



Association between child marriage and utilization of maternal health care services in India: Evidence from a nationally representative cross-sectional survey

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ABSTRACT

Objective: In an effort to improve utilization of maternal health care services, age at marriage of girls has gain very little attention by the policy maker and programmer. Studies have indicated that child marriage has serious negative consequences on maternal health. Moreover, there is a paucity of research on explaining the links between child marriage and maternal health care utilization. In this study, we aimed to examine the association between child marriage and utilization of maternal health care services using nationally representative sample survey of India.

Design: Cross-sectional observational study.

Setting: India.

Participants: A total number of 190,898 ever-married women who had at least one live birth during the last five years preceding the survey from the 2015 to 2016 National Family Health Survey (NFHS) were utilized.

Measurements: *Outcome measures:* At least four antenatal visits (ANC), ANC visit within first trimester, institutional delivery, delivery by skilled health personnel, and postnatal care (PNC) within 42 days of delivery. *Predictor variable:* Child marriage. *Control variables:* Socio-economic and demographic characteristics of women. Bivariate and multivariate analyses were performed for the analyses of the study data.

Results: The results of our study revealed that women who married at <18 years were significantly less likely to use maternal health care services than those married at ≥18 years even after accounting for socio-economic and demographic characteristics of women. Furthermore, nuanced analysis revealed that the odds of maternity care services is much lower for those women who married at ≤14 years compared with later married groups.

Conclusions: The findings of our study suggest that efforts should be made to increase age at marriage of girls which could have positive impact on utilization of maternal health care services. Moreover, targeted intervention is needed to improve the utilization of maternity care especially among socio-economically vulnerable women.

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Introduction

The incidence of maternal mortality is unacceptably high in lower-middle income countries. Every day, about 830 women die from pregnancy or childbirth-related complications around the world (Alkema et al., 2016). The risk of maternal mortality is highest among adolescent girls and complications related to pregnancy and childbirth is a leading cause of death among adolescent girls in developing countries (Patton et al., 2009; Conde-Agudelo et al.,

2005). Evidence has found that inadequate use of maternity care significantly contributed to the maternal mortality (Murray and Lopez, 1997; Thaddeus and Maine, 1994).

A number of studies have documented that socio-economic and demographic factors significantly influence utilization of maternal health care services (Abbas and Walkar, 1986; Bhatia and Cleland, 1995; Celik and Hotchkiss, 2000; Navaneetham and Dharmalingam, 2002; Obermeyer and Potter, 1991; Ochako et al., 2011; Singh et al., 2012a,b; Tarekegn et al., 2014). Many studies have indicated the importance of household-level, village-level, and community-level factors in determining utilization of maternal health care services (Babalola and Fatusi, 2009; Navaneetham and Dharmalingam, 2002). However, from an extensive literature review, we

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have found that educational attainment of women, economic status of household, women's empowerment, and age at marriage are most crucial determinants of maternal health care utilization.

In a patriarchal society like India where gender inequality and discrimination against girls is deeply-rooted in the society, the practice of child marriage is widespread (UNICEF, 2014; Paul, 2019). The high incidence of child marriage is attributed to living in rural areas, lower level of education, high poverty, and discriminatory norms against girls (Mathur et al., 2003; ICRW, 2007; UNICEF, 2014; Nour, 2009; Paul 2019). Child marriage increases the risk of unintended pregnancy, pregnancy termination (Adhikari et al., 2009; Godha et al., 2013; Nasrullah et al., 2014a; Raj et al., 2009) and complications during pregnancy (Paul, 2018), which further leads to high maternal mortality (Say et al., 2014).

The pathways through which child marriage affects utilization of maternal health care services are manifold. Child marriage often leads to early childbearing among adolescent mother (Choe et al., 2005). Early pregnancy and childbearing are susceptible to high maternal mortality because they have increased risk of complications during pregnancy, labor, and postpartum period (Conde-Agudelo et al., 2005). Early married women have less power and status in the society (Jensen and Thornton, 2003). Evidence from several studies has reported that lower autonomous women have less access to health care services (Bloom et al., 2001; Mistry et al., 2009; Rai et al., 2012), which in turn, may increase the risk of high maternal morbidity and mortality. Moreover, lack of education among child married women leads to lower use of contraception, which further increases the risk of unplanned pregnancies and pregnancy termination, resulting high mortality among young married women. Therefore, it is important to understand the linkages of child marriage with utilization of maternal health care services to combat the incidence of maternal mortality among married adolescents.

There is a paucity of research in explaining the links between child marriage and utilization of maternal health care services. The problem of child marriage remains pervasive in India despite several efforts have been made to eliminate the practice. Affordable and quality maternity care is still a major challenge in India. Moreover, maternal mortality remains high in India, accounting for 20% of global share (WHO, 2015). With this backdrop, our study aimed to examine the association between child marriage and utilization of maternal health care services in India. This study will enable to provide some policy implications to improve utilization of maternal health care services among young married women and thereby, would reduce the risk of maternal mortality.

Methods

Data source

We have utilized the data from the fourth round of National Family Health Survey (NFHS), conducted in 2015–2016. The NFHS 2015–2016 is a nationally representative sample survey of 601,509 households, 699,686 women aged 15–49 years with a response rate of 97%, and 112,122 men aged 15–54 years with a response rate of 92%. This survey was selected sample using a stratified two-stage sampling design comprising of 28,586 clusters; 8397 in urban, 20,059 in rural, and 130 from slums list provided by Municipal Corporation Offices (MCOs). In the first stage, clusters were selected using probability proportional to clusters size. In the second stage, 22 households from each cluster were selected with an equal opportunity systematic selection from the household listing. A detailed description of the sampling procedure is provided in the national report of NFHS, 2015–2016 (IIPS and ICF, 2017). The current study is based on 190,898 ever-married women aged 15–49 years

who had at least one live birth in the past five years preceding the survey.

Measures

Maternal health care utilization

Utilization of maternal health care has been assessed through indicators of antenatal care (ANC), delivery care, and postnatal care (PNC). ANC care is generally measured from an adequate number of ANC visits and timing of first ANC visit (WHO, 2016). At least four ANC visits during pregnancy is considered as adequate number of ANC visits. The proper timing of first ANC visit is defined as ANC visit within first trimester (first three months) of pregnancy. Delivery attended by a trained person or in an institutional setting is considered as 'safe delivery' according to the recommendation of World Health Organization standards (WHO, 2007). Delivery by a trained person was defined whether delivery assisted by a doctor, ANM/nurse/midwife or other health worker. In contrast, delivery by the unskilled person was defined as those assisted by a traditional health worker (Dai), friends/relatives or other person. Institutional deliveries were defined as those deliveries occurred in a medical institution such as government hospital, dispensary, primary health centre, community health centre or sub-centre, non-governmental hospital and private clinic. In addition, PNC check-ups within 42 days of delivery is considered as PNC care as per the recommendation of World Health Organization (WHO, 2013).

Child marriage

Child marriage of girls is the main predictor variable in this study. Child marriage is defined as marriage or union below 18 years of age (Mathur et al., 2003). For the purpose of the study, women's age at marriage has been categorized into <18 years (legally defined as child marriage) and ≥18 years. Further, child marriage is categorized into ≤14 years and 15–17 years to assess the impact of child marriage on the utilization of maternal health care at the disaggregate level.

Study covariates

Socio-economic and demographic characteristics of women were included as covariates in this study. These are place of residence (urban and rural), social groups (Scheduled Caste/Scheduled Tribe [SC/ST], Other Backward Classes [OBC], and other), religion (Hindu, Muslim, and other), women's age (15–24, 25–34, and 35–49 years), women's education (no education, primary, secondary, and higher), wealth index/quintile (poorest, poorer, middle, richer, and richest), women's exposure to mass media (no exposure, partial exposure, and full exposure), and region (north, central, east, northeast, west, and south).

It is worth mentioning that wealth index/quintile is an indicator of economic status of the household. Household wealth quintile has been measured from the ownership of household assets including consumer items and dwelling characteristic. A score was generated for each individual using principal component analysis and categorized into five quintiles, each represents 20% of the respondents, between 1 (poorest) and 5 (richest). Similarly, women's exposure to mass media was assessed from frequency of reading newspaper and magazine, listening radio, and watching television on a weekly basis. On the basis of these three medium, women were categorized into three groups: no exposure (accesses none of the three media at least once a week), partial exposure (accesses any two media at least once a week), and full exposure (accesses all three media at least once a week). Furthermore, a region variable was constructed to assess the regional differences in utilization of maternal health care services. For the purpose of this study, India was divided into six regions based on the NFHS division of national report (IIPS and ICF, 2017).

Table 1

Socio-economic and demographic characteristics of ever-married women aged 15–49 years who had at least one live birth in the last 5 years preceding the survey, India, 2015–2016.

Variables	Weighted%	n
Age at marriage		
<18 years	38.9	69,751
≥18 years	59.5	117,078
Don't know/missing	1.6	4069
Residence		
Urban	29.7	47,833
Rural	70.3	143,065
Social groups		
Scheduled Caste/Scheduled Tribe [SC/ST]	31.4	73,059
Other backward classes [OBC]	43.6	74,060
Other	20.3	34,705
Don't know	4.7	9074
Religion		
Hindu	78.9	138,343
Muslim	16.1	29,309
Other	5.0	23,246
Age		
15–24	34.7	62,082
25–34	55.9	107,500
35–49	9.4	21,316
Women's education		
No education	27.6	55,165
Primary	13.5	26,712
Secondary	46.9	88,871
Higher	12.0	20,150
Wealth Index		
Poorest	23.4	46,782
Poorer	21.2	43,739
Middle	19.9	38,393
Richer	19.0	33,212
Richest	16.6	28,772
Women's media exposure		
No exposure	24.6	49,374
Partial exposure	67.7	126,910
Full exposure	7.7	14,614
Region		
North	13.2	36,079
Central	25.7	52,952
East	25.4	39,243
Northeast	3.9	28,825
West	13.1	13,892
South	18.7	19,907
Total n	100.0	190,898

Statistical analyses

Bivariate and multivariate analyses were carried out to assess the association between child marriage and utilization of maternal health care services among women aged 15–49 years who had at least one live birth during the last five years preceding the survey. Bivariate analyses were performed to understand the nature of association between predictor variables and outcome variables. Binary logistic regressions were employed to assess the association between child marriage and utilization of maternal health care services. The regression results were estimated by unadjusted and adjusted odds ratio with 95% confidence interval. Sample weight was applied for the analyses. All analyses were carried out using STATA version 12.1 (StataCorp LP, College Station, TX, USA).

Results

Table 1 depicts socio-economic and demographic characteristics of the women. About 39% of the last birth women were married before 18 years of age. Majority of them were living in rural areas, belonged to Other Backward Classes, and believed in Hinduism. More than one-third of women were younger than age twenty-five. More than one in four women had no formal education. Majority

of them were belong to poorest and poorer quintile of household wealth, had no or partial exposure to mass media and were from central and east region of the country.

Table 2 presents socio-economic and demographic characteristics of women by utilization of maternal health care services. Among the women who had at least one live birth in the last 5 years preceding the survey, 52%, 59%, 81%, 83% and 69% had at least 4 ANC visits, ANC visit within first trimester, institutional delivery, delivery by skilled health personnel, and PNC check-ups within 42 days of delivery, respectively. The percentage of all five indicators of usage of maternal health care services was significantly lower among the women who married before 18 compared with those who married at 18 or above. Moreover, significant differences in the utilization of maternal health care services were found by socio-economic and demographic characteristics of women.

Table 3 presents binary logistic regression analyses for the association between child marriage and utilization of maternal health care services. Crude analyses revealed that women who married below 18 years were significantly less likely to have at least four ANC (Unadjusted OR: 0.49, 95% CI: 0.48–0.50), ANC visit within first trimester (Unadjusted OR: 0.59, 95% CI: 0.58–0.60), institutional delivery (Unadjusted OR: 0.53, 95% CI: 0.52–0.54), delivery by skilled health personnel (Unadjusted OR: 0.54, 95% CI: 0.52–0.55), and PNC check-ups within 42 days of delivery (Unadjusted OR: 0.61, 95% CI: 0.61–0.63) than those women who married at 18 years or above. Moreover, after adjusting for relevant socio-economic and demographic characteristics, child marriage remained significant with all the indicators of maternal health care utilization. However, the strength of associations was attenuated in adjusted analyses. The results yielded that child married women were having significantly lower odds of at least four ANC (Adjusted OR: 0.76, 95% CI: 0.74–0.77), ANC visit within first trimester (Adjusted OR: 0.76, 95% CI: 0.75–0.78), institutional delivery (Adjusted OR: 0.77, 95% CI: 0.75–0.79), delivery by skilled health personnel (Adjusted OR: 0.77, 95% CI: 0.75–0.79), and PNC check-ups within 42 days of delivery (Adjusted OR: 0.81, 95% CI: 0.79–0.83) compared with their adult married counterparts after adjusting for relevant control variables.

For more precise analyses, a separate assessment was carried out to examine the association of child marriage with utilization maternal health care services where women's age at marriage was categorized into ≤14 years, 15–17 years, and ≥18 years. The results indicated that the odds of having at least four ANC visits and ANC visit within first trimester were significantly lower for the women who married at ≤14 years and 15–17 years compared with those who married at ≥18 years. Similarly, women who married at ≤14 years and 15–17 years were significantly lower likelihood of having institutional delivery, skilled assistance during delivery, and PNC check-ups within 42 days of delivery than those married at ≥18 years even after controlling for relevant socio-economic and demographic characteristics. We also found that women who married at ≤14 years were significantly less likely to receive maternal health services compared to those who married at 15–17 years (Table 4).

Discussion

The present study provides important insights into the association between child marriage and utilization of maternal health care services in the Indian context. The results of our study show that about 11% and 39% of ever-married women who had at least one live birth during the last 5 years preceding the survey were married before 15 and 18 years of age, respectively. Our study also demonstrates a considerable improvement in utilization of maternal health care services compared with previous estimates. The findings of our study indicate that child marriage was significantly associated with ANC care (at least four ANC visits and ANC visit

Table 2

Percentage distributions of ever-married women aged 15–49 years who had at least one live birth in the past 5 years preceding the survey by utilization of maternal health care services, India, 2015–2016.

Variables	At least 4 ANC visits	ANC visit within first trimester	Institutional delivery	Delivery by skilled health personnel	PNC check-ups within 42 days
Age at marriage					
<18 years	42.2	50.8	74.4	77.4	63.0
≥18 years	58.1	64.0	86.2	87.5	73.6
Residence					
Urban	67.1	69.1	90.5	91.3	76.5
Rural	45.1	54.2	77.5	80.0	66.0
Social groups					
SC/ST	48.1	54.6	77.2	79.4	67.1
OBC	48.6	58.5	82.4	84.2	68.9
Other	61.8	65.7	86.1	87.8	73.9
Religion					
Hindu	51.3	58.6	83.1	84.6	69.7
Muslim	49.3	56.5	72.1	76.1	63.2
Other	65.3	65.2	83.2	86.1	78.3
Age					
15–24	53.6	60.4	84.5	86.2	70.4
25–34	52.4	59.4	81.5	83.4	69.7
35–49	39.5	47.2	69.1	72.1	60.9
Women's education					
No education	28.2	41.2	63.7	67.8	54.8
Primary	45.7	53.8	75.6	78.7	65.0
Secondary	61.6	65.7	89.4	90.4	75.2
Higher	73.7	76.4	97.0	96.6	82.9
Wealth index					
Poorest	25.2	37.7	61.3	65.7	52.2
Poorer	44.7	52.5	77.1	79.9	64.6
Middle	57.7	63.2	86.9	88.2	73.9
Richer	66.5	69.9	91.9	92.6	78.6
Richest	73.9	77.4	96.2	96.1	82.1
Women's exposure to mass media					
No exposure	24.6	38.2	62.8	67.0	51.6
Partial exposure	60.1	65.1	86.8	88.1	74.5
Full exposure	64.5	67.4	93.1	93.7	77.5
Region					
North	50.5	65.4	85.6	87.9	72.3
Central	32.0	50.1	73.6	75.0	62.3
East	41.9	46.9	72.6	77.7	60.7
Northeast	49.3	56.0	71.3	75.0	61.9
West	72.3	69.8	91.2	90.9	78.4
South	78.8	74.2	96.2	95.7	82.7
Overall	51.7	58.6	81.4	83.3	69.1

Abbreviations: ANC, Antenatal care; PNC, Postnatal care.

Table 3

Binary logistic regression models for the association between child marriage (< 18 years) and utilization of maternal health care services among women aged 15–49 years who had at least one live birth during last 5 years preceding the survey, India, NFHS, 2015–2016.

Predictor variable	Outcome variables				
	At least 4 ANC visits	ANC visit within first trimester of pregnancy	Institutional delivery	Delivery by skilled health personnel	PNC check-ups within 42 days of delivery
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Unadjusted OR					
Age at marriage					
<18 years	0.49 (0.48–0.50)	0.59 (0.58–0.60)	0.53 (0.52–0.54)	0.54 (0.52–0.55)	0.61 (0.61–0.63)
≥18 years (ref)	1.00	1.00	1.00	1.00	1.00
Observations (n)	185,081	186,382	186,301	186,829	186,829
Adjusted OR					
Age at marriage					
<18 years	0.76 (0.74–0.77)	0.82 (0.80–0.83)	0.77 (0.75–0.79)	0.77 (0.75–0.79)	0.81 (0.79–0.83)
≥18 years (ref)	1.00	1.00	1.00	1.00	1.00
Observations (n)	176,607	177,815	177,718	178,221	178,221

Note: OR: Odds ratio; CI: Confidence interval; ref: reference category.

All odds are significant at $p \leq 0.01$.

Adjusted analyses were controlled for residence, caste, religion, age, education, wealth index, exposure to mass media, and region.

Table 4

Binary logistic regression models for the association between child marriage (< 15 years and 15–17 years) and utilization of maternal health care services among women aged 15–49 years who had at least one live birth during last 5 years preceding the survey, India, NFHS, 2015–2016.

Predictor variable	Outcome variables				
	At least 4 ANC visits	ANC visit within first trimester of pregnancy	Institutional delivery	Delivery by skilled health personnel	PNC check-ups within 42 days of delivery
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Unadjusted OR					
Age at marriage					
<15 years	0.35 (0.34–0.36)	0.45 (0.44–0.47)	0.43 (0.41–0.44)	0.44 (0.42–0.45)	0.50 (0.48–0.51)
15–17 years	0.55 (0.54–0.57)	0.65 (0.64–0.66)	0.58 (0.57–0.60)	0.58 (0.57–0.60)	0.67 (0.66–0.69)
≥18 years (ref)	1.00	1.00	1.00	1.00	1.00
Observations (n)	185,081	186,382	186,301	186,829	186,829
Adjusted OR					
Age at marriage					
<15 years	0.64 (0.62–0.67)	0.72 (0.69–0.74)	0.73 (0.70–0.76)	0.75 (0.72–0.78)	0.73 (0.71–0.76)
15–17 years	0.80 (0.78–0.82)	0.86 (0.84–0.88)	0.78 (0.76–0.80)	0.78 (0.76–0.81)	0.84 (0.82–0.86)
≥18 years (ref)	1.00	1.00	1.00	1.00	1.00
Observations (n)	176,607	177,815	177,718	178,221	178,221

Note: OR: Odds ratio; CI: Confidence interval; ref: reference category.

All odds are significant at $p \leq 0.01$.

Adjusted analyses were controlled for residence, caste, religion, age, education, wealth index, exposure to mass media, and region.

within first trimester of pregnancy), delivery care (institutional delivery and delivery assistance by skilled health personnel), and PNC care (PNC check-ups within 42 days of delivery). Women who married before 18 years of age were significantly less likely to use maternal health care services than those who married at 18 years or later even after accounting for socio-economic and demographic factors. Furthermore, disaggregation of child marriage found that the odds of having maternal health care services was much lower among the women who married at ≤ 14 years compared with those who married at 15–17 and ≥ 18 years. One possible reason for lower use of maternity care among child married women could be limited decision making ability to use health care services as they are often controlled by their husbands and in-laws (Jenson and Thornton, 2003; Nour, 2009). Studies also have indicated that limited decision making ability in the household is a major barrier for utilization of health care among young married women (Bloom et al., 2001; Mistry et al., 2009; Rai et al., 2012). Moreover, lack of health information, poverty, and limited health facility among child married women may also leads to lower use of maternal health care services.

The findings of our study are consistent with previous studies conducted in India and elsewhere (Godha et al., 2016,2013; Nasrullah et al., 2013; Raj, 2010; Santhya et al., 2010). For instance, a study of young married women aged 20–24 years in selected South Asian countries reported that the number of ANC visits, delivery by skilled health personnel, and delivery at an institutional setting are significantly lower among those women who married at age ≤ 14 years and 15–17 years than those married at age ≥ 18 years (Godha et al., 2013). In a separate analysis, Godha et al. found that association between child marriage and utilization of maternal health care services depends on place of residence and parity across various lower-middle income countries (Godha et al., 2016). Nasrullah et al.'s study demonstrated similar findings on the association of child marriage with prenatal care, ANC care, and delivery care in Pakistan (Nasrullah et al., 2013).

Additionally, a number of studies have documented that women's socio-economic status significantly determines the utilization of maternal health care (Abbas and Walkar, 1986; Bhatia and Cleland, 1995; Celik and Hotchkiss, 2000; Navaneetham and Dharmalingam, 2002; Obermeyer and Potter, 1991; Singh et al., 2012a,b). Studies also have indicated that maternity care is inadequate among the poor, uneducated, and those women who are

residing in impoverished areas where access to health facility is limited (Bhatia and Cleland, 1995; Celik and Hotchkiss, 2000; Navaneetham and Dharmalingam, 2002; Obermeyer and Potter, 1991; Ochako et al., 2011; Tarekegn et al., 2014). The lower use of maternal health care services substantially increases the risk of complications during pregnancy and childbirth, which further, leads to high maternal mortality. Therefore, effort needs to reduce socio-economic vulnerabilities of women, which could made substantial improvement in utilization of maternal health care services.

Limitations

This study has several limitations. The data for the present study including age at first marriage is self-reported which are prone to recall bias and social desirability. We are unable to assess the causal relationship between child marriage and utilization of maternal health care services because of the cross-sectional nature of data. Furthermore, we did not account for village-level and community-level factors of maternal health care utilization in multivariate analyses. Such factors previously studied for the determination of maternal health care utilization in many countries.

Implication for practice and policy

We have found that child marriage has significant negative association with utilization of maternal health care services. Our study suggests increasing age at marriage of girls which may have positive impact on maternal health care utilization. Moreover, targeted intervention is needed among young married women to improve the use of maternity care. In addition, providing affordable and quality health care especially among socio-economically vulnerable women could reduce the incidence of maternal mortality.

Conclusions

Our study indicates that delay in marriage significantly improves the utilization of maternal health care services. Therefore, there is a need for eliminate the practice of child marriage by intervening effective policies and programmes, which could leads to better use of maternal health care.

Conflict of interest

None declared.

Ethical approval

This study is based on secondary data which is available in public domain. Therefore, ethical approval is not required for conducting this study.

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