Risk Factors Associated with Lifetime Prevalence of Suicidal Ideation and Attempts Amongst the Bhutanese Population

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Abstract

With statistics on suicidal death increasing, suicide has become a serious public health concern in Bhutan. In an effort to provide information for prevention and treatment strategies, this paper identifies risk factors associated with suicidal ideation and attempt. Analyses were carried out using cross-sectional data from the Gross National Happiness Survey 2015. The survey has a sample size of 7,153 collected via face-to-face interviews. The prevalence of lifetime suicidal thoughts and attempt were the main outcome variables. Independent variables include individual, and household level characteristics, and few other indicators on health and relationships. A multiple logistic regression was performed to explore the correlates and influencing factors. Lifetime prevalence of suicidal thoughts and attempt were found to be significantly greater amongst females (OR 1.653; 95% CI 1.252-2.181). On the contrary, middle (OR 0.430; 95% CI 0.294-0.630) and older (OR 0.168; 95% CI 0.078-0.363) age groups seem to be contemplating lesser on suicide as compared to the younger population (aged 15 to 24). Those who reported higher levels of mental distress (OR 1.06; 95% CI 1.036-1.087), scored lower in family relationship index (OR 0.743; 95% CI 0.704-0.784), and who displayed higher frequency of negative emotions (OR 1.061; 95% CI 1.029-1.095) were more likely to

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have ideated and attempted suicide. Likewise, suicidal behaviour was observed to be greater amongst those who reported some form of disability, lower number of healthy days, and those who had been a victim of crime. The findings have important implications for developing targeted interventions for suicide prevention and treatment. The study is, however, limited by its cross-sectional data design and a restricted set of predictors.

Keywords: suicide; suicidal thoughts; suicidal attempts; risk factors

Introduction

The World Health Organization [WHO] has identified suicide as the 17th leading cause of death among all age groups globally, and the second leading cause of death among 15-29 years old (WHO, 2017), making it a serious public health concern worldwide. Suicide is not an isolated process, but a continuous one starting from ideation, leading to attempt which then results in completion (Lweinsohn, Rohde, & Seeley 1996; Nock et al., 2008; Wasserman & Wasserman, 2009). All these stages are collectively referred to as suicidal behaviours (Shepard et al., 2015). Studies on the prevalence rate of suicidal ideation and attempt are a significant component of such behaviours (Borges et al., 2006).

Besides, the loss of human life, suicidal behaviour places heavy burden on a society in terms of mental health status, impaired physical health, poor quality of life for the concerned families and communities, and economic costs associated with care and productivity (Kessler et al., 2005). As a result, it has prompted a plethora of research devoted to understanding how such behaviours can be predicted and prevented (McKeown, Cuffe, & Schulz, 2006; Nock et al., 2008). These studies have identified a wide range of risk factors associated suicidal ideation and attempt mainly involving psychosocial,

environmental, and socio-demographic characteristics (Peter et al., 2008). Psychosocial factors primarily include mental disorders and state of physical health, while environmental factors constitute external factors such as relationships (Yip et al., 2003). Socio-demographic characters on the other hand are mostly defined by gender, age, marital status, education level and income (Jeon et al., 2010).

Currently, suicide research in Bhutan is based primarily on mortality statistics. As a result, little is known about suicidal behaviours or its risk factors. Relying on statistics on suicidal rates alone may be reflecting only a portion of persons affected, as there may be a higher number of people who are undergoing suicidal thoughts and attempts. Hence, prevalence figures based on completed suicides may substantially underestimate the burden of suicidal behaviours on societal wellbeing and general health status. The identification of risk and protective factors for such behaviours is therefore, a critical component of suicide research. Further, to prevent suicide at an early point, it is vital to identify the risk factors that lead an individual to engage in ideation and attempt. Gaining a deeper knowledge on the associates will therefore, help enhance prevention efforts in Bhutan.

Objective

The main objective of the study is to ascertain risk factors associated with the lifetime prevalence of suicidal ideation and attempts.

Method

This study was carried out using cross-sectional data from the 2015 GNH survey. The data contains information from across

the nine thematic[1] areas of GNH including demographic[2] characteristics. A stratified four stage systematic random sampling design had been adopted to generate a sample size of 8871. Sample was estimated for both national and regional level representation. A structured GNH questionnaire[3] was administered through Paper Assisted Personal Interviews (PAPI) and Computer Assisted Personal Interview (CAPI). Survey witnessed a response rate of 80.63 percent resulting in a successful interview of 7,153 respondents. During the analysis, no replacements have been made for the item 'non-response'. Data analysis compared respondents who had suicidal thoughts and attempts with those who had not thought about suicide or attempted in their lifetime. Independent sample t-test was used to compare groups on continuous variables and contingency chi-square test was used for categorical variables. Factors significantly different between groups were included as independent variables in the multivariate logistic regression analysis, with absence and presence of suicidal thoughts and attempts as the dependent variables. Independent variables with low correlations were only included to avoid multicollinearity[4]. Estimations were made using StataSE 15. Due to limitations of the data and research design, there may have been important predictors that were not considered in the analysis. Other limitations

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[1] Survey questionnaire has been designed to collect information across the nine GNH domains, namely psychological wellbeing, health, time use, education, cultural diversity and resilience, community vitality, good governance, ecological diversity and resilience and living standards.

[2] Refer Annexure 1.

[3] Questionnaire was administered as a face-to-face interview. Multi lingual interviewers were used to conduct interviews in various Bhutanese dialects. Around 85% of the interviews were conducted in complete isolation while the rest were carried out within a good distance from people. Survey questionnaire can be found here www.grossnationalhappiness.com

[4] A pairwise correlation matrix in Annexure 2 indicates low correlation (<0.22) between the independent variables.

include cross-sectional survey design and exclusion of respondents who were aged below 15 years.

Dependent variable

Two main outcome variables have been identified. For suicidal ideation, people were asked 'Have you seriously thought of committing suicide?', with a dichotomous response of 'yes' or 'no'. Suicidal attempt measure is structured the same way and is assessed through answers to the question, 'Have you ever attempted to commit suicide?'.

Independent variable

It is beyond the scope of this paper to include each and every predictor found to be associated in literature. The choice of independent variables was made based on normative grounds, and availability of data. It includes indicators on health, relationships, work hours, and sleep hours amongst others.

Individual and household level characteristics: Individual level information incorporates age, gender, completed years of education, occupation, and marital status while household level characteristics are defined by region of residence (rural/urban), migration status, household income, household debt, household size and dependency ratio. These features were also included to account for confounding effect if any on the outcome variables.

Health: Both physical and mental health has been accounted for under the health component. As an indicator of physical health, number of healthy days has been computed by aggregating an average number of good physical and mental days experienced in the past one month. The level of distress that was measured by the 12-item General Health Questionnaire (GHQ-12) reflected mental condition of the respondent. GHQ-12 index comprised of 12 questions, which investigated feelings, and behaviours related to mental health

experienced in the past four weeks. A score is derived from the sum of answers to the twelve questions which cover feelings of strain, depression, inability to cope, lack of confidence, and loss of sleep amongst others. Responses are made on a four-point scale of frequency of a feeling in relations to a person's usual state: 'Not at all', 'No more than usual', Rather more than usual', and 'Much more than usual'. The between-item validity of the GHQ-12 is high for this sample with a Cronbach's Alpha score of 0.82. A total score was obtained upon addition of the responses of the 12 questions. Disability was assessed from the answers to a set of questions evaluating difficulties faced by respondents across a list of conditions such as vision, hearing, speech, etc.

Emotional balance: Emotional balance constitutes positive and negative emotion indices. Positive emotion index was computed based on five emotions experienced over the past four weeks; compassion, generosity, forgiveness, contentment and calmness. Similarly, anger, jealousy and worry[5] were aggregated to develop the negative emotion index score.

Personal relationship: There are two measures for personal relationship; family relationship index and social support. Family relationship index is computed using six questions on strength of ties within family; and social support represents the average number of people available for resort during sickness, financial and emotional needs and important events.

Community relationship: Strength of community relationship has been defined from three indicators: number of days volunteered, amount donated and the average number of days participated in socio-cultural activities in the past 12 months.

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[5] Factor analysis reveals a single factor comprising of anger, jealousy and worry.

Spirituality: A respondent's level of spirituality is represented through the frequency of prayer recitation and meditation.

Work life balance: Associations of work life balance with suicidal thoughts are assessed through working and sleeping hours as reported by the respondents.

Victim of crime: To assess association of victimization with suicidal thoughts, an indicator specifying if the respondent had been a victim of crime in the past 12 months was used.

Results

Univariate analysis

Bhutan has witnessed a consistent rise in suicide rates as indicated in the figure below. Over the past five years, suicide mortality has increased by around 10 percent. Bhutan's crude suicide rate stands at 12 per 100,000 persons in 2017, greater than the global rate of 11.1 (WHO, 2017).
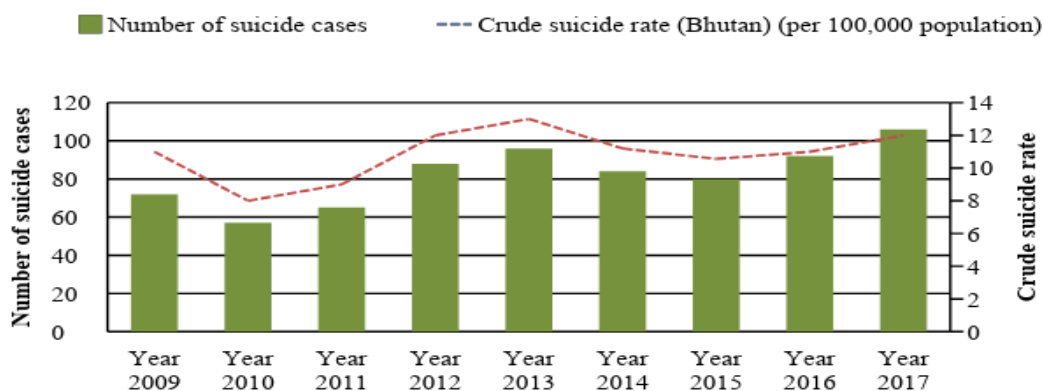
Data source: Ministry of Health

Figure 1: Crude suicide rate by year

The estimated lifetime prevalence of suicidal ideation in the overall cross-national sample is 4.6%, which corresponds to about 23,679 Bhutanese. Globally, lifetime prevalence rates are approximated at about 9.2% (Nock et al. 2008a).

Have you ever seriously thought of committing suicide?

Yes (n=326, 4.54%)

Projected population=23,679

No (n=6868, 95.46%)

Have you seriously thought of committing suicide in the past 12 months?

Yes (n=207, 63.50%)

Projected population=14,671

No (n=119, 36.50%)

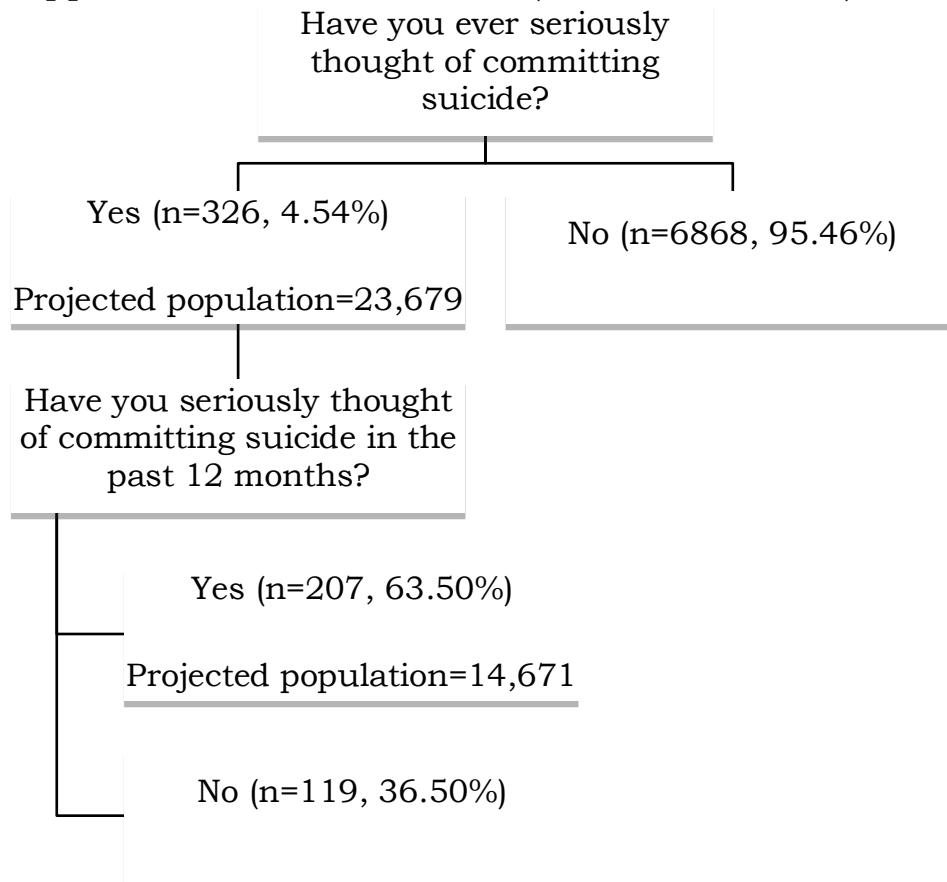Figure 2: Prevalence of suicidal thoughts in 2015

Among those who have suicidal thoughts, the conditional probability of leading to an attempt is around 21% as shown below. Overall, in a sample of 7147, nearly 1%[6] had attempted suicide in their lifetime. This approximates to about 4,879 Bhutanese. In 2015, the number of suicide completion cases

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[6] Overall suicidal attempt=68 /7147=0.95

reported was about 98, so possibly around 2% of the attempted suicide may lead to suicidal death.

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          Have you ever attempted to
          commit suicide? (n=320)

  Yes (n=68, 21.25%)        No (n=252, 78.75%)

      Have you ever attempted to commit
         suicide in the past 12 months?

          Yes (n=39, 57.35%)

          No (n=29, 42.65%)
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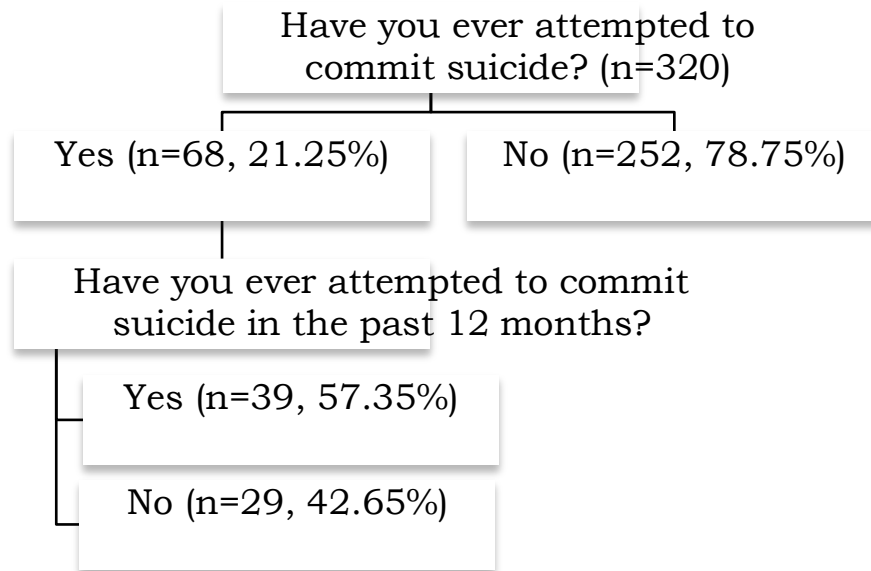
Figure 3: Prevalence of suicidal attempt amongst those who had suicidal thoughts[7]

The GNH survey questionnaire also collected information on the reasons why respondents had attempted suicide. Among the perceived causes, family relationship issues were the most common, accounting for 62% of attempts followed by psychiatric illnesses.

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[7] There were six missing values for suicidal attempt variable. As a result, the number of responses reduced to 320.
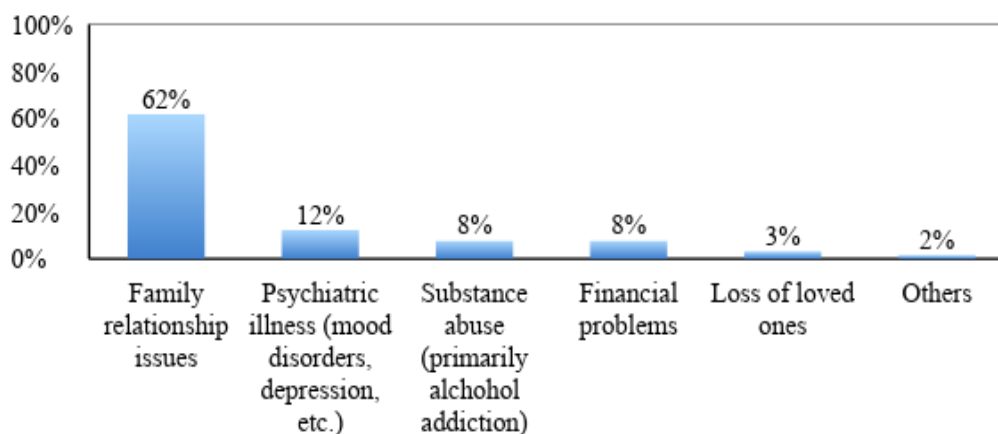
Figure 4: Perceived causes of suicidal attempt (n=65[8])

Bivariate analysis

Prevalence estimates of suicidal thoughts show substantial variability across some of the factors. Preliminary analyses using t-test indicated significant difference across a range of socio-demographic variables as shown in Table 1. Respondents with suicidal thoughts were significantly younger, had higher frequency of negative emotions, experienced higher level of mental distress, and lower number of healthy days. Family relationship and social support were also observed to be significantly weaker for those who experienced suicidal thoughts. While, mean working hours were slightly lower for those who had suicidal thoughts, the mean sleeping hours was found to be higher. It was hypothesized that respondents who spent greater time in service of others or those who made more donations might lower the risk of suicidal ideation. However,

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[8] Of the total 68 respondents who had made suicidal attempts, only 65 provided reasons as to why they had attempted suicide.

no significant association was found between suicidal ideation, and voluntary days or the amount donated to others.

Table 1: Difference in means of continuous variables between groups; independent samples t test

	Suicidal thoughts		
	Present (n=325)	Absent (n=6828)	
Variable	Mean and SD	Mean and SD	t value
Individual characteristics			
Age	35.07 ±13.75	40.55 ± 15.63	-6.21***
Years of education	3.91 ±4.98	3.63 ± 4.95	0.989
Household characteristics			
Dependency ratio	0.68 ±0.66	0.65 ± 0.66	0.863
Household size	4.493 ±2.23	4.76 ± 2.16	1.427
Household income per capita	58378.25 ± 218177.7	61008.41 ± 421914.2	-0.112
Household debt	54440.01 ± 353822.2	26366.77 ± 129289.4	-1.426
Emotional balance			
Positive emotion index	20.72 ±5.86	20.99 ±6.48	-0.717
Negative emotion index	13.36 ±3.87	11.3 ± 4.03	8.99***
Health			
Level of distress	12.42 ± 5.88	9.31 ± 4.75	11.389***
Number of healthy days	26.1 ± 8.83	28.47 ±5.05	-7.9***
Personal relationship			
Family relationship index	15.80 ± 2.73	17.32 ±1.37	-18.32***
Social support	12.87± 19.20	15.68 ±19.30	-2.569*
Work life balance			
Working hours	7.52 ± 3.73	7.99 ± 3.77	-2.189*
Sleeping hours	9.01 ± 1.799	8.78 ± 1.916	2.144*
Community relationship			
Number of days volunteered	9.99 ± 20.84	10.52 ± 22.10	-0.4242
Amount donated	5654.77 ± 14741.35	10234.64 ± 55936.3	-1.473
Participation in community events	8.87 ± 13.23	8.71 ± 12.61	0.233

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Chi-square test also revealed a significant association between gender and suicidal tendency. Suicidal thoughts were higher amongst females as compared to males. Likewise, there were significant differences amongst the groups on marital status. The prevalence of suicidal thoughts was higher amongst

unmarried adults. Suicide is an issue that affects people throughout the lifetime and across different age groups; however, the incidences associated to suicide are most frequent amongst the younger generation. In particular, the test showed, prevalence to be significantly higher amongst the younger age group (aged 15-24) as compared to older age groups. People in rural regions; those who are disabled and those who were victims of crime were more likely to have suicidal ideation in the unadjusted analysis. A higher proportion of people who slept more than 11 hours had suicidal thoughts as compared to other groups. There was no significant difference in reported suicidal ideation among participants with different level of education, and across farmers and non-farmers.

Table 2: Difference in proportions of discrete variables between groups; contingency chi-square test

	Suicidal thoughts			
Gender	Present (n=325)	Absent (n=6828)	Chi Square	P-value
Male	79 (2.66%)	2887 (97.34%)	41.293***	0.000
Female	246 (5.88%)	3941 (94.12%)		
Marital status				
Never married	63 (5.72%)	1039 (94.28%)	7.048***	0.000
Married	225 (4.17%)	5170 (95.83%)		
Divorced/Separated/Widowed	37 (4.54%)	619 (95.46%)		
Age group				
Young (=<24)	87 (7.60%)	1057 (92.40%)	34.964***	0.000
Middle (25-64)	225 (4.18%)	5164 (95.82%)		
Old (>=65)	13 (4.54%)	607 (97.90%)		
Literacy				
Literate	164 (4.49%)	3485 (95.51%)	0.0415	0.839
Illiterate	161 (4.59%)	3343 (95.41%)		

Risk Factors of Suicidal Ideation and Attempts

Education level				
No education	184 (4.44%)	3962 (95.56%)	6.306	0.098
Low (1-5 years)	25 (3.51%)	687 (96.49%)		
Medium (6-10 years)	76 (5.70%)	1257 (94.30%)		
High (Above 10 years)	40 (4.16%)	922 (95.84%)		
Occupation				
Farmer	141 (4.13%)	3271 (95.87%)	2.541	0.111
Non-farmer	184 (4.92%)	3557 (95.08%)		
Employment status				
Employed	316 (4.52%)	6671 (95.48%)	0.322	0.570
Unemployed	9 (5.45%)	156 (94.55%)		
Disability				
Yes	65 (7.71%)	778 (92.29%)	22.099***	0.000
No	260 (4.12%)	6050 (95.88%)		
Region				
Rural	228 (4.45%)	4899 (95.55%)	0.3887***	0.000
Urban	97 (4.79%)	1929 (95.21%)		
Migration status				
Non-migrant	131 (3.72%)	3390 (96.28%)	11.773**	0.008
Intra Dzongkhag migrant	51 (5.56%)	867 (94.44%)		
Inter Dzongkhag migrant	141 (5.33%)	2505 (94.67%)		
Migrated from outside	2 (3.03%)	64 (96.97%)		
Frequency of prayer recitation				
Prayer recitation at least once a day	163 (3.85%)	4069 (96.15%)	11.902**	0.003
Few times a week/Occasionally	126 (5.69%)	2089 (94.31%)		
Never	36 (5.12%)	667 (94.88%)		
Frequency of meditation				
Frequency of meditation at least once a day	26 (4.99%)	495 (95.01%)	1.303	0.521

Few times a week/Occasionally	42 (5.21%)	764 (94.79%)		
Never	257 (4.41%)	5569 (95.59%)		
Victim of crime				
Yes	61 (11.03%)	492 (88.97%)	58.06***	0.000
No	264 (4%)	6331 (96%)		
Working hours				
<=9 hours of work	203 (5.18%)	3716 (94.82%)		
10=< __>9 hours of work	28 (3.23%)	840 (96.77%)	9.132*	0.028
12=<__>10 hours of work	60 (3.83%)	1507 (96.17%)		
>12 hours of work	34 (4.26%)	765 (95.74%)		
Sleeping hours				
<=6 hours of sleep	176 (4.28%)	3935 (95.72%)		
9=<__>6 hours of sleep	11 (2.90%)	368 (97.10%)	7.858*	0.049
11=<__>9 hours of sleep	103 (4.87%)	2013 (95.13%)		
>11 hours of sleep	35 (6.40%)	512 (93.60%)		

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Multivariate analysis

Multiple logistic regressions were run using a combination of various independent variables. Model 1[9] explores the relationship of the four outcome variables (lifetime suicidal thoughts, current suicidal thoughts, lifetime suicidal attempt and current suicidal attempt) with individual and household level characteristics. Younger age group were found to be at a higher risk of both contemplating and attempting suicide in their lifetimes as well as in the past 12 months. Model 2[10] include both significant and non-significant independent

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[9] Refer Annexure 3.
[10] Refer Annexure 4.

variables. Based on these models and bivariate analysis, for the final model as depicted in the following table, a multiple logistic regression was run with variables that indicated significant association. Few non-significant characteristics such as education and income were incorporated as control variables. Hosmer-lemeshow goodness of fit test was computed to assess model specificity. For both regressions (suicidal thoughts and attempt) of the final model, there were no evidences of poor fit, suggesting that the model was correctly specified.[11]

Table 3: Logistic regression

Model 3	Lifetime prevalence of suicidal thoughts			Lifetime prevalence of suicidal attempts		
Individual characteristics	Odds Ratio	95% CI		Odds Ratio	95% CI	
Female	1.653***	1.252	2.181	1.993*	1.041	3.818
Never married (baseline)						
Married	1.392	0.882	2.196	3.812**	1.448	10.039
Divorced/Separated /Widowed	1.308	0.716	2.388	2.272	0.617	8.365
Age group						
Young age (=<24) (baseline)						
Middle age (64=<___>=25)	0.430***	0.294	0.630	0.291***	0.148	0.576
Old age (>=65)	0.168***	0.078	0.363	0.161*	0.035	0.749
No education (baseline)						
Low (1=<__>=5)	0.874	0.556	1.373	1.429	0.630	3.241
Medium (6=<__>=12)	0.966	0.685	1.360	1.271	0.650	2.483
High (>12)	0.654	0.407	1.049	1.290	0.449	3.703
Disability						
Yes	1.655**	1.177	2.329	1.375	0.609	3.106
Household characteristics						
Non-migrants (baseline)						
Intra Dzongkhag migrants	1.408	0.987	2.009	0.516	0.204	1.307
Inter-Dzongkhag migrants	1.391*	1.062	1.823	0.806	0.448	1.451
Emotional balance						
Negative emotion index	1.061***	1.029	1.095	0.983	0.914	1.056

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[11] Refer Annexure 6.

Frequency of prayer recitation						
Prayer recitation at least once a day (baseline)						
Few times a week/Occasionally	1.397*	1.080	1.810	1.298	0.746	2.259
Never	1.313	0.888	1.942	2.399*	1.136	5.070
Health						
Level of distress	1.06***	1.036	1.087	1.050*	0.999	1.104
Number of healthy days	0.979*	0.963	0.996	0.971	0.939	1.005
Personal relationship						
Family relationship index	0.743***	0.704	0.784	0.673***	0.619	0.734
Victim of crime (Yes)	1.721**	1.215	2.439	2.007*	0.987	4.084
Constant	2.378	0.701	8.061	4.082	0.452	36.877
# of observations	7136			7,064		
Wald chi2(15)	326.930			173.06		
Prob > chi2	0.000			0.000		

Note: * p<0.05, ** p<0.01, *** p<0.001

Discussion

Results from the multiple logistic regression (model 3) confirmed previous findings (Kesslar et al., 1999; Scocco et al., 2008), that women were more likely to experience suicidal thoughts. This is hardly surprising given the burden of distress that a woman experience. Bhutanese women[12] are undergoing greater psychological distress, which may precede suicide. They are also more likely to act upon the idea as chances of females attempting suicide were found to be significantly higher. However, it is vital to note that the suicide completion rate is greater amongst males (Lhadon, 2014). So, if women are more likely to suffer from mental distress, to experience suicidal thoughts and to actually attempt suicide, then how do we explain that suicidal deaths are higher for men? It may be a question of method used to complete suicide. Studies show that men prefer more violent methods (Michel et al., 2000) and are more intended on dying (Harris et al., 2018) than women.

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[12] Women were found to be significantly distressed as compared to men as per 2015 GNH survey. Refer Annexure 5.

It has also been hypothesized that men have a higher tendency to act without much thought about consequences (Cross et al., 2011), leaving them more vulnerable to the spur of the moment suicidal behavior. Other factors such as drug and alcohol use has also been linked with suicidal completion amongst men (Haw et al., 2005). For instance, strong correlations between intoxication and suicide among men have been established through various empirical studies. These acts might amplify the completion of a suicide. Clearly, more research needs to be done to understand this complexity. Overall, women are found to be far more vulnerable to experience suicidal thoughts, which also creates an opportunity for gender specific prevention plans.

With regard to age groups, occurrence rate of suicidal thoughts and attempts seem to mirror suicide completion rates (Lhadon, 2014). Similar to the many studies (Ma et al., 2009; Scocco et al., 2008), people belonging to the younger age group category are more likely to not only experience suicidal ideation, and plan an attempt but also complete suicide as compared to their older age counterparts. Therefore, it is wise to recommend that early and more advanced youth-centric interventions should be formulated to target younger age groups. Furthermore, it would also be effective to target suicide awareness to students who fall in the high school and college going age groups. The education sector should strive to mobilise resources to encourage conversations revolving around suicide prevention.

Risk of suicidal thoughts and attempts also was highest when respondents exhibited greater mental distress and poorer physical health. Studies reveal that the one's mental health status is a strong predisposing factor for suicide (Garlow et al., 2008). Findings from this study confirm this claim. The odds ratio in Table 3 indicates that people who have contemplated or attempted suicide experience higher levels of mental distress. As level of mental distress is found to be good predictors, early identification of people at risk could involve the use of instruments for assessing and screening mental

health status. Likewise, proper recognition and management of increased reported rates of depression or other psychiatric illnesses may help reduce suicidal deaths. Introduction of mental health literacy programs and resources, which are gender and age sensitive, are strongly recommended. The health sector may train more clinical professionals in the areas of psychiatry or clinical psychology, and ensure their equitable distribution in key health facilities across the country.

The presence of any disability was associated with an increase in suicide ideation. However, the likelihood was not found to be significant for attempted suicide. Disability in the data is not a category of disease but rather relates to physical, cognitive or mental condition that substantially limits the respondent from performing daily activities. These functional limitations have been found to be predictive of suicidal ideation. Furthermore, studies show that disabled people are often experience greater socially and environmentally induced depression than the average (Turner & Beiser, 1990) suggesting an increased potential for preventable suicide. People with disabilities represent a minor group for which often, neither suicidal rate data are collected nor targeted suicide research is conducted. It is suggested that suicide prevention services should be extended to meet the needs of those who are disabled. This involves better scrutiny of disabled persons' suicidal intentions, and providing adequate support for adjustment to those who are facing new or challenging disabilities.

Perceived family cohesion is a protective factor against suicidal ideation and suicidal attempt. This identification of a highly significant association with poor family relationship and suicidal ideation and attempt is a significant contribution to understanding the cause of suicide. It highlights the key role; a family plays in such behaviors. Findings from this extend previous findings (Ahookosh et al., 2017). Family relationship index remained significant even after adjusting for household income per capita as a measure of economic status. This may

suggest that the ease of talking about problems or distress with family members has a protective effect. Familial resources such as encouraging a harmonious environment based on mutual respect and trust should be included as protective factors when implementing advocacy programs.

Logistic regressions from the current study also strongly suggest an association between suicidal behavior and victimization. Those who experienced victimization are more likely to have suicidal thoughts and over two times more likely to have made at least one suicide attempt in their lifetime. This may be explained by various factors such as physical, economical, psychological, and social consequences a victim may experience due to the crime. Studies show that a victim of crime may suffer from depression and self-destructive behaviors (Turner et al., 2012). This suggests the need for comprehensive victimization assessments especially among younger population who are believed to be at risk of suicidal ideation. Seeking explanations for the specific crimes such as sexual assault, bullying, physical assault etc., is beyond the scope of current study. Future research should attempt to better specify the type of crimes that strongly predicts suicidal ideation.

Negative emotions were significantly associated with suicidal ideation, suggesting that one way to intervene and prevent suicide is to understand the sequence of thoughts and feelings. Improving social support and emotional coping mechanism may be helpful for those at risk. Further studies need to be carried out to understand the underlying pathways from negative emotions to suicidal ideation. Results also indicated that daily prayer reciters were found to less likely to have suicidal thoughts as compared to those who recited few times a week or occasionally. Studies examining the relationship between suicidal behavior and prayer recitations are rare; however, it may be concluded that daily recitation of prayers could have a positive effect on one's mental wellbeing, and thus enhance the status of mental health.

This study did not find any role of several factors that are often claimed as risk factors of suicidal thoughts and attempts. Low economic status was not found to be associated with higher suicidal ideation and attempts. It is claimed that the role of income in suicide is in fact confounding (Bhugra, 2006). This raises a possibility that income per se for now seems independent from suicidal contemplation or attempt. Level of education did not reveal any association with the likelihood of ideation or attempt. Even working hours and sleeping hours were not found to have any predictive power. Although, the predictive power failed short or significance level in this study, there is a growing body of research emphasizing the quality and length of sleep in suicidal behaviors (Bernert et al., 2005). Single status (never married) was not found to have any role in predicting suicidal ideation but seems to be a risk factor for suicidal attempt. Perhaps, due to the cultural differences in other countries, many correlates that have been supported in previous studies were not found to be significant in the current study.

Conclusion

Suicide is preventable with effective interventions and strategies. Identifying groups vulnerable to suicide could be helpful to develop such plans. It is hoped that the information here can raise awareness, and evoke interest with regards to the serious public health, and community burden presented by suicide. Prediction models for assessing risk factors could be useful for early detection of high-risk groups. In future, a longitudinal study may be useful for determining causations. All gathered data are self-reports; future studies could concentrate on clinical features of sample. Likewise, there may still be some important factors that were not considered in the relationship to suicidal ideation and attempts.

Reference

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Annexure

Annexure 1: Data demographics

	Observations	Percent
Gender		
Male	2,966	41.47
Female	4,187	58.53
Marital status		
Never married	1,102	15.41
Married	5,395	75.42
Divorced	268	3.75
Separated	32	0.45
Widowed	356	4.98
Educational status		
No education	4,146	57.96
Low (1=<__>=5)	712	9.95
Medium (6=<__>=12)	1,975	27.61
High (>12)	320	4.47
Age group		
Young age (=<24)	1,144	15.99
Middle age (64=<___>=25)	5,389	75.34
Old age (>=65)	620	8.67
Region		
Rural	5,127	71.68
Urban	2,026	28.32
Religion		
Non-Buddhist	1,207	16.88
Buddhist	5,945	83.12
Migration status		
Non-migrants	3,521	49.24
Intra-Dzongkhag migrants	918	12.84
Inter-Dzongkhag migrants	2,646	37
Migrated from outside Bhutan	66	0.92

Annexure 2: Correlation between variables

	Level of mental distress	# of healthy days	Working hours	Sleeping hours	Social support	Positive emotion	Negative emotion	HH income	HH size	Dependency ratio
Level of mental distress	1									
Number of healthy days	-0.2903	1								
Working hours	-0.0719	0.0879	1							
Sleeping hours	0.0948	-0.0624	-0.3305	1						
Social support	-0.0841	0.001	0.0037	-0.0443	1					
Positive emotion	-0.0625	-0.0208	-0.0258	-0.0339	0.0846	1				
Negative emotion	0.216	-0.1197	-0.0109	0.0221	-0.0259	0.3445	1			
HH per capita income	-0.0368	0.0117	-0.0197	-0.0359	0.0335	0.0038	0.0029	1		
HH size	-0.0179	-0.0017	0.0298	-0.0124	0.0663	0.0048	0.0715	-0.048	1	
Dependency ratio	0.0467	-0.0147	0.0405	-0.0116	-0.0135	-0.0227	0.0242	-0.038	0.2289	1

Annexure 3: Model 1

	Prevalence of suicidal thoughts in lifetime			Prevalence of suicidal thoughts in the past 12 months			Prevalence of suicidal attempts in lifetime			Prevalence of suicidal attempts in the past 12 months		
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI	
Individual characteristics												
Gender												
Female	1.902***	1.445	2.504	2.259***	1.565	3.263	2.33*	1.19	4.56	2.052	0.829	5.080
Marital status												
Never married (baseline)												
Married	1.193	0.754	1.889	1.34	0.767	2.345	2.68*	1.04	6.90	4.75*	1.103	20.502
Divorced/Separated/Widowed	1.700	0.951	3.037	1.86	0.904	3.845	2.853	0.85	9.60	4.215	0.707	25.148
Age group												
Young age (=<24) (baseline)												
Middle age (64=<___>=25)	0.381***	0.254	0.571	0.283***	0.180	0.448	0.302**	0.15	0.63	0.232**	0.092	0.583
Old age (>=65)	0.143***	0.067	0.305	0.127***	0.053	0.303	0.183*	0.04	0.83	0.154	0.024	1.008
Education level												
No education (baseline)												
Low (1=<___>=5)	0.801	0.510	1.256	0.77	0.444	1.330	1.478	0.63	3.45	0.973	0.286	3.314
Medium (6=<___>=12)	0.965	0.698	1.334	0.78	0.516	1.172	1.470	0.80	2.72	1.553	0.703	3.432
High (>12)	0.651	0.416	1.019	0.358**	0.190	0.678	1.099	0.42	2.88	0.474	0.076	2.972
Disability												
Yes	2.39***	1.747	3.262	2.396***	1.637	3.509	1.998	0.95	4.20	2.212	0.855	5.723
Household characteristics												
Region												
Urban	0.908	0.673	1.227	0.90	0.603	1.345	1.044	0.53	2.05	1.245	0.446	3.476
Migration status												
Non-migrants (baseline)*												
Intra Dzongkhag migrants	1.633*	1.149	2.322	1.541*	1.009	2.356	0.623	0.24	1.59	0.585	0.180	1.904
Inter-Dzongkhag migrants	1.573**	1.177	2.103	1.24	0.849	1.819	0.939	0.49	1.79	0.713	0.269	1.888
Household income per capita	1.000	1.000	1.000	1	0.999	1.000	1.000	1.00	1.00	1.000	1.000	1.000
Household debt	1.000	1.000	1.000	0.999	1.000	1.000	1.000	1.00	1.00	1.000	1.000	1.000
constant	0.047	0.030	0.072	3.41E-02	0.020	0.060	0.005	0.00	0.02	0.003	0.001	0.015
# of observations	7151			7,084			7,079			7,079		
Wald chi2(15)	114.220			115.69			37.36			31.85		
Prob > chi2	0.000			0.000			0.001			0.004		

Note: * p<0.05, ** p<0.01, *** p<0.001

* Category for those migrated from outside Bhutan has been excluded due to small sample size

Annexure 4: Model 2

Model 2	Prevalence of suicidal thoughts in lifetime			Prevalence of suicidal attempts in lifetime		
	Odds Ratio	95% CI		Odds Ratio	95% CI	
Individual characteristics						
Female	1.672***	1.267	2.208	2.00*	1.058	3.811
Never married (baseline)						
Married	1.506	0.943	2.404	4.040**	1.590	10.266
Divorced/Separated/Widowed	1.398	0.755	2.589	2.405	0.662	8.737
Age group						
Young age (=<24) (baseline)						
Middle age (64=<__>=25)	0.439***	0.296	0.653	0.285***	0.146	0.557
Old age (>=65)	0.160***	0.073	0.348	0.147*	0.031	0.703
No education (baseline)						
Low (1=<__>=5)	0.866	0.548	1.370	1.340	0.571	3.145
Medium (6=<__>=12)	0.948	0.665	1.351	1.157	0.571	2.343
High (>12)	0.636	0.390	1.039	1.088	0.353	3.350
Disability						
Yes	1.642**	1.167	2.313	1.343	0.586	3.079
Household characteristics						
Urban	1.037	0.763	1.409	1.498	0.745	3.012
Non-migrants (baseline)						
Intra Dzongkhag migrants	1.382	0.959	1.992	0.497	0.188	1.310
Inter-Dzongkhag migrants	1.384*	1.029	1.863	0.741	0.377	1.453
Household income per capita	1.000	1.000	1.000	1.000	1.000	1.000
Household debt	1.000	1.000	1.000	1.000	1.000	1.000
Emotional balance						
Negative emotion index	1.063***	1.032	1.097	0.985	0.916	1.060
Frequency of prayer recitation						
Prayer recitation at least once a day (baseline)						

Few times a week/Occasionally	1.423**	1.091	1.856	1.223	0.705	2.122
Never	1.338	0.898	1.993	2.29*	1.073	4.894
Frequency of meditation						
Frequency of meditation at least once a day (baseline)						
Few times a week/Occasionally	1.052	0.611	1.812	3.035	0.617	14.930
Never	0.826	0.514	1.326	1.919	0.423	8.703
Health						
Level of distress	1.058***	1.033	1.085	1.048	0.996	1.103
Number of healthy days	0.980*	0.964	0.997	0.973	0.940	1.007
Personal relationship						
Family relationship index	0.745***	0.706	0.788	0.672***	0.613	0.738
Social support	0.997	0.990	1.005	1.001	0.988	1.014
Work life balance						
Working hours	0.978	0.944	1.012	0.985	0.916	1.060
Sleeping hours	1.001	0.942	1.062	1.074	0.962	1.198
Victim of crime (Yes)	1.744**	1.232	2.470	2.019	0.988	4.125
constant	2.949	0.695	12.513	1.181	0.065	21.586
# of observations	7117			7,045		
Wald chi2(15)	342.480			193.940		
Prob > chi2	0.000			0.000		

Note: * p<0.05, ** p<0.01, *** p<0.001

Annexure 5: Mental health across gender

GHQ-12 score categorized	Male (%)	Female (%)	Total (%)
Severe psychological distress	35.38	64.62	100
Some mental distress	34.57	65.43	100
Normal mental wellbeing	42.25	57.75	100
Total	41.47	58.53	100

Pearson chi2(2) = 15.3756 Pr = 0.000

Annexure 6: Logistic model for suicidal attempt, goodness-of-fit test (Table collapsed on quantiles of estimated probabilities)

Dependent variable	Suicidal thought	Suicidal attempt
Number of observations	7136	7064
Number of groups	10	10
Hosmer-Lemeshow chi2(8)	13.78	4.61
Prob > chi2	0.0876	0.798

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