Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Occupational differences in depressive and anxiety symptoms among men aged 15 to 49 years in Nepal

Digamber Upadhyay

digmberupadhyay@gmail.com

B.P. Koirala Institute of Health Sciences

Jyoti Dhakal

Manmohan Memorial Institute of Health Sciences

Neelam Upadhyay

Tribhuvan University

Bidushi Neupane

Tribhuvan University

Research Article

Keywords: Depression, anxiety, occupation, men's mental health, occupational health, Nepal, Nepal Demographic and Health Survey

Posted Date: November 16th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11395449/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Occupational inequalities in men's mental health remain understudied in Nepal. We assessed whether depressive symptom severity and anxiety symptoms differed across occupational groups among working men aged 15–49 years.

Methods

Cross-sectional secondary analysis of the 2022 Nepal Demographic and Health Survey was conducted. The analytic domain included 4,259 working men aged 15–49 years. Occupation was grouped into five categories, with unskilled manual work as the reference. Depressive symptoms were classified as no/minimal (PHQ-9 score 0–4), mild (5–9), or moderate-to-severe (10–27); anxiety symptoms were defined using the NDHS threshold of GAD-7 ≥ 6. Survey-weighted ordinal and binary logistic regression models accounted for stratification, clustering, and sampling weights and were adjusted for the prespecified DAG-informed covariate set.

Results

Overall, 9.4% had mild and 1.8% moderate-to-severe depressive symptoms, while 11.5% had anxiety symptoms. Occupation was associated with depressive symptom severity after adjustment (Wald p = 0.033). Compared with unskilled manual workers, the adjusted odds of greater severity were lower among professional and office-based workers (AOR 0.50, 95% CI 0.31–0.82), sales and service workers (0.56, 0.36–0.86), and men in agricultural occupations (0.70, 0.51–0.97). Occupation was not associated with anxiety symptoms overall (p = 0.180).

Conclusions

Occupational group was associated with depressive symptom severity but not anxiety symptoms at the overall factor level. The cross-sectional design and broad occupational categories preclude causal or mechanistic interpretation. Longitudinal studies should directly measure specific working conditions and employment exposures.

Background

Depression and anxiety disorders are among the leading contributors to the global burden of disease, accounting for a large and rising share of years lived with disability [1]. Nepal as a lower-middle income, post-conflict South Asian country carries a substantial mental-health burden: the National Mental Health Survey 2019–2020 estimated the current prevalence of any mental disorder among adults at 10%, set

against a persistently wide treatment gap [2]. Community-based evidence shows a high population risk of major depressive disorder, partly mitigated by social support infrastructure [3].

Nationally representative analyses of the NDHS 2022 have documented depression and anxiety among reproductive-aged women, linking lower education, rural residence, Karnali Province residence, and lower socioeconomic status to higher symptom burden [4]. Traditional masculine ideals discourage symptom disclosure and help-seeking of working age when they are emotionally or mentally distressed [5, 6], likely contributing to under-detection in clinical settings and making population-based, symptom-scale estimation particularly valuable for this group.

Occupational position is a socially meaningful but under-examined axis of mental-health inequality. Beyond proxying income or education, occupation captures social position, working conditions, autonomy, and security independently associated with mental disorders [7]. High-income settings show a well-documented inverse occupational gradient in depression, with manual and lower-grade workers at elevated risk and slower recovery [8], and precarious, low-control work is consistently linked to psychological distress [9]. Recent nationally representative analyses have quantified symptom prevalence in Nepali men and its association with age, education, and wealth, but have centred on gender contrasts and conventional sociodemographic predictors [10]; the occupational patterning of men's mental health specifically remains unexamined nationally.

We therefore examined occupational differences in depressive symptom severity and anxiety symptoms among recently employed Nepali men aged 15–49 years. By examining occupation as a socioeconomic marker in a nationally representative sample, the study aimed to extend evidence on mental-health inequalities among men in a lower-middle-income setting.

Methods

Study design and data source

This cross-sectional study used data from the 2022 Nepal Demographic and Health Survey, a nationally representative household survey employing a multistage, stratified cluster-sampling design. Survey analyses incorporated the 2022 NDHS complex sampling design using the men’s individual sampling weight, primary sampling unit, and sampling stratum. The normalized analysis weight was calculated as individual sampling weight/1,000,000. An SPSS Complex Samples analysis plan specified sampling stratum as the stratum variable, primary sampling unit as the cluster variable, and the scaled weight as the analysis weight. The analytic design comprised 14 strata and 476 primary sampling units, yielding 462 design degrees of freedom.

We defined working men as male respondents aged 15–49 who reported recent employment as an analytic survey domain within the complete male dataset; non-working men remained in the analysis file for variance estimation. Men aged 15–49 years with complete information on occupation, mental-health outcomes, and selected covariates, were included in the study, yielding an analytic subpopulation of

4,259 participants. The estimates are nationally representative of eligible male respondents interviewed in sampled households who reported recent employment; men abroad and therefore not interviewed were not represented.

Recent employment was defined as reporting current employment or having worked at any time during the 12 months preceding the interview. Occupation referred to the respondent's current or most recent occupation during that period and was classified into five groups. Professional/technical/managerial and clerical occupations were combined as "professional and office-based" because clerical work was conceptually similar to office-based white-collar employment and the clerical subgroup contained relatively few respondents. The agricultural occupations, sales and service, skilled manual, and unskilled manual work comprised the remaining categories (Supplementary Table S1). Unskilled manual work was selected a priori as a substantively relevant lower-status manual comparator.

Depressive symptoms were assessed using the Patient Health Questionnaire-9 and classified into three ordered categories: no/minimal symptoms (0–4), mild symptoms (5–9), and moderate-to-severe symptoms (10–27). Moderate, moderately severe, and severe depressive symptoms were combined into a single moderate-to-severe category because the upper PHQ-9 categories contained sparse numbers of participants. This grouping also follows the commonly used clinical convention of treating PHQ-9 scores of 10 or higher as indicating at least moderate, clinically relevant depressive symptom severity [11]. Anxiety symptoms were measured using the Generalized Anxiety Disorder-7 scale and dichotomised as no anxiety symptoms (score < 6) or anxiety symptoms present (score ≥ 6), following the NDHS classification [12].

Potential confounders were selected a priori based on established relationships with occupational group and mental-health symptoms. A directed acyclic graph identified a minimally sufficient measured adjustment set comprising age, education, ethnicity, province, and urban–rural residence (Supplementary Figure S1). For the depression model, age was centered at the survey-weighted mean of 31.43 years and entered as both linear and quadratic terms because exploratory modelling indicated a nonlinear association. For the anxiety model, age was retained as a continuous linear variable because no evidence of nonlinearity was observed.

Survey-weighted ordinal logistic regression was used to estimate associations with depression severity, and the proportional-odds assumption was assessed using the test of parallel lines. Survey-weighted binary logistic regression was used for anxiety symptoms. Adjusted odds ratios with 95% confidence intervals were reported, and overall Wald F tests were used for categorical variables. All analyses accounted for sampling weights, clustering, and stratification and were conducted in IBM SPSS Statistics version 27.

Results

Sociodemographic and health characteristics of the analytic sample by occupational group

The analysis included 4,259 working men aged 15–49 years. All 4,259 respondents in the analytic domain had complete information on occupation, both outcomes, and the prespecified adjustment variables; complete-case analysis therefore did not reduce the analytic sample. Agriculture was the largest occupational group (27.3%), followed by skilled manual work (22.7%), unskilled manual work (20.1%), sales and service occupations (16.6%), and professional or office-based occupations (13.3%). The survey-weighted mean age was 31.43 years and differed across occupational groups (Wald $p < 0.001$), ranging from 30.02 years among unskilled manual workers to 32.82 years among professional or office-based workers.

Overall, 71.5% of participants were currently married or in union. Educational attainment varied substantially by occupation. Higher education was most common among professional or office-based workers (39.0%) and least common among men in agricultural occupations (1.2%), skilled manual (2.0%), and unskilled manual workers (0.7%). Conversely, no formal education was most prevalent among unskilled manual workers (19.3%). Brahmin/Chhetri men constituted 45.8% of professional or office-based workers, whereas Dalit and minority groups accounted for 54.3% of unskilled manual workers.

Urban residence was most common among sales and service (80.7%) and professional or office-based workers (79.6%), while 45.7% of agricultural workers lived in rural areas. Self-rated health was broadly similar across occupational groups; overall, 46.4% reported good or very good health, 48.7% reported moderate health, and 4.9% reported bad or very bad health.

Table 1
Characteristics of working male respondents aged 15–49 years, overall and by occupational group

Characteristic	Total (n = 4,259)	Professional/ office-based (n = 498)	Sales and service (n = 622)	Agriculture (n = 1,367)	Skilled manual (n = 873)	Unskilled manual (n = 899)
Age, weighted mean years	31.43	32.82	32.28	31.79	30.80	30.02
Marital status						
Currently married/in union	3,120 (71.5)	380 (72.9)	480 (74.9)	973 (69.5)	668 (73.3)	619 (68.5)
Not currently married/in union	1,139 (28.5)	118 (27.1)	142 (25.1)	394 (30.5)	205 (26.7)	280 (31.5)
Education						
No education	387 (9.1)	7 (1.1)	22 (3.6)	114 (9.2)	84 (8.7)	160 (19.3)
Basic	1,796 (41.0)	50 (10.4)	168 (26.6)	634 (46.0)	453 (52.0)	491 (54.0)
Secondary	1,792 (41.7)	259 (49.5)	369 (57.2)	603 (43.7)	320 (37.3)	241 (26.0)
Higher	284 (8.2)	182 (39.0)	63 (12.5)	16 (1.2)	16 (2.0)	7 (0.7)
Ethnicity						
Brahmin/Chhetri	1,277 (26.3)	239 (45.8)	242 (36.0)	487 (29.6)	149 (16.0)	160 (12.6)
Janajati	1,618 (39.0)	158 (33.6)	208 (35.4)	563 (42.9)	386 (45.1)	303 (33.1)
Dalit and minorities	1,364 (34.7)	101 (20.6)	172 (28.6)	317 (27.4)	338 (38.9)	436 (54.3)
Province						
Koshi	748 (19.5)	77 (17.9)	61 (9.8)	343 (30.4)	167 (19.6)	100 (13.6)
Madhesh	757 (20.1)	77 (15.5)	98 (17.2)	182 (16.6)	151 (17.9)	249 (32.6)
Bagmati	693 (23.7)	112 (30.5)	133 (32.1)	173 (16.1)	202 (33.1)	73 (12.0)
Gandaki	418 (7.5)	42 (7.3)	80 (10.4)	148 (7.4)	75 (7.0)	73 (5.8)

Characteristic	Total (n = 4,259)	Professional/ office-based (n = 498)	Sales and service (n = 622)	Agriculture (n = 1,367)	Skilled manual (n = 873)	Unskilled manual (n = 899)
Lumbini	622 (16.6)	81 (17.6)	125 (20.1)	152 (14.3)	111 (12.8)	153 (20.5)
Karnali	519 (5.4)	59 (5.8)	48 (3.5)	232 (8.1)	86 (3.9)	94 (4.6)
Sudurpaschim	502 (7.3)	50 (5.4)	77 (6.8)	137 (7.2)	81 (5.6)	157 (10.9)
Place of residence						
Urban	2,296 (69.1)	331 (79.6)	423 (80.7)	550 (54.3)	526 (74.5)	466 (66.8)
Rural	1,963 (30.9)	167 (20.4)	199 (19.3)	817 (45.7)	347 (25.5)	433 (33.2)
Self-rated health						
Good/very good	1,905 (46.4)	230 (48.3)	288 (47.5)	620 (47.1)	387 (44.8)	380 (45.0)
Moderate	2,121 (48.7)	243 (47.3)	308 (48.8)	658 (46.8)	445 (50.8)	467 (49.8)
Bad/very bad	233 (4.9)	25 (4.5)	26 (3.7)	89 (6.1)	41 (4.3)	52 (5.3)

Values are unweighted n (survey-weighted column %) unless otherwise indicated. Age is shown as the survey-weighted mean. Categorical variables had complete data. Mean age differed across occupational categories (design-adjusted Wald F $p < 0.001$).

Distribution of depression severity and anxiety by occupational category

Overall, 88.8% of working men had no or minimal depressive symptoms, 9.4% had mild symptoms, and 1.8% had moderate-to-severe symptoms. The proportion with no or minimal symptoms was highest among professional or office-based workers (91.1%) and lowest among unskilled manual workers (87.1%). Mild depressive symptoms ranged from 7.3% among professional or office-based workers to 10.8% among unskilled manual workers, while moderate-to-severe symptoms ranged from 1.4% among sales and service workers to 2.1% among unskilled manual workers.

Anxiety symptoms, defined as a GAD-7 score of 6 or higher, were present in 11.5% of working men. Their prevalence was lowest among sales and service workers (10.5%) and highest among unskilled manual

workers (12.7%). Agricultural workers had a prevalence of 10.9%, compared with 11.2% among professional or office-based workers and 12.0% among skilled manual workers.

Table 2
Distribution of depressive and anxiety symptoms by occupational category among working Nepali men aged 15–49 years

Characteristic	Total (n = 4,259)	Professional/ office-based (n = 498)	Sales and service (n = 622)	Agriculture (n = 1,367)	Skilled manual (n = 873)	Unskilled manual (n = 899)
Depression severity						
No/minimal symptoms (PHQ-9 0–4)	3,762; 88.8 (87.1–90.3)	456; 91.1 (87.0–94.0)	563; 90.9 (87.9–93.2)	1,193; 88.3 (85.9–90.3)	772; 87.9 (84.5–90.7)	778; 87.1 (84.0–89.7)
Mild symptoms (PHQ-9 5–9)	417; 9.4 (8.2–10.9)	35; 7.3 (4.8–10.9)	50; 7.8 (5.6–10.6)	144; 9.9 (8.2–12.0)	85; 10.2 (7.8–13.3)	103; 10.8 (8.5–13.6)
Moderate-to-severe symptoms (PHQ-9 10–27)	80; 1.8 (1.3–2.3)	7; 1.6 (0.7–3.5)	9; 1.4 (0.6–2.9)	30; 1.8 (1.2–2.7)	16; 1.8 (1.1–3.1)	18; 2.1 (1.1–3.9)
Anxiety symptoms						
No anxiety symptoms (GAD-7 < 6)	3,769; 88.5 (86.9–89.9)	447; 88.8 (84.6–91.9)	555; 89.5 (86.5–92.0)	1,212; 89.1 (87.1–90.8)	777; 88.0 (84.9–90.5)	778; 87.3 (83.9–90.0)
Anxiety symptoms present (GAD-7 ≥ 6)	490; 11.5 (10.1–13.1)	51; 11.2 (8.1–15.4)	67; 10.5 (8.0–13.5)	155; 10.9 (9.2–12.9)	96; 12.0 (9.5–15.1)	121; 12.7 (10.0–16.1)

Cells show unweighted n; survey-weighted % (95% CI). Percentages are calculated within occupational category.

Factors associated with depression severity among Nepali men

In the survey-weighted ordinal logistic regression model, occupational group was associated with depressive symptom severity after adjustment, Wald F (4,459) = 2.64, p = 0.033. The proportional-odds assumption was not rejected, Wald F (18,445) = 1.38, p = 0.136. Compared with unskilled manual workers, men employed in professional or office-based occupations had 50% lower adjusted odds of being in a higher depression-severity category (AOR = 0.50; 95% CI: 0.31–0.82). Lower odds were also

observed among sales and service workers (AOR = 0.56; 95% CI: 0.36–0.86) and men in agricultural occupations (AOR = 0.70; 95% CI: 0.51–0.97). The association for skilled manual workers was not statistically significant (AOR = 0.77; 95% CI: 0.54–1.09).

Age was modelled using centered linear and quadratic terms. Although the centered linear term was not statistically significant ($p = 0.110$), the quadratic term was significant ($p = 0.048$), suggesting a modest nonlinear relationship between age and depression severity. Province was also significantly associated with depression severity overall ($p < 0.001$). Relative to men in Sudurpaschim, those residing in Bagmati (AOR = 1.89; 95% CI: 1.07–3.32) and Karnali (AOR = 2.65; 95% CI: 1.58–4.45) had higher adjusted odds of greater depression severity. Education, ethnicity, and urban–rural residence were not associated with depression severity.

Table 3
Adjusted associations with depressive symptom severity among working male respondents

Characteristic	Adjusted odds ratio (95% CI)	Overall/term p-value
Occupation		**0.033**
Professional/office-based	0.50 (0.31–0.82)	
Sales and service	0.56 (0.36–0.86)	
Agriculture	0.70 (0.51–0.97)	
Skilled manual	0.77 (0.54–1.09)	
Unskilled manual	1.00 (Reference)	
Age		
Centered age (years)	0.99 (0.98–1.00)	0.11
Centered age squared	1.001 (1.000–1.002)	0.048
Education		**0.825**
No education	0.73 (0.33–1.61)	
Basic	0.91 (0.48–1.72)	
Secondary	0.89 (0.50–1.59)	
Higher	1.00 (Reference)	
Ethnicity		**0.645**
Brahmin/Chhetri	1.19 (0.82–1.74)	
Janajati	1.14 (0.81–1.59)	
Dalit and minorities	1.00 (Reference)	
Province		**< 0.001**
Koshi	1.59 (0.90–2.80)	
Madhesh	0.57 (0.29–1.10)	
Bagmati	1.89 (1.07–3.32)	
Gandaki	1.22 (0.67–2.21)	

Note: Higher AORs indicate greater odds of being in a higher depression-severity category. Age was centered at the weighted mean of 31.43 years and modelled using linear and quadratic terms; the two age coefficients should be interpreted jointly. Overall p-values for categorical variables are Wald F tests. Analytic n = 4,259. Models adjusted for age, education, ethnicity, province, and urban-rural residence. Unadjusted survey-weighted outcome distributions are presented in Table 2.

Characteristic	Adjusted odds ratio (95% CI)	Overall/term p-value
Occupation		**0.033**
Lumbini	1.49 (0.90–2.47)	
Karnali	2.65 (1.58–4.45)	
Sudurpaschim	1.00 (Reference)	
Place of residence		**0.914**
Urban	0.98 (0.74–1.31)	
Rural	1.00 (Reference)	

Note: Higher AORs indicate greater odds of being in a higher depression-severity category. Age was centered at the weighted mean of 31.43 years and modelled using linear and quadratic terms; the two age coefficients should be interpreted jointly. Overall p-values for categorical variables are Wald F tests. Analytic n = 4,259. Models adjusted for age, education, ethnicity, province, and urban-rural residence. Unadjusted survey-weighted outcome distributions are presented in Table 2.

Factors associated with anxiety among Nepali men

In the survey-weighted binary logistic regression model, the overall association between occupational group and anxiety symptoms was not supported, Wald F (4,459) = 1.58, p = 0.180. Nevertheless, agricultural workers had lower adjusted odds of anxiety symptoms than unskilled manual workers (AOR = 0.70; 95% CI: 0.51–0.97). The estimates were also lower among professional or office-based workers (AOR = 0.63; 95% CI: 0.39–1.03) and sales and service workers (AOR = 0.66; 95% CI: 0.44–1.00), although these contrasts were not clearly statistically significant. Skilled manual workers did not differ significantly from unskilled manual workers (AOR = 0.79; 95% CI: 0.55–1.14).

Province was significantly associated with anxiety symptoms overall ($p < 0.001$). Compared with men residing in Sudurpaschim, the adjusted odds of anxiety symptoms were higher among men in Koshi (AOR = 1.94; 95% CI: 1.09–3.47), Bagmati (AOR = 1.80; 95% CI: 1.05–3.09), and Karnali (AOR = 2.41; 95% CI: 1.41–4.11). Age was not associated with anxiety symptoms (AOR per one-year increase = 1.00; 95% CI: 0.99–1.01; p = 0.789). Education, ethnicity, and urban–rural residence were also not associated with the outcome.

Table 4
Adjusted associations with anxiety symptoms among working male respondents

Characteristic	Adjusted odds ratio (95% CI)	Overall/term p-value
Occupation		**0.18**
Professional/office-based	0.63 (0.39–1.03)	
Sales and service	0.66 (0.44–1.00)	
Agriculture	0.70 (0.51–0.97)	
Skilled manual	0.79 (0.55–1.14)	
Unskilled manual	1.00 (Reference)	
Age (years)	1.00 (0.99–1.01)	0.789
Education		**0.466**
No education	0.59 (0.29–1.20)	
Basic	0.86 (0.52–1.43)	
Secondary	0.83 (0.53–1.31)	
Higher	1.00 (Reference)	
Ethnicity		**0.104**
Brahmin/Chhetri	1.10 (0.78–1.56)	
Janajati	0.82 (0.58–1.14)	
Dalit and minorities	1.00 (Reference)	
Province		**< 0.001**
Koshi	1.94 (1.09–3.47)	
Madhesh	0.83 (0.45–1.55)	
Bagmati	1.80 (1.05–3.09)	
Gandaki	0.99 (0.50–1.96)	
Lumbini	1.54 (0.90–2.63)	
Karnali	2.41 (1.41–4.11)	
Sudurpaschim	1.00 (Reference)	
Place of residence		**0.516**
Urban	1.10 (0.83–1.45)	

Characteristic	Adjusted odds ratio (95% CI)	Overall/term p-value
Occupation		**0.18**
Rural	1.00 (Reference)	

Analytic n = 4,259. Models adjusted for age, education, ethnicity, province, and urban–rural residence. Unadjusted survey-weighted outcome distributions are presented in Table 2.

Discussion

In this nationally representative sample of 4,259 working Nepali men aged 15–49 years, most participants reported no or minimal depressive symptoms; 9.4% reported mild symptoms and 1.8% reported moderate-to-severe symptoms, while anxiety symptoms were present in 11.5%. Absolute differences were modest. The prevalence of any depressive symptoms ranged from 8.9% among professional and office-based workers to 12.9% among unskilled manual workers, while anxiety-symptom prevalence ranged from 10.5% to 12.7%. In the survey-weighted ordinal logistic regression model, occupational category was associated with depression severity after adjustment (Wald p = 0.033). Relative to unskilled manual workers, the adjusted odds of occupying a higher depression-severity category were lower among men in professional or office-based occupations (AOR = 0.50; 95% CI: 0.31–0.82), sales and service occupations (AOR = 0.56; 95% CI: 0.36–0.86), and agriculture (AOR = 0.70; 95% CI: 0.51–0.97), whereas the contrast for skilled manual workers did not reach statistical significance (AOR = 0.77; 95% CI: 0.54–1.09). For anxiety, occupational category showed no overall association (Wald p = 0.180); the lower adjusted odds observed among men in agricultural occupations relative to unskilled manual workers (AOR = 0.70; 95% CI: 0.51–0.97) are therefore reported with caution, given the non-significant overall test. Province was significantly associated with both depression severity and anxiety symptoms (both p < 0.001).

The prevalence we observed aligns closely with national estimates for men once equivalent instrument thresholds are applied. Our moderate-to-severe depression prevalence (PHQ-9 ≥ 10; 1.8%) is virtually identical to the 1.7% reported for Nepali men aged 15–49 in the most recent nationally representative NDHS 2022 analysis, which applied the same cut-off, and our anxiety estimate (GAD-7 ≥ 6; 11.5%) closely mirrors the 11.3% reported for men at that identical threshold [10], demonstrating consistency with published estimates from the same survey. Published NDHS estimates for women aged 15–49 were higher than those observed in our recently employed male sample − 5.4% versus 1.8% for PHQ-9 ≥ 10 and 21.9% versus 11.5% for GAD-7 ≥ 6 [10]. This aligns with the internationally observed trend that depressive and anxiety disorders are approximately twice as prevalent in women compared to men [13]. Direct comparison with analyses using a more conservative anxiety case definition such as the substantially lower anxiety figure reported for reproductive-aged Nepali women [4] or with pooled pandemic-era South Asian estimates (anxiety 41.3%, depression 34.1%) [14] is not warranted, since differing thresholds, sampling frames, and the COVID-19 measurement window preclude equivalence. The markedly lower

male estimates are unlikely to reflect true burden. Masculine norms that discourage emotional disclosure and help-seeking [6, 15], together with the expression of male distress through somatic or externalising channels poorly captured by internalising-weighted scales such as the PHQ-9 and GAD-7, plausibly contribute to systematic symptom under-ascertainment in men [13, 16].

In the depression model, all four non-reference occupational groups had adjusted cumulative odds ratios below 1.0 relative to unskilled manual work, although the skilled-manual contrast was imprecise and included the null. The lowest point estimate occurred among professional and office-based workers. This ordering is consistent with the inverse occupational association documented in high-income settings, where low-control, high-demand, and effort-reward-imbalanced work predicts depression, and where precarious, low-security employment is a recognised determinant of psychological distress [17–20]. Our exposure, however, comprised broad occupational titles that serve only as proxies for these conditions; job control, reward, and security were not measured directly, and the categories cannot be assumed to have captured them. This proxy status may also explain why occupation, unlike education or working status, is an inconsistent correlate of depression across low- and middle-income settings [21, 22].

For anxiety, the overall test of the occupational factor was not significant (Wald p = 0.180), and the omnibus test was the primary inferential result. When the factor-level test is non-significant, category-specific comparisons are unprotected and are best treated as hypothesis-generating, since inspecting several contrasts inflates the Type I error rate [23]. The nominally lower odds among men in agricultural occupations (AOR = 0.70; 95% CI: 0.51–0.97) should therefore not be read as a robust effect, and the sales and service estimate (AOR = 0.66; 95% CI: 0.44–1.00) is borderline. The findings may indicate that broad occupational titles do not adequately distinguish anxiety risk. Studies directly measuring job strain, insecurity, working hours, and hazardous exposures are needed to evaluate this possibility [24].

Unskilled manual workers carried the highest crude symptom burden in our sample: the lowest proportion with no or minimal depressive symptoms (87.1%) and the highest anxiety prevalence (12.7%) while agriculture showed lower adjusted odds of greater depression severity relative to this reference (AOR = 0.70). One possible explanation for this association is that aspects of agricultural work, including greater autonomy over daily tasks, strong community ties, and the cyclical nature of farming activities, may provide psychosocial resources that buffer depressive symptoms. Alternatively, cultural differences in symptom reporting, with psychological distress being expressed more through physical complaints than emotional symptoms, may reduce the apparent prevalence when measured using standard screening instruments [25–27]. Interpretation is further complicated by heterogeneity within these broad categories, by migrant selection, since large-scale male labour out-migration reshapes who remains in domestic agriculture and unskilled work [28], and by healthy-worker bias, whereby restricting the sample to working men plausibly excludes those whose symptoms preclude employment and compresses observable differences [29]. These structural features, rather than any true protective effect of farming, may plausibly account for the observed pattern.

Province was associated with both outcomes after adjustment. Relative to Sudurpaschim, the adjusted odds of greater depression severity were higher in Bagmati (AOR = 1.89) and Karnali (AOR = 2.65), and the odds of anxiety were higher in Koshi (AOR = 1.94), Bagmati (AOR = 1.80), and Karnali (AOR = 2.41). The elevated Karnali estimates echo the burden reported for reproductive-aged women in the same province [4], and are consistent with its status as Nepal's most remote and least-resourced region, whereas the Bagmati signal, encompassing the Kathmandu valley, may reflect urban living conditions or greater symptom recognition. These readings are still just speculation because province as a fixed effect in a single-level model can't separate composition (the traits of the people who live there) from context (the traits of the places themselves) [30]. Observed geographic variation may simply aggregate individual-level risk, or may reflect genuine area-level influences operating through health services, livelihoods, and the social-support infrastructure that shapes population risk in Nepal [3, 31]; distinguishing compositional from contextual explanations would require data containing appropriate area-level characteristics and a design capable of estimating contextual effects [32].

For age, the pattern was modest and nonlinear. The linear term was not significant while the quadratic term was ($p = 0.048$), indicating slight curvature in the age–depression relationship, whereas anxiety showed no association with age (AOR ≈ 1.00). This divergence is congruent with population evidence that internalising conditions follow nonlinear and disorder-specific age trajectories [33], although our restricted range (15–49 years) and symptom-scale measurement limit how far the curvature can be interpreted.

These cross-sectional associations support cautious, testable implications rather than firm prescriptions. Because men underreport distress and use services less, the clearest priority is improving access to forms of mental-health care that men find acceptable and approachable [15, 34, 35]. Occupational settings offer one such platform: voluntary and confidential workplace-based mental-health outreach, information, and referral could provide one route to reaching men who may not otherwise access services, with focused assessment of unskilled manual workers, who bore the highest symptom burden here. Any such effort must, however, be matched to capacity. Screening is justifiable only where reliable referral and treatment pathways exist, since case-finding without follow-through risks harm [36]. Crucially, seeing occupation as a marker, future studies should measure the conditions occupation only proxies such as job control, demand, insecurity, remuneration, migration, working hours, and hazardous exposures to identify what is actually modifiable.

This study has several strengths. It draws on a large, nationally representative survey and applies analysis appropriate to its complex, multistage design, with sampling weights, clustering, and stratification preserved throughout. Confounder selection followed a directed acyclic graph, yielding a prespecified adjustment set among the measured covariates, and the outcomes were modelled with methods matched to their structure: ordinal regression for graded depression severity, binary regression for anxiety with the proportional-odds assumption formally checked.

Several limitations temper the findings. The cross-sectional design precludes causal or temporal inference. Depression and anxiety were captured by standardized symptom screens rather than diagnostic interviews, and occupation was represented by broad categories that proxy, but do not measure, working conditions. Male underreporting of internalising symptoms may have attenuated true burden and biased occupational contrasts, and residual confounding by unmeasured factors is likely. Prevalent-case sampling is further exposed to healthy-worker selection, plausibly non-random with respect to occupation. Men working abroad were not represented in the survey. Because international labour migration is common and socially patterned by occupation, the observed occupational distribution and symptom associations may differ from those in the complete Nepali male workforce. The moderate-to-severe depression category was relatively small, limiting precision for the most severe outcomes. Finally, provincial associations, entered as fixed contrasts, cannot disentangle individual composition from contextual place effects, which would require appropriate area-level data and a design capable of estimating contextual effects.

Conclusion

In this nationally representative sample of working Nepali men, occupational position was associated with depression severity after adjustment, with lower adjusted odds among professional, sales and service, and agricultural occupations relative to unskilled manual workers, who carried the greatest descriptive symptom burden. Evidence for a comparable occupational patterning of anxiety was weaker, the overall factor test being non-significant. Because the design is cross-sectional and occupation was represented only by broad categories, these findings should be read as associations rather than causal or mechanistic effects; they map where symptom burden concentrates, not why. Establishing whether and how work shapes men's mental health in this setting will require longitudinal studies that measure the specific conditions of occupation such as control, demand, insecurity, remuneration, and hazardous exposure. In the interim, the results identify unskilled manual workers as a group warranting closer attention within Nepal's wider efforts to reach men.

Declarations

Ethics statement

The 2022 NDHS protocol was approved by the Ethical Review Board of the Nepal Health Research Council (Ref. No. 678; 494/2021 P) and the ICF Institutional Review Board (ICF Project No. 180657.0.001.NP.DHS.01). All methods were performed in accordance with the Declaration of Helsinki and the National Ethical Guidelines for Health Research in Nepal, 2022. No additional approval was required for this secondary analysis of anonymised data obtained with permission from The DHS Program.

Consent to participate

Informed consent was obtained from all respondents by the 2022 NDHS implementing team before interview, with additional consent from a parent or guardian for respondents aged 15–17 years. The authors had no contact with participants.

Consent to publish

Not Applicable

Competing interests

The authors declare that they have no competing interests.

Data availability

The 2022 Nepal Demographic and Health Survey dataset (Men's Recode) analysed in this study is available from the DHS Program after registration and approval at https://dhsprogram.com/data/available-datasets.cfm. The authors cannot redistribute the dataset because access is governed by DHS Program terms.

Clinical trial number

Not Applicable

Funding statement

This study did not receive any funding.

References

1. Santomauro DF, Mantilla Herrera AM, Shadid J, Zheng P, Ashbaugh C, Pigott DM, et al. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021;398(10312):1700–12. 10.1016/S0140-6736(21)02143-7.
2. Dhimal M, Dahal S, Adhikari K, Koirala P, Bista B, Luitel N, et al. A Nationwide Prevalence of Common Mental Disorders and Suicidality in Nepal: Evidence from National Mental Health Survey, 2019–2020. J Nepal Health Res Counc. 2022;19 4:740–7. 10.33314/jnhrc.v19i04.4017.
3. Axinn WG, Choi KW, Ghimire DJ, Cole F, Hermosilla S, Benjet C, et al. Community-Level Social Support Infrastructure and Adult Onset of Major Depressive Disorder in a South Asian Postconflict Setting. JAMA Psychiatry. 2022;79(3):243–9. 10.1001/jamapsychiatry.2021.4052.
4. Noor STA, Yeasar S, Siddique S, Banik R, Raza S, Prevalence. Determinants and Wealth-Related Inequality of Anxiety and Depression Symptoms Among Reproductive-Aged Women (15–49 Years) in Nepal: An Analysis of Nationally Representative Nepal Demographic and Health Survey Data 2022. Depress Anxiety. 2025;2025(1):9942669. 10.1155/da/9942669.

5. DeBate R, Gatto A, Rafal G, Bleck J. A qualitative assessment of mental health literacy and help-seeking behaviors among male college students. Discov Ment Health. 2022;2(1):23. 10.1007/s44192-022-00028-9.
6. Valerius K, von Eitzen L, Göbel M, Ohlbrecht H, van den Berg N, Völzke H, et al. Value-related attitudes towards mental health problems and help-seeking barriers: a sequential mixed-methods design investigating participants with reported depressive episodes in rural Northern Germany with and without treatment experience. BMC Psychiatry. 2024;24(1):153. 10.1186/s12888-024-05521-9.
7. Pulkki-Råback L, Ahola K, Elovainio M, Kivimäki M, Hintsanen M, Isometsä E, et al. Socio-economic position and mental disorders in a working-age Finnish population: the health 2000 study. Eur J Public Health. 2012;22(3):327–32. 10.1093/eurpub/ckr127.
8. Ervasti J, Vahtera J, Pentti J, Oksanen T, Ahola K, Kivimäki M, et al. Depression-Related Work Disability: Socioeconomic Inequalities in Onset, Duration and Recurrence. PLoS ONE. 2013;8(11):e79855. 10.1371/journal.pone.0079855.
9. Salas ML, Quezada S, Basagoitia A, Fernandez T, Herrera R, Parra M, et al. Working Conditions, Workplace Violence, and Psychological Distress in Andean Miners: A Cross-sectional Study Across Three Countries. Ann Glob Health. 2015. 10.1016/j.aogh.2015.06.002.
10. Shawon MSR, Hossain F, Hasan M, Rahman MR. Gender differences in the prevalence of anxiety and depression and care seeking for mental health problems in Nepal: Analysis of nationally representative survey data. Camb Prisms Glob Ment Health. 2024;11. 10.1017/gmh.2024.37.
11. Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. Can Med Assoc J. 2012;184(3):E191. 10.1503/cmaj.110829.
12. Ministry of Health and Population [Nepal], New ERA. ICF. Nepal Demographic and Health Survey 2022 [Internet]. Kathmandu, Nepal: Ministry of Health and Population [Nepal]; 2023. Available from: https://dhsprogram.com/publications/publication-FR379-DHS-Final-Reports.cfm
13. Smith DT, Mouzon DM, Elliott M. Reviewing the Assumptions About Men's Mental Health: An Exploration of the Gender Binary. Am J Mens Health. 2016;12:78–89. 10.1177/1557988316630953.
14. Hossain MM, Rahman M, Trisha F, Tasnim S, Nuzhath T, Hasan T, et al. Prevalence of anxiety and depression in South Asia during COVID-19: A systematic review and meta-analysis. Heliyon. 2020;7:e06677–06677. 10.1016/j.heliyon.2021.e06677.
15. Staiger T, Stiawa M, Mueller-Stierlin A, Kilian R, Beschoner P, Gündel H, et al. Masculinity and Help-Seeking Among Men With Depression: A Qualitative Study. Front Psychiatry. 2020;11. 10.3389/fpsyt.2020.599039.
16. Shi P, Yang A, Zhao Q, Chen Z, Ren X, Dai Q. A Hypothesis of Gender Differences in Self-Reporting Symptom of Depression: Implications to Solve Under-Diagnosis and Under-Treatment of Depression in Males. Front Psychiatry. 2021;12. 10.3389/fpsyt.2021.589687.
17. Rönnblad T, Grönholm E, Jonsson J, Koranyi I, Orellana C, Kreshpaj B, et al. Precarious employment and mental health: a systematic review and meta-analysis of longitudinal studies. Scand J Work

Environ Health. 2019. 10.5271/sjweh.3797.

18. Madsen I, Nyberg S, Hanson L, Ferrie J, Ahola K, Alfredsson L, et al. Job strain as a risk factor for clinical depression: systematic review and meta-analysis with additional individual participant data. Psychol Med. 2017;47:1342–56. 10.1017/s003329171600355x.
19. Rugulies R, Aust B, Madsen I. Effort-reward imbalance at work and risk of depressive disorders. A systematic review and meta-analysis of prospective cohort studies. Scand J Work Environ Health. 2017;43 4:294–306. 10.5271/sjweh.3632.
20. Seidler A, Schubert M, Freiberg A, Drössler S, Hussenoeder FS, Conrad I, et al. Psychosocial Occupational Exposures and Mental Illness. Dtsch Arztebl Int. 2022;119(42):709–15. 10.3238/arztebl.m2022.0295.
21. Lund C, Breen A, Flisher A, Kakuma R, Corrigall J, Joska J, et al. Poverty and common mental disorders in low and middle income countries: A systematic review. Soc Sci Med 1982. 2010;71:517–28. 10.1016/j.socscimed.2010.04.027.
22. Barrass L, Joshi E, Dawe J, Rubbo B, Redaniel MT, Riglin L, et al. The association between socioeconomic position and depression or suicidal ideation in low- and middle-income countries in Southeast Asia: a systematic review and meta-analysis. BMC Public Health. 2024;24. 10.1186/s12889-024-20986-9.
23. Bender R, Lange S. Adjusting for multiple testing–when and how? J Clin Epidemiol. 2001;54 4:343–9. 10.1016/s0895-4356(00)00314-0.
24. Stansfeld S, Candy B. Psychosocial work environment and mental health–a meta-analytic review. Scand J Work Environ Health. 2006;32 6:443–62. 10.5271/sjweh.1050.
25. Karasek RA. Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. Adm Sci Q. 1979;24(2):285–308. 10.2307/2392498.
26. Riethmuller ML, Newnham EA, Mcevoy P. Supporting mental health in farming communities where and when it is needed most: A longitudinal analysis of risk and protective factors. Soc Sci Med. 2024;361:117381. 10.1016/j.socscimed.2024.117381.
27. Kleinman A. Neurasthenia and depression: A study of somatization and culture in China. Cult Med Psychiatry. 1982;6:117–90. 10.1007/bf00051427.
28. Devkota H, Bhandari B, Adhikary P. Perceived mental health, wellbeing and associated factors among Nepali male migrant and non-migrant workers: A qualitative study. J Migr Health. 2020;3. 10.1016/j.jmh.2020.100013.
29. Li CY, Sung F. A review of the healthy worker effect in occupational epidemiology. Occup Med. 1999;49 4:225–9. 10.1093/occmed/49.4.225.
30. Macintyre S, Ellaway A, Cummins S. Place effects on health: how can we conceptualise, operationalise and measure them? Soc Sci Med. 2002;55 1:125–39. 10.1016/s0277-9536(01)00214-3.
31. Mair C, Roux A, Galea S. Are neighbourhood characteristics associated with depressive symptoms? A review of evidence. J Epidemiol Community Health. 2008;62:940–6. 10.1136/jech.2007.066605.

32. Diez Roux AV. Investigating Neighborhood and Area Effects on Health. Am J Public Health. 2001;91(11):1783–9. 10.2105/AJPH.91.11.1783.
33. van Loo HV, Beijers L, Wieling M, de Jong TD, Schoevers R, Kendler K. Prevalence of internalizing disorders, symptoms, and traits across age using advanced nonlinear models. Psychol Med. 2021;53:78–87. 10.1017/s0033291721001148.
34. Luitel N, Jordans M, Kohrt B, Rathod S, Komproe I. Treatment gap and barriers for mental health care: A cross-sectional community survey in Nepal. PLoS ONE. 2017;12. 10.1371/journal.pone.0183223.
35. Lacey L, Mishra N, Mukherjee P, Prakash N, Prakash N, Quinn D, et al. Can destigmatizing mental health increase willingness to seek help? Experimental evidence from Nepal. J Policy Anal Manage. 2024. 10.1002/pam.22643.
36. Gilbody S, House A, Sheldon T. Screening and case finding instruments for depression. Cochrane Database Syst Rev. 2005;4:CD002792. 10.1002/14651858.cd002792.pub2.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryFile.docx