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ORIGINAL PAPER

Suicidal ideation among Nepali widows: an exploratory study of risk factors and comorbid psychosocial problems

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Abstract

Purpose Suicide is a leading cause of death among Nepali women of reproductive age. Suicidal ideation has known associations with stressful life events, which Nepali widows disproportionately experience. We aimed to identify risk and protective factors that could lead to effective interventions for this population.

Methods To study suicidal ideation in Nepali widows, we collected data from 204 women in urban, semi-urban, and rural areas whose husbands died at least one year prior. The questionnaire included sociodemographic information, the Hopkins Symptom Checklist-25, PTSD Checklist—Civilian Version, Somatic Symptom Scale–8, and the Multidimensional Scale of Perceived Social Support. Overall severity of prolonged grief was assessed by a counselor after completing a structured clinical interview. Using multivariate regression models, we assessed associations of sociodemographic and psychosocial indicators with past-year suicidal ideation. Latent profile analysis was also performed to estimate profiles of comorbidities.

Results Past-year suicidality was high, with 16.2% ($N=33$). Each year increase since husband's death was protective and reduced odds of ideation 8% (95% CI 0.85–0.98) and being educated and of older age also reduced the odds of ideation by 0.21 (95% CI 0.06–0.70), and 0.09 (95% CI 0.01–0.64), respectively. Depression (OR = 6.37, 95% CI 2.78–14.59), PTSD (OR = 3.84, 95% CI 2.15–6.86), prolonged grief (OR = 6.04, 95% CI 3.04–12.00) and anxiety (OR = 6.52, 95% CI 2.96–14.38) were highly associated with suicidality, and mapped onto the three profiles of increasing mental distress severity.

Conclusion Suicide remains a major issue among Nepali widows, showing high comorbidity with other mental disorders. Screening for depression, anxiety, and prolonged grief, may aid in identifying widows at increased risk of suicidal ideation.

Keywords Suicide · Transcultural psychiatry · Depression · Women's health

Introduction

Globally nearly 800,000 people die by suicide every year [1, 2]. Low and middle-income countries (LMIC) disproportionally bear the burden of suicide, accounting for an estimated 75% of all suicides worldwide [1]. Given the stigma surrounding suicide, and that suicide is illegal in some countries, these numbers likely underestimate the true global prevalence of suicide [2]. Nepal was ranked the country with the 7th highest annual suicide rate in 2014, with 24.9 suicides per 100,000 people [1]. Among women of reproductive age in Nepal, suicide is estimated to be a leading cause of death [3].

In Nepal, risk factors for suicide among women include the experience of violence, gender inequality, low social status, and notably, being a widow [3]. After a decade of armed conflict, widows' issues are especially pressing, with estimates placing the number of conflict-related deaths in

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Nepal over 16,000 [4]. Research from Nepal and other South Asian countries highlights problems widows face including discrimination, low social status, economic insecurity, restricted living arrangements, and inadequate policies and procedures to address their needs [5, 6]. Compared to women of reproductive age in Nepal, formerly married women, including women who are divorced, separated or widowed, experience high rates of violence with 28% reporting physical abuse since age 15 [7, 8]. Ethnographic research on upper caste widows in Kathmandu describes how widows are often socially marginalized and displaced from their homes and communities, which contributes to poor psychosocial health outcomes [9]. Abuse and discrimination lead many widows to conceal their status as a widow to protect themselves and their children from societal stigma [10].

In spite of these burdens and problems facing widows in Nepal, limited research has focused on suicide or suicidal ideation (sometimes known as "suicidality") specifically among this population. While suicide among women has been studied in Nepal [11], surveys such as the Demographic and Health Survey (DHS) typically group widows with divorced and separated women, therefore producing potentially misleading estimates of key health outcomes [8]. In addition, given that suicidal ideation is often comorbid with mental health disorders [12–14], assumptions about grief may be masking more severe distress and suicidality in this population. As such, research is needed to illuminate the mental health problems facing widows, including risk and protective factors for suicidal ideation.

The aim of this study was to understand women's risk and protective factors associated with suicidal ideation, as well as to understand the relation between other mental health concerns in this population in relation to suicidal ideation.

Methods

Study setting

Nepal is a landlocked country of roughly 29 million people, ranging from the Himalayan mountain range in the north bordering China to fertile plains in the south bordering India [7]. The four study districts, Kathmandu, Lalitpur, Bhaktapur, and Kavrepulanchowk, are centrally located in the Bagmati province. Nepal has many ethnicities and a diverse caste system with over 100 distinct caste/ethnic groups [15]. Chhetri and Brahmin make up roughly 16.6% and 12.3% of the national population, respectively, followed by Magar (7.1%), Tharu (6.6%), and Tamang (5.8%) [7]. Within the Bagmati province, Tamangs, Newars, and Brahmin/Chhetri make up a considerable proportion of the population [7]. Currently, Nepal is considered a low-income country but has been rapidly developing, with an expanding economy of 6.2% GDP growth [16]. However, women's participation in the labor force and literacy has continued to lag behind that of men. Considering employment, 78.5% of women are employed compared to 85.5% of men, and roughly 62.0% of women are literate compared to 80.0% of men [17]. Across the country, there are roughly 500,000 widows [18].

Study population

The study sample included 204 women in the Kathmandu, Lalitpur, Bhaktapur, and Kavrepulanchowk districts of Nepal, whose husbands had died at least one year before the start of the study in 2017. Recruitment was conducted in partnership with Women for Human Rights (WHR), a single women's support and advocacy organization operating throughout the country, using snowball sampling. WHR chapters in and around Kathmandu Valley were selected to maintain a roughly equal urban/rural geographic distribution, which resulted in 15 municipalities or village development committees (VDC) represented, roughly 4 VDCs per district. All participants were recruited by their local WHR chapter leader, and those expressing interest were assessed for eligibility and invited to participate. Questionnaires were administered to eligible participants by trained local data collectors employed by the non-governmental organization Transcultural Psychosocial Organization (TPO) Nepal and TPO Alliance. Due to the stigmatized nature of widowhood and logistical constraints, home interviews were discouraged, therefore participants were interviewed in confidential spaces near their homes coordinated by WHR (e.g. public meeting rooms reserved for this purpose).

Study questionnaire

The survey consisted of self-reported sociodemographic questions and psychosocial and mental health indicators. Sociodemographic characteristics included age, urbanicity, highest educational level achieved, occupation, land ownership, caste/ethnicity, religion, and number of years since the husband's death. Suicidality was assessed by questions adapted from the Composite International Diagnostic Interview (CIDI) suicidality module [19], which has been previously used in Nepal [20, 21]. We asked if participants had thought of taking their own life ever during their lifetime, in the past year, and currently. Women who responded affirmatively to the past-year ideation question were asked if they had planned to take their own life during that time. Women who responded affirmatively to planning were asked if they attempted to take their own life. Those who responded affirmatively to past-year attempting suicide were asked if they had disclosed their suicide attempt to anyone (including family, friends, or clinicians) and if they had received any treatment for suicidality. Given the small number who had planned ($N=7$) or attempted suicide

($N=1$), suicidality in our study was defined as past-year ideation, including those who planned or attempted suicide as well. Participants who reported past-year or current suicidal ideation were closely monitored and referred to counseling services coordinated by WHR in accordance with a safety protocol. Counselors followed up with participants the same- or next-day.

Psychosocial variables included PTSD symptoms as assessed by the 19-item Post-Traumatic Stress Disorder Checklist—Civilian Version: PLC-C [22], which has previously been validated among conflict-affected populations in Nepal [23]. Depression and anxiety symptoms were assessed via the 25-item Hopkins Symptom Checklist (HSCL-25) [24], also validated among conflict-affected populations in Nepal [23]. Somatic symptoms often associated with common mental disorders were assessed via the 8-item Somatic Symptom Scale (SSS-8) [25]. The Multidimensional Scale of Perceived Social Support (MSPSS) [26], validated in a Nepali diaspora population [27], was used to measure social support. Given that it is commonly considered inappropriate to ask widows about romantic partners after their husband's death in the study context, MSPSS questions were limited to eight items related to either friends or family. We also assessed participants with a global severity rating on the Structured Clinical Interview for Prolonged Grief Disorder (SCIP) [28] based on interviews conducted by psychological counselors, who performed a diagnostic interview and gave a final rating of symptoms on a 5-point global severity Likert scale to indicate impaired daily functioning among participants that may benefit from treatment. Because the Prolonged Grief Disorder-13 Scale (PG-13) was not yet validated in Nepal, this clinician global severity scale was used to assess the risk of prolonged grief disorder.

Exclusion criteria and missing data

For one participant, it was discovered during the survey that her husband had died less than one year prior. Thus, her record was removed from the data. Two participants were identified as having participated in our formative qualitative work to develop supplementary questions for prolonged grief disorder [29]. Two participants were unable to finish the questionnaire due to significant emotional distress and were referred for immediate counseling. Their records were also excluded from this analysis to reduce any bias from having seen and discussed the PG-13 and similar questions before. All other 204 participants had complete records and no missing data.

Data analysis

Exploratory analysis

Initial analyses included *t* tests for continuous variables and the mean scores of psychosocial indicators. χ^2 tests were conducted for categorical variables in relation to suicidal ideation (versus never reporting ideation). Any χ^2 estimates involving groups with ≤ 5 individuals were rerun using Fisher's exact test to confirm similar *p* values.

The normality of the psychosocial variables was tested using one-sample Kolmogorov–Smirnov tests. Logistic regression was performed with suicidal ideation within the past 12 months as the outcome. Models controlled for age, years since husband's death, religion, education, caste, occupation, and land ownership. Age was assessed categorically, defined as < 35 for young adulthood, 35–55 as middle age, and > 55 as older age. This was done because evidence suggests individuals experience differential risks of suicidality at different life stages [3]. Variables of interest included global severity of Prolonged Grief Disorder (PGD) symptoms as assessed by a mental health counselor, mean scores of the PTSD Civilian Inventory, somatic symptoms, MSPSS family items, and the HSCL subscales for depression and anxiety. These analyses were conducted in Stata 15.1 [30].

Latent profile analysis (LPA)

To understand the underlying clustering of symptoms across the psychosocial metrics, we conducted latent profile analysis (LPA) with the prolonged grief global severity score, and the mean scores for the PCL-C, HSCL anxiety and depression subscales, SSS-8 somatic symptoms scale, and the MSPSS family subscale. Multivariate regression with simultaneous adjustment for all psychosocial variables was avoided due to concerns of overfitting given correlations between them. Therefore, LPA was carried out to assess different response patterns across the psychosocial indicators. Ultimately, the MSPSS friend subscale was not used because it did not reveal crude or adjusted associations with suicidal ideation, which is in alignment with previous research showing greater family-related influences on suicidality among Nepali women [31–33]. Past-year suicidal ideation was included in the LPA as a binary variable. Covariates were selected for inclusion in the LPA if they were statistically significant in the regression models ($p < 0.05$). They included: age in years, receipt of any schooling, and years since husband's death.

Two-profile and three-profile models were estimated, and the Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC), and the Bootstrap likelihood ratio test (BLRT) were used to evaluate and compare model fit. The AIC, BIC, and BLRT results were weighted in combination with consideration of scientific and clinical relevance of categories and sufficient distribution of participants across the different classes. The three-class model had the best fit in light of these considerations. No more than three-classes were fit given sample size considerations. Entropy was calculated, and a value > 0.80 was considered sufficient

delineation between classes. The estimated probabilities of class membership in the sample were also calculated. The mean scores of the psychosocial metrics across classes were estimated with the posterior probability of suicidal ideation given class membership. Covariate odds ratios for class memberships were also calculated. LPA and associated analyses were conducted in Mplus Version 8 [34].

Results

Sample characteristics

A total of 204 women were included in the final sample, of which 30.4% (62 women) expressed suicidal ideation ever in their lifetime (data not shown), and 16.2% (33 women) expressed suicidal ideation in the past year (Table 1). Of these 33 women, 7 (21.2%) reported planning to take their life in the past year. Only one participant reported attempting suicide in this time period.

There was fairly equal geographic distribution among participants (Table 1), with the largest proportion living in rural areas ($N=86$, 42.2%). Nearly half of our participants were of the Brahmin or Chhetri caste ($N=97$, 47.5%), and 30.4% were of Newar ethnicity ($N=62$). Over a third of our sample worked in agriculture ($N=77$, 37.8%), while the large majority were head of their household ($N=171$, 83.8%). Overall, less than half the sample (40.2%, $n=82$) had ever attended school, and the median grade achieved was 7th. The mean number of years since the husband's death was 10.5 (SD: 8.1) in the sample overall, and 6.8 years (SD: 5.3) among those who had experienced suicidal ideation. Most participants' husbands died from natural causes ($N=159$, 77.9%), with accident/natural disaster as the second most common cause ($N=30$, 14.7%). The average age of our participants was 45.0, ranging from 22 to 72 years old. Years of age only exhibited a fair correlation with years since husband's death (Pearson correlation: 0.40). Among women with suicidal ideation, 27.3% were younger than 35 years, compared to just 13.7% of the overall sample.

Differences were observed in age, with younger women being more likely to express suicidality (P: 0.04). Women who experienced suicidality on average lost their husbands nearly 5 years more recently than those without (P: 0.005). We did not observe statistically significant differences between women with and without suicidal ideation for most sociodemographic variables studied.

Women with suicidal ideation had higher average scores on nearly all the psychosocial indicators, with prolonged grief showing the largest difference among suicidal and non-suicidal participants (mean difference: −1.00, P: <0.0001), followed by PTSD (mean difference: −0.82, P: <0.0001). On the MSPSS, only the family subscale showed differences in average scores (mean difference: 0.88, SE: 0.30, P: 0.004); the friend subscale was not associated with suicidality. Regarding somatic symptoms often associated with common mental disorders, neurological complaints (such as headaches, dizziness, numbness, and general weakness) were more strongly associated with suicidal ideation (mean difference: −0.80, SE: 0.17) than bodily pain complaints (such as chest, back, or muscle pain) (mean difference: −0.42, SE: 0.17) ($p<0.05$ for both).

Regression analyses

All psychosocial measures passed the Kolmogorov–Smirnov test for normality, though the p-value for the mean Structured Clinical Interview for Prolonged Grief Disorder (SCIP) global rating was 0.05. In adjusted regression analyses (Table 2), a one-point increase in the global severity score for prolonged grief was associated with six times higher odds of suicidal ideation (95% CI 3.04, 12.00). An increase in the mean score of PCL-C was highly associated with increased odds of suicidality (OR = 3.84, 95% CI 2.15, 6.86). Likewise, somatic symptoms were associated with nearly three times higher odds (95% CI 1.67, 4.81), and the depression and anxiety HSCL subscales both showed similar associations with suicidality (OR = 6.37; 95% CI 2.78, 14.59 and OR = 6.52; 95% CI 2.96, 14.38 respectively). Family social support was protective, reducing the odds of suicidality by 29% (95% CI 0.55, 0.93).

Latent profile analysis

Comparing the two-class and three-class latent profile models for mental distress, both bootstrap likelihood ratio tests were statistically significant, suggesting improvement in the model fit by the addition of the third class. Similarly, the AIC and BICs improved from the two-class to the three-class model (Supplementary Table 1). Given this, we fit the three-class model which included non-distressed ($n=62$, 30.4%), moderate distress ($n=797$, 47.5%), and severe psychosocial distress ($n=45$, 22.1%) classes (Table 3). Entropy for the three-class model was 0.86, indicating good discrimination. The probability of past-year suicidal ideation among the three classes was 0.00%, 13.1%, 46.6% respectively. Similarly, prolonged grief, anxiety, depression, PTSD, and somatic symptoms all increased in their average mean score across the distress categories (Fig. 1). For example, the mean score for the HSCL-25 depression subscale was 1.34 (95% CI 1.22, 1.46) for non-distressed, 1.85 (95% CI 1.71, 1.99) for moderate, and 2.75 (95% CI 2.48, 3.02) for severe. Family support was inversely associated with severity class, with women in the non-distressed class having an estimated 4.77 (95% CI 4.44, 5.10) mean family support score, those

Table 1 Characteristics of the study population and subgroups with past-year suicidal ideation

	Total sample ($n=204$)	Past-year suicidal Ideation ($n=33$)	*P*-value*
Age (categorical)			0.004
Age < 35	28 (13.73%)	9 (27.27%)	
Age 35–55	143 (70.10%)	21 (63.64%)	
Age 55 +	33 (16.18%)	3 (9.09%)	
District, *n* (%)			0.60
Kathmandu	47 (23.04%)	9 (27.27%)	
Lalitpur	58 (28.43%)	4 (12.12%)	
Bhaktapur	54 (26.47%)	10 (30.3%)	
Kavrepulanchowk	45 (22.06%)	10 (30.3%)	
Urban/Rural, *n* (%)			0.38
Rural	86 (42.2%)	16 (48.48%)	
Semi-urban	38 (18.63%)	8 (24.24%)	
Urban	80 (39.22%)	9 (27.27%)	
Ever attended school, *n* (%)	82 (40.2%)	11 (33.33%)	0.12
Occupation, *n* (%)			0.94
Housewife	66 (32.4%)	9 (27.3%)	
Farmer/agriculture	77 (37.8%)	15 (45.5%)	
Other (Daily wage laborer, shop owner, salaried job with monthly pay)	61 (29.9%)	9 (27.3%)	
Land ownership, *n* (%)	95 (46.6%)	13 (39.39%)	0.97
Caste/Ethnicity, *n* (%)			0.53
High caste (Brahmin/Chhetri)†	97 (47.5%)	16 (48.5%)	
Janajati	94 (46.1%)	15 (45.5%)	
Dalit	13 (6.4%)	2 (6.1%)	
Religion, *n* (%)			0.82
Hindu	176 (86.3%)	26 (78.8%)	
Non-Hindu	28 (13.7%)	7 (21.2%)	
Years since husband's death—Mean(SD)	**10.47 (8.14)**	**6.82 (5.25)**	**0.008**
Met threshold criteria *n* (% +)			
Hopkins symptom checklist[1]			
Depression	**124 (60.8%)**	**29 (87.9%)**	**0.004**
Anxiety	**109 (52.9%)**	**27 (81.2%)**	**0.005**
PTSD–Civilian Checklist[2]	**82 (40.2%)**	**24 (72.3%)**	**0.005**
Prolonged Grief Global Score	**27 (13.2%)**	**16 (48.5%)**	**< 0.001**
Somatic symptoms—Mean Score (SD)	**2.32 (0.85)**	**2.86 (0.84)**	**0.02**
Social support (MSPSS)			
Family support—Mean Score (SD)	**3.72 (1.19)**	**3.23 (1.36)**	**0.006**
Friend support—Mean Score (SD)	**3.57 (1.42)**	**3.36 (1.43)**	**0.87**

Bold text reflects statistical significance in the association of the measure and past-year suicidal ideation to the 0.05-level

*For categorical variables, χ^2 tests were conducted when all categories had > 5 individuals, and Fisher's exact test was conducted when ≤ 5 were present. Student's *t*-tests were conducted for mean differences between continuous variables.

†Janajati groups included 62 Newari participants, and 32 participants of other indigenous groups such as Tamang, Magar, Rai, etc.

in the moderate profile having a 3.48 (95% CI 3.07, 3.89) mean support score, and those with severe psychosocial distress having the lowest estimated mean support score with 3.37 (95% CI 2.82, 3.92).

Statistically significant covariates from the multivariate regression analysis were used as parameter adjustments in the latent profile analysis to predict odds of profile membership. Each profile served, in turn, as a reference category in

Table 2 Logistic regression results of sociodemographic risks and psychometric scores related to suicidal ideation in the past year

	Sociodemographic Covariates	PGD (PG-13)	PTSD (PCL-C)	Somatic Symptoms (SSS-8)	Family social support (MSPSS)	Depression (HSCL)	Anxiety (HSCL)
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age (categorical, in years)							
35–55	0.63 (0.24, 1.64)	0.47 (0.12, 1.78)	0.50 (0.14, 1.74)	0.26 (0.08, 0.86)**	0.43 (0.14, 1.31)	0.47 (0.14, 1.58)	0.42 (0.12, 1.45)
55 <	0.53 (0.14, 1.96)	0.17 (0.02, 1.60)	0.15 (0.02, 1.11)*	0.09 (0.01, 0.64)**	0.16 (0.02, 1.04)*	0.19 (0.03, 1.39)*	0.17 (0.02, 1.37)*
Years since husband's death	0.92 (0.85, 0.98)**	0.97 (0.91, 1.05)	0.94 (0.88, 1.02)	0.93 (0.87, 1.00)*	0.92 (0.85, 0.99)**	0.94 (0.87, 1.02)	0.93 (0.87, 1.01)*
Religion (hindu)	0.50 (0.16, 1.52)	0.44 (0.11, 1.74)	0.38 (0.11, 1.41)	0.50 (0.15, 1.73)	0.53 (0.16, 1.72)	0.40 (0.11, 1.43)	0.41 (0.11, 1.51)
Owning land	0.53 (0.28, 1.45)	0.55 (0.20, 1.54)	0.57 (0.23, 1.42)	0.61 (0.25, 1.50)	0.73 (0.31, 1.74)	0.64 (0.28, 1.60)	0.74 (0.29, 1.88)
Ever educated	0.49 (0.19, 1.22)	0.21 (0.06, 0.70)**	0.35 (0.13, 0.97)**	0.44 (0.16, 1.22)	0.42 (0.16, 1.11)*	0.48 (0.17, 1.34)	0.44 (0.15, 1.26)
Occupation (Ref: housewife)							
Farmer	0.85 (0.30, 2.53)	0.92 (0.26, 3.21)	0.82 (0.26, 2.57)	0.93 (0.30, 2.90)	0.73 (0.24, 2.18)	0.99 (0.31, 3.17)	1.13 (0.35, 3.70)
Other	0.81 (0.26, 2.53)	0.94 (0.25, 3.58)	1.10 (0.32, 3.76)	0.95 (0.29, 3.18)	0.51 (0.15, 1.72)	1.28 (0.36, 4.49)	1.16 (0.33, 4.04)
Caste (high caste)	1.45 (0.61, 3.43)	2.08 (0.75, 5.78)	2.19 (0.79, 6.08)	1.32 (0.53, 3.33)	1.44 (0.58, 3.58)	1.63 (0.62, 4.30)	1.49 (0.56, 3.95)
PGD (global severity)		6.04 (3.04, 12.00)***					
PTSD (mean score)			3.84 (2.15, 6.86)***				
Somatic symptoms (mean score)				2.84 (1.67, 4.81)***			
Family social support (mean score)					0.71 (0.55, 0.93)**		
HSCL depression (mean score)						6.37 (2.78, 14.59)***	
HSCL anxiety (mean score)							6.52 (2.96, 14.38)***

PGD (Prolonged grief disorder) is measured by the global symptom severity scale by clinician rating; PTSD is measured by the PTSD Checklist–Civilian Version; Family social support is measured by the Multidimensional Scale of Perceived Social Support subscale; Depression was measured by Hopkins Symptoms Checklist 25 (HSCL-25) depression subscale, and anxiety was measured with HSCL-25 anxiety subscale

*Refers to p-value < 0.10, ** refers to p-value < 0.05, *** refers to p-value < 0.01

the analysis. This showed that more years since husband's death were consistently associated with increased odds of being in the non-distressed group (Table 4). Using the non-distress class as the reference, an increase of 1 year since the husband's death was associated with a 6% decrease in the odds of moderate distress (95% CI 0.60, 0.99) and an 8% decrease in the odds of severe distress (95% CI 0.87, 0.98). Using either the moderately distressed or severely distressed categories as reference, increased years since husband's death remained statistically associated with increased odds of belonging to the non-distressed category (P: 0.03 and P: 0.03, respectively).

However, when moderately distressed was the reference, years since husband's death was no longer significantly related to the likelihood of women belonging to the severely distressed group (95% OR = 0.99 CI 0.92, 1.06).

Table 3 Probability and mean scores of suicidal ideation in the last year by latent class membership

	Non-distressed ($N=62$)	Moderately distressed ($N=97$)	Severely distressed ($N=45$)
Marginal Probability of class membership	30.4%	47.5%	22.1%
Probability given class membership (SE)			
Past-year suicidal ideation	0.00% (0.00)	13.1% (4.4)	46.6% (10.0)
Mean Scores given class membership (SE)			
Prolonged Grief Disorder Global Severity	0.14 (0.05)	0.62 (0.11)	1.29 (0.16)
Anxiety Subscale (HSCL-25)	1.31 (0.06)	1.85 (0.07)	2.59 (0.15)
Depression Subscale (HSCL-25)	1.34 (0.06)	1.97 (0.08)	2.75 (0.14)
Somatic Symptoms Scale (SSS-8)	1.62 (1.34)	2.40 (0.13)	3.20 (0.16)
PTSD (PCL-C)	1.34 (0.07)	2.16 (0.13)	3.20 (0.15)
Family Support Subscale (MSPSS)	4.77 (0.17)	3.48 (0.21)	3.37 (0.28)

HSCL-25 Hopkins symptoms Checklist 25, *PCL-C* Post-traumatic stress disorder checklist–Civilian Version, *MSPSS* multidimensional scale of perceived social support

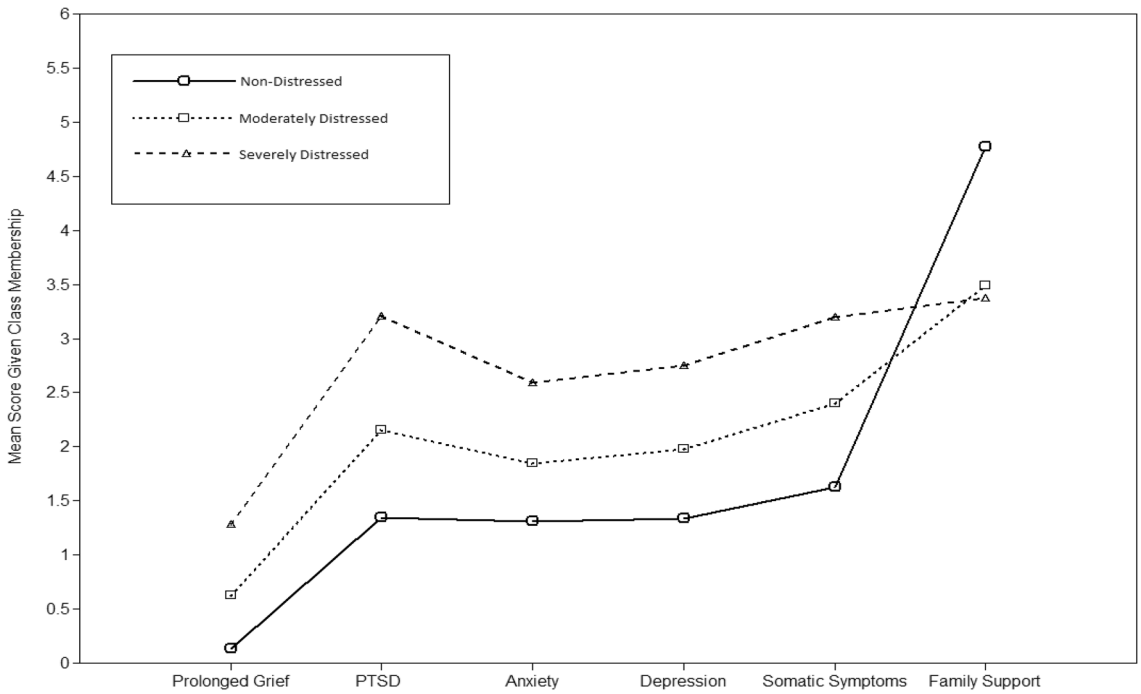

Fig. 1 Estimated mean scores of psychosocial metrics by distress class membership. "Prolonged Grief" refers to the global severity scale by mental health counselor after completing the structured clinical interview for prolonged grief (RANGE 0–3). PTSD refers to PTSD Checklist-Civilian (PCL-C) scores (range 1–5). Anxiety refers to the anxiety subscale of the Hopkins Symptoms Checklist-25 (HSCL-25), and depression refers to the depression subscale of the HSCL-25 (ranges 1–4). Somatic symptoms refers to the Somatic Symptom of Symptoms Score 8 (SSS-8) (range 1–5). Family Support refers to the family subscale of the Multidimensional Scale of Perceived Social Support (MSPSS) (range 1–6)

This was also the case when severe distress was used as the reference, whereby increased years since husband's death was not associated with being in the moderate distress group (OR = 1.1, 95% CI 0.96, 1.08). Age in years and ever being educated both were not statistically significant regardless of the reference category (Table 4).

Discussion

The high prevalence of suicidal ideation in our sample reaffirms the importance of this issue among widows in Nepal, and our findings further draw attention to several

Table 4 Associations of parameterized covariates from latent profile analysis using low distress, moderate distress, and severe distress as reference categories

	Low psychosocial distress ($N=62$)		Moderate psychosocial distress ($N=97$)		Severe psychosocial distress ($N=45$)	
	OR (95% CI)	*P*-value	OR (95% CI)	*P*-value	OR (95% CI)	*P*-value
Class 1 (low distress) reference						
Age (years)	Ref		1.04 (0.99, 1.09)	0.16	1.00 (0.95, 1.06)	0.90
Years since husband's death	Ref		0.94 (0.60, 0.99)	0.03	0.92 (0.87, 0.98)	0.01
Education (ever)	Ref		1.07 (0.46, 2.48)	0.87	0.65 (0.25, 1.65)	0.36
Class 2 (moderate distress) reference						
Age (years)	1.00 (0.94, 1.05)	0.90	Ref		0.97 (0.92, 1.02)	0.20
Years since husband's death	1.08 (1.02, 1.15)	0.03	Ref		0.99 (0.92, 1.06)	0.72
Education (ever)	1.55 (0.61, 3.97)	0.36	Ref		0.60 (0.39, 1.43)	0.25
Class 3 (severe distress) reference						
Age (years)	0.97 (0.92, 1.01)	0.16	1.03 (0.98, 1.06)	0.20	Ref	
Years since husband's death	1.07 (1.01, 1.14)	0.03	1.01 (0.95, 1.08)	0.72	Ref	
Education (ever)	0.93 (0.43, 2.15)	0.87	1.66 (0.70, 4.00)	0.91	Ref	

OR odds ratio, *CI* confidence interval

important risk and protective factors. In the four districts studied, we found a high lifetime prevalence of ever having suicidal ideation among Nepali widows ($N=62$, 30.4%) and high past-year prevalence ($N=33$, 16.2%) compared to previously estimated prevalence (4.3%) of ever experiencing suicidal ideation among Nepali widows [3]. We found that all mental health conditions we studied were similarly elevated across the latent profiles of mental distress, indicating that suicidal ideation is highly comorbid with other mental health concerns. This finding has important implications for identifying women at risk. Our results also suggested family social support as protective, but not social support from friends, which may reflect the cultural context of Nepali widows, and contrasts previous research among populations in industrialized countries [35].

Given that suicide is a leading cause of mortality among women of reproductive age in Nepal [3], it is important to understand associations between suicidal ideation and other mental health problems. All of the mental distress scales (prolonged grief disorder, PTSD, depression, anxiety, and somatic symptoms) were significantly associated with suicidal ideation. Using latent profile analysis, three risk groups were identified representing mild, moderate, and severe mental distress, with the mean scores of the psychometric variables increasing incrementally with each subsequent category, and with almost half of this sample reporting past-year suicidal ideation in the severe distress category. One recent study using the Beck Depression Inventory found 53% of war-widows in Bardiya, Surkhet, Sindhupalchowk, and Kavrepulanchowk districts experienced depression, while 63% experienced anxiety measured on the Beck Anxiety Inventory [36]. These estimates are similar to those for depression (60.8%) and anxiety (52.9%) found in our study. While suicidal ideation is often discussed in the context of depression among South Asian women [3, 37, 38], these findings highlight that mental health providers should be aware that individuals presenting prolonged grief, PTSD, and anxiety may also be at high risk for suicidal ideation.

Most women in our sample lost their husbands sometime between the aftermath of the Maoist insurgency (ending in 2006) and the 2015 earthquake/aftershocks in the Kathmandu Valley (an area from which many of our participants were sampled). We found rates of major mental distress in our population to be most similar to those of populations exposed to major trauma-inducing events (e.g. war, natural disaster, e.g. earthquake aftershocks). For example, one study found suicidal ideation, among a representative cluster sample of those affected by the 2015 earthquake to be prevalent in 10.7% of respondents [21], similar to our reported prevalence of past-year suicidal ideation. In addition, the estimated prevalence of anxiety, depression, and PTSD reported in our overall sample is most similar to estimates reported among former child soldiers following the end of the Maoist insurgency (46%, 53%, and 55% respectively) [39]. Among those in our sample with suicidality, their rates of anxiety, depression, and PTSD were most similar to rates estimated among torture survivors during the conflict (86%, 81%, and 60% respectively) [40]. This speaks to the severity and multiple morbidities associated with the mental health difficulties that many women interviewed in this study face.

We found younger age to be associated with suicidal ideation, which is a risk factor that has been previously described in South Asian populations [41, 42]. However, in contrast to a nationally representative study from India [43] which

found that increased education increased suicidality risk, we found that being ever educated reduced the odds of suicidal ideation. Our conflicting results may be due to the overall low rate of school attendance in our sample, which could skew estimates.

Specific to widows, a higher number of years since the husband's death was also associated with lower odds of suicidal ideation. While it is true that increased age was associated with reduced suicidal ideation as well, we believe that the relationship with age and with increased time since the husband's death are independent of one another. There was a low correlation between age and years since the death, and they each remained significant when controlling for one another. Therefore, we hypothesize this independent effect may have been due to increased emotional healing after the initial trauma or may have been due to increased social status among older women. It is worth noting that social norms in Nepal dictate that women grieve for a period after the death of their husband by wearing certain clothing and avoiding particular foods and religious rituals [18]. Because of this, and to reduce potential emotional distress due to the death, we did not include women whose husbands had passed away less than a year prior to their participation. This may have resulted in our study missing individuals who experienced intense distress immediately after the death, and symptoms reported in our sample may be more likely to reflect chronic mental health concerns.

If individuals showed elevated levels of one mental health disorder, it is likely they would also score higher levels on other mental health indicators. If widows scored an average of 3 on a 4-point Likert scale for the HSCL-25, or 3.5 on a 5-point Likert scale for the PCL-C, providers must be aware there is almost a 50% probability that a widow has experienced suicidal ideation in the past year as well. Given our results suggesting comorbidity between suicidality and additional mental health problems and other research reporting high rates of recurrence of suicidal thoughts among persons who previously reported ideation during a depressive episode [44], mental health service providers should be aware of and have resources available for suicide prevention if widowed clients appear to have such other mental health problems.

Experiences of social isolation and discrimination are well documented in studies among widows in Nepal [6, 18, 45, 46]. Many widows report exclusion from religious and social activities, and discrimination when discussing health concerns with providers [45]. In our study, family social support, but not friend support, reduced the odds of suicidal ideation, which may reflect the importance of familial ties in this context. Among a population of older women in Nepal, one study found that visiting friends and socializing with others was related to improvements in reported satisfaction and quality of life [47]. However, given that widows traditionally live in their parents-in-law's homes after the death of their husbands, family ties may be more important in their daily life for their mental health than friendships. Treatment from in-laws appears to be particularly important for Nepali widows [8]. The phrasing of the MSPSS questions unfortunately do not distinguish between natal and in-law relationships.

There are several limitations of this study. Particularly, the small sample size limited the statistical power of the analyses and made it difficult to fit a latent profile model with a sufficient number of individuals in profile groups of more than three classes. Specifically, we limited our LPA to a maximum of three profiles to ensure at least 15 individuals were in a profile group. Our power calculation suggested we had 80% power to detect an effect size of 2.87 for a given exposure. Therefore, we appear to have had reasonable power for the psychosocial variables, but were more limited in our ability to detect associations between sociodemographic variables and suicidal ideation, which are not expected to be as strong. Future studies of with larger samples should be conducted to understand if other sociodemographic factors may be significant risk or protective factors. The small number of participants in the severe latent profile group was also reflected in the regression models, with certain covariates having wide confidence intervals.

Our study may have been subject to selection bias given that we sampled from WHR members rather than all widows in Nepal. Women who are affiliated with and participate in WHR events may be at less risk for suicidal ideation compared to other women because they receive social support through the organization, or may be at high risk, e.g., if seeking out support serves as an indicator that support is lacking. However, because of the stigma that widows face, without such a research partnership it would be difficult to identify study participants and make them feel at ease responding to questions about difficult topics such as suicidal ideation. Notably, the proportion of high-caste widows in our sample was likely reflective of WHR's membership base in the study districts. While this is, to date, the largest study of widows in Nepal that we know of, and one of the few that reports specifically on suicide, future research is needed that includes more lower caste widows to understand if they experience similar demographic and psychosocial risk factors for suicidal ideation.

Finally, the cross-sectional nature of this study makes it difficult to establish temporality of suicidal ideation and the identified risk factors. For example, an individual may have experienced suicidal ideation once 11 months ago, but their data on psychosocial variables were collected in reference to the past month. Future longitudinal studies should examine causal relationships between sociodemographic or psychosocial risk factors and suicide outcomes.

Despite these limitations, to our knowledge this study serves the first assessment of risk and protective factors of suicidal ideation specifically among widows in Nepal, a highly vulnerable group. These results suggest that fundamental problems such as low education, which may reflect socio-economic status more broadly, are important risk factors for suicidal ideation among widows and could be important points of intervention. Also, when screened for any mental health concerns, elevated scores for not only depression, but also prolonged grief, anxiety, PTSD, or somatic symptoms may indicate a woman has a profile of moderate or severe mental distress and has a highly elevated probability of suicidal ideation. In light of the stigmatized nature of widowhood, targeted screening and interventions among widows may reduce suicidal ideation in Nepal, and potentially death by suicide. To reduce the burden of suicide among Nepali women, the specific needs of widows must be considered and understood.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical standards Ethical approval for this study was obtained from the Nepal Health Research Council (NHRC) and the Institutional Review Board of Johns Hopkins Bloomberg School of Public Health. Participants provided oral informed consent. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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