Widowhood and Adult mortality in India: Evidence from a follow-up survey of 104,774 individuals

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Abstract

The study examines the "widowhood effect", an uplifted risk of mortality among widowed men and women after the death of one's spouse in India. We also study disparities in mortality risk by socio-economic status (SES) and across diverse communities by caste, religion, region, and rural/urban status. We use data from the India Human Development Survey (IHDS), a nationally representative panel study. The finding shows that a spouse's death had a more substantial effect on mortality among men than women. We find that widowed mortality was higher for men and women with lower socio-economic status. These results highlight that widowhood effects can be observed in a low- and middle-income contexts, and that despite relative social advantage, widowed men may still have elevated mortality risks compared to widowed women.

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The death of one's spouse is a major life shock. This shock can cause changes in the health of surviving spouses. A significant body of research documents the association between widowhood and health outcomes suggesting that widowed individuals experience a range of adverse health outcomes, including poor mental health, less health regulation, and greater use of health care services (Rico-Uribe et al. 2018; Fagundes et al. 2019; Iwashyna & Christakis 2003; Williams 2004; Stroebe et al. 2007; Perkins et al. 2016, Siflinger 2017). A vital health indicator on which a considerable difference between widowed and married individuals has been observed is mortality. Both widowed men and women have a higher risk of mortality compared to married persons, a phenomenon known in the literature as the "widowhood effect" (Kaprio et al. 1987; Boyle et al. 2011; Shor et al. 2012; Moon et al. 2014; Dabergott 2021). Evidence from high income contexts indicates that widowed persons have a 10% to 36% higher risk of mortality compared to married individuals with the mortality gap being even more pronounced for younger populations and for men (Manzoli et al., 2007; Shor et al., 2012). Most of the evidence on widowhood and mortality is from high income countries, where longitudinal data reliably measures survival after widowhood. However, some recent research suggests that a similar widowhood effect may also be present in other contexts. One study found that the widowed in Japan, China, and Bangladesh had a 12% higher risk of mortality than married individuals (Wang et al., 2020).

Though it has received limited attention in the widowhood effects literature, India is an important case to study widowhood as a social determinant of mortality risk. First, the widowed population in India is large both in absolute size and as a share of the population. At the time of the 2011 Census in India, there were 43 million widowed women and 12 million widowed men (Government of India 2011). With as many as 7.4% of Indian women widowed, a significant portion of the Indian population may be vulnerable to heightened mortality risk associated with widowhood. Second, widowhood takes on unique cultural meanings in the Indian context due to taboos on female widow remarriage and historical traditions of seclusion and ostracism of female widows (Chen 2000; Lamb 2000). Because of the uniquely vulnerable position of female widows in India, there is reason to suspect that patterns of widowhood effects documented in other countries may not be found in India. For example, the higher widowhood effect on mortality for men observed in other countries may not be expected in the Indian context given the vulnerable social position of Indian widows. Recent literature has explored widowhood effects on employment (Reed 2020) and health (A. Agrawal, Lalji, and Pakrashi 2020) in India. However, the effect of widowhood on mortality has not yet been quantified.

In this study, we investigate widowhood effects on mortality in the Indian context using nationally representative panel data from the India Human Development Survey. By following households and individuals over time, this dataset presents a unique opportunity to track mortality by marital status using a large sample of nearly 100,000 people. Following the previous literature, we measure how widowhood effects vary by gender and examine how those gender differences are mediated by other factors like age, caste, education, and economic position. One of the most significant findings in the existing literature is the large gender gap in widowhood effects where men see larger risk of mortality after widowhood than women (Shor et al. 2012; Stroebe et a. 2007). In the previous literature in other social contexts, this

gender gap in widowhood effects were found to be mediated by age, socio-economic status, anticipation, and coping strategies (Angel, Jiménez, and Angel 2007; Shor et al. 2012; Moon et al. 2013; Dabergott 2021). We examine how these patterns differ in the Indian context, a setting where female widows face special vulnerabilities due to cultural patterns of widow seclusion and ostracism. In the previous literature, female Indian widows have been found to have much worse health than married women (Chen and Dreze 1992; Jensen 2005; A. Agrawal, Lalji, and Pakrashi 2020). Given this health disadvantage, female widows might be expected to experience high mortality risk as well.

Widowhood effects on health and mortality

Widowhood may influence mortality through the psychological and physical stress associated with bereavement and end-of-life care work as well as changes to health behaviours such as alcohol consumption, smoking, diet, and exercise (Manzoli et al., 2007; Shor et al., 2012; Moon et al. 2014; Ennis & Majid 2019; Stroebe et al. 2001; Trivedi 2009;). Studies suggest that widowers and widows often use smoking and alcohol consumption to cope with grief (Ding et al. 2021). Widowed individuals may also begin irregular meal intake and skip physical activity, eventually causing elevated levels of cardiovascular diseases leading to higher mortality rates among both widowed men and women (Rosenbloom & Whittington 1993; Vesnaver et al. 2016; Stahl et al. 2016). Whether the death was anticipated or a sudden plays an important role in mediating the bereavement process and subsequent widowhood effects on mortality, with more sudden deaths having a larger widowhood effect especially for men (Sullivan and Fenelon 2014; Vable et al. 2015; Siflinger 2017). Some studies have suggested that the widowhood effect on mortality is especially or only present within the first few months or years following the loss of their spouse (Shor et al. 2012; Moon et al. 2013).

The termination of marriage through the death of the spouse can also negatively influence surviving spouses' household finances as well as their relationship with children and other household members (Bound 1991; Ha 2008; Cornman et al. 2012). This may jeopardise access to and utilisation of healthcare as well as decrease the quality of care received (Smith & Zick 1996; Jin & Chrisatakis 2009). In addition, with the loss of their partner, widows have been found to practice less health regulation in the form of receiving reminders and health assistance from others, leading to less healthy habits (Williams 2004).

Widowhood effects by gender

Prior studies in the literature have often found that men are at greater risk of mortality due to widowhood than women, especially when the death was unexpected (Gove 1973; Smith & Zick 1996; Stroebe et al. 2007; Shor et a. 2012). The gender gap in widowhood effects is more pronounced at younger ages than at older ages (Shor et al. 2012; Manzoli et al 2007, Stroebe et a. 2007). However, not all evidence has suggested a female advantage in widow mortality effects. Sullivan and Fenelon (2014) found no major differences by gender in widow mortality using the US Health and Retirement Study.

There are two broad theories attempting to describe the gender gap in widowhood effects observed in some settings. The grief model argues that the surviving spouses' response toward losing their marital partner differs with their gender because of gendered coping with

bereavement (Stroebe et al. 1993a; Stroebe 1993b). For instance, men may attempt to distract themselves from the grieving process, distance themselves from others, or engage in negative coping behaviours such as smoking, drinking, unhealthy diet, or drug use (Utz et al 2012; Lin & Brown 2020). As a result, the unaddressed grief causes escalating depression level coupled with poor health behaviour which eventually increases the mortality risk among widowers relative to widows. By contrast, women may be more likely to reach out for support and comfort from others during the bereavement process, which may decrease the risk of mortality.

Others emphasize gender roles in marriages as a possible explanation for why men often face higher risk of mortality after widowhood. Classic texts argue that due to gender specialization in some households men may be dependent on their wives' skill for daily household tasks and care work whereas women who are not in the labour force may dependent on their husband for income (Kalish 1971; Smith & Zick 1996; Smith & Zick 1986). With their wife's death, widowers often are forced to increase their housework labour as they attempt to fill the void left by their wife's activities and skillset (Utz et al 2004). In addition, widowers may supplement with service provided by their children, through outsourcing household labour to domestic workers, or through re-partnering. In contrast, widows may lose substantial income with the husband's death which could place them at a higher risk of facing financial strains. Historical records suggest that young widows with small children face extremely high mortality risk, at least partially due to the loss of an essential income earner for the household (Alter, Dribe, and Van Poppel 2007).

The role of social-economic status

Many recent studies have focused on the role of socio-economic indicators as either a mediator or a moderator of widowhood effects on mortality. Individuals in a vulnerable economic or social position are not only more likely to be widowed but simultaneously more prone to die, independent of any widowhood effect (Bowling 1987). Some evidence has suggested that socioeconomic resources also may attenuate widowhood effects, especially for widowers (Martikainenn & Valkonen 1998; Kalediene et al. 2007; Choi & Marks 2011; Nystedt 2002; Kung 2020). Other evidence finds the opposite effect, where widowhood effects are found to be significantly larger in the lowest SES group for women and in the highest SES group for men and using Swedish register data (Dabergott 2021). Another literature focuses on how widowhood itself may be associated with a decline in economic status, especially for female widows and those from racial or ethnic minority communities (Bound et al. 1991; Zick & Smith 1991; Bound et al. 1991; Lloyd-Sherlock et al. 2015; Angel, Jimenez, and Angel 2007). The drop in living standard associated with the death of a spouse can impact access to and quality of health care for widows.

The literature has also examined the interaction between racial/ethnic inequality and widowhood disadvantage in mortality. Research documents how widowhood effects differ across racial and ethnic groups. In the United States, evidence suggest that racial minorities face larger widowhood effects on mortality and these effects are found to be at least partially mediated by economic resources (Angel, Jiménez, and Angel 2007; Liu, Umberson, and Xu 2020). Other evidence finds that widowhood effects are large for endogamously married white

couples and non-significant for endogamously married black couples (Elwert and Christakis 2006).

Widow and Widower Health in India

Most studies of widowhood in the South Asian context focus exclusively on female widows because of the especially vulnerable position that the hold in society. Ethnographic evidence describes how Hindu widows in India often face strict norms of "perpetual mourning" which can lead to discrimination and restrictions on her dress, movement, diet, and ability to work outside of the home (Chen and Dreze 1992; Chakravarti 1998; Chen 2000; Lamb 2000). South Asian widows are often reliant on their adult sons for their care and maintenance (Vlassofft 1990; Rahman, Foster, and Menken 1992; Agarwal 1998). Most of the literature focuses on health outcomes but two important mortality studies by Rahman, Foster, and Menken (1992) and Bhat (1998) find some evidence of widowhood effects on mortality in Bangladesh and India respectively.

Studies on widow health suggest that Indian female widows suffer from worse health when compared to married women as measured by nutritional status, mental health, cognitive ability, and presence of chronic disease (Chen and Dreze 1992; Jensen 2005; Lloyd-Sherlock, Corso, and Minicuci 2015; Perkins et al. 2016; A. Agrawal, Lalji, and Pakrashi 2020). Most of the literature focuses on rural areas, where the deprivation of female widows is expected to be higher (Chen and Dreze 1992). Because few of these studies include widowers, it remains unclear if India faces similar gender gaps in widowhood effects as other countries. One study found that elderly widowers did not face increased risk for poor health relative to married Indian men, except as measured through cognitive decline (Perkins et al. 2016). Other research suggests that widows receive less health care services than widowers (G. Agrawal and Keshri 2014). Given the robust evidence on the weak position of female widows in India, it is possible that female widows face a larger widowhood effect than men, which would make India an outlier compared to other countries where the gender gap in widowhood effects either favour women or are not significant.

One way that widowhood could lead to higher mortality risk in India is through the impact it has on the economic position of the surviving spouse. Pandey and Kumar (2012) suggest that decreased labour force participation and economic independence may be important mechanisms through which widows and widowers experience decreased health status. Rural households which contain widows in India were found to be no more likely to be poor; however, households which are headed by widows had the lowest levels of consumption suggesting high levels of poverty for this group (Drèze and Srinivasan 1997). To our knowledge, no study has focused on how widowhood effects on either health or mortality vary across India's diverse communities by caste, religion, region, and rural/urban status.

Material and Methods

Data source

We use prospective data from IHDS wave-1 (2004-05) and IHDS wave-2 (2011-2012). IHDS is a panel survey providing sufficient samples for vita events such as birth, marriage, migration

and mortality, and different socio-demographic information such as education, employment, social-cultural capital, household assets, family structure, and health. IHDS 1 collected information on 41,554 households and 215,754 individuals across 1,503 villages and 971 urban areas from 33 states. In 2011-12, 83% of the household were re-interviewed. In the second wave, a tracking sheet was filled out containing information (even for migrants and deaths) of each individual surveyed in IHDS wave 1. In addition, the tracking sheet provides detailed information on the deaths of individuals, such as years since the death of the individuals at the time of the second wave, the educational, marital and employment status of the deceased individuals.

Using IHDS survey data, the widowhood mortality of individuals aged 25 years and above was calculated. As the analysis focus on individual's mortality, the deaths reported in IHDS 2 survey was compared with SRS[1] was given mortality before analysis. The mortality rate for 15 to 59 years was 4.2 per 1000 person for males, and 2.6 per 1000 person for females respectively, similar to SRS reported mortality rate for 15 to 59 years in 2011. However, the mortality rate for 60 and above years was underestimated in IHDS than SRS figures.

Study sample selection

We are interested in studying the effect of widowhood on mortality. For this, we compare mortality among those who were widowed in IHDS-1 to those who were married in IHDS-1. We start with information on 104,774 individuals aged 25 years and above (out of a total 215,754 measured) in IHDS-1. Out of these, 98,044 were married or widowed during IHDS 1 (2005-06). The IHDS tried to contact these individuals in 2011-12, for its second wave. We ignore individuals whose Marital status changed (5,947 individuals). Another 5,650 individuals were lost to follow-up. 86,447 individuals were part of the final sample, as Figure 1 shows. More than seven thousand individuals died between the two rounds.

[1] Based on the dual record system, the SRS is an extensive demographic surveillance system. It provides estimates of fertility and mortality at the State and National on a regular basis from 1971 onwards.

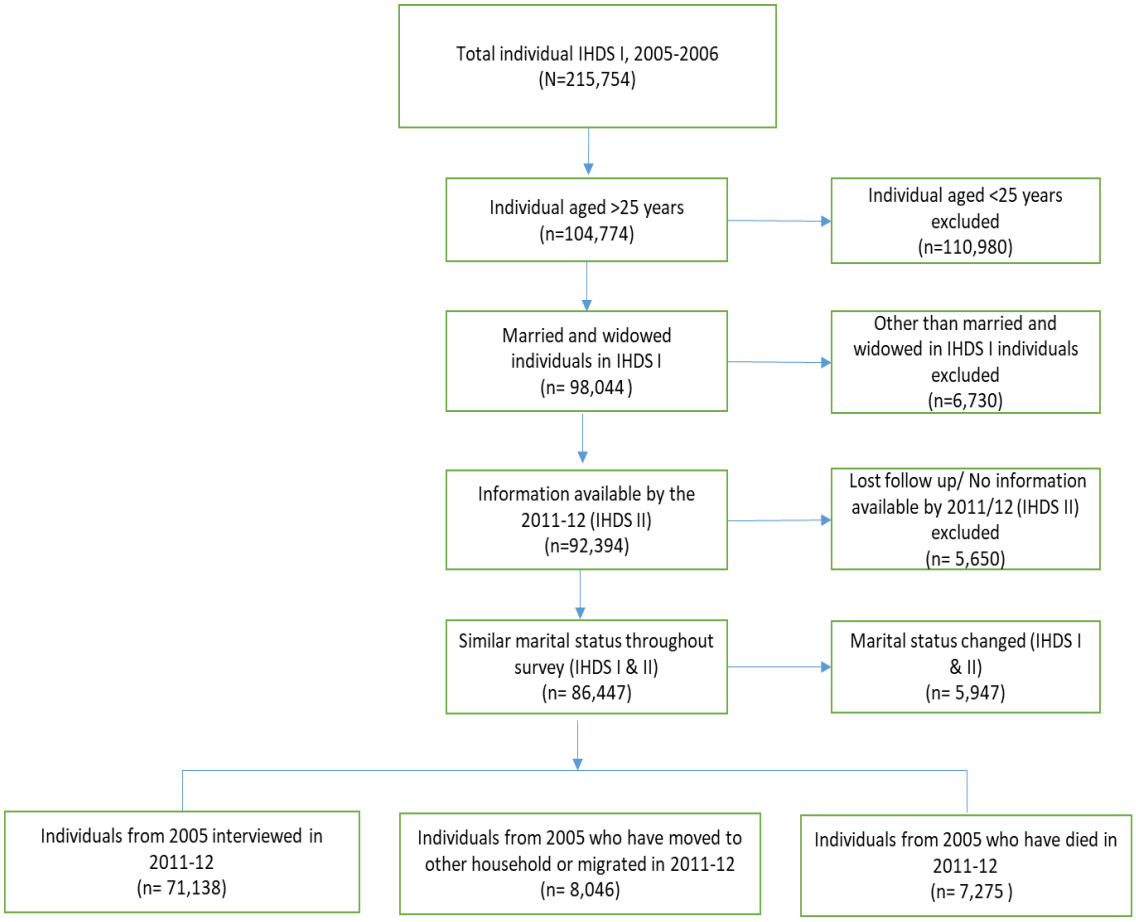

Figure 1: Flowchart of the sample selection and the number of participants excluded for the study.

Variables

In the present study, we considered a number of socioeconomic characteristics by which mortality among currently widowed and married individuals could vary. For individuals observed in Wave-1 who died by Wave 2, the IHDS provides information on years since the death of dead individuals. We estimated the age of all living person and expected age of deceased persons at the time of IHDS wave 2 using ages reported in IHDS-1. In addition to gender and age, we consider place of residence in two groups rural and urban. Social groups include three categories i.e., Other Backward classes (OBC), Scheduled caste/ Scheduled tribes (SC/ST), others. Religion was divided in two categories Hindu and Non-Hindu. Educational level was measured in three categories i.e., illiterate, up to class 9 and 10 and above. Economic condition was measured using the household asset index and we categorised households into three groups – poor, middle and rich. We also consider region in which an individual stays.

Statistical methodology

We calculate marital specific mortality rates. In the survey, an individual was interviewed in 2004-05 and re-interviewed in 2011-12 until he/she either lost in follow-up with no information or dies. These individual contributed between zero to seven person-years. Based on the information on the years since death reported in 2011-12, a full interval of person-years was allocated to the exposed population.

Using these information, age and sex specific death rate by the marital status was calculated at regional level.

$$ASDR_m = \frac{d_m}{PY_m} * 1000$$

Where, $ASDR_m$ is the age specific death rate by marital status, d_m is the number of deaths by marital status, and PY_m are person years exposed by the marital status.

Age-adjusted mortality rate for widowed and married individuals was further calculated across different socioeconomic groups and regions. All the statistical analysis was done using Stata (version 15) and MS excel program.

Results

Mortality rates by marital groups (currently married and widowed) and socioeconomic status

Figure 2 shows the age group wise mortality rate of widowed and married individuals separately for men and women. The death of the spouse had a stronger effect on mortality among men than women. In the 25-59 age group, the mortality rate for widowers was 12.4 per 1000 person-years compared to 5 deaths per 1000 person-years for married men. Among middle-aged women, the mortality rate was 3 and 5 deaths per 1000 person-years for married and widowed women, respectively.

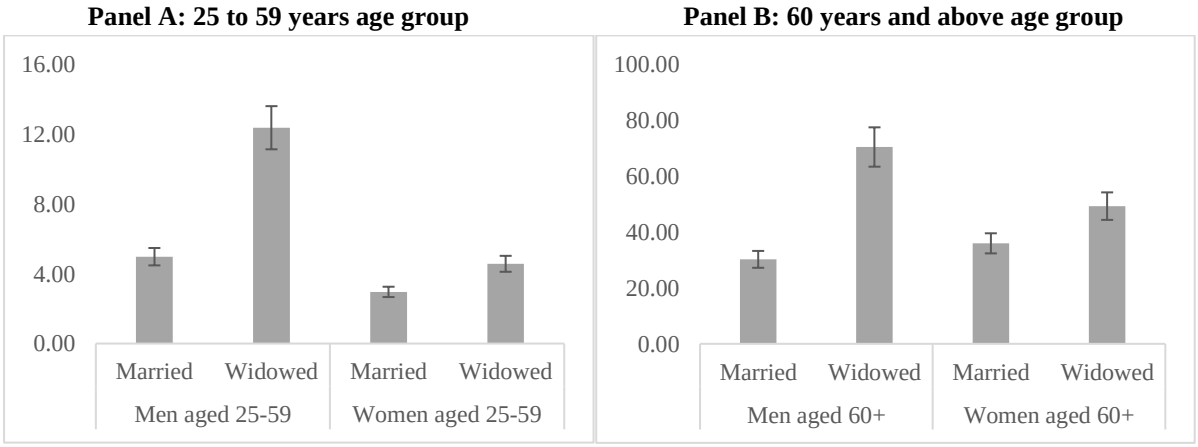

Figure 2: Age adjusted mortality rates by marital status in India

Similarly, older widower men had a mortality rate of 70.5 deaths per 1000, higher than married men (30.3 per 1000). Among older women, widows had a mortality rate of 49.3 per 1000, higher than married women (36.0 deaths per 1000).

Table 1: Age-adjusted mortality rate and 95% Confidence Intervals (in Parentheses) for Men and Women according to socioeconomic groups, India, India Human Development Survey 2011–12 from 2004–05 wave

	25-59		60+	
Backgrounds	**Men**	**Women**	**Men**	**Women**
Place of residence				
Rural	6.11 (5.34-6.40)	3.66 (2.90-3.71)	47.57 (42.64-49.05)	43.02 (38.58-44.83)
Urban	5.39 (5.13-6.60)	2.64 (1.75-3.86)	41.67 (40.86-50.83)	38.49 (36.82-46.59)
Social group				
Others	4.79 (4.56-6.40)	2.90 (2.76-3.86)	44.80 (41.30-50.30)	37.98 (33.83-46.06)
OBC	5.59 (4.95-6.44)	2.98 (2.76-4.06)	43.72 (41.33-50.33)	40.80 (37.26-46.16)
SC/ST	6.75 (4.92-7.21)	4.23 (2.72-3.90)	49.88 (40.70-52.94)	47.55 (36.78-46.63)
Religion				
Hindu	6.03 (5.87-6.33)	3.34 (2.91-3.66)	46.13 (42.92-48.17)	41.76 (38.92-44.60)
Non-Hindu	4.92 (3.37- 7.01)	3.10 (2.45-4.17)	44.22 (38.82-52.84)	41.79 (34.67-48.86)
Education				
Illiterate	8.23 (5.23-7.00)	4.56 (2.85-5.77)	54.97 (42.60-50.81)	44.93 (38.84-44.76)
Up to 9	6.17 (5.44-6.79)	2.27 (1.72-3.88)	44.16 (42.28-51.14)	29.90 (35.37-48.23)
10 and above	4.21 (3.29-6.93)	1.59 (1.42-4.09)	30.68 (27.03-53.38)	27.35 (25.33-56.25)
Economic condition				
Poor	6.88 (5.12-7.61)	4.41 (2.75-3.88)	50.32 (41.14-50.55)	44.00 (37.20-46.20)
Middle	5.95 (5.13-6.60)	3.30 (1.75-4.85)	48.83 (45.85-50.67)	41.55 (37.09-46.32)
Rich	4.77 (4.13-6.42)	2.25 (1.18-3.59)	39.11 (31.81-50.34)	39.51 (35.17-47.21)

Table 1 shows the death rates according to socioeconomic groups for 25-59 years and 60+ years old men and women. As expected, rural dwelling men and women in the 25-59 years and 60+ years age group had a higher mortality rate. Although there was little difference among different social groups, SC/ST men (6.75 per 1000 person-years) and women (4.23 per 1000 person-years) had a higher mortality rate. Similarly, illiterate and poorer individuals had a mortality rate. These descriptive patterns, which follow expected patterns, confirm the reliability of mortality data collected by the IHDS.

The socioeconomic difference in rate ratios for men and women according to marital status (currently married and widowed)

Table 2 shows rate ratios for men and women according to marital status (currently married and widowed) by variables of interest. Among men, results suggest that relative excess mortality among widowers was higher in rural areas. In contrast, among women, widows had higher excess mortality in urban areas. Results indicated that education had protective on mortality for the widowed population. For instance, relative excess mortality of widowed persons with no education was 165% and 69% higher for men and women among middle-age groups, respectively. In contrast, relative excess mortality among widowed men and women with 10 and above years of schooling in the middle age groups was 65% and 29% higher.

Table 2: Mortality rate ratio by sex in broad age groups in different background characteristics, India, India Human Development Survey 2011–12 from 2004–05 wave

	25-59		60+	
	Men	Women	Men	Women
Backgrounds	Rate ratio (W/M)	Rate ratio (W/M)	Rate ratio (W/M)	Rate ratio (W/M)
Place of residence				
Rural	2.70	1.56	1.35	1.10
Urban	2.12	2.52	1.26	1.19
Social group				
Others	3.13	1.57	1.40	1.09
OBC	2.91	2.08	1.33	1.13
SC/ST	2.91	1.72	1.22	1.10
Religion				
Hindu	2.48	1.81	1.29	1.13
Non-Hindu	3.54	2.20	1.73	1.07
Education				
Illiterate	2.65	1.69	1.32	1.11
Up to 9	2.02	1.80	1.22	0.94
10 and above	1.65	1.29	1.06	1.30
Economic condition				
Poor	2.63	1.89	1.37	1.17
Middle	2.51	1.52	1.31	1.11
Rich	2.34	1.56	1.36	1.12

Note: W denotes widowed, and M denotes married.

Regional difference in rate ratios for men and women

Table 3 shows the mortality ratio (widowed/married) for men and women by broad age groups. At the all-India level, a widower in the 25 to 59 years age group had 148% excess mortality than married men. The relative excess morality of widow to married women in the 25 to 59 years age group was slightly lower (54%). For the older population, mortality was higher for widowers – widowed men had 133% excess mortality than married men, women had 37% higher excess mortality. However, at the regional level, the results vary widely. Men aged 25 to 59 years in the southern India had the highest excess mortality. Whereas, among middle-aged women, the western region (Mortality ratio of 2.75) followed by the north region (Mortality ratio of 2.49) had relatively higher excess mortality among widows. Whereas among the older population, widower excess mortality was relatively higher in the western region (Mortality ratio of 1.68) followed by the east region (Mortality ratio of 1.57), whereas widow excess mortality was higher in the central region (Mortality ratio of 1.53).

Table 3: Mortality ratio by sex in broad age groups for India and regions, India Human Development Survey 2011–12 from 2004–05 wave

	25-59		60+	
	Male	Female	Male	Female
Region	Rate ratio (W/M)	Rate Ratio (W/M)	Rate ratio (W/M)	Rate ratio (W/M)
North	2.37	2.49	1.47	1.33
Central	2.51	1.69	1.46	1.53
East	2.74	1.56	1.57	1.31
West	2.33	2.75	1.68	1.42
South	2.85	1.09	1.32	1.38
India	2.48	1.54	2.33	1.37

Discussion

This article examines widowhood effects on mortality in India, paying attention to how the effect varies by intersecting social categories of gender, age, region, caste, and socioeconomic status. We find large widowhood effects, for both and women, which are patterned by class and social identity. To our best knowledge, this is the first study documenting widowhood effects on mortality across the SES and diverse communities using nationally representative panel data in the Indian context. The reasons why widowed women, who have among the lowest social status in Indian society, have lower mortality risks that widowed men, deserves further scrutiny and investigation. One reason for these lower mortality risks could be public interventions aimed to address the vulnerability of widowed women. These interventions include social security pensions, and preferences in employment, such as mid-day meal cooks in public schools. Another reason for the lower mortality risks among widowed women that we document here could be that single-person households, which tend to have a larger proportion of older widowed women, were not visited by the household. This likely biases the widowhood effects we document here downwards. Another limitation of our study is that remarriage after widowhood may alter the widowhood effect on mortality. The study has purposefully excluded remarriage for the simplicity of the calculations. Future prospective studies are needed to investigate the role of remarriage to understand the impact of widowhood with subsequent remarriage or non-remarriage on mortality in India.

In our next steps in the analysis, we aim to further strengthen our discussion of the results, as well as conduct further robustness checks. First, we will examine the likely magnitude of the bias because of missing single-person households in the IHDS. Second, we will calculate clustered standard errors for the odds-ratios presented in Table 2 and 3. Finally, we will compare age specific mortality rates in the SRS with the NFHS. For robustness checks, we will examine these patterns using the ARIS-REDS dataset, which is a longer panel of rural households.

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