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# Socioeconomic, religious, spiritual and health factors associated with symptoms of common mental disorders: a cross-sectional secondary analysis of data from Bhutan's Gross National Happiness Study, 2015

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## ABSTRACT

**Objective** Common mental disorders (CMDs) are a major cause of the global burden of disease. Bhutan was the first country in the world to focus on happiness as a state policy; however, little is known about the prevalence and risk factors of CMDs in this setting. We aim to identify socioeconomic, religious, spiritual and health factors associated with symptoms of CMDs.

**Design and setting** We used data from Bhutan's 2015 Gross National Happiness (GNH) Survey, a multistage, cross-sectional nationwide household survey. Data were analysed using a hierarchical analytical framework and generalised estimating equations.

**Participants** The GNH Survey included 7041 male and female respondents aged 15 years and above.

**Measures** The 12-item General Health Questionnaire was used to measure symptoms of CMDs. We estimated the prevalence of CMDs using a threshold score of ≥12.

**Results** The prevalence of CMDs was 29.3% (95% CI 26.8% to 31.8%). Factors associated with symptoms of CMDs were: older age (65+) (β=1.29, 95% CI 0.57 to 2.00), being female (β=0.70, 95% CI 0.45 to 0.95), being divorced or widowed (β=1.55, 95% CI 1.08 to 2.02), illiteracy (β=0.48, 95% CI 0.21 to 0.74), low income (β=0.37, 95% CI 0.15 to 0.59), being moderately spiritual (β=0.61, 95% CI 0.34 to 0.88) or somewhat or not spiritual (β=0.76, 95% CI 0.28 to 1.23), occasionally considering karma in daily life (β=0.53, 95% CI 0.29 to 0.77) or never considering karma (β=0.80, 95% CI 0.26 to 1.34), having poor self-reported health (β=2.59, 95% CI 2.13 to 3.06) and having a disability (β=1.01, 95% CI 0.63 to 1.40).

**Conclusions** CMDs affect a substantial proportion of the Bhutanese population. Our findings confirm the importance of established socioeconomic risk factors for CMDs, and suggest a potential link between spiritualism and mental health in this setting.

## INTRODUCTION

WHO estimates that approximately 450 million people worldwide suffer from a common mental disorder (CMD) and 75% of

### Strengths and limitations of this study

► This is one of the first studies to explore risk factors for common mental disorders (CMDs) in Bhutan using a large nationally representative sample, including all age groups 15 years and above from both rural and urban communities.
► We estimate the prevalence of CMDs and identify potential socioeconomic, religious, spiritual and health risk factors for CMDs in this population.
► Due to the cross-sectional nature of the data, we were unable to establish causal relationships between risk factors and symptoms of CMDs.
► The General Health Questionnaire was used to assess symptoms of CMDs. This tool has not been validated in Bhutan though it has been used internationally and validated in other South Asian settings.
► Data on established risk factors of CMDs, such as alcohol, substance abuse and history of mental illness were not collected.

them live in low-income and middle-income countries (LMICs) where social inequalities are high.[1] CMDs are 'disorders which are commonly encountered in community settings, and whose occurrence signals a breakdown in normal functioning'.[2] WHO refers to CMDs as a range of anxiety and depressive disorders that impact on the mood or feelings of the affected person.[3] CMDs lead to disability and reduced work participation and productivity.[4 5] National-level epidemiological data on CMDs from LMICs are lacking, hindering mental health service and policy development.[6]

In some LMICs, risk factors for CMDs include poverty, lack of education, female sex, marital discord and divorce.[7–9] However, in other settings factors such as education

and income have been found to be less relevant.[10] Similarly, there have been heterogeneous findings regarding the association between rural versus urban residence and CMDs.[11–13] For example, a meta-analysis of studies from high-income countries, including the UK, the Netherlands, Canada and the USA, found a higher risk of CMDs in urban settings.[14] Religion and spiritual factors also contribute to mental health. A meta-analysis of 147 studies that involved nearly 100 000 subjects from mainly high-income settings found that religiousness was associated with fewer depressive symptoms.[15] Conversely, a study from mainland China, a middle-income setting, reported a higher risk of mental disorders among religious individuals.[16]

The aim of this study is to identify factors associated with symptoms of CMDs in Bhutan, a lower middle-income South Asian country. Bhutan was the first country to focus on happiness as a state policy, however, little is known about mental ill health in this setting. Two Gross National Happiness (GNH) Surveys were conducted in 2010 and 2015 to assess happiness.[17] Through these surveys, data were also collected on CMDs. Our study is a secondary analysis of data from the GNH Survey 2015 and aims to examine associations between socioeconomic, religious, spiritual and health factors, and symptoms of CMDs.

## METHODS
### Study setting and participants
Bhutan is a mainly Buddhist country in the Eastern Himalayas. Seventy per cent of its population live in rural areas[18] and 69% of the total population are farmers.[19] The national literacy rate is 63% among people aged 6 years and above.[18] We used data from the second GNH Survey, conducted between January and May 2015 by the Centre for Bhutan Studies and GNH Research, Royal Government of Bhutan. The GNH Survey is a household survey administered verbally via a trained enumerator to minimise potential literacy barriers. A nationally representative household-based sample was created using a stratified, multistage cluster sampling strategy. First, urban and rural areas within each district were identified as the main sampling strata. Second, the blocks were selected systematically using probability proportional to size. Third, households were randomly selected within the designated enumeration areas. Further details of data collection and management procedures are described in the 2015 GNH Survey report.[17]

### Measures
The GNH Survey measured symptoms of CMDs using the embedded 12-item General Health Questionnaire (GHQ-12). The GHQ-12 is a screening tool to detect minor psychological distress in the general population or in a non-clinical setting.[20] It has been extensively used in population studies in diverse cultures and contexts.[20 21] The tool consists of 12 items assessing

the severity of a symptom over the last 4 weeks using a 4-point Likert scale (0-1-2-3). For each participant, the 12 items were summarised into a single score by adding together responses for each item, giving an overall score that could range from 0 to 36. A higher score indicated poorer mental health. The GHQ-12 has not been validated in Bhutan, though it has been validated in other South Asian settings.[22–24]

A participant was classified as having a CMD if he or she had a total GHQ-12 score of 12 or more. This threshold was recommended by Goldberg et al[21] and has a sensitivity of 78.9% and specificity of 77.4%. Furthermore, Lundin et al reported that this threshold score provides the optimal trade-off between sensitivity and specificity for the GHQ-12 scored using the Likert method.[25] Hence, we have chosen a threshold of 11/12 (a score of 11 or less indicating the absence of CMD and a score of 12 or greater indicting the presence of CMD) to report the prevalence of CMDs in the population.

From the GNH Survey, we also extracted the data on social and economic status (age, gender, residence, income, marital status, literacy, occupation and household size), religion and spirituality (spirituality, karma and meditation) and health (self-reported health status, disability and walking distance to the nearest health centre) to assess the association of these factors with symptoms of CMDs. A person was considered literate if they were able to read and write in English, Dzongkha (National Language) or Nepali. Urban areas were defined as any settlement with a resident population of more than 5000 and more than 50% of the population being dependent on non-primary economic activities such as construction, the service sector and the civil sector. Rural areas were defined as having a smaller and more sparsely distributed population where the main economic activities are agriculture, livestock and forestry.[26 27] Household income measures included income earned by all household members from any sources, including salary, agricultural/livestock/forestry products and non-agricultural activities, adjusted for in-kind payments.[17] We dichotomised income based on mean annual household income of Nu.164,829 (US$2535).[18]

Respondents were asked which religion they followed: Buddhism, Hinduism, Christianity, other or none. Spirituality was assessed by asking 'How spiritual do you consider yourself to be: very, moderately, somewhat or not at all?' We combined respondents who answered 'not at all' and 'somewhat' due to low numbers in these categories. The GNH Survey collected data on frequency of meditation. Data were also collected on belief in Buddhist concepts of karma by asking 'Do you consider karma in the course of your daily life: regularly, occasionally, rarely or not at all?'

Self-reported health status was determined by a single question 'In general, would you say your health is excellent, very good, good, fair or poor?' Due to a low number of cases and to be consistent with previous studies,[28 29] we combined responses into good health (ie, 'excellent', 'very good' and 'good') and poor health (ie, 'fair' and
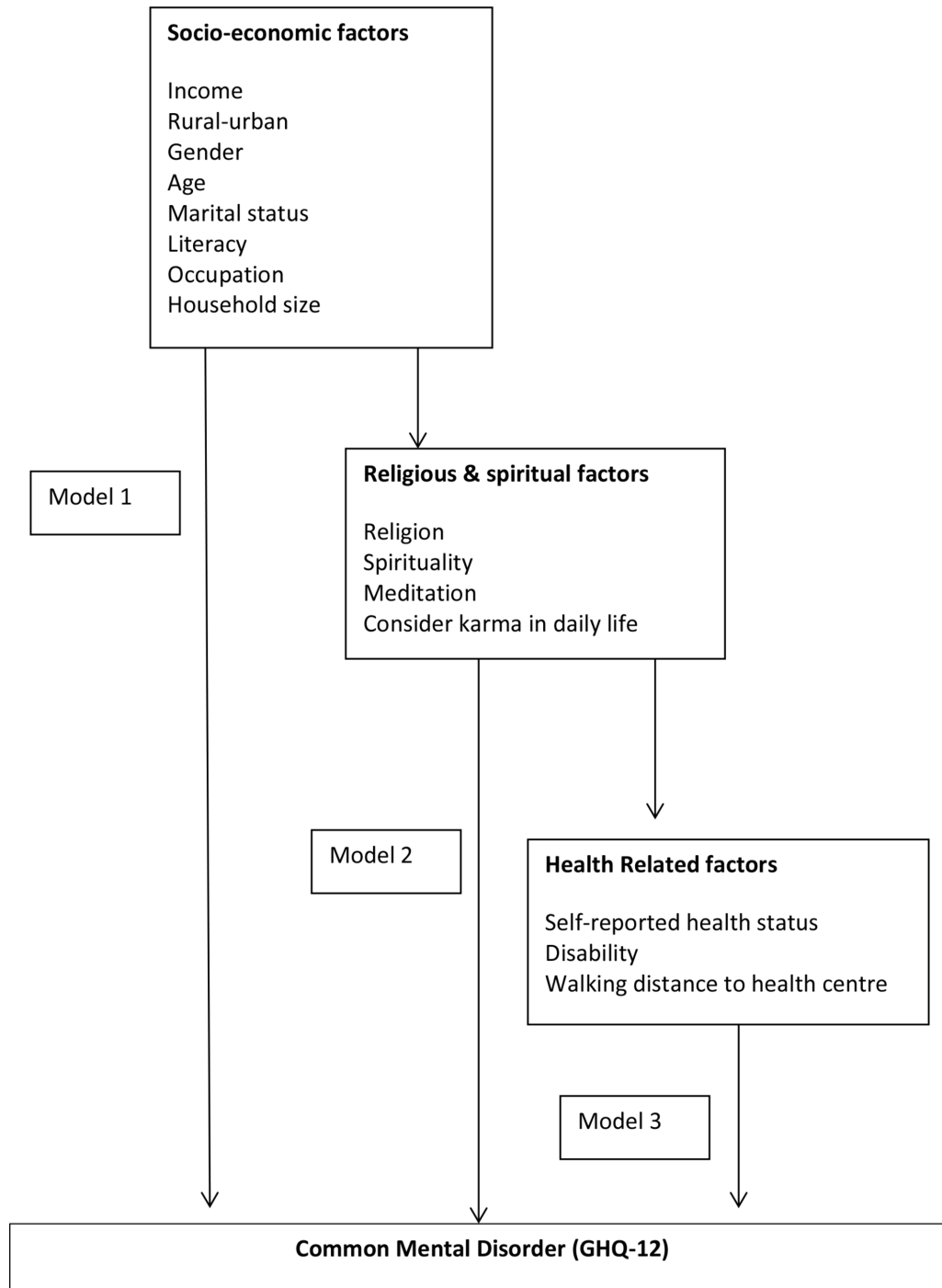
**Figure 1** Analytical framework for the analysis. GHQ-12, General Health Questionnaire.

'poor'). We also used data on disability and walking time to the nearest health centre.

### Analysis

Stata V.13 was used for all analyses. The prevalence of CMDs was estimated as the proportion of respondents classified as having a CMD. Due to the survey design, estimates were obtained using stratification of district and sample weights of the primary sampling units. Internal consistency for the GHQ-12 score was checked using Cronbach's alpha.

Based on the global literature and on local concepts of mental illness in Bhutan,[30–34] we identified factors from the GNH Survey dataset that were potentially associated with CMDs. We organised factors into an analytical framework (figure 1). This framework draws on socioecological models for CMDs,[35 36] and distinguishes potentially distal socioeconomic factors (level 1) from more proximal religious and spiritual factors (level 2) and health-related factors (level 3).

We analysed GHQ-12 score as a continuous outcome and explored the association of potential risk factors with

GHQ-12 score through univariable and multivariable linear regression models using generalised estimating equations (GEE). GEE models were used to account for the clustering of respondents within the primary sampling units. We assumed an exchangeable correlation structure and applied sandwich estimator to obtain robust SEs. We also included district as an explanatory variable in all models. The regression coefficients (β) denote the average change in GHQ-12 score.

All factors that showed an association at P≤0.25 in the univariable analyses were included in the multivariable modelling stage.[37] Multivariable models included only those respondents with complete data. To guide multivariable analyses, we applied the analytical framework in figure 1, entering groups of factors into the model procedure in a hierarchical order. The socioeconomic variables (level 1) that showed an association at P≤0.25 with GHQ-12 score in the univariable analyses were included in model 1. Model 2 included the socioeconomic variables that remained associated with GHQ-12 score at P≤0.1 in model 1, plus religious and spiritual variables (level 2) that were associated at P≤0.25. Model 3 included variables that were associated with GHQ-12 score in model 2 (P≤0.1), along with health-related factors (level 3) from the univariable analysis (P≤0.25). This approach avoided reliance on statistical associations by considering the hierarchical inter-relationship between risk factors.[38] A P≤0.25 was used for inclusion in the multivariable models to ensure that no important variables were missed. However, in the final model (model 3), variables were considered statistically significant if P<0.01, due to the large sample size. Collinearity between variables was checked using variance inflation factors and found to be <2 for all variables.[39] The fit of the final model was checked using residual plots, which indicated model assumptions were adequately satisfied.

We used secondary data that had no identifying information.

## RESULTS

In total there were 7153 respondents, of whom 7041 had complete data. Table 1 presents key characteristics of respondents: 59% were women; 48% were farmers; 58% had no formal education; more than 60% were from the low-income group; three-quarters were married; 46% said they were 'very spiritual' and 72% lived in rural areas.

GHQ-12 scores were normally distributed with a mean of 9.4 (SD ±4.8). Cronbach's alpha was 0.84 indicating satisfactory internal consistency. The estimated prevalence of CMDs was 29.3%, 95% CI 26.8% to 31.8%. Table 1 also shows the estimated prevalence for each potential factor and results from univariable analyses. All socioeconomic factors were associated (P≤0.25) with GHQ-12 score. Among the religious and spiritual factors, degree of spirituality and consideration of karma in daily life were associated with higher GHQ-12 scores. Religion was not associated with GHQ-12 score (P=0.67). All three health-related factors (self-reported health status, disability and walking time to the nearest health centre) were univariably associated with higher GHQ-12 scores (P<0.01).

Table 2 shows the results of the multivariable models. In model 1, older age, being female, being divorced or widowed, illiteracy, low income and occupation were associated with higher GHQ-12 scores, and were therefore retained in model 2. Rural residence and household size were not associated with GHQ-12 score in model 1. In model 2, level of spirituality and consideration of karma were associated with GHQ-12 score along with retained variables from model 1. In model 3, poor self-reported health status and disability were associated with higher GHQ-12 scores along with retained variables from model 2.

In the final model (model 3), factors independently associated (P<0.01) with higher GHQ-12 scores were: age, gender, marital status, literacy, occupation, income, spirituality, karma, self-reported health status and disability. GHQ-12 score was higher for older (β=1.29, 95% CI 0.57 to 2.00), female (β=0.70, 95% CI 0.45 to 0.95), divorced/widowed (β=1.55, 95% CI 1.08 to 2.02), illiterate (β=0.48, 95% CI 0.21 to 0.74) and low-income respondents (β=0.37, 95% CI 0.15 to 0.59). Respondents who were moderately spiritual (β=0.61, 95% CI 0.34 to 0.88), not or somewhat spiritual (β=0.76, 95% CI 0.28 to 1.23), or who occasionally (β=0.53, 95% CI 0.29 to 0.77) or never considered karma in daily life (β=0.80, 95% CI 0.26 to 1.34) had significantly higher GHQ-12 scores. Respondents with poor self-reported health status (β=2.59, 95% CI 2.13 to 3.06) and with disability (β=1.01, 95% CI 0.63 to 1.40) also had higher GHQ-12 scores.

## DISCUSSION

In line with previous research, our study suggests that older age, being female, being divorced or widowed, illiteracy, occupation, low income, poor self-reported health status and having a disability are potential risk factors for CMDs in Bhutan.[8 30 40] Conversely, we found that increased spirituality and belief in karma were protective for CMDs.

We report a 29.3% prevalence of CMDs, similar to community-based studies in other South Asian settings.[41 42] Our estimate was higher compared with the estimate in the 2015 GNH Survey report (10.3%) because we used a lower GHQ-12 threshold score (≥12 vs ≥16).[17] Our threshold score was selected based on findings from the Goldberg et al study[21] and the Lundin et al study.[25]

### Socioeconomic factors are important determinants of mental health status

Our findings support existing evidence that social and economic factors are independently associated with CMDs. We found that divorced or widowed respondents were at risk of CMDs. The prevalence of divorce in Bhutan is increasing, leading to a rise in matrimonial cases and single mothers seeking support for their families from

**Table 1** Univariable results of factors associated with GHQ-12 score, GNH Survey 2015

| Variables | Participants* N | Prevalence of common mental disorders n | %† (95% CI) | Unadjusted mean change in GHQ-12 score β‡ (95% CI) | P value |
|---|---|---|---|---|---|
| **Income** | | | | | <0.001 |
| High income | 2711 | 640 | 24.0 (21.6 to 26.6) | Reference | |
| Low income | 4330 | 1411 | 32.7 (30.9 to 34.6) | 0.98 (0.73 to 1.22) | |
| **Residence** | | | | | 0.006 |
| Urban | 1987 | 472 | 24.7 (20.9 to 28.8) | Reference | |
| Rural | 5059 | 1579 | 31.4 (29.7 to 33.1) | 0.71 (0.20 to 1.21) | |
| **Gender** | | | | | <0.001 |
| Male | 2923 | 776 | 26.9 (24.6 to 29.3) | Reference | |
| Female | 4120 | 1273 | 30.9 (27.8 to 34.2) | 0.94 (0.69 to 1.19) | |
| **Age** | | | | | <0.001 |
| 15–24 | 1113 | 297 | 26.9 (24.0 to 30.0) | Reference | |
| 25–34 | 1800 | 439 | 24.3 (21.8 to 26.9) | −0.20 (−0.53 to 0.13) | |
| 35–44 | 1562 | 402 | 26.5 (22.8 to 30.6) | −0.08 (−0.58 to 0.41) | |
| 45–54 | 1183 | 376 | 31.9 (29.0 to 34.9) | 0.49 (0.02 to 0.97) | |
| 55–64 | 776 | 263 | 34.4 (30.9 to 38.1) | 0.80 (0.25 to 1.34) | |
| 65+ | 612 | 274 | 44.3 (39.8 to 49.0) | 2.48 (1.77 to 3.18) | |
| **Marital status** | | | | | <0.001 |
| Married | 5328 | 1498 | 26.6 (25.6 to 31.0) | Reference | |
| Never married | 1070 | 281 | 28.2 (24.0 to 29.3) | −0.20 (−0.66 to 0.26) | |
| Divorced/widowed | 648 | 272 | 42.4 (38.1 to 46.7) | 2.35 (1.82 to 2.88) | |
| **Literacy** | | | | | <0.001 |
| Literate | 3578 | 878 | 25.0 (22.7 to 27.4) | Reference | |
| Illiterate | 3468 | 1173 | 33.9 (31.4 to 36.5) | 1.28 (1.01 to 1.56) | |
| **Occupation** | | | | | <0.001 |
| Farmers | 3377 | 1116 | 33.2 (31.5 to 34.8) | Reference | |
| Home makers | 1177 | 327 | 28.2 (23.4 to 33.6) | −0.17 (−0.68 to 0.33) | |
| Students | 545 | 145 | 27.0 (23.9 to 30.4) | −1.01 (−1.46 to −0.55) | |
| Civil/business§ | 1541 | 323 | 21.7 (18.8 to 24.9) | −1.33 (−1.63 to −1.03) | |
| Others | 405 | 140 | 34.2 (28.7 to 40.1) | 0.51 (−0.06 to 1.08) | |
| **Household size** | | | | | 0.060 |
| 3–4 members | 2491 | 712 | 29.0 (25.8 to 32.3) | Reference | |
| 1–2 members | 910 | 302 | 33.0 (29.6 to 36.6) | 0.60 (0.16 to 1.04) | |
| 5–6 members | 2453 | 688 | 28.1 (25.6 to 30.7) | 0.03 (−0.23 to 0.28) | |
| ≥7 members | 1190 | 347 | 29.3 (26.4 to 32.5) | 0.05 (−0.32 to 0.43) | |
| **Religion** | | | | | 0.670 |
| Buddhist | 5882 | 1679 | 28.7 (26.5 to 31.1) | Reference | |
| Hindu | 1000 | 331 | 33.0 (28.9 to 37.5) | 0.03 (−0.32 to 0.38) | |
| Others | 163 | 41 | 25.1 (18.6 to 33.0) | −0.27 (−0.92 to 0.38) | |
| **Spirituality** | | | | | <0.001 |
| Very | 3262 | 889 | 27.3 (25.1 to 29.7) | Reference | |
| Moderately | 3174 | 960 | 30.3 (27.1 to 33.7) | 0.51 (0.27 to 0.74) | |
| Not at all | 610 | 202 | 33.4 (29.6 to 37.4) | 0.88 (0.44 to 1.32) | |
| **Meditation** | | | | | 0.190 |
| Yes | 1291 | 390 | 30.7 (28.0 to 3.5) | Reference | |
| Never | 5755 | 1661 | 28.9 (26.3 to 31.7) | 0.21 (−0.10 to 0.51) | |

Continued

| Variables | Participants* N | Prevalence of common mental disorders n | %† (95% CI) | Unadjusted mean change in GHQ-12 score β‡ (95% CI) | P value |
|---|---|---|---|---|---|
| Consideration of karma in daily life | | | | | |
| Regularly | 4048 | 1107 | 27.5 (24.9 to 30.3) | Reference | |
| Occasionally | 2219 | 685 | 30.9 (27.6 to 34.4) | 0.68 (0.43 to 0.94) | |
| Never | 776 | 258 | 33.3 (29.7 to 37.0) | 0.98 (0.46 to 1.50) | |
| Self-reported health status | | | | | <0.001 |
| Good health | 6315 | 1660 | 26.4 (24.2 to 28.7) | Reference | |
| Poor health | 731 | 391 | 54.1 (48.9 to 59.3) | 3.58 (3.07 to 4.09) | |
| Disability | | | | | <0.001 |
| No | 5960 | 1601 | 27.0 (24.6 to 29.5) | Reference | |
| Yes | 1084 | 448 | 42.1 (38.6 to 45.7) | 2.28 (1.89 to 2.68) | |
| Walking distance to health centre (min) | | | | | <0.001 |
| ≤30 | 3529 | 929 | 26.6 (24.3 to 29.1) | Reference | |
| 31–60 | 1379 | 408 | 29.5 (25.4 to 34.1) | 0.21 (−0.15 to 0.57) | |
| ≥61 | 2137 | 714 | 33.5 (30.9 to 36.2) | 0.78 (0.43 to 1.13) | |

*Missing values for all factors were ≤112.
†Percentage may not match n/N due to adjustment for the survey design using Stata's SVY command.
‡The regression coefficients (β) denote the average change in GHQ-12 score.
§Includes civil servants, local government, corporate, business and armed forces.
GHQ-12, General Health Questionnaire; GNH, Gross National Happiness.

local non-governmental organisations.[43 44] Social stigma associated with divorce and court proceedings, coupled with the financial stress of raising a child as a single parent could partly explain the link between divorce and CMDs in Bhutan.

We found that older respondents as well as those who are illiterate or have a low income are more at risk of CMDs, in line with studies from other LMICs.[7 8 30 40 45 46] In Bhutan, 37% of adults are illiterate, however, this is lower among younger generations due to improved utilization of educational services . Illiteracy may be a marker of relative poverty and marginalisation, as well as low utilization of health and education services. WHO reports that CMDs are 1.5–2 times more prevalent among low-income groups.[47] This may be because people living in poverty lack the financial means to education and employment opportunities, perpetuating a negative cycle between poverty and CMDs.[47] Older people may be more at risk of CMDs compared with other age groups due to increased social isolation and susceptibility to non-communicable disease.[48]

We did not find any association between residence (rural/urban) and CMDs. This could be due to the massive rural to urban migration in Bhutan over recent years,[49] masking any potential association. It could also be due to the inclusion of other more distal markers of socioeconomic status in the model, such as income and occupation. Findings from other settings have been heterogeneous. Some studies in USA and Australia found no difference in risk of CMDs between rural and urban areas.[50 51] Studies in the UK[14 52] and Canada[46 53] reported higher rates of CMDs in urban areas compared with rural areas, whereas studies in China[54] and India[55] reported lower or similar rates of CMDs in rural and urban areas. Such mixed findings could be due to different definitions of rural and urban areas which may incorporate population density,[46] remoteness and accessibility to health services.[13 53]

## Are spirituality and religious involvement beneficial for mental health?

We found that spirituality was associated with higher GHQ-12 scores. This is consistent with findings from other studies suggesting that spirituality is associated with mental health.[56–58] We also found that respondents who occasionally and never considered karma in their daily lives reported higher GHQ-12 scores compared with respondents who regularly considered karma. Regular consideration of karma may relate to an individual's level of religious involvement. Raphael *et al* found a significant positive association between religious involvement and mental health in a review of 43 studies.[32] Similarly, a recent reviews reported that religious participation was inversely associated with depressive symptoms, anxiety, stress and suicide.[59 60]

Bhutan is a predominantly Buddhist country and more than 90% of its population report that they are spiritual.[17] In this setting, spirituality and religious involvement may promote mental health through supportive faith-based community networks, and by providing individuals with a sense of inclusion and community acceptance, as well as meaning and goals for their lives.[57 59 61] Religious

**Table 2** Multivariable analyses of factors associated with GHQ-12 score, GNH Survey 2015

| Socioeconomic factors | Model 1 (Socioeconomic factors) Mean change β* (95% CI) | P value | Model 2 (Socioeconomic, spiritual and religious factors) Mean change β* (95% CI) | P value | Model 3 (Socioeconomic, spiritual, religious and health factors) Mean change β* (95% CI) | P value |
|---|---|---|---|---|---|---|
| Age (years) | | <0.001 | | <0.001 | | <0.001 |
| 15–24 | Reference | | Reference | | Reference | |
| 25–34 | −0.28 (−0.73 to 0.18) | | −0.18 (−0.64 to 0.28) | | −0.28 (−0.73 to 0.16) | |
| 35–44 | −0.21 (−0.73 to 0.32) | | −0.05 (−0.56 to 0.46) | | −0.28 (−0.77 to 0.21) | |
| 45–54 | 0.24 (−0.34 to 0.82) | | 0.47 (−0.12 to 1.06) | | 0.08 (−0.48 to 0.65) | |
| 55–64 | 0.52 (−0.11 to 1.14) | | 0.80 (0.18 to 1.42) | | 0.32 (−0.26 to 0.90) | |
| 65+ | 1.90 (1.14 to 2.65) | | 2.24 (1.46 to 3.02) | | 1.29 (0.57 to 2.00) | |
| Gender | | <0.001 | | <0.001 | | <0.001 |
| Male | Reference | | Reference | | Reference | |
| Female | 0.84 (0.59 to 1.10) | | 0.82 (0.57 to 1.08) | | 0.70 (0.45 to 0.95) | |
| Marital status | | <0.001 | | <0.001 | | <0.001 |
| Married | Reference | | Reference | | Reference | |
| Never married | 0.26 (−0.23 to 0.74) | | 0.18 (−0.30 to 0.66) | | 0.13 (−0.34 to 0.60) | |
| Divorced/widowed | 1.64 (1.12 to 2.17) | | 1.65 (1.13 to 2.17) | | 1.55 (1.08 to 2.02) | |
| Literacy | | <0.001 | | <0.001 | | <0.001 |
| Literate | Reference | | Reference | | Reference | |
| Illiterate | 0.61 (0.33 to 0.88) | | 0.57 (0.29 to 0.84) | | 0.48 (0.21 to 0.74) | |
| Occupation | | 0.002 | | <0.001 | | 0.003 |
| Farmers | Reference | | Reference | | Reference | |
| Home makers | 0.02 (−0.43 to 0.47) | | 0.04 (−0.39 to 0.48) | | −0.01 (−0.46 to 0.43) | |
| Students | 0.02 (−0.83 to 0.16) | | −0.38 (−0.88 to 0.12) | | −0.42 (−0.92 to 0.09) | |
| Civil/business† | 0.02 (−0.67 to −0.01) | | −0.35 (−0.66 to −0.04) | | −0.31 (−0.62 to −0.00) | |
| Others | 0.02 (0.13 to 1.31) | | 0.73 (0.16 to 1.30) | | 0.64 (0.10 to 1.17) | |
| Income | | <0.001 | | <0.001 | | <0.001 |
| High income | Reference | | Reference | | Reference | |
| Low income | 0.45 (0.23 to 0.68) | | 0.44 (0.22 to 0.67) | | 0.37 (0.15 to 0.59) | |
| Residence | | 0.507 | | | | |
| Urban | Reference | | | | | |
| Rural | 0.12 (−0.24 to 0.48) | | | | | |
| Household size | 0.03 (−0.03 to 0.08) | 0.374 | | | | |
| Religious and spiritual factors | | | | | | |
| Spirituality | | | | <0.001 | | <0.001 |
| Very spiritual | | | Reference | | Reference | |
| Moderately spiritual | | | 0.58 (0.30 to 0.87) | | 0.61 (0.34 to 0.88) | |
| No and somewhat | | | 0.79 (0.29 to 1.29) | | 0.76 (0.28 to 1.23) | |
| Consider karma in daily life | | | | <0.001 | | <0.001 |
| Regularly | | | Reference | | Reference | |
| Occasionally | | | 0.52 (0.28 to 0.77) | | 0.53 (0.29 to 0.77) | |
| Never | | | 0.81 (0.26 to 1.35) | | 0.80 (0.26 to 1.34) | |
| Meditation | | | | 0.146 | | |
| Yes | | | Reference | | | |
| No | | | −0.22 (−0.52 to 0.08) | | | |
| Health-related factors | | | | | | |
| Self-reported health status | | | | | | <0.001 |

Continued

**Table 2** Continued

| Socioeconomic factors | Model 1 (Socioeconomic factors) Mean change β* (95% CI) | P value | Model 2 (Socioeconomic, spiritual and religious factors) Mean change β* (95% CI) | P value | Model 3 (Socioeconomic, spiritual, religious and health factors) Mean change β* (95% CI) | P value |
|---|---|---|---|---|---|---|
| Good health | | | | | Reference | |
| Poor health | | | | | 2.59 (2.13 to 3.06) | |
| Disability | | | | | | <0.001 |
| No disability | | | | | Reference | |
| Disability | | | | | 1.01 (0.63 to 1.40) | |
| Walking distance to health centre (min) | | | | | | 0.155 |
| ≤30 | | | | | Reference | |
| 31–60 | | | | | −0.01 (−0.30 to 0.32) | |
| ≥61 | | | | | 0.30 (0.01 to 0.60) | |

*The regression coefficients (β) denote the average change in GHQ-12 score.
†Includes civil servants, local government, corporate, business and arm force.
GHQ-12, General Health Questionnaire; GNH, Gross National Happiness.

involvement is found to be associated with a better ability to cope with stress, and depression, suicide, anxiety and substance abuse.[61] In Bhutan, Buddhist values encompass acceptance, forgiveness and law of karma, which could help to build tolerance and reduce tensions in communities, with benefits for individual mental health. On average, people spend 51 min per day on religious activities.[17] Since the majority of the population is involved in religious activities, the national mental health strategy and action plan (2015–2023) includes working with the monastic and religious institutions in the country.[62] Spiritual beliefs and practices may enable people to face difficulties and provide guidelines for individuals to live and work together. In other words, development policies need to consider religious amenities like temples, monastic schools and access to spiritual leaders as basic consideration in any settlement plans.

Our study did not find an association between frequency of meditation and GHQ-12 score. This may be due to the small proportion (7.5%) of respondents who reported meditating. Meditation is a higher spiritual Buddhist practise uncommon among lay people.

### Interdependency of physical and mental health
In line with several previous studies, we found that individuals with poor self-reported health status or a disability had higher GHQ-12 scores.[46 63–65] Due to the cross-sectional nature of the data, it is not possible to determine the direction of effect between physical health and mental health, However, a bi-directional relationship in which mental ill health exacerbates physical illness which further impacts on mental health is highly plausible.[66] At present, there is no legislation or national policy on disability in Bhutan.[67] Findings from our study suggest that any future disability initiative in this setting should consider incorporating a mental health component.

Our study identifies possible targets for mental health promotion strategies, which could be delivered by non-specialised mental health workers. Potential strategies include provision of mental health support to older people, and mental health literacy programmes for non-specialist health workers to aid recognition, management and prevention of CMDs among individuals with poor general health.[68 69] In rural Bhutan, task shifting to non-specialised health workers like village health volunteers will be essential in providing access to mental health services. At present, there are only four psychiatrists in the country and only 1% of the total expenditure of health is directed towards mental health.[70] This study highlights the need for more research to help advocate for increased resources and political commitment for a national mental health programme.[71 72]

### Strengths and limitations
The main strengths of this study are the large nationally representative sample including all age groups of 15 years and above from both rural and urban communities of Bhutan. In addition, a range of social, economic, religious and health factors were included in the multivariable analysis. However, the study has several limitations. First, it used cross-sectional data making it impossible to establish causal relationships. Second, the GHQ-12 has not been validated in Bhutan, however we used a continuous outcome to conduct the analyses in order to avoid over-reliance on a non-validated threshold score. The GHQ-12 is a self-reported screening tool. Although it is not diagnostic of CMDs, it is a feasible approach to assess mental health in a large national survey. The prevalence of CMDs reported in this study is an estimate due to the lack of a locally validated threshold score. Third, the GHQ-12 was not translated into the local language in the questionnaire. Enumerators translated the items from

English into the appropriate language for each respondent and this could potentially have led to some inconsistencies in translation. Finally, data on other established risk factors of CMDs, such as alcohol, substance abuse and history of mental illness were not collected.

## CONCLUSIONS

Findings from this study highlight the importance of established socioeconomic factors of CMDs in Bhutan and suggest that religious involvement and spirituality may be protective factors for mental health in this setting. Further studies are needed to understand causal pathways to CMDs and to provide evidence to support mental health policy decisions and investment.

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