



Depression and suicidal ideation: association of physical, mental, social, and spiritual health status

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Abstract

Purpose The aim of this study was to determine if multidimensional (physical, mental, social, spiritual) health status could predict the presence of depressive symptoms and suicidal ideation in the general population.

Methods We administered a population-based, cross-sectional survey to 1200 participants from the general Korean population. The survey included the 5 Health Status Questionnaire (SHSQ) for self-rated health status, Patient Health Questionnaire-9 (PHQ-9) for depression, and a question from the PHQ-9 for suicidal ideation. Multiple logistic regression was performed to estimate the association of significant socio-demographic factors and self-rated health status with depression and suicidal ideation.

Results Physical health status was associated with depression in both men and women (men: adjusted odds ratio [aOR], 4.69; 95% confidence interval [CI] 2.44–9.00; women: aOR, 2.05; 95% CI 1.13–3.72) while spiritual health status only affected men (aOR, 5.50; 95% CI 2.59–11.65) and mental health status only women (aOR, 3.92; 95% CI 2.03–7.54). Social health status was associated with suicidal ideation in men (aOR, 4.87; 95% CI 2.74–19.99) while mental health status was associated with suicidal ideation in women (aOR, 4.31; 95% CI 1.90–9.76).

Conclusion Physical, mental, social, and spiritual self-rated health statuses were all found to be associated with an individual's predisposition to depression and suicidal ideation with notable differences between men and women.

Keywords Self-rated health status · Depression · Suicidal ideation · General population

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Introduction

Suicide and depression have become imperative issues in contemporary society [1–4]. In 2015, approximately 322 million people or 4.4% of the world's population suffered from depression [5]. Depression is a critical health condition that may further develop into chronic or recurrent medical symptoms and may degrade a patient's quality of life [6, 7]. Patients with depression often experience life-disabling symptoms such as fatigue, insomnia, lack of motivation, and hopelessness [5–9]. The burden of such clinically significant depressive symptoms may result in suicide, the ultimate consequence. National and worldwide studies have consistently indicated that depression is the main factor in more than half of the million suicidal deaths occurring each year [6, 10, 11].

Many patients often fail to recognize their symptoms and are not appropriately treated even though the depressive symptoms could be easily managed with pharmacological and psychosocial interventions [12–14]. While previous research has shown that depression is often managed in

primary care settings, underrecognition and undertreatment of depression, especially in minor depression, still occur due to poor systematic approaches in predicting, diagnosing, and treating [13–15]. There is a limited list of depression predictors that could be used in the primary care setting; thus, investigating additional predictors is necessary to enhance the patient screening, diagnosing, and treating processes before the symptoms escalate to suicide attempts.

Researchers have long demonstrated the significant relationship between depression and self-rated health status [16, 17]. Poor self-rated health status is now used as a strong predictor for depression and other psychiatric illnesses. However, it is important to note that overall health and well-being not only includes physical aspects but also integrates and balances all physical, mental, social, and spiritual health components [5, 18]. Given the broadening view of health, there is a need to investigate the relationship between depression and holistic health.

In this study, we hypothesized that a negative self-assessment of physical, social, mental, and spiritual health status would predict the presence of depression and suicidal ideation. If these health statuses were found to be associated with the severity of psychological distress, such parameters could be utilized to screen for depression and to develop a psychosocial intervention for depressed individuals. Gaining insight on self-rated physical, mental, social, and spiritual health status poses multiple positive societal implications that may reduce worldwide depression and suicide rates.

Methods

Participants and data collection

The study is a secondary analysis of a cross-sectional, descriptive study that investigated the general Korean population's perspective of health-related issues by Lee et al. [1]. The survey included Koreans who are older than 20 and are currently living in one of the fifteen main provinces. Based on the guidelines provided by the 2016 Census of Korea, the data were further stratified into age and gender. Using the probability-proportional-to-size sampling method, we included 4000 eligible respondents who were over 18 and showed a strong understanding of the survey purposes. With a response rate of 30%, the total number of 1200 people completed the survey, in which 592 respondents were men and 608 respondents were women. Over the course of two months (March–May 2018), proficient and knowledgeable interviewers of the World Research Co. Ltd distributed the self-administered questionnaire. This comprehensive study was accepted by the Institutional Review Board of Seoul National University College of Medicine (IRB No: 1804–024–934).

Depression and suicidal ideation were measured by Patient Health Questionnaire-9 (PHQ-9), a scale that diagnoses depression and measures its severity [19]. Each of the nine items can be scored from 0 to 3, resulting in a summed total score between 0 and 27, with higher scores indicative of increased depression severity. PHQ-9 total scores are categorized as: 0–4 (minimal), 5–9 (mild), 10–14 (moderate), 15–19 (moderately severe), and 20 or more (severe depression). The last question, “[T]hought that you would be better off dead or of hurting yourself in some way,” was assessed by how often participants had these thoughts over the past two weeks (0 = not at all, 1 = 3 ~ 4 days, 2 = 8 ~ 10 days, 3 = 12 ~ 14 days). In this study, presence of depression was determined by the PHQ-9 scale with the cut-off score of 5 or greater, including mild, moderate, and severe depression, and suicidal ideation was measured by the item 9 score of 1 or greater.

Measurement

To measure self-rated multidimensional health status, 5 Health Status Questionnaire (5HSQ) [20] was included in the survey. The five dimensions of health were assessed by the following questions: (1) “Physical health is the state of having normal physical strength, without diseases and injuries. What do you think about your physical health status?” (2) “Mental health is the state of being mentally stable, able to overcome stress. What do you think about your mental health status?” (3) “Social health is the state of having good social relationships, carrying out one’s work properly. What do you think about your social health status?” (4) “Spiritual health is the state of having a meaning in life through volunteering, religious experience, and meditation. What do you think about your spiritual health status?” (5) “Considering your physical, mental, social, and spiritual health status, what do you think about your health status in general?” Each participant rated his or her mental, physical, social, spiritual, and general health on a five-point scale: excellent (1), very good (2), good (3), poor (4), and bad (5). Additionally, participants reported socio-demographic characteristics, displayed in Tables 1 and 2, including: age (twenties; thirties; forties; fifties; sixties; older than seventies), gender, education (no education; graduated elementary school; graduated middle school; graduated high school; graduated university or higher), job status (self-employed; employed; unemployed; retired), marital status (married; bereaved; divorced; unmarried), monthly income (less than 1 million KRW; between 1 and 2 million KRW; between 2 and 3 million KRW; between 3 and 4 million KRW; between 4 and 5 million KRW; between 5 and 6 million KRW; more than 6 million KRW), residence (metropolitan; urban; rural), and religion (Christian, Buddhist, Catholic, none; other).

Table 1 Bivariate analysis of factors associated with depression based on gender

Characteristic	Depression					
	Men (<i>n</i> = 592)			Women (<i>n</i> = 608)		
	Depressed (<i>n</i> = 63) <i>n</i> (%)	Not depressed (<i>n</i> = 529) <i>n</i> (%)	<i>P</i>	Depressed (<i>n</i> = 75) <i>n</i> (%)	Not depressed (<i>n</i> = 533) <i>n</i> (%)	<i>P</i>
Age, years						
20–49	26 (7.8)	309 (92.2)	0.009	26 (8.1)	294 (91.9)	0.001
≥ 50	37 (14.4)	220 (85.6)		49 (17.0)	239 (83.0)	
Education						
High school or less	40 (13.2)	264 (86.8)	0.046	54 (15.1)	303 (84.9)	0.013
Higher education	23 (8.0)	265 (92.0)		21 (8.4)	230 (91.6)	
Job status						
Unemployed	16 (19.8)	65 (80.2)	0.004	39 (14.0)	240 (86.0)	0.257
Employed	47 (9.2)	464 (90.8)		36 (10.9)	293 (89.1)	
Marital status						
Unmarried	17 (10.1)	152 (89.9)	0.771	23 (15.6)	124 (84.4)	0.161
Married	46 (10.9)	377 (89.1)		52 (11.3)	409 (88.7)	
Monthly income						
< 2 million KRW	12 (27.9)	31 (72.1)	< 0.001	26 (34.2)	50 (65.8)	< 0.001
≥ 2 million KRW	50 (9.1)	497 (90.9)		49 (9.3)	479 (90.7)	
Residence						
Rural	34 (10.5)	290 (89.5)	0.898	37 (11.1)	296 (88.9)	0.312
Urban	29 (10.8)	239 (89.2)		38 (13.8)	237 (86.2)	
Religion						
Yes	30 (15.2)	168 (84.8)	0.012	43 (14.8)	248 (85.2)	0.079
No	33 (8.4)	359 (91.6)		32 (10.1)	285 (89.9)	
BMI						
< 25.0	42 (9.5)	399 (90.5)	0.089	56 (76.7)	451 (87.7)	0.010
≥ 25.0	21 (14.6)	123 (85.4)		17 (23.3)	63 (12.3)	
Tobacco use						
Yes	23 (8.9)	236 (91.1)	0.220	3 (27.3)	8 (72.7)	0.128
No	40 (12.0)	293 (88.0)		72 (12.1)	525 (87.9)	
Alcohol use						
Yes	49 (9.3)	478 (90.7)	0.003	33 (10.2)	289 (89.8)	0.097
No	14 (21.5)	51 (78.5)		42 (14.7)	244 (85.3)	
Physical health status						
Positive	33 (6.5)	473 (93.5)	< 0.001	39 (8.2)	434 (91.8)	< 0.001
Negative	30 (34.9)	56 (65.1)		36 (26.7)	99 (73.3)	
Mental health status						
Positive	44 (8.1)	496 (91.9)	< 0.001	50 (9.3)	489 (90.7)	< 0.001
Negative	19 (36.5)	33 (63.5)		25 (36.2)	44 (63.8)	
Social health status						
Positive	47 (8.5)	508 (91.5)	< 0.001	61 (10.9)	501 (89.1)	< 0.001
Negative	16 (43.2)	21 (56.8)		14 (30.4)	32 (69.6)	
Spiritual health status						
Positive	41 (7.6)	502 (92.4)	< 0.001	56 (10.3)	489 (89.7)	< 0.001
Negative	22 (44.9)	27 (55.1)		19 (30.2)	44 (69.8)	

KRW Korean Won; BMI Body Mass Index

P values were derived by the chi-square tests

Depressed group: PHQ-9 total score ≥ 5 Not depressed group: PHQ-9 total score < 5

Table 2 Bivariate analysis of factors associated with suicidal ideation based on gender

Characteristic	Suicidal ideation					
	Men (<i>n</i> = 592)			Women (<i>n</i> = 608)		
	Have suicidal ideation (<i>n</i> = 24) <i>n</i> (%)	No suicidal ideation (<i>n</i> = 568) <i>n</i> (%)	<i>P</i>	Have suicidal ideation (<i>n</i> = 31) <i>n</i> (%)	No suicidal ideation (<i>n</i> = 577) <i>n</i> (%)	<i>P</i>
Age, years						
20–49	12 (3.6)	323 (96.3)	0.506	11 (3.4)	309 (96.6)	0.050
≥ 50	12 (4.7)	245 (95.3)		20 (6.9)	268 (93.1)	
Education						
High school or less	14 (4.6)	290 (95.4)	0.485	24 (6.7)	333 (93.3)	0.030
Higher education	10 (3.5)	278 (96.5)		7 (2.8)	244 (97.2)	
Job status						
Unemployed	7 (8.6)	74 (91.4)	0.034	16 (5.7)	263 (94.3)	0.511
Employed	17 (3.3)	494 (96.7)		15 (4.6)	314 (95.4)	
Marital status						
Unmarried	8 (4.7)	161 (95.3)	0.596	9 (6.1)	138 (93.9)	0.517
Married	16 (3.8)	407 (96.2)		22 (4.8)	439 (95.2)	
Monthly income						
< 2 million KRW	8 (18.6)	35 (81.4)	< 0.001	15 (19.7)	61 (80.3)	< 0.001
≥ 2 million KRW	15 (2.7)	532 (97.3)		16 (3.0)	512 (97.0)	
Residence						
Rural	16 (4.9)	308 (95.1)	0.230	18 (5.4)	315 (94.6)	0.705
Urban	8 (3.0)	260 (97.0)		13 (4.7)	262 (95.3)	
Religion						
Yes	14 (7.1)	184 (92.9)	0.009	16 (5.5)	275 (94.5)	0.668
No	10 (2.6)	382 (97.4)		15 (4.7)	302 (95.3)	
BMI						
< 25.0	16 (3.6)	425 (96.4)	0.311	22 (4.3)	485 (95.7)	0.050
≥ 25.0	8 (5.6)	136 (94.4)		8 (10.0)	72 (90.0)	
Tobacco use						
Yes	9 (3.5)	250 (96.5)	0.529	0 (0.0)	11 (100.0)	1.000
No	15 (4.5)	318 (95.5)		31 (5.2)	566 (94.8)	
Alcohol use						
Yes	20 (3.8)	507 (96.2)	0.322	12 (3.7)	310 (96.3)	0.103
No	4 (6.2)	61 (93.8)		19 (6.6)	267 (93.4)	
Physical health status						
Positive	14 (2.8)	492 (97.2)	0.001	15 (3.2)	458 (96.8)	< 0.001
Negative	10 (11.6)	76 (88.4)		16 (11.9)	119 (88.1)	
Mental health status						
Positive	16 (3.0)	524 (97.0)	0.001	19 (3.5)	520 (96.5)	< 0.001
Negative	8 (15.4)	44 (84.6)		12 (17.4)	57 (82.6)	
Social health status						
Positive	16 (2.9)	539 (97.1)	< 0.001	27 (4.8)	535 (95.2)	0.282
Negative	8 (21.6)	29 (78.4)		4 (8.7)	42 (91.3)	
Spiritual health status						
Positive	18 (3.3)	525 (96.7)	0.010	23 (4.2)	522 (95.8)	0.010
Negative	6 (12.2)	43 (87.8)		8 (12.7)	55 (87.3)	

KRW Korean Won; BMI Body Mass Index

P values were derived by the chi-square tests

Have suicidal ideation group: PHQ-9 item 9 score ≥ 1; No suicidal ideation group: PHQ-9 item 9 score < 1

These factors were analyzed as independent variables in our analyses.

Several additional factors were included in the analyses based on the previous research. Multiple studies have indicated that body weight and health habits, such as smoking and drinking alcohol, are linked to depression and suicidal ideation [21–25]. The Body Mass Index (BMI) of each respondent was calculated separately and was grouped into < 25 or ≥ 25 based on the Korean classification of obesity [26]. The tobacco use was assessed by the question, “do you currently smoke?” and the alcohol use was assessed by the question, “In the past year, how many times did you drink per week?” Participants were grouped into non-smokers or smokers and non-drinkers or drinkers depending on their responses.

Statistical analysis

Chi-square tests of each socio-demographic factor and each self-rated health status question were conducted to determine which factors were significantly and independently related to depression and suicidal ideation. Before performing multiple logistic regression analysis, every socio-demographic factor and the four components of health status were grouped into dummy variables. Then multiple logistic regression was employed to identify the association between socio-demographic factors, self-rated health status, depression, and suicidal ideation. The data from the survey were analyzed using SPSS version 25.0 (SPSS Inc., Chicago, IL, USA).

Results

Bivariate analysis

Tables 1 and 2 list the associations between socio-demographic characteristics and self-rated health status with depression (PHQ-9 total score ≥ 5) and suicidal ideation (PHQ-9 item 9 score ≥ 1). The bivariate analyses showed that all four self-rated health statuses and socio-demographic factors such as age, level of education, and monthly income influenced depression in both men and women. In addition, job status, religion, and alcohol usage were associated with depression only in men while higher BMI was associated with depression only in women. As shown in Table 2, job status, monthly income, and religion were related to suicidal ideation in men along with all physical, mental, social, and spiritual health statuses. For women, education, monthly income, and all health statuses excluding social health status influenced suicidal ideation.

Multiple logistic regression

After identifying the most significantly correlated factors associated with depression and suicidal ideation in men and women, we performed multiple logistic regression analyses by using backward stepwise selection. Table 3 presents the adjusted odds ratios, the 95% confidence intervals, and *p* values for each significant factor for depression in men and women. Unemployment, religion, negative self-rated physical health status, and negative self-rated spiritual health status significantly predicted depression in men. Unemployed men had about twice the odds of being depressed compared to employed men (adjusted odds ratio [aOR], 2.25; 95% confidence interval [CI] 1.09–4.62). Men with any religion also had about twice the odds of being depressed than men with no religion (adjusted odds ratio [aOR], 2.20; 95% confidence interval [CI] 1.21–3.99). Specifically, Christian and Buddhist men both showed twice the odds of depression compared to non-religious men as shown in Appendix Table 5 (aOR, 2.15; 95% CI 1.09–4.21; aOR, 2.21; 95% CI 1.10–4.26; respectively). Men who report negative spiritual health status were five times more likely to be depressed than men who report positive spiritual health status (aOR, 5.50; 95% CI 2.59–11.65). Lower monthly income, negative self-rated physical health status, and negative self-rated mental health status significantly predicted depression in women. Women with income less than 2 million KRW had four times greater chance of being depressed than women with income more than 2 million KRW (aOR, 4.23; 95% CI 2.28–7.83). Notably, negative self-rated physical health status was found to be associated with depression in both genders. Men who reported negative physical health status were four times more likely to be depressed than men who reported positive physical health; women who reported negative physical health status were twice as likely to be depressed than women who reported positive physical health. (aOR, 4.69; 95% CI 2.44–9.00 in men vs. aOR, 2.05; 95% CI 1.13–3.72 in women).

Table 4 presents the adjusted odds ratios, the 95% confidence intervals, and *p* values for each significant factor for suicidal ideation in men and women. Negative self-rated social health status was statistically significant in men and negative self-rated mental health status was statistically significant in women. Lower monthly income was found to be associated with suicidal ideation in both men and women. Men who indicated negative social health status had about five times greater chances of experiencing suicidal thoughts than men who indicated positive social health status (aOR, 4.87; 95% CI 2.74–19.99); women who indicated negative mental health status had about four times greater chances of experiencing suicidal thoughts than women

Table 3 Factors associated with depression by multiple logistic regression analysis

Characteristic	Depression					
	Men (<i>n</i> = 592)			Women (<i>n</i> = 608)		
	aOR	95% CI	<i>P</i> *	aOR	95% CI	<i>P</i> *
Job status						
Unemployed	2.248	1.094–4.620	0.027			
Employed	1 (reference)					
Monthly income						
< 2 million KRW				4.225	2.279–7.833	< 0.001
≥ 2 million KRW				1 (reference)		
Religion						
Yes	2.195	1.209–3.986	0.010			
No	1 (reference)					
Physical health status						
Positive	1 (reference)	2.441–8.995	< 0.001	1 (reference)	1.133–3.715	0.018
Negative	4.685			2.052		
Mental health status						
Positive				1 (reference)	2.033–7.540	< 0.001
Negative				3.915		
Spiritual health status						
Positive	1 (reference)	2.593–11.648	< 0.001			
Negative	5.496					

KRW Korean Won; aOR adjusted odds ratio; CI confidence interval

Depressed group: PHQ-9 total score ≥ 5 Not depressed group: PHQ-9 total score < 5

*Backward stepwise selection, multiple logistic regression model

Table 4 Factors associated with suicidal ideation by multiple logistic regression analysis

Characteristic	Suicidal ideation					
	Men (<i>n</i> = 592)			Women (<i>n</i> = 608)		
	aOR	95% CI	<i>P</i> *	aOR	95% CI	<i>P</i> *
Monthly income						
< 2 million KRW	6.171	2.296–16.582	< 0.001	6.447	2.960–14.042	< 0.001
≥ 2 million KRW	1 (reference)			1 (reference)		
Mental health status						
Positive				1 (reference)		< 0.001
Negative				4.307	1.901–9.759	
Social health status						
Positive	1 (reference)	2.744–19.990	< 0.001			
Negative	4.865					

KRW Korean Won; aOR adjusted odds ratio; CI confidence interval

Have suicidal ideation group: PHQ-9 item 9 score ≥ 1; No suicidal ideation group: PHQ-9 item 9 score < 1

*Backward stepwise selection, multiple logistic regression model

who indicated positive mental health status (aOR, 4.31; 95% CI 1.90–9.76). Both men and women with income less than 2 million KRW had six times greater chances of having suicidal ideation than people with income more than 2 million KRW (aOR, 6.17; 95% CI 2.30–16.58 in men vs. aOR, 6.45; 95% CI 2.96–14.04).

Discussion

We investigated the presence of depressive symptoms and suicidal ideation according to physical, mental, social, and spiritual self-rated health statuses and socio-demographic status in order to determine whether lower self-rated multidimensional health statuses may predict negative psychological well-being

in the general population. This study used a comprehensive understanding of health that included physical, mental, social, and spiritual components. We found predictors of depression in men and women based on the different socio-demographic factors and components of multidimensional health status. The findings suggest that lower-than-average monthly income may be a significant predictor of depression in both men and women. Men and women who negatively rate their physical health status tend to report depressive symptoms. However, men are more susceptible to depression when experiencing negative spiritual health status, and women are more susceptible to depression when experiencing negative mental health status. Negative social health may induce suicidal ideation in men while negative mental health status may induce it in women. Physical, mental, social, and spiritual aspects of multidimensional health status may all predict depressive symptoms, according to our study. To the best of our knowledge, this is the first research study that explored and determined the significant associations of all four health components with depression and suicidal ideation.

While we uniquely incorporated the holistic understanding of health into the study, these findings align with previous studies showing significant association between various dimensions of self-rated health with depression and suicidal ideation. A meta-analysis of cross-sectional studies in depressed elderly patients determined that poor physical self-rated health status is an important indicator of depression development [27]. Although this paper is the first to explore the associations of all four self-rated health statuses (physical, mental, social, and spiritual) with depression and suicidal ideation in a cross-sectional study, previous studies have shown significant relationships between psychiatric distress and each aspect of health status. Individuals with chronic illness, for instance, have a higher chance of experiencing depression than individuals without such illness according to much research. Specific biological factors such as prolactin and thyroid hormone levels may be dysregulated, which could predict a suicide attempt [28]. Improving social health by getting familial support and improving spiritual health status by participating in religious activities are known to be useful for preventing severe depression and suicidal ideation [29, 30].

As this was a self-reported survey study, the results should be understood within the limitations of this sampling method. Since multidimensional health status, depression, and suicidal ideation were all determined through self-reported survey questions, the participants may have incorrectly or inadequately estimated their own current status. It is also important to acknowledge that any chronic illness or medical comorbidities of participants may have influenced the findings. While our research investigated the association of multidimensional health status with depression and suicidal ideation, the causal relationship between these variables should be examined in future studies. Researchers

may carry out longitudinal studies and determine whether changes in self-rated health statuses directly influence depression level in study participants. Further research may be conducted to confirm whether the present findings could be generalized to other cultures regardless of possible difference in perception of psychiatric illness and health statuses. Researchers may also consider conducting a study with chronically ill or clinically depressed patients to confirm the effect of comorbidities on multidimensional health status.

Conclusion

Physical, mental, social, and spiritual self-rated health statuses are all found to be associated with an individual's predisposition to depression and suicidal ideation. Our study specifically suggests that these components, except for physical health, have varying levels of correlation with depression and suicidal ideation depending on gender. In addition, our findings suggest that depressed women were more inclined to experience suicidal ideation than depressed men. There are several significant clinical and public health implications following the results of the current study. Primary care professionals may use the 5 Health Status Questionnaire as a starting approach when providing care for patients with depressive symptoms. Not only could the patients' depression status be predicted, but primary care doctors could quickly identify the specific aspect of life that intensifies depression. The general public may also assess multidimensional self-rated health status and use the results as a guideline to improve their health well-being in one or more health dimensions. Healthcare professionals should educate the public about the relationship between multidimensional health status and psychological well-being.

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Compliance with ethical standards

Conflict of interest All authors declare that they have no conflicts of interest.

Appendix

See Appendix Table 5.

Table 5 Religion with depression by multiple logistic regression analysis

Characteristic	Depression					
	Men (n = 592)			Women (n = 608)		
	OR	95% CI	P*	OR	95% CI	P*
Christian	2.145	1.092–4.213	0.027	1.007	0.510–1.987	0.984
Buddhist	2.210	1.103–4.26	0.025	2.776	1.545–4.988	0.001
No religion	1 (reference)			1 (reference)		

aOR adjusted odds ratio; CI confidence interval

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