institution (Sub Centre, Primary Health Centre, Community Health Centre and District Hospital) accessible to the sampled villages. The focus of DLHS-III is to provide health care and utilization indicators at the district level for the enhancement of the activities under NRHM.

DLHS-III data, has been used to examine the extent of maternal deaths and its distribution among different socio-economic and demographic groups apart from its distribution in different regions of India as classified by NRHM. DLHS- III data was collected for events that took place between 2004 to 2007-08 (till the date of interview) that is for a three year time frame from 7,20,320 households from 28 States and 6 Union Territories of India during 2007-08. From these households 6, 43,944 ever-married women aged 15-49 years were interviewed. Among them 1334 maternal deaths have been reported in 1330 households at national level. Four households have reported more than one maternal death. All eligible ever married women (913 women) in reproductive age group of 15-49 years from these 1330 households were selected. For analyzing the health care seeking behaviour and utilisation of ever-married women in the event of pregnancy, all the women who experienced pregnancy, child birth (321 women) in this reference period (between 1st January 2004 to date of interview) have been sorted for analysis. Analysis has been done at regional level. These regions comprise of states that are grouped according to NRHM focus and performance of health indicators. The states under each region are as follows:

- High Focus Northeastern (NE) region: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura.

- High Focus-Non NE region: Bihar, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and Uttarakhand.

- Non High Focus Large States: Andhra Pradesh, Goa, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal.

- Non High Focus- Small States & Union Territories (UT): Andaman and Nicobar islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Delhi, Lakshadweep and Pondicherry.

The states are grouped to focus interventions according to the health outcomes. This helps to focus on the region specific interventions and monitor the outcomes. There is a similarity in distribution of health indicators in the states under each group; hence, this helps in analyzing the data at national level according to the regions. This categorization helps in dividing the homogenous states and union tertiary under one region.

Results

Background characteristics of households

Table 1 shows the distribution of maternal deaths by place of residence and regions in India, 2007-08. Out of total households interviewed in rural areas, 54 percent were from high focus non-northeastern states however in urban areas majority were from non high focus states/UTs. Table shows that in rural areas 70 percent and in urban areas 52 percent of the maternal deaths have been reported from high focus non-northeastern states while, only 54 and 37 percent households interviewed belonged to corresponding areas. Half of the sample was drawn from high focus non-northeastern states while 14.2 percent and 35.4 percent was drawn from high focus non-eastern states and non high focus large states. The remaining was drawn from non high focus small states and union territories.

Table 2 shows the distribution of households reported maternal deaths by selected characteristics in India. Among total households interviewed, 22 percent were from urban areas. Seventy-six percent of the sampled households belonged to Hindus, 11 percent Muslims and seven percent Christians. Thirty-six percent of the households belonged to either scheduled caste or scheduled tribe categories. Thirty-nine percent of the households lived in kaccha houses and about 32 percent are in semi-pucca houses and the remaining in pucca houses. This table shows that 87 percent of the maternal deaths have been reported from rural areas while, only 78 percent households

interviewed belonged to rural areas. Urban areas reported 13 percent maternal deaths, while 22 percent of the total households covered belonged to urban areas.

The distribution of maternal deaths follows a similar pattern when the data is disaggregated by religion providing a non specific indication that the maternal deaths are higher in any particular region, although by numbers, more than a thousand maternal deaths were reported by Hindus. Table shows that scheduled caste and scheduled tribes have reported more maternal deaths 21.4 percent and 23.9 percent as compared to households surveyed whereas the incidence of maternal death is least in the others caste category. The proportion of maternal deaths reported from kuchha houses was much higher than pucca houses to the extent of 53 percent and 14.1 percent respectively. A result clearly shows the inverse relationship between the economic status and maternal deaths. The percentage of maternal deaths reported in the poorest quintile is 32.6 percent as compared to 13.4 and 7.1 percent in the fourth and richest quintile respectively.

Table 3 shows the distribution of maternal deaths and utilisation of Janani Suraksha Yojana (JSY) schemes across regions in India, 2007-08. Table presents the comparison between the extents of utilisation of government incentive schemes like JSY with MMR in particular regions. It is clear from the table that in High focus NE states percent maternal death and utilization of JSY is almost same. However in High focus Non NE states 68 percent maternal death has been reported but the utilization of JSY scheme was only 10 percent.

Table 4 present the distributions of maternal deaths by time and age at maternal death in India, 2007-08. Most of the deaths were reported during pregnancy (56 percent) however, the cause of death has not been enquired and there is a no data to substantiate that recorded death due to any direct or indirectly to pregnancy or due to some accidents etc. while the woman was pregnant. Another important concern is the maternal deaths in the post partum period, 23.5 percent of maternal deaths were caused in this period, which could be easily preventable. Table also presents the distribution of maternal deaths by age of mother at death. It clearly follows a pattern showing maximum maternal deaths at 20 to 29 years of age. This is the most fertile phase of the women and most of the women in India complete child bearing during this phase, hence, the maternal deaths follow the same pattern where most fertile period shows most of the maternal deaths in frequency.

Table 5 shows the characteristics of ever married women from the households reported maternal death in India, 2007-08. A total of 913 ever married women in reproductive age group (15-49 years) were identified from the households reporting maternal deaths (1330). Majority of women in the household reported maternal death have more than four children. Eighty six percent women belong to rural areas. At all India level, nearly 46.9 percent ever married women were non literate

whereas, 58 percent of ever-married women from the household reporting maternal deaths were non literates. Table also shows that mainly the sample women were from bottom three quintiles. Although more maternal deaths have been reported from the households falling in poorest quintile, the utilization of financial incentive schemes like JSY is low to the extent of only 10.9 percent as compared to 13.3 percent at the national. Also four out of five women were from Hindu religion and 46 percent women from household reporting maternal death were living in Kachha house.

Healthcare seeking behaviour of ever married woman

Table 6 represents maternal health indicators of women from households reported maternal deaths in India, 2007-08. The data above gives a clear indication that the utilization of antenatal and natal care services is very poor in households reporting maternal deaths. It has been assumed that the health seeking behavior of the women from the households reporting maternal deaths is reflective of the health seeking behavior of the mothers who died during pregnancy or child birth. It has been considered as proxy indicator of the health-seeking behavior of the mothers who died during child birth. This assumptions resets on the fact that the decision making of women for availing natal and perinatal care; often lies in the hands of elders in the family especially mother in-law and the husband. Looking at the consumption of Iron and folic acid (any form i.e. tablets/ syrup) the utilization is very low in households reporting maternal deaths as compared to all India average i.e. 20.2 percent. More than 60 percent deliveries took place at home in case of households reporting maternal deaths as compared to 52.3 percent at all India. Only 47 percent women from households reporting maternal deaths had safe delivery as compared to more than fifty percent in all India. The data on contraceptive behaviour is quiet strikingly lagging behind when compared to national average. Contraceptive coverage is very low in household which reported maternal deaths. Only 34 percent used any contraceptive method as compared to national average of 64.5 percent. The usage of modern methods of contraception is also very low to the extent of 28 percent when compared to more than 55 percent in India.

Conclusions and Discussions

Although from the cross sectional data it is difficult to correlate process indicators like utilization of maternal and child health care services and outcome indicators like maternal and neonatal death. In the present paper an attempt has been made to indirectly link the utilization of maternal/child health care services, JSY scheme and maternal mortality in India. The examination was based on the third round of District Level Household and Facility Survey data in India.

Finding shows that even after years of efforts, rural areas still need to be the areas of high priority as there is significant contribution of maternal deaths occurring in rural areas as compared to urban

areas. Religion does not have a major influence for occurrence of maternal deaths however upon disaggregation on basis; scheduled caste and scheduled tribe caste have reported more maternal deaths as compared to other than these two caste categories. Incidence of maternal deaths being still higher in the poorest quintile and also being higher in households living in kuchha houses provides an evidence that economic status of a household is an important determinant of maternal mortality as well as utilization of maternal health care services. This clearly indicates inequity in maternal health in India.

High Focus NE states areas still remain areas of high priority. Significant maternal deaths are recorded in the postpartum phase wherein deaths could be prevented. There is a mention of improving postnatal care in the current RCH program however; there are empirical evidences that there is a gross neglect of care during this phase. Most of the women who seek institutional delivery at government healthcare facilities are discharged within two hours of delivery and no or dismal follow up of post delivery. The MMR remaining more or less constant at 20 to 34 years of age and increases drastically post 34 years age as well; however, the results of 15–19 years age group is very much similar with the findings from other studies. Various studies have cited reasons for high MMR in younger and older aged women, reasons like high risk due to softer reproductive organs in younger age, that is, the reproductive system is not mature enough for child bearing. Similarly in older age, the elasticity of the reproductive organs decreases hence, higher risk for both mother and child. Other important reason is increase induced abortions at this age, the incidence of unwanted pregnancies is higher in these age groups hence, many seek illegal abortion that increase risk of maternal morbidity as well as mortality. The incidence of maternal deaths is high among illiterate mothers and even the contraceptive coverage is quite low. Studies also highlighted that there is significant relationship between level of haemoglobin and maternal mortality. The risk of maternal deaths increased with decreasing level of haemoglobin [17].

Data is clearly indicative of the low coverage of birth spacing as well as other contraceptive methods that expose women to repeated and unwanted births hence, increasing risk of maternal morbidity and mortality in these households. Woman's education has a strong bearing on reproductive health care, contraceptive behavior and fertility. It is clear from the health seeking behavior indicators data that the maternal health indicators are worse in the households reporting maternal deaths. Target schemes like, Janani Suraksha Yojana, have been designed for the vulnerable and the under-privileged however, the data reflects that these schemes have not been able to cover the vulnerable sections fully although, and there is partial coverage of the natalcare of the poor (nearly 10 percent).

The data from DLHS III shows a high disparity in MMR level between different regions (222 – 688 per one lakh live births) during three years preceding the survey. Lower socioeconomic status

and SC/ST caste groups reported higher maternal deaths. Data for age at death of the mother shows a higher MMR in younger and elderly mothers. Contraceptive coverage is very low among households reported maternal deaths. Low coverage of contraceptive methods might be the reason for shorter birth spacing which further exposed the women to repeated births. However, the arguments that shorter duration of birth interval may lead to a help in deteriorating the nutritional status of mother.

The term 'maternal depletion syndrome' in the literature refers to "the effect of a rapid succession of pregnancies and periods of lactation which erode the nutritional status of the mother". There have been very few studies dealing with the effects of birth interval on maternal mortality (measurement of maternal health) because maternal mortality is a relatively rare event. Moreover, information cannot be gathered in surveys. It is very difficult to measure the health effect of high fertility or short birth intervals on mothers. Using health care seeking behaviour of women among households reported maternal deaths; it is found that maternal health indicators are worse in the households reporting maternal deaths as compared to the all India average.

Hence, it is seen that we are far away from achieving the MDG goal of reducing maternal mortality and morbidity, increasing contraception rate, improving the access to maternal healthcare utilization, by 2015, at this pace. Flagship programmes like NRHM have been successful to some extent in making an effort to improve physical infrastructure, increasing spending on healthcare through strategies like decentralization, improving human resource, but have not been able to reach the most vulnerable and the marginalized as is evident from the differentials seen in maternal health outcomes. Need to spread awareness for schemes like targeted interventions like JSY and make them operational so that women from the underprivileged sections make the best use of it and improve their health status. There is hence, a greater need for improving community awareness, community participation and addressing contextual factors and socio economic determinants to achieve the MDG 5 and save women from preventable mortality.

Conflict of Interests

The author(s) declare(s) that there is no conflict of interests regarding the publication of this article.

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Table 1: Region-wise distribution of maternal deaths by place of residence in India, 2007-08.

	Rural				Urban				Combined			
	Maternal deaths		Households surveyed		Maternal deaths		Households surveyed		Maternal deaths		Households surveyed	
Regions	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**
High focus NE states	14.0	162	15.4	86256	8.0	14	10.2	16386	13.2	176	14.2	102642
High focus Non NE states	70.2	811	54.0	301965	52.3	91	37.7	60524	67.8	902	50.3	362489
Non High focus States/UTs	15.8	183	30.6	171442	39.7	69	52.1	83747	18.9	252	35.4	255189
All India	**100.0**	**1156**	**100.0**	**559663**	**100.0**	**174**	**100.0**	**160657**	**100.0**	**1330**	**100.0**	**720320**

Table 2 Distribution of Maternal deaths by selected characteristics in India, 2007-08.

Background Characteristics	Maternal deaths		Households surveyed	
	Percent	**Number**	**Percent**	**Number**
Place of Residence				
Rural	86.9	1156	77.7	559663
Urban	13.1	174	22.3	160657
Regions				
High focus NE states	13.2	176	14.2	102642
High focus Non NE states	67.8	902	50.3	362489
Non High focus States/UT	18.9	252	35.4	255189
Religion				
Hindu	77.7	1033	76.3	549471
Muslim	10.8	143	10.9	78586
Christian	5.0	67	6.4	45977
Others	6.5	87	6.4	46286
Caste				
Scheduled caste	21.4	285	17.6	126769
Scheduled tribe	23.9	318	19.2	138031
Other backward class	37.6	500	37.0	266681
Others	17.1	227	26.2	188839
Type of house				
Kachha	53.2	707	39.3	283017
Semi-pucca	32.8	436	32.3	232567
Pucca	14.1	187	28.4	204736
Wealth index				
Poorest	32.6	434	20.0	144059
Poorer	26.7	355	20.0	144149
Middle	20.2	269	20.0	144038
Richer	13.4	178	20.0	144038
Richest	7.1	94	20.0	144036
Total	**100.0**	**1330**	**100.0**	**720320**

Table 3 Distribution of maternal deaths and utilization of Janani Suraksha Yojana (JSY) across regions in India, 2007-08.

Regions	**Maternal deaths**		**Utilization of JSY/ state run schemes by ever-married women**	
	Percent	**Number**	**Percent**	**Number**
High focus NE states	13.2	176	13.3	3458
High focus Non NE states	67.8	902	9.8	12392
Non High focus States/UTs	18.9	252	10.0	6619
All India	**100.0**	**1330**	**10.3**	**22469**

Table 4 Distributions of maternal deaths by time and age at maternal death in India, 2007-08.

Time of maternal death	**Maternal deaths**	
	Percent	**Number**
During pregnancy	56.3	749
Within six weeks of abortion or time of abortion	7.2	96
During childbirth	12.9	172
Within six weeks of childbirth or end of pregnancy	23.5	313
Maternal age at death (in years)		
<15	3.7	49
15-19	14.1	188
20-24	26.3	350
25-29	24.4	325
30-34	14.5	193
35-39	8.8	117
40+	8.1	108
Total	**100.0**	**1330**

Table 5 Characteristics of ever married women from the households reported maternal death in India, 2007-08.

Background Characteristics	Percent	Frequency
Age Group		
15-19	17.2	157
20-24	23.8	217
25-29	16.6	152
30-34	11.0	100
35+	31.4	287
Children Ever Born		
0	26.1	238
1	16.1	147
2	14.7	134
3	13.4	122
4+	29.8	272
Residence		
Rural	86.4	789
Urban	13.6	124
Education (in years)		
Illiterate	57.9	529
Less than 5	7.3	67
5-9 years	26.1	238
10 or more year	8.7	79
Wealth Index		
Poorest	23.6	215
Second	23.4	213
Middle	23.1	211
Fourth	19.5	178
Richest	10.4	95
Religion		
Hindu	81.3	742
Muslim	11.3	103
Christian	2.4	22
Others	5.0	46
Caste Group		
Scheduled Caste	19.5	178
Scheduled Tribe	18.0	164
Other Backward Class	42.3	386
Others	20.3	185

Type of House		
Kachha	45.6	416
Semi-Pucca	39.1	357
Pucca	15.3	140
Total	**100.0**	**913**

Table 6 Maternal health indicators of women from households reported maternal deaths in India, 2007-08.

Antenatal Care	**Percent**	**Frequency**
No	31.8	102
Yes	68.2	219
Number of ANC Visits		
No visit	32.7	105
1	7.5	24
2	21.2	68
3+	38.6	124
Tetanus Injection		
No TT	33.9	109
1 Received	4.4	14
2+ Received	61.7	198
No IFA Syrup/Tablets		
No	79.8	256
Yes	20.2	65
Institutional Delivery		
No	60.1	193
Yes	39.9	128
skilled persons		
No	92.8	298
Yes	7.2	23
safe delivery		
No	53.0	170
Yes	47.0	151
Received JSY		
yes	10.9	35
no	89.1	286
Total	**100.0**	**321**
Current family planning method		
Not using	65.1	542
Permanent method	24.0	200

Morden method	5.5	46
Traditional method	5.4	45
Total	**100.0**	**833**

Note: All the indicators are based on those women who had their last live/still birth since January 2004 except current use of any family planning method which is based on currently married women.