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Associations of anxiety and depression with quality of life: the mediating role of sleep quality in a Mongolian sample

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Abstract: Anxiety and depression are among the most common mental disorders and are strongly associated with reduced quality of life (QOL). In this cross-sectional study, we examined the associations of anxiety and depression with four QOL domains, namely, physical, psychological, social, and environmental, among Mongolian adults, and tested whether sleep quality mediates these relationships. Although previous Mongolian studies have examined anxiety, depression, and sleep, none of them have tested sleep quality as a mediator of their effect on QOL. A total of 534 adults completed the Hospital Anxiety and Depression Scale (HADS), the World Health Organization Quality of Life–BREF self-report measure (WHOQOL-BREF), and the Pittsburgh Sleep Quality Index (PSQI), each previously translated and validated for the Mongolian population. Associations were assessed using Pearson correlations and multiple regressions, and indirect effects were estimated through mediation analysis. Higher anxiety and depression scores were significantly associated with lower QOL across all domains ($p < .001$). Poor sleep quality, reported by 43% of participants, was associated with higher anxiety and depression and lower QOL. Mediation analyses showed that sleep quality partially mediated the associations between anxiety/depression and QOL, most strongly in the physical and environmental domains. These findings indicate that sleep quality is a modifiable factor that may be targeted to reduce the impact of psychological distress on well-being. Culturally adapted interventions addressing both mental health and sleep may yield meaningful public health benefits in Mongolia.

Keyword: mental health, mediation analysis, sleep quality, quality of life, Mongolia;

INTRODUCTION

Anxiety and depression are among the most prevalent mental disorders worldwide and contribute substantially to the global burden of disease. In 2015, depression affected

more than 300 million people and anxiety disorders more than 260 million [1] across the globe.

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Beyond their prevalence, these conditions impair emotional, cognitive, and physical functioning, reduce social participation and occupational productivity, and they rank among the leading contributors to disability-adjusted life years (DALYs) lost [2]. Understanding the mechanisms through which they erode well-being is therefore an urgent public health priority.

Quality of life (QOL) is a multidimensional construct encompassing an individual's perception of their position in life within the relevant cultural and value context, including personal goals, standards, and concerns [3]. Across cultural settings, higher anxiety and depression are consistently associated with lower QOL [4], [5]. These effects are not uniform across domains: depression, characterised by fatigue, anhedonia, and reduced motivation, most strongly affect the physical and psychological domains, whereas anxiety, marked by hyperarousal and avoidance, more often impairs social and environmental functioning [11], [12]. Cross-cultural work suggests that collectivist societies tend to report greater impairment in social domains and individualist societies in psychological well-being [4], [5], and even subthreshold symptoms can diminish daily functioning and life satisfaction, indicating that the relationship between distress and QOL is dimensional rather than categorical [13].

Although the association between mental health and QOL has been well established, the pathways linking them remain unclear. Sleep quality is an increasingly recognized candidate. Poor sleep is not only a common symptom of anxiety and depression, but may also contribute causally to their onset and persistence [6]. Sleep disturbances, including difficulty initiating or maintaining sleep, non-restorative sleep, and disrupted circadian rhythms, impair immune function, elevate systemic inflammation, and destabilise emotional regulation and cognitive performance [7], [8]. The allostatic load framework offers a theoretical basis for this pathway, chronic

stressors such as persistent worry or rumination dysregulate physiological systems over time, with disturbed sleep acting as both a consequence of, and a contributor to, this dysregulation [16]. From this perspective, sleep is not merely a symptom but a potential mechanism through which psychological distress lowers QOL, and one that is modifiable and therefore, relevant to intervention.

Empirical studies support a mediating role for sleep. Sleep quality has been shown to partially explain the association between depressive symptoms and QOL in community-dwelling older adults [7], and Ichikawa et al. reported that sleep disturbance mediated the depression–QOL relationship in Japanese patients with type 1 diabetes, indicating that the pathway operates in both clinical and non-clinical samples [17]. Longitudinal Chinese studies have likewise found that poor sleep partially mediates associations between cognitive decline and depressive symptoms [18], [19]. This evidence, however, derives largely from high-income countries and is scarce in low- and middle-income settings.

In Mongolia, population studies estimate the prevalence of anxiety and depression at 9.9% and 4.9%, respectively [14], and confirm that both significantly predict lower QOL across domains [9], [15]. A validation study of the Mongolian Pittsburgh Sleep Quality Index found that 43% of adults reported poor sleep quality, which was associated with higher anxiety and depression and lower QOL [10], elevated rates of sleep disturbance have also been documented in occupational groups, such as coal miners [20]. Complementary Mongolian psychometric work has extended the locally validated instrument base to fatigue assessment [21]. These findings are particularly concerning given Mongolia's limited access to specialist mental health care and its distinctive socio-environmental context, including a harsh climate, rapid socioeconomic change, and marked urban–rural disparities. Despite this groundwork, no study has examined whether sleep quality mediates the effects

of anxiety and depression on QOL in the Mongolian population.

The present study is an attempt to address this gap. The associations of anxiety and depression with the four QOL domains in Mongolian adults were examined and tested whether sleep quality mediates these relationships. We hypothesised that (a) anxiety and depression would be negatively associated with QOL, and (b) sleep quality would partially mediate these associations across all four domains.

MATERIALS AND METHODS

Study design and participants

This cross-sectional study included 534 Mongolian adults (288 men, 53.9%; 246 women, 46.1%) recruited from five *aimags* (provinces), Selenge ($n = 128$, 24.0%), Ulaanbaatar ($n = 119$, 22.3%), Bayan-Ulgii ($n = 116$, 21.7%), Khentii ($n = 100$, 18.7%), and Sukhbaatar ($n = 71$, 13.3%). The mean age was 33.8 years ($SD = 7.83$, range = 18–61). With respect to marital status, 67.6% ($n = 361$) were married, 16.7% ($n = 89$) had never married, and 15.7% ($n = 84$) reported other statuses. Educational attainment was approximately balanced, with 48.9% ($n = 261$) reporting secondary education and 51.1% ($n = 273$) higher education. Occupational settings varied, 57.1% ($n = 305$) worked in a typical environment, 14.6% ($n = 78$) in a public or state service, 6.9% ($n = 37$) in hazardous conditions, and 21.3% ($n = 114$) in other occupations.

Participants were recruited by convenience sampling from community centers, workplaces, and schools. Inclusion criteria were (a) age 18 years or older, (b) Mongolian-speaking, and (c) ability to provide informed consent.

Ethical approval

The study protocol and the procedures for informed consent were approved by the Institutional Review Board and Ethics Committee of the Mongolian National University of Medical Sciences on 5 March 2020.

Written informed consent was obtained from all participants before data collection, and participation was voluntary and anonymous.

Measures

Anxiety and depression (HADS)

Anxiety and depressive symptoms were assessed with the Hospital Anxiety and Depression Scale (HADS) [22], a 14-item self-report instrument comprising two seven-item subscales for anxiety and depression. Items are rated on a four-point scale (0–3), with higher scores indicating greater symptom severity. The HADS has demonstrated good reliability and validity across diverse populations [23] and has been translated and validated for use with Mongolian adults [10]. In the present sample, Cronbach's alpha was .735.

Sleep quality (PSQI)

Sleep quality was measured with the Pittsburgh Sleep Quality Index (PSQI) [24], a 19-item self-report questionnaire assessing subjective sleep quality over the previous month. It yields a global score (0–21) and seven component scores: sleep duration, sleep disturbance, sleep latency, daytime dysfunction, sleep efficiency, overall sleep quality, and use of sleep medication. Higher scores indicate poorer sleep quality, and a global score above 5 indicates poor sleep. The PSQI has been validated in the Mongolian adult population [10]. In the present sample, Cronbach's alpha was .711.

Quality of life (WHOQOL-BREF)

QOL was assessed with the World Health Organization Quality of Life–BREF (WHOQOL-BREF) [3], a 26-item instrument measuring four domains, namely physical, psychological, social, and environmental, over the previous two weeks. Items were rated on a five-point scale, and domain scores were transformed to a 0–100 scale, with higher scores indicating better QOL. The Mongolian version has been validated in the adult population [9]. In the present sample, Cronbach's alpha was .892.

Statistical analyses

All analyses were performed using JAMOV and IBM SPSS Statistics 25.0. Continuous variables are presented as mean $\pm$ standard deviation. Group differences were examined using independent-samples t-tests and one-way analysis of variance (ANOVA), with Tukey post-hoc comparisons, where appropriate. Associations among anxiety, depression, sleep quality, and QOL domains were assessed using Pearson correlation coefficients. Multiple linear regression models examined the effects of anxiety and depression on each QOL domain, and multicollinearity was evaluated using tolerance and the variance inflation factor (VIF). Binary logistic regression was used to identify predictors of good versus poor status in each QOL domain. Mediation analyses tested the indirect effect of anxiety

and depression on QOL through sleep quality. Indirect effects were estimated using a bootstrap mediation approach with 5,000 resamples, and mediation was considered significant when the 95% confidence interval for the indirect effect did not include zero. Statistical significance was set at $p < .05$ (two-sided).

RESULTS AND DISCUSSION

Descriptive statistics

The mean anxiety score was 6.82 (SD = 3.40, range 0–17) and the mean depression score was 6.03 (SD = 2.94, range 0–15). The mean global PSQI score was 8.53 (SD = 2.81, range 2–17), indicating poor sleep quality on average. Mean QOL domain scores were 65.3 (SD = 15.6) for physical, 73.6 (SD = 14.0) for psychological, 74.9 (SD = 19.1) for social, and 62.1 (SD = 17.7) for environmental QOL (Table 1).

Table 1. Mean, median, standard deviation, minimum, and maximum of the study variables.

	Anxiety	Depression	PSQI	PhQOL	PsQOL	SQOL	EQOL
Mean	6.82	6.03	8.53	65.3	73.6	74.9	62.1
Median	7	6	8	66.9	75	75	62.5
SD	3.40	2.94	2.81	15.6	14.0	19.1	17.7
Minimum	0	0	2	25	29.2	16.7	6.25
Maximum	17	15	17	100	100	100	100

Note: PSQI = Pittsburgh Sleep Quality Index; PhQOL = physical, PsQOL = psychological, SQOL = social, EQOL = environmental quality of life.

Group comparisons

Differences in anxiety, depression, sleep quality, and the four QOL domains by gender, education, place of residence, occupational condition, and marital status were examined using independent-samples t-tests and one-way ANOVA (Table 2). No significant differences emerged over gender, education, or marital status ($p > .05$). Anxiety differed by place of residence ($F = 2.49$, $p = .04$); post-hoc comparisons indicated that participants in

Sukhbaatar *aimag* ($M = 7.58$, $SD = 3.64$) reported higher anxiety than those in Bayan-Ulgii *aimag* ($M = 6.16$, $SD = 2.99$). Anxiety and social QOL also differed by occupational condition ($F = 2.83$ and $F = 3.14$, respectively, $p < .05$); individuals in hazardous occupations reported lower anxiety ($M = 5.92$) and higher social QOL ($M = 81.8$) than the “other” occupational group ($M = 7.48$ and $M = 72.4$, respectively).

Table 2. Group differences in study variables by demographic characteristics.

Variable	Gender t	p	Education t	p	Residency F	p	Occupation F	p	Marital F	p
Anxiety	1.71	>.05	-1.54	.12	2.49	.04	2.83	.041	2.79	>.05
Depression	0.02	>.05	-1.14	.25	0.44	>.05	1.36	>.05	1.01	>.05
Sleep quality	1.19	>.05	1.00	.32	0.65	>.05	0.43	>.05	1.21	>.05
PhQOL	-1.02	>.05	0.56	.58	0.70	>.05	1.78	>.05	0.54	>.05
PsQOL	-0.78	>.05	1.80	.07	0.28	>.05	1.02	>.05	1.00	>.05
SQOL	0.21	>.05	1.88	.06	0.73	>.05	3.14	.028	1.49	>.05
EQOL	-0.32	>.05	1.17	.24	0.88	>.05	1.86	>.05	0.01	>.05

Correlations

Pearson correlations (Figure 1) showed that higher anxiety was significantly associated with poorer sleep quality ($r = .392$, $p < .01$) and lower physical ($r = -.385$), psychological ($r = -.344$), social ($r = -.271$), and environmental ($r = -.300$) QOL (all $p < .01$) domains. Higher depression was similarly associated with poorer sleep quality ($r = .295$) and lower physical ($r = -.324$), psychological ($r =$

$-.357$), social ($r = -.280$), and environmental ($r = -.210$) QOL (all $p < .01$) domains. Sleep quality was inversely related to all QOL domains, most strongly with the physical domain ($r = -.451$), followed by the environmental ($r = -.321$), social ($r = -.241$), and psychological ($r = -.276$) domains (all $p < .01$). These patterns are consistent with a mediating role for sleep quality.

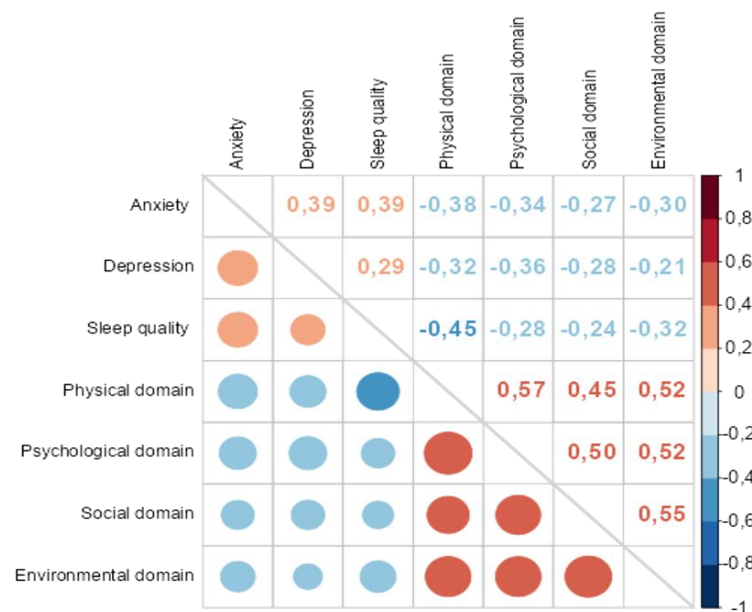


Figure 1. Pearson correlations among anxiety, depression, sleep quality (PSQI), and the four WHOQOL-BREF domains.

Multiple linear regression

Multiple linear regression models examined the effects of anxiety and depression (z-standardised, entered simultaneously) on each QOL domain. All four models were statistically significant. For the physical domain, the model

explained 18.4% of the variance ($F = 59.82$, $p < .001$, $R^2 = .184$); both anxiety ($\beta = -.305$, $p < .001$) and depression ($\beta = -.205$, $p < .001$) were significant negative predictors. For the psychological domain, the model explained 17.7% of the variance ($F = 57.03$, $p < .001$, $R^2 = .177$), with both

anxiety ($\beta = -.241$) and depression ($\beta = -.263$) significant ($p < .001$). For the social domain, the model explained 11.0% of the variance ($F = 32.79$, $p < .001$, $R^2 = .110$), with anxiety ($\beta = -.192$) and depression ($\beta = -.205$) both significant ($p < .001$). For the environmental domain, the model explained 10.1% of the variance ($F = 29.67$, $p < .001$, $R^2 = .101$); anxiety ($\beta = -.257$, $p < .001$) was a stronger predictor than depression ($\beta = -.111$, $p = .014$). Multicollinearity was not a concern (tolerance = .847, VIF = 1.180 across models).

Logistic regression

Binary logistic regression models examined predictors of good versus poor status in the physical, psychological, social, and environmental QOL domains, adjusting for demographic variables. For the physical domain, the model was significant, $\chi^2(9) = 108.65$, $p < .001$, explaining 18.4% (Cox & Snell R^2) to 24.5% (Nagelkerke R^2) of the variance and correctly classifying 68.7% of cases. Higher anxiety (OR = 0.617, 95% CI [0.491, 0.777], $p < .001$) and poorer sleep quality (OR = 0.506, 95% CI [0.403, 0.634], $p < .001$) were associated with lower odds of good physical QOL (Table 3).

Table 1. Logistic regression results for predictors in the physical domain.

Physical domain					
	B	S.E.	Wald	p	OR
Age	0.006	0.014	0.202	0.653	1.006
Gender	0.161	0.198	0.657	0.418	1.174
Marital status	0.197	0.144	1.872	0.171	1.218
Education	-0.181	0.195	0.860	0.354	0.835
Residency	-0.038	0.066	0.319	0.572	0.963
Occupational condition	-0.012	0.081	0.020	0.886	0.988
Anxiety	-0.482	0.117	16.950	0.000	0.617
Depression	-0.160	0.108	2.186	0.139	0.852
Constant	-0.561	0.673	0.697	0.404	0.570

For the psychological domain, the model was significant, $\chi^2(9) = 86.04$, $p < .001$, explaining 14.9% (Cox & Snell R^2) to 19.9% (Nagelkerke R^2) of the variance and correctly classifying 66.1% of cases. Higher anxiety (OR = 0.69, 95% CI [0.55, 0.86], $p = .001$) and higher depression (OR = 0.59, 95% CI [0.47, 0.73], $p < .001$) were

associated with lower odds of good psychological QOL. Marital status and sleep quality were marginally significant ($p = .063$ and $.062$, respectively); other predictors were not significant ($p > .1$) (Table 4).

Table 2. Logistic regression results for predictors in the psychological domain.

Psychological domain					
	B	S.E.	Wald	p	OR
Age	0.014	0.014	1.040	0.308	1.014
Gender	0.168	0.194	0.743	0.389	1.183
Marital status	-0.266	0.143	3.460	0.063	0.767
Education	0.288	0.191	2.265	0.132	1.333
Residency	-0.072	0.066	1.171	0.279	0.931
Occupational condition	-0.029	0.079	0.137	0.711	0.971
Anxiety	-0.371	0.112	10.999	0.001	0.690
Depression	-0.531	0.111	23.004	0.000	0.588
Constant	-0.031	0.662	0.002	0.962	0.969

For the social domain, the model was significant, $\chi^2(9) = 74.12$, $p < .001$, explaining 13.0% (Cox & Snell R^2) to 17.6% (Nagelkerke R^2) of the variance and correctly classifying 67.6% of cases. Higher anxiety (OR = 0.72, $p = .003$), higher

depression (OR = 0.65, $p < .001$), and poorer sleep quality (OR = 0.73, $p = .003$) were associated with lower odds of good social QOL; demographic predictors were not significant ($p > .05$) (Table 5).

Table 3. Logistic regression results for predictors in the social domain.

Social domain					
	B	S.E.	Wald	p	OR
Age	0.018	0.014	1.671	0.196	1.018
Gender	-0.304	0.198	2.361	0.124	0.738
Marital status	-0.069	0.144	0.234	0.629	0.933
Education	0.327	0.194	2.852	0.091	1.387
Residency	0.052	0.067	0.604	0.437	1.054
Occupational condition	0.043	0.081	0.282	0.595	1.044
Anxiety	-0.329	0.112	8.651	0.003	0.720
Depression	-0.429	0.110	15.273	0.000	0.651
Constant	-0.192	0.663	0.084	0.772	0.825

For the environment domain, the model was statistically significant, $\chi^2(9) = 68.46$, $p < .001$, explaining between 12.0% (Cox & Snell R^2) and 16.1% (Nagelkerke R^2) of the variance in environmental QOL, and correctly classified 65.7% of cases. Higher education level (B = 0.42, $p = .025$, OR = 1.52, 95% CI [1.05, 2.20]), lower anxiety (B = -0.33, $p = .003$, OR = 0.72,

95% CI [0.58, 0.90]), and better sleep quality (B = -0.47, $p < .001$, OR = 0.62, 95% CI [0.51, 0.77]) were associated with higher odds of reporting good environmental QOL. Age, gender, marital status, residency, occupational condition, and depression scores were not significant statistically ($p > .05$) (Table 6).

Table 4. Logistic regression results for predictors in the environmental domain.

Environmental domain					
	B	S.E.	Wald	p	OR
Age	0.004	0.013	0.082	0.775	1.004
Gender	0.107	0.191	0.314	0.575	1.113
Marital status	-0.109	0.139	0.616	0.432	0.897
Education	0.421	0.188	5.024	0.025	1.524
Residency	0.054	0.065	0.689	0.407	1.055
Occupational condition	0.077	0.078	0.953	0.329	1.080
Anxiety	-0.326	0.110	8.776	0.003	0.721
Depression	-0.150	0.105	2.026	0.155	0.861
Constant	-0.811	0.647	1.573	0.210	0.444

Mediation analyses

Mediation analyses examined whether sleep quality mediated the associations of anxiety and depression with the four QOL domains.

For anxiety, a mediation model tested whether sleep quality mediated the relationship between anxiety and the physical, psychological, social, and environmental domains of QOL (Figure 2). Anxiety was significantly associated with

poorer sleep quality ($a = .399$). Sleep quality, in turn, was negatively associated with the physical ($b_1 = -.345$), psychological ($b_2 = -.158$), social ($b_3 = -.146$), and environmental ($b_4 = -.233$) domains. The direct effects of anxiety remained significant across all domains: physical ($c_1 = -.243$), psychological ($c_2 = -.257$), social ($c_3 = -.197$), and environmental ($c_4 = -.203$). The indirect effects indicated partial mediation, with sleep quality accounting for 36.2% of the total effect on the physical domain ($a \times b_1 =$

$-.138$, 95% CI $[-.182, -.100]$), 19.6% on the psychological domain ($a \times b_2 = -.0629$, 95% CI $[-.107, -.028]$), 22.8% on the social domain ($a \times b_3 = -.0582$, 95% CI $[-.101, -.028]$), and 31.4% on the environmental domain ($a \times b_4 = -.0829$, 95% CI $[-.133, -.056]$). All indirect effects were significant, as none of the confidence intervals included zero. Thus, sleep quality was a substantial but partial mediator of the association between higher anxiety and poorer QOL.

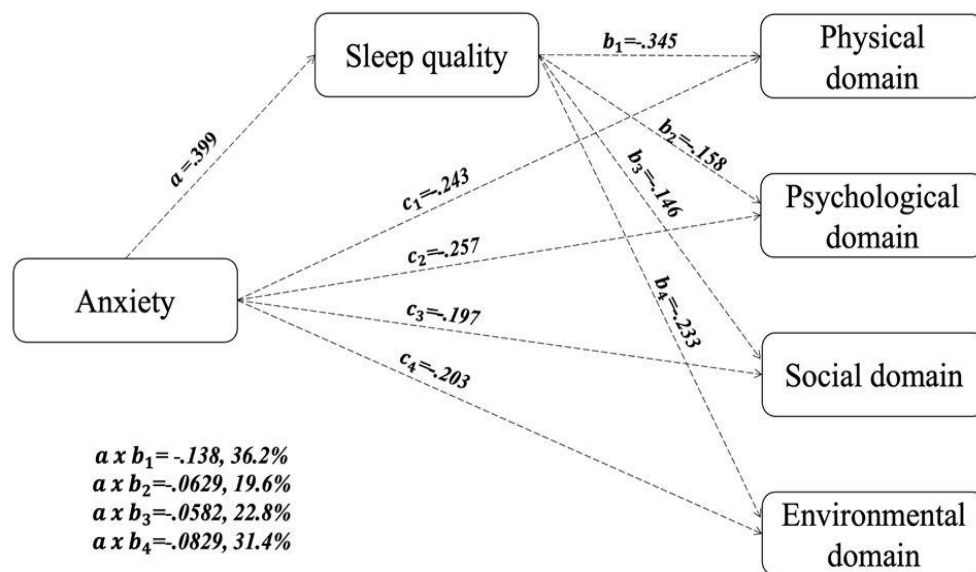


Figure 2. Mediation model of the relationship between anxiety and quality of life through sleep quality.

For depression, a parallel mediation model tested whether sleep quality mediated the relationship between depression and the four QOL domains (Figure 3). Depression was significantly associated with poorer sleep quality ($a = .301$). Sleep quality was negatively associated with the physical ($b_1 = -.379$), psychological ($b_2 = -.176$), social ($b_3 = -.160$), and environmental ($b_4 = -.275$) domains. The direct effects of depression were significant for each domain: physical ($c'_1 = -.208$), psychological ($c'_2 = -.281$), social ($c'_3 = -.216$), and environmental ($c'_4 = -.126$). Sleep quality partially mediated

these associations, accounting for 35.4% of the total effect on the physical domain ($a \times b_1 = -.114$, 95% CI $[-.151, -.080]$), 15.9% on the psychological domain ($a \times b_2 = -.031$, 95% CI $[-.088, -.029]$), 18.2% on the social domain ($a \times b_3 = -.0482$, 95% CI $[-.079, -.026]$), and 39.4% on the environmental domain ($a \times b_4 = -.0827$, 95% CI $[-.116, -.053]$). All indirect effects were significant, as none of the confidence intervals included zero. The largest mediated proportions occurred for the environmental and physical domains.

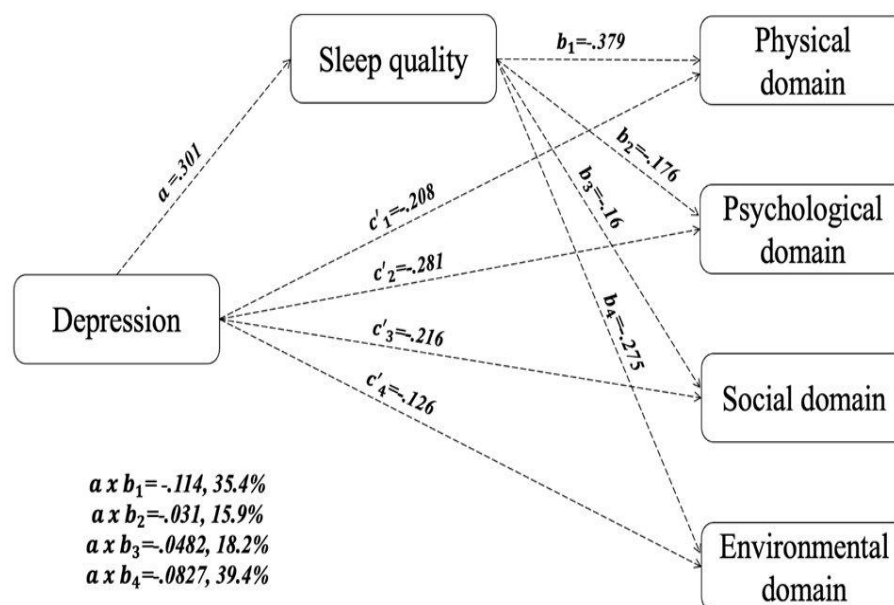


Figure 3. Mediation model of the relationship between depression and quality of life through sleep quality.

This study examined the associations of anxiety and depression with four domains of quality of life in Mongolian adults and tested whether sleep quality mediates these relationships. Consistent with previous research [9], higher anxiety and depression were significantly associated with poorer QOL across all domains. Importantly, sleep quality emerged as a significant partial mediator, supporting the view that it is a modifiable mechanism through which psychological distress diminishes well-being rather than being merely a co-occurring symptom.

The strength of mediation varied across domains. Sleep quality mediated the largest proportions of the effects of anxiety and depression on the physical and environmental domains, whereas mediation was weaker in the psychological and social domains. This pattern is consistent with the allostatic load framework, chronic distress and disrupted sleep act primarily through physiological pathways, such as fatigue, reduced vitality, and impaired physical functioning, that map most directly onto physical and environmental QOL [16], [17]. The weaker mediation in the psychological and social domains suggests that additional factors, including cognitive appraisal, coping style, and social support, may carry more of the effect in those areas.

Anxiety was a stronger predictor of environmental QOL than depression, while both contributed comparably to physical and psychological QOL. This may reflect the hyperarousal and vigilance characteristic of anxiety, which can heighten sensitivity to environmental stressors, such as noise, crowding, and safety concerns, whereas both conditions undermine health-related and cognitive-emotional functioning.

From a public health perspective, the high prevalence of poor sleep quality observed here (43%) is notable and consistent with prior Mongolian validation work [10]. Mongolia's distinctive socio-environmental context, including a harsh climate, marked urban–rural disparities, rapid socio-economic change, and limited access to specialist mental health care, may intensify both sleep disturbance and psychological distress. Interventions that target sleep health, alongside mental health screening and treatment may, therefore, yield broad benefits for population QOL. Because the sample has been under-represented in the international literature, these findings also extend the cross-cultural evidence base, while underscoring the importance of local context in designing interventions.

Several limitations should be noted. The cross-sectional design precludes causal inference, and the use of self-report measures may introduce social desirability and recall biases. Convenience sampling limits generalisability, particularly to remote rural communities. Future studies should employ longitudinal designs, objective measures of sleep such as actigraphy, and representative sampling to strengthen causal and population-level inferences.

CONCLUSIONS

Anxiety and depression are significantly associated with poorer physical, psychological, social, and environmental quality of life in Mongolian adults, and sleep quality partially mediates these associations. Sleep quality thus represents a promising, modifiable target for reducing the impact of psychological distress on well-being. Given the high prevalence of poor sleep in Mongolia, public health strategies that combine sleep-health promotion with mental health screening and treatment could produce meaningful gains in population QOL. Such interventions should be culturally adapted and address mental health and sleep quality together to optimise outcomes across domains.

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Author contributions

E.T. conceived the concept and completed the interpretation of data, data analysis, drafting of the manuscript, and revision of the manuscript. G.T-O., O.G., and T.J. contributed to data collection and interpretation of data. S.N. and N.B. contributed to developing items and drafting the manuscript. U.B. and K.B. contributed to the revision of the manuscript. T.D. contributed to data collection. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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