



Article

Marital Disruption and Disparity in Tobacco Use in Reproductive-Aged Women: Evidence from India

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Abstract: Marital disruption defined as widowhood, divorce, or separation, has adverse consequences for women's health and wellbeing. Extant evidence, however, is primarily available for older women or in developed country settings. Consequences of marital disruption for younger women in the developing countries is relatively less visited. The aim of this cross-sectional study is to assess whether maritally disrupted women of reproductive age (18–49 years) had differential risk of tobacco-use compared to their married counterparts. Using nationally representative data from India, we estimated multivariable logistic regressions to obtain the odds in favor of tobacco-use for maritally disrupted women. We found that compared to women remained in marriage, maritally disrupted women were 1.5 times (95% CI: 1.4–1.6) more likely to consume tobacco. The higher risk of tobacco-use of maritally disrupted women was evident in both younger (age 18–34) and older (age 35–49) cohorts. The results were robust across urban and rural areas, high- and low- education groups, and poor- and non-poor households. The higher odds of tobacco-use among maritally disrupted women persisted even after accounting for household fixed effects. The study findings thus, have implications for strengthening targeted tobacco control policies and health promotion among maritally disrupted women in low-and-middle income countries.

Keywords: marital disruption; widowhood; divorce; separation; tobacco; reproductive-aged women; India



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1. Introduction

Marital disruption is related to risky health behaviors and adverse health outcomes in women [1,2]. Compared to women who are widowed, divorced, or separated, women who are in marriage are more likely to engage in healthy behaviors, have better health outcomes, and have a higher life expectancy. For example, an Australian study covering middle-aged and older adults concluded that divorce, separation, and widowhood are associated with smoking, alcohol use, worse diet, less physical activity, distress, anxiety, and depression [3]. A meta-analysis concluded that marital disruption is associated with an increased risk for cardiovascular disease (CVD) as well as all-cause mortality [4]. While these studies were conducted on different populations mostly for developed country settings, there is a dearth of research on the effects of marital disruption on health and wellbeing of reproductive-aged women in developing countries.

Studies that examined the effects of marital disruption in women in low-and-middle income countries (LMICs) were focused on welfare effects [5,6], standard of living [7], poverty [7,8], livelihood and income opportunities [9], and property ownership [10,11]. These studies report significantly lower living standard of the maritally disrupted women, which persist over the life course and even passed on to children. Further widowed women were excluded from critical decisions on their socioeconomic wellbeing. Widowhood was

found associated with limited livelihood opportunities, especially in the rural areas, which adversely impact widowed women's earnings and living conditions. Widowed women also face discrimination in asset inheritance upon death of their husband. All together extant evidence suggests that maritally disrupted women without spousal support, face a higher risk of poverty and socioeconomic vulnerability in the LMICs.

Studies also explore the role of marital disruption on nutrition [12,13], food insecurity [14] and infant mortality [15] in the LMICs. These studies found significantly lower nutritional status among widowed and divorced women. The children of maritally disrupted women were also found more likely to experience food insecurity. Further high mortality rates were reported for infants of maritally disrupted mothers. Few studies that assessed health outcomes among maritally disrupted women in the LMICs explored the areas of health care access [16], self-rated health and chronic conditions [17,18], HIV risk [19], and depression [20]. These studies report poorer health conditions of maritally disrupted women along with financial and social barriers obstructing their access to health care services.

Amato's (2000) divorce-stress-adjustment perspective asserts that separation results in stressors that lead to negative emotional, behavioral, and health outcomes [21]. Widowhood can increase health risk behaviors thorough loss of social support and subsequent decline in health regulation [22]. Even though both men and women are negatively affected by the marital disruption, the impact of widowhood may be more pronounced in women than men as women are less likely to remarry after the death of a spouse [1]. Further the strain of divorce or separation was found transient in men but chronic in women [23]. As such, the stressors are especially pertinent to women who are separated, divorced, or widowed.

Another important aspect of marriage that significantly impacts wellbeing of married couples is perceived social support provided by spouses [24]. Perceived social support is an important determinant of health-promoting lifestyle [25] and health behaviors in women [26]. Perceived social support is also linked to psychological and emotional wellbeing [27,28]. As such, experiencing negative social support can influence risky behaviors such as tobacco and alcohol consumption [29]. Marital disruption has a disruptive impact on social support due to loss of companionship, everyday assistance, and emotional support [30]. Further connectedness to spouse's social network is an important source of collective support [31], which could get waned in an event of marital disruption. Loss of social support due to marital disruption, thereby, can adversely impact psychosocial factors affecting risk behaviors [32] in maritally disrupted women.

Given the link between tobacco-use and psychosocial stressors, social environment, and socioeconomic status conditions [33–35], several studies examined how tobacco-use is associated with marital status. With large-scale longitudinal data, Nstedt (2005) found that the risk of smoking was lower among married individuals in Sweden, compared to those who experienced marital disruption [36]. Similar association was observed in another study in Korean population [37]. Smoking was also found to be a predictor of increased mortality risk among maritally disrupted individuals in a longitudinal study in English population [38]. However, like the protective effect of marriage on stress or psychological behavior, all these studies were conducted in developed country setting, and little is known about how marital status, especially marital disruption, impacts tobacco-use behavior when developing countries are concerned. One study on older Indian adults (age 60+) reported higher likelihood of chewing tobacco use among widowed women [39]. The risk of tobacco-use among maritally disrupted women of reproductive age in the developing countries, however, is less visited.

To address this gap in the literature, the current study investigates the association of marital disruption—defined as widowhood, divorce, or separation, with tobacco-use in reproductive-aged women in India. According to the World Widows Report, India is home to the largest number of widowed women in the world [40]. India is also the second-leading tobacco consumer globally [41]. Assessing the relationship between marital disruption and tobacco-use in ever married women, therefore, is of great public health importance in the Indian context.

Aims

Building on the transition mechanism from marital disruption to psychosocial alterations to risky health behavior, the aim of this study is to examine whether among ever married adult women of reproductive age (18 to 49 years) in India, those who experienced marital disruption, had a different tobacco-use prevalence compared to their counterparts who were currently (at the time of the survey) in marriage.

2. Results

30,383 (5.6%) out of 540,575 women in our sample were maritally disrupted at the time of the survey. Among maritally disrupted women, 73.7% were widowed, 8.0% were divorced, and 18.3% were separated. Prevalence of marital disruption were higher among older women (age 35–49) compared to that in younger women (aged 18–34). Prevalence of tobacco consumption among women in our sample was 5.1%. While the prevalence was 4.8% among women who were married, it was 4.9 percentage-points (pp) higher among women who experienced marital disruption. Though tobacco use prevalence was higher in older age cohort (3.4% vs. 7.1%), similar differences were observed in both younger and older age cohorts (Table 1).

Table 1. Share of maritally disrupted women and share of women consuming tobacco by marital disruption.

	Share of Women Maritally Disrupted ¹			Share of Women Consuming Tobacco		
	All	Age 18–34	Age 35–49	All	Age 18–34	Age 35–49
Currently married	-	-	-	4.87 (4.76, 4.97)	3.29 (3.18, 3.40)	6.72 (6.56, 6.89)
Widowed/divorced/separated	5.58 (5.48, 5.68)	2.54 (2.45, 2.63)	8.93 (8.76, 9.09)	9.78 (9.31, 10.25)	7.10 (6.36, 7.83)	10.62 (10.06, 11.18)
Difference ($\Delta_{WDS} - \Delta_{Married}$)	-	-	-	4.91 *** (4.45, 5.38)	3.81 *** (3.08, 4.54)	3.90 *** (3.34, 4.46)

¹ Estimates were obtained using complex survey weights. 95% confidence intervals are in parenthesis. *** $p < 0.001$.

The difference in tobacco-use prevalence between maritally disrupted and married women were evident across various sociodemographic characteristics namely educational attainment, household wealth, religion, caste, and urban/rural residence (Figure 1). Variation in some of these characteristics existed across the two group of women by marital status (Table 2). For example, while 27.5% of the married women had no education, among maritally disrupted women this share was as high as 42.4%. On the other hand, 12.9% of the maritally disrupted women belonged to the richest households, whereas that share was 20.1% among married women. Despite these differences, maritally disrupted women, across all sociodemographic attributes, were found more likely to use tobacco compared to their counterparts who were married at the time of the survey. This pattern was evident in both younger and older age cohort (Figure 2).

Table 3 presents the crude odd ratios in favor of tobacco-use for various sociodemographic characteristics. Tobacco-use was positively associated with age. Compared to women with no education, women with secondary and higher education were 71.6% and 95.5% less likely to use tobacco. Tobacco-use was also lower among women from wealthier households and among women residing in urban areas. Tobacco-use was significantly higher among women belonged to scheduled caste and scheduled tribes. These patterns were very similar across women who were married and who experienced marital disruption. In other words, the sociodemographic risk factors of tobacco use were similar in both groups of women.

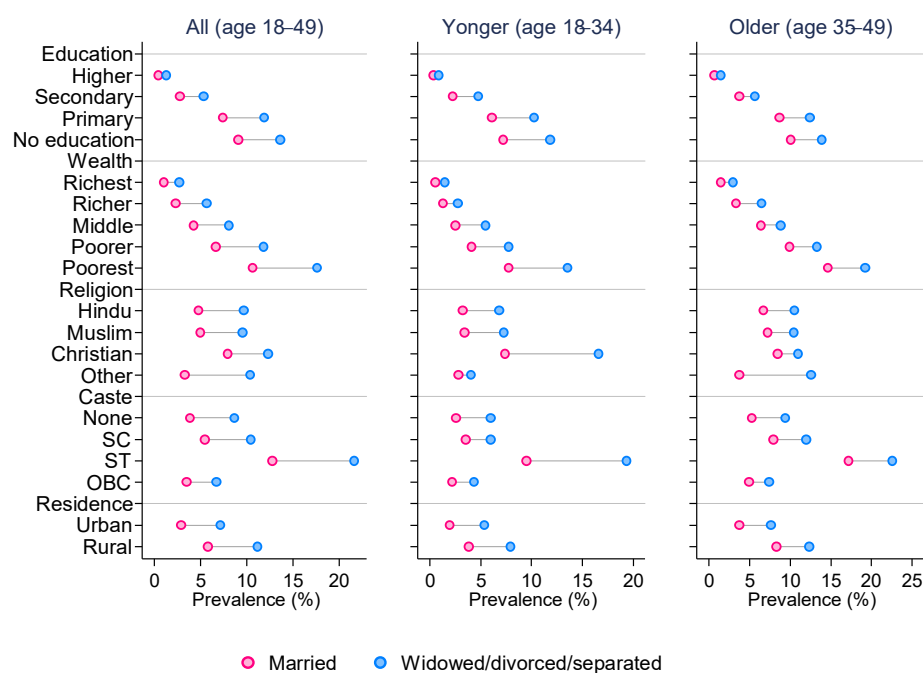


Figure 1. Tobacco use prevalence by sociodemographic characteristics and marital status. Estimates were obtained using complex survey weights. The differences in tobacco use prevalence between married and widowed/divorced/separated women were statistically significant across all sociodemographic groups except for “age 18–34: other religion”.

Table 2. Descriptive statistics of the study participants by marital disruption.

	Share of All Women Aged 18–49 ¹		Share of Women Aged 18–34		Share of Women Aged 35–49	
	Married N = 510,192	WDS N = 30,383	Married N = 273,443	WDS N = 7482	Married N = 236,749	WDS N = 22,901
Education						
No education	27.51	42.41	17.73	25.26	39.01	47.78
Primary	13.86	17.84	12.36	17.47	15.62	17.96
Secondary	45.7	33.58	53.45	46.68	36.57	29.48
Higher	12.93	6.17	16.45	10.58	8.79	4.78
Wealth index quintiles						
Poorest	18.7	21.09	20.11	24.4	17.03	20.05
Poorer	19.91	22.32	20.87	24.92	18.79	21.51
Middle	20.43	23.6	20.69	21.61	20.12	24.22
Richer	20.81	20.14	20.49	18.17	21.2	20.75
Richest	20.14	12.85	17.84	10.89	22.86	13.47
Religion						
Hindu	81.96	82.23	81.59	79.69	82.4	83.02
Muslim	13.12	11.09	14.05	13.32	12.02	10.39
Christian	2.19	3.43	1.88	3.5	2.55	3.41
Other	2.73	3.25	2.48	3.49	3.04	3.17
Caste						
None	26.12	23.23	24.95	20.94	27.49	23.95
Scheduled caste	21.58	24.96	22.42	26.42	20.59	24.51
Scheduled tribe	9.16	11.16	9.68	13.05	8.55	10.57
Other backward class	43.14	40.64	42.95	39.59	43.37	40.97
Residence						
Rural	68.56	64.64	70.92	67.31	65.78	63.8
Urban	31.44	35.36	29.08	32.69	34.22	36.2

¹ Estimates were obtained using complex survey weights.

Table 3. Crude odds ratios in favor of tobacco use for the covariates by marital status.

	All ¹	Currently Married	Maritally Disrupted
Age	1.052 *** (1.050, 1.054)	1.050 *** (1.048, 1.053)	1.032 *** (1.024, 1.039)
Education			
No education	Ref.	Ref.	Ref.
Primary	0.800 *** (0.766, 0.835)	0.799 *** (0.764, 0.836)	0.856 * (0.742, 0.987)
Secondary	0.284 *** (0.273, 0.297)	0.286 *** (0.274, 0.299)	0.359 *** (0.315, 0.409)
Higher	0.045 *** (0.039, 0.053)	0.045 *** (0.038, 0.053)	0.082 *** (0.054, 0.123)
Wealth index quintiles			
Poorest	Ref.	Ref.	Ref.
Poorer	0.601 *** (0.577, 0.627)	0.598 *** (0.573, 0.624)	0.626 *** (0.555, 0.707)
Middle	0.379 *** (0.359, 0.399)	0.374 *** (0.354, 0.394)	0.411 *** (0.353, 0.478)
Richer	0.202 *** (0.189, 0.215)	0.195 *** (0.182, 0.209)	0.281 *** (0.234, 0.337)
Richest	0.091 *** (0.081, 0.102)	0.090 *** (0.080, 0.101)	0.130 *** (0.097, 0.173)
Religion			
Hindu	Ref.	Ref.	Ref.
Muslim	1.029 (0.961, 1.101)	1.042 (0.972, 1.118)	0.988 (0.825, 1.183)
Christian	1.693 *** (1.565, 1.832)	1.707 *** (1.574, 1.851)	1.315 ** (1.116, 1.551)
Other	0.725 *** (0.629, 0.834)	0.668 *** (0.583, 0.766)	1.084 (0.697, 1.686)
Caste			
None	Ref.	Ref.	Ref.
Scheduled caste	1.422 *** (1.335, 1.514)	1.425 *** (1.336, 1.520)	1.226 * (1.033, 1.455)
Scheduled tribe	3.576 *** (3.356, 3.811)	3.611 *** (3.382, 3.855)	2.906 *** (2.459, 3.435)
Other backward class	0.877 *** (0.828, 0.928)	0.887 *** (0.836, 0.941)	0.758 *** (0.644, 0.892)
Residence			
Rural	Ref.	Ref.	Ref.
Urban	0.499 *** (0.468, 0.532)	0.479 *** (0.448, 0.512)	0.609 *** (0.529, 0.701)

¹ Estimates were obtained using complex survey weights. 95% confidence intervals are in parenthesis. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The unadjusted and adjusted odds in favor of tobacco-use for marital disruption indicator were presented in Table 4. Odds of tobacco-use for maritally disrupted women were 2.1 times that of their counterparts who were married. The pattern was same in both age cohorts, though the odds ratio was higher for the younger cohort than that for the older cohort (2.2 vs. 1.6, $p < 0.001$). When the sociodemographic attributes were adjusted for, the results persisted though the magnitude became smaller. For maritally disrupted women, the adjusted odds of tobacco-use were 1.5 times that of women who were married. Like the unadjusted odds ratios, adjusted odds were higher among younger women than those for the older women (1.7 vs. 1.5, $p < 0.05$).

Table 4. Unadjusted and adjusted odds ratios in favor of tobacco use for marital disruption.

	All ¹	Age 18–34	Age 35–49
A. Unadjusted			
Marital disruption	2.119 *** (2.008, 2.236)	2.245 *** (2.005, 2.514)	1.649 *** (1.551, 1.752) [†]
Observations	540,575	280,925	259,650
B. Adjusted			
Marital disruption	1.478 *** (1.393, 1.569)	1.683 *** (1.484, 1.909)	1.455 *** (1.363, 1.553) [†]
Observations	540,575	280,925	259,650

¹ Estimates were obtained using complex survey weights. 95% confidence intervals are in parenthesis. *** $p < 0.001$.

[†] Estimates for the older cohort is statistically different from that of the younger cohort. The multivariable specifications accounted for respondent's age, educational attainment, wealth index quintiles, religion, caste, urban/rural residence, and geographic region fixed effects.

To check the robustness of these results, we performed the analyses by urban/rural residence and socioeconomic status (SES) conditions, which are presented in Figure 2. Maritally disrupted women in both urban and rural areas were more likely to use tobacco than women who were married. Similar was the case for poor and non-poor women, and women with lower and higher educational attainment. Across all sub-groups, for both younger and older age cohorts, the odds and adjusted odds of tobacco-use were significantly greater for maritally disrupted women.

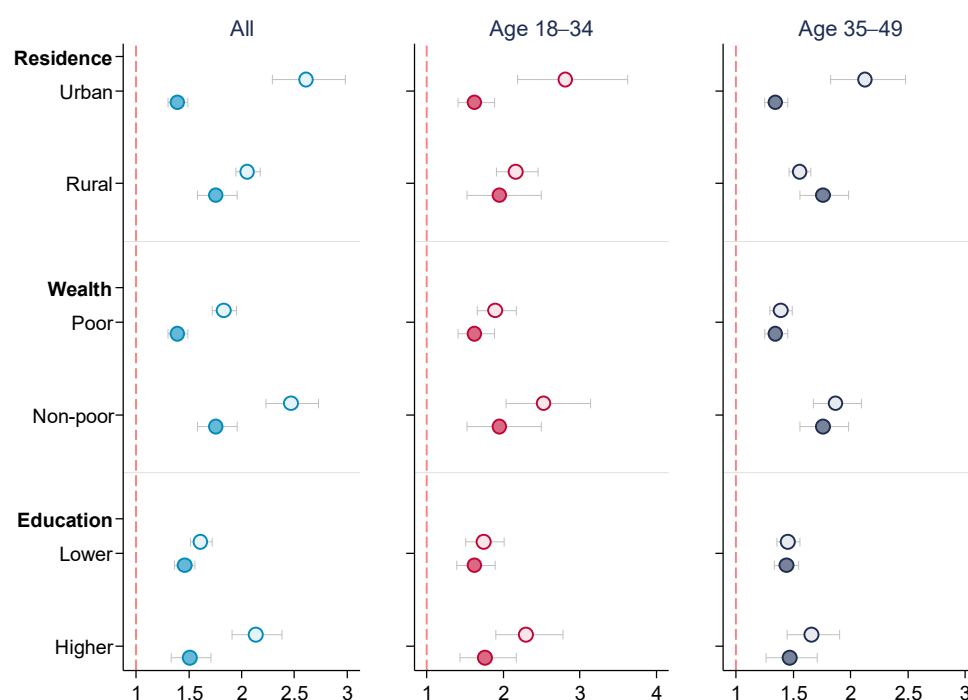


Figure 2. Unadjusted and adjusted odds ratios in favor of tobacco use for marital disruption by residence and SES sub-groups. The lighter markers depict unadjusted odds ratios. The darker markers depict adjusted odds ratios. Estimates were obtained using complex survey weights. Horizontal lines across the markers denote 95% confidence intervals. The multivariable specifications accounted for respondent's age, educational attainment (for urban/rural and poor/non-poor sub-groups only), wealth index quintiles (for urban/rural and lower-education/higher-education sub-groups only), religion, caste, urban/rural residence (for lower-education/higher-education and poor/non-poor sub-groups only), and geographic region fixed effects.

Table 5 presents the results of conditional fixed effects logistics regressions that accounts for household fixed effects. The sample for this analysis included households that had more than one respondent. The higher odds of tobacco-use among maritally disrupted women persisted after taking account of household fixed effects. The odds were significantly higher with controls for age and educational attainment as well. Since we controlled for household fixed effects, we could not control for household level covariates such as urban/rural residence, or household wealth in this specification. Therefore, we further estimated the models by urban, rural, poor, and non-poor sub-groups. Across all these sub-groups, maritally disrupted women were more likely to use tobacco compared to married women within the same household. The adjusted odds, however, were not statistically significant for the urban and poor sub-groups.

Table 5. Results of conditional fixed effects logistic regression models.

	All ¹	Urban	Rural	Poor	Non-poor
A. Not adjusted for age and education					
Marital disruption	2.777 *** (2.435, 3.201)	2.695 *** (1.996, 3.653)	2.797 *** (2.407, 3.276)	2.430 *** (2.048, 2.917)	3.399 *** (2.743, 4.272)
Observations	10,551	1665	8886	6067	4484
Number of households	4874	757	4117	2861	2013
B. Adjusted for age and education					
Marital disruption	1.355 ** (1.123, 1.63)	1.459 (0.956, 2.151)	1.330 ** (1.091, 1.684)	1.270 (1.001, 1.635)	1.477 * (1.097, 2.052)
Observations	10,551	1665	8886	6067	4484
Number of households	4874	757	4117	2861	2013

¹ 95% confidence intervals (obtained through bootstrapping) are in parenthesis. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Sample is confined to households that had at least two respondents.

3. Discussion

This study contributes to the literature by providing evidence on the association between marital disruption and tobacco-use in developing countries, with India as a case. Our findings suggest a strong correlation between marital disruption and tobacco-use in ever married reproductive-aged women in India. This association appeared to be empirically robust and generalizable across various sociodemographic groups.

The association between tobacco-use risks and marital disruption may resulted from the additional stress and psychosocial changes experienced through this disruption [42,43], as stress and related issues appear to be positively associated with risky health behavior. As such, marital disruption serves as a psychosocial risk factor for tobacco-use in women in developing countries. In addition, loss of social support can also play a critical role on the relationship between marital disruption and tobacco-use. Perceived quality of emotional support was found associated with stress and depression, and tobacco use [44]. Social support is also associated with subjective wellbeing and life satisfaction [45], which are determinants of healthy lifestyle behaviors [46] and tobacco use [47]. As marital disruption may disrupt social support [30], loss of perceived support could be another potential channel of higher risk of tobacco consumption in maritally disrupted women.

Marital disruption can result in adverse economic outcomes in women [48]. Economic vulnerability endured by maritally disrupted women, along with gender disparity and traditional gender roles in India [49], might have led to socio-economic marginalization for separated, widowed, and divorced women. Lower socioeconomic status has been found to be associated with higher tobacco-use in the low-and-middle income countries [50]. Social and economic vulnerability, therefore, can be another potential channel through which marital disruption is associated with higher risk of tobacco-use in Indian women.

The findings of the current study are consistent with the conclusions of the previous studies done in developed country settings [36–38]. Even though India is culturally much different compared to Western countries, whenever it comes to the association between marital disruption and tobacco-use, we did not observe something very different for India. In fact, the socio-economic status of India may further exacerbate the risk of tobacco-use in maritally disrupted women.

We found that the association between sociodemographic factors and tobacco use in women in marriage in India were commensurate with that in maritally disrupted women. Lower educational attainment was an important predictor of tobacco use in both groups of women, which was also evident in extant literature on tobacco use in India [51]. We also found that the likelihood of tobacco-use in our study population was higher among women from poorer households. Similar to our results, poverty was identified as a significant risk factor of tobacco consumption in the literature on the prevalence and determinants of tobacco-use in India [52,53]. In addition, we observed that compared to study participants living in urban areas, tobacco use prevalence was significantly higher among respondents living in rural areas. This was also consistent with the findings in extant literature [54]. Women in India predominantly consume smokeless tobacco products [55], and the prevalence of smokeless tobacco use in women is significantly higher in rural parts of the country [56]. Lastly, the likelihood of tobacco-use was higher among women from scheduled castes and scheduled tribes, which was also consistent with the existing evidence [57]. As mentioned earlier, these risk factors were similar in both married and maritally disrupted women. Further to that, the association between marital disruption and tobacco-use was evident in sub-groups women from urban and rural areas, poor and non-poor households, and with higher and lower educational attainment. These results were suggestive of a potential psychosocial pathway of the observed relationship between tobacco-use in women and marital disruption.

Even though compared to men, the prevalence of tobacco-use among women in India is relatively low [58], considering the size of the population, still a substantial number of women are tobacco-users in India. Marital disruption, which impacts many women in India, can make things worse. Therefore, targeted policy or preventative activities will be required for these groups instead of putting them in the broad category of women.

As it is evident that marital disruption has negative effects on health outcomes, increased tobacco-use serves as a risk factor for a myriad of chronic conditions such as various forms of cancer, cardiovascular diseases, and chronic obstructive pulmonary diseases [59]. A recent study reports disproportionately higher risk of uncontrolled hypertension among tobacco-user women of reproductive age in India [55]. In addition to disease burden, tobacco-user women in India also endure significant economic and social costs [60]. As such, higher risk of tobacco-use in maritally disrupted women puts some already vulnerable population-group to even more vulnerable stage.

The findings of this study indicate that maritally disrupted women in India had a higher risk of tobacco-use compared to their counterparts who were in marriage. Of note, we did not compare tobacco use in maritally disrupted women with that of never married women, whose health outcomes tend to be different from ever married women. Our findings suggest that tobacco control and prevention strategies may consider targeting maritally disrupted women to promote tobacco cessation and prevention. Women in India who were widowed, divorced, or separated were also socioeconomically vulnerable with unequal access to health care and health promotion services [61]. Improving the outreach of anti-tobacco communication interventions in this population through innovative and culturally appropriate approaches can play an important role in reducing the burden of tobacco-use. Community based interventions to educate women on the harmful impact of tobacco use and improving access to tobacco cessation services at the community health centers may help as well. Community engagement programs to change tobacco-use related cultural norms and practices can also play a positive role [62]. In addition, providing targeted mental health services to cope against stress and anxiety, and strengthening social

support can be considered as potential preventive measures against tobacco use in maritally disrupted women in India.

Like other observational studies, our analysis is subject to some limitations. First and foremost, in the cross-sectional data, we did not know the timing of tobacco initiation and the timing of widowhood, divorce, or separation. This restrained us from offering any causal relationship. For some of the respondents, tobacco-use might precede marital disruption. The heterogeneity in tobacco initiation across sociodemographic groups, however, were partially addressed by assessing the relationship across various sub-groups (e.g., rural/urban, poor/non-poor) and accounting for common risk factors for tobacco-use. We could not assess any potential influence of spousal concordance in tobacco-use behavior since spousal information for maritally disrupted women was not available in the survey. Future studies using appropriate longitudinal data will further add to our understanding of these issues.

One strength of our analysis was that the relationship between marital disruption and tobacco-use persisted even after controlling for household fixed effects. Respondents within a household, were supposed to encounter similar behavioral and environmental factors that could impact tobacco consumption [63]. The higher likelihood of tobacco-use among maritally disrupted women within the same household, after accounting for age and educational attainment, refers to a strong association between marital disruption and tobacco-use in ever married women of reproductive age in India.

4. Methods

4.1. Participants and Study Design

We conducted a cross-sectional analysis using data from the latest (2019–21) wave of the India National Family Health Survey (NFHS-5). The NFHS-5 is a nationally representative survey that collects data on various health and behavioral issues as well as a wide range of sociodemographic and anthropometric measures. The survey entails a two-stage stratified sampling framework that covers urban and rural areas of all 28 states and 8 union territories of India. The survey protocol of the NFHS-5 was reviewed and approved by the International Institute for Population Sciences (IIPS) Institutional Review Board and the ICF Institutional Review Board. Informed consent was obtained prior interview [64]. Our sample includes 540,575 ever married women of age 18 to 49 years. The data were anonymized and obtained from publicly available secondary source.

4.2. Conceptual Framework

Figure 3 presents the conceptual framework of the relationship between marital disruption and tobacco use in women. The effects of stress, depression, anxiety, and other mental health issues on tobacco use is well documented in the extant literature [65,66]. The effect of life events such as marital dissolution or spousal loss, on depressive symptoms among women are also evident in the literature [67,68]. Theoretical models suggest that marital gain or loss can have a significant effect on stress and anxiety. For instance, the marital resource model suggests that the couple tends to combine both tangible (such as income) and intangible (such as social ties) resources to have a better life, and marital disruption may invoke lack of regulation of health behaviors, loss of social support, and social disadvantage [69]. The crisis model, on the other hand, suggests that the strains from marital disruptions can cause psychological stress and psychiatric disorders [69]. Together, marital disruption can lead to stress and adverse mental health outcomes in maritally disrupted women.

Cognitive behavioral theories of addiction suggest a relationship between stress-coping and tobacco, alcohol or substance use. For instance, the stress coping model provides perspectives on tobacco use as a coping mechanism against life stress [70]. The biopsychosocial model of addiction further posits that social norms and cultural influences along with psychological impacts of adverse life experiences are associated with an individual's risk of tobacco use [71]. As such, maritally disrupted women could have a higher

likelihood of tobacco use. In addition, the interaction between socioeconomic status (SES) and biopsychosocial factors can influence the risk of tobacco use in maritally disrupted women [72].

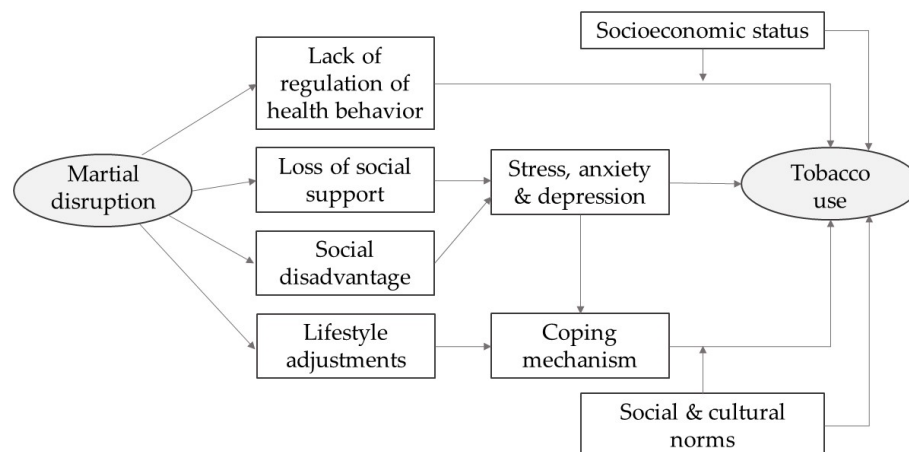


Figure 3. Conceptual framework of marital disruption and tobacco use.

4.3. Assessment Tools and Outcome Variables

The NFHS-5 reports respondent's current marital status at the time of the survey, from which we identified ever married women who were in marriage and who were widowed/ divorced/ separated. The NFHS-5 asks the respondent whether they currently (i.e., at the time of the survey) consume smoking tobacco products including cigarette, pipe, cigar, bidi, hookah, and other; and smokeless tobacco products including chewing tobacco, snuff, gutkha, paan with tobacco, and khaini. A respondent was determined as tobacco user if she used any form of the smoking- or smokeless-tobacco products.

Our outcome variable $Tobacco_i$ was a binary variable that took the value 1 if individual i was a tobacco-user and 0 otherwise. Our key explanatory variable WDS_i was a binary variable that took the value 1 if individual i was widowed/ divorced/ separated, and 0 if in marriage. Of note, our analysis did not include single or never married women. Other sociodemographic correlates in the model included: educational attainment (no education—base category, primary, secondary, and higher), household wealth index quintiles (1st: poorest—base category, 2nd: poorer, 3rd: middle, 4th: richer, and 5th: richest), religion (Hindu—base category, Muslim, Christian, and other), caste (none—base category, scheduled caste, scheduled tribe, and other backward class), residence (rural—base category, and urban) and age (continuous variable). To account for regional differences in societal norms associated with tobacco-use, we also controlled for geographic regions of India as follows: North—base category, Central, East, Northeast, West, and South.

4.4. Statistical Analysis

We first examined how tobacco-use prevalence differed between women who were in marriage and women who were widowed/ divorced/ separated. We performed adjusted Wald tests to determine whether the difference between the two group was statistically significant. Next, we estimated a set of binomial logistic regression models to assess the sociodemographic factors associated with tobacco use in married and maritally disrupted women as follows:

$$\text{logit}(Tobacco_i) = \alpha_0 + \sum_{j=1}^{n-1} \gamma_j Factor_{j,i}^k \quad (1)$$

$Factor_{j,i}^k$ are binary variables (except for age) where k denotes k th factor (e.g., education, wealth index, etc.) and j denotes j th category within k th factor (e.g., primary, secondary, etc. within educational attainment). We examined whether the association between tobacco use and sociodemographic factors were similar across women who were in marriage and women who were widowed/divorced/separated.

Next, to obtain odds ratios and adjusted odds ratios in favor tobacco-use for the marital disruption indicator we estimate the following univariate and multivariable logistic regressions:

$$\text{logit}(\text{Tobacco}_i) = \beta_0 + \beta_1 \text{WDS}_i \quad (2)$$

$$\text{logit}(\text{Tobacco}_i) = \delta_0 + \delta_1 \text{WDS}_i + \mathbf{X}_i \delta_2 + \text{Region} \quad (3)$$

$\mathbf{X}$ denotes the vector of sociodemographic correlates and *Region* is the geographic region fixed effect. The models were estimated for the full sample as well as for younger (18 to 34 years)- and older (35 to 49 years)-age cohorts. We performed Chow test to examine whether estimates of β_1 and δ_1 varied across age cohorts.

Next to check the robustness of our results, we estimated Equations (2) and (3) for the following sub-groups: (i) urban, (ii) rural, (iii) poor (i.e., bottom two quintiles of household wealth index), (iv) non-poor (i.e., top three quintiles of household wealth index), (v) lower educational attainment (i.e., primary or no education), and (vi) higher educational attainment (i.e., secondary or higher level of education). All estimates were obtained using complex survey weights.

Lastly, to explore the within household differences in tobacco use between women in marriage and women experiencing marital disruption, we estimated the following conditional fixed effect logistic regression models with household fixed effects:

$$\text{logit}(\text{Tobacco}_{i,h}) = \gamma_0 + \gamma_1 \text{WDS}_{i,h} + \text{Household}_h \quad (4)$$

$$\text{logit}(\text{Tobacco}_{i,h}) = \lambda_0 + \lambda_1 \text{WDS}_{i,h} + \mathbf{X}_{i,h} \lambda_2 + \text{Region} + \text{Household}_h \quad (5)$$

Household level characteristics—household wealth, religion, caste, residence, and region were dropped since those are already captured by household fixed effect. $\mathbf{X}$ in this case, therefore, includes only age and educational attainment. The sample was confined to households that had at least two respondents. We estimated the household fixed effect models for the full sample as well as for urban-, rural-, poor-, and non-poor-sub-samples. Statistical analyses were performed in Stata version 17.0 (StataCorp, College Station, TX, USA) software.

5. Conclusions

In this study, we showed that among ever married women of reproductive age (18 to 49 years) in India, who were widowed, divorced, or separated, had a disproportionately higher risk of consuming tobacco compared to their counterparts who were in marriage. The higher risk was evident in both younger (18 to 34 years) and older (35 to 49 years) age cohorts across various socioeconomic status. Of note, these results apply to a region where tobacco use is high and may not be generalizable in different social and cultural settings. Our findings, in general, add to the broad body of literature that examines the impact of marital disruption on health outcomes and risky health behaviors. In particular, we contributed to the literature by providing evidence from a developing country perspective. Our findings have implications for strengthening targeted tobacco control policies as well as for health promotion among maritally disrupted women in India and in other similar low-and-middle income countries.

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Data Availability Statement: The data used in this paper are freely available from the USAID’s Demographic and Health Surveys (DHS) Program website (https://www.dhsprogram.com/data/dataset_admin/login_main.cfm (accessed on 6 May 2022)) upon registering as a DHS data user and submitting a research proposal.

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