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Association between depression and perceived health status in Korean adult women: a nationwide cross-sectional study

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Abstract

Background Perceived health status (PHS) can be influenced by mental health. A negative correlation between high levels of depression and self-evaluation of health has been reported, but research focusing on depression as a risk factor for poor PHS has been limited in Asia. This study aimed to analyse the association between depression and PHS in Korean adult women and explore the degree of depression's association on poor PHS.

Methods We conducted a cross-sectional study for adult women in Korea using data from the Korean National Health and Nutrition Examination Survey from 2014, 2016, 2018, 2020 and 2022. Depression was assessed using the nine-item Patient Health Questionnaire, and PHS was evaluated through a self-report questionnaire. Multivariate logistic regression analyses were used to identify the association between depression and PHS after adjusting for various covariates.

Results A total of 15,082 Korean adult women were included. A significant inverse relationship was found between depression and PHS across all adjusted models, with an odds ratio of 3.18 (95% confidence interval 2.37–4.27; $P < 0.01$). Poor PHS had a stronger association with depression than with chronic diseases such as hypertension, diabetes, and dyslipidemia.

Conclusions Depression was strongly associated with poor PHS among Korean adult women. These findings highlight the importance of the implementation of mental health policies and programs to improve PHS. Future longitudinal studies are required to further validate these findings and explore causal relationships.

Keywords Depression, Perceived health status, Korea, Adult women, Cross-sectional study

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Background

The World Health Organisation (WHO) defines health as not merely the absence of disease or infirmity but as the state of complete physical, mental, and social well-being [1]. Relatedly, perceived health status (PHS) is generally defined as a self-assessment of one's health, and has been proven to be a sensitive predictor of future health outcomes including morbidity, mortality, and well-being [2]. Additionally, PHS is a cost-effective and simple method to predict future healthcare costs, typically estimated by a single question [3]. This approach is particularly valuable in aging societies in which healthcare costs are expected to significantly increase as it can inform resource allocation and healthcare planning [3–4]. However, Korea's PHS ranks near the bottom among Organisation for Economic Co-operation and Development (OECD) countries, contrasting with a higher life expectancy compared to the OECD average. According to 2019 OECD subjective health status data, only 33.7% of Koreans rate their PHS positively, which is significantly lower than the OECD average of 68.5% [5]. This discrepancy is particularly pronounced among women, with only 29.8% of Korean women rating their health positively compared to the OECD average of 66.3% among women [5].

As PHS can be driven less by bodily or environmental factors than by an individual's prior beliefs about themselves as healthy or unhealthy, it can be influenced by mental health [6]. While previous studies have found a significant negative correlation between high levels of depression and subjective evaluation of one's own health [7, 8], few studies have focused on depression as a risk factor for poor PHS and examined the impact of depression alone on PHS in Asia [7]. For instance, in a study conducted on patients of an internistic-geriatric hospital in Germany, PHS was for the most part explained by the three variables depression, subjective physical complaints, and sense of coherence [8].

In 2020, during the COVID-19 pandemic, the prevalence of depression was reported to be 36.8%, the highest among OECD countries, elevating depression to a significant public health concern in Korea [9]. Considering the prevalence of depression increased by seven times in a meta-analysis study for cross-sectional community-based studies after the COVID-19 pandemic, there is an urgent need for enhanced mental health support and research [10]. Despite this sharp increase in depression, Korea still faces limited awareness and accessibility to mental health treatment [11]. Given that women are more susceptible to depression than men, a more tailored approach to mental health assessment for women is necessary [12].

Korean women have been reported to have very poor PHS and high levels of depression; however, there remains a significant lack of research on this topic. Therefore, this study aimed to investigate the association between depression and PHS and examine the extent of the impact of depression on poor PHS using data from the 2014 to 2022 Korea National Health and Nutrition Examination Survey (KNHANES).

Methods

Study design and participants

This cross-sectional study utilised data from 2014, 2016, 2018, 2020 and 2022 KNHANES, as the Patient Health Questionnaire-9 (PHQ-9) used to assess depression was surveyed only in even-numbered years. The KNHANES is a continuous nationwide survey of the general health and nutritional status of all non-institutionalised civilian Koreans [13]. Participants were selected using a stratified multistage probability sampling design to ensure the representativeness of the Korean population. Exclusion criteria included individuals under 19 years of age and those with incomplete data on key variables (Fig. 1).

The KNHANES survey is managed by the Korean Ministry of Health and Welfare in collaboration with the Division of Health and Nutrition Research and Analysis of the Korean Centers for Disease Control and Prevention. All participants of the KNHANES provide written consent for providing information before survey participation. The KNHANES was approved by the institutional review board of the Korea Centers for Disease Control and Prevention; however, it was exempt from an ethics review based on the Bioethics and Safety Act of 2016, No. 2013-12EXP-03–5 C in 2014, 2018-01-03-P-A in 2018, 2018-01-03–2 C-A in 2020, and 2018-01-03–4 C-A in 2022. The present study was exempt from review by the Institutional Review Board of Chung-Ang University (1041078-20240522-HR-126).

Data collection

In the KNHANES, trained staff conducted interviews using standardised health questionnaires covering demographic and clinical information, including medical history, physical activity, and anthropometric data. Interviews were conducted face-to-face at participants' homes or designated health centres and standardised questionnaires were administered electronically to minimise data entry errors and ensure consistency.

Depression was assessed using the PHQ-9, a self-reported questionnaire comprising nine questions about depressive symptoms over the last two weeks [14]. This questionnaire is one of the most widely used and validated screening tools for depression worldwide, with high reliability and validity [14]. Each item was scored on a 4-point Likert scale from 0 ('not at all') to 3 ('nearly every day'), with a total score ranging from 0 to 27, with higher scores indicating more severe depressive symptoms [14]. We selected a PHQ-9 cut-off score of 10 as it maximizes sensitivity and specificity for depression [15].

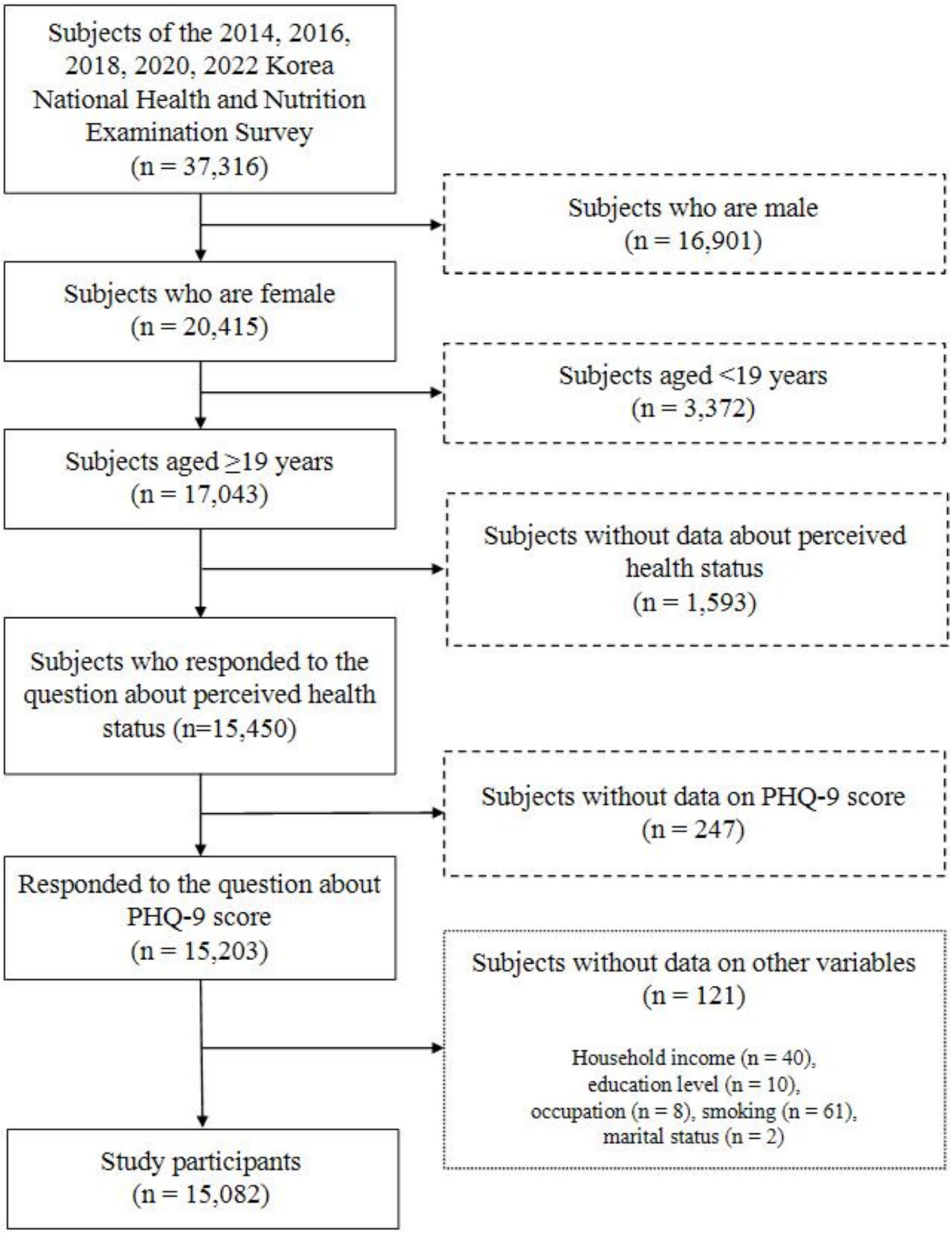

Fig. 1 Flow chart of participant inclusion in the study

For sensitivity analysis, we further categorized depression severity into five levels based on PHQ-9 scores to refine its classification: none (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27) [16].

PHS was assessed through the question, 'How do you perceive your general state of health?' rated on a 5-point Likert scale from 'very good' to 'very poor'. Responses were classified into two categories: 'good' (combining 'very good' and 'good') and 'poor' (combining 'fair', 'poor', and 'very poor') [17].

We collected additional data on smoking, alcohol consumption, physical activity, and obesity. Current smoking was defined as meeting both of the following criteria: (1) having smoked more than five packs of cigarettes (100 cigarettes) over a lifetime, and (2) currently engaging in regular smoking [18]. Similarly, hazardous alcohol intake was defined as meeting both of the following criteria: (1) drinking at least 2–3 times per week, and (2) consuming an average number of ≥ 5 drinks per occasion [19, 20]. Individuals who consumed alcohol but did not meet these criteria were classified as having non-hazardous alcohol intake. The number of drinks was calculated based on each type of glassware regardless of the type of alcohol, and one can of beer (355 mL) was counted as 1.6 glasses of beer. Physical activity was defined as engaged if they performed at least 150 minutes of moderate-intensity or 75 minutes of high-intensity physical activity per week, or an equivalent combination of both [21]. Obesity was defined as a BMI ≥ 25 kg/m^2 according to the WHO's Asia-Pacific obesity criteria [22]. Stress perception was classified as 'high' if participant felt stress in their daily life 'very much' or 'feel a lot'. Chronic diseases including hypertension, diabetes, and dyslipidemia were defined by a diagnosis by a physician.

Statistical analysis

The KNHANES employs a stratified, multistage, clustered probability sampling method to select a representative sample of the Korean population. Therefore, statistical analyses were conducted using stratification, clustering, and weight variables. We utilized the KNHANES sampling weight variables, which were derived by incorporating the sampling rate and response rate, along with masked variance primary sampling unit and stratum variables. This adjustment allowed for a more accurate estimation of the entire non-institutionalized Korean population from the sample [23, 24]. Participants' characteristics are reported as unweighted numbers and weighted percentages for categorical variables and as means and standard errors for continuous variables. Categorical variables were compared using chi-square tests while continuous variables were compared using independent t-tests. Multivariate logistic regression analyses were performed to evaluate factors contributing to poor PHS and the impact of depression on PHS. For the sensitivity analysis, we conducted (1) an evaluation of the association based on PHQ-9 scores, categorizing the severity of depression into five levels: 'none', 'mild', 'moderate', 'moderately severe', and 'severe'; and (2) an assessment of the potential synergistic effect by adding an interaction term between depression and PHS, based on the presence or absence of chronic diseases known to have a direct impact on PHS in women [25]. Odds ratios (ORs) and 95% confidence intervals (CIs) were determined and adjusted for multiple clinically relevant variables associated with both the exposure and the outcome, based on a comprehensive literature review [26, 27]. These variables included age, survey year, residential area, household income, education level, occupation, marital status, current smoking status, alcohol consumption, physical activity, obesity, stress perception, and chronic diseases. Multicollinearity was assessed before the regression analysis, and variables with a variance inflation factor of < 5 were used. Restricted Cubic Spline (RCS) analysis was performed to assess the potential nonlinear relationship between PHQ-9 score and PHS. All statistical analyses were performed using SAS statistical software, version 9.4 (SAS Institute Inc. Cary, NC, USA). Statistical significance was set at a P value of < 0.05.

Results

General characteristics of participants

A total of 37,316 participants from the 2014, 2016, 2018, 2020 and 2022 KNHANES were included. After we excluded participants based on criteria such as gender, age, and incomplete data, 15,082 participants were included in this study (Fig. 1). The sociodemographic and health-related characteristics of the participants are summarised in Table 1. The mean age of the participants was 51.4 years. The prevalence of poor PHS was 71.0% while that of depression was 7.0%. Participants with poor PHS were relatively older (Table 1).

Association between general characteristics and poor PHS

Participants with poor PHS were significantly associated with older age, live rural, lower household income and education levels, current smokers, absence of physical activity, obese, perceived high stress, and suffering from chronic diseases in the fully adjusted model (all, $P < 0.05$) (Table 2). Depression had the highest OR of 3.18 (95% CI, 2.37–4.27) followed by high stress perception (OR 2.17, 95% CI, 1.95–2.43) and diabetes (OR 2.05, 95% CI, 1.64–2.57).

Association of depression with poor PHS

Depression had a strong association with poor PHS across crude and adjusted models (Table 3). In the

Table 1 General characteristics of study participants according to perceived health status

Variables	Total (*n* = 15,082)	Perceived health status[1]		*P*-value
		Good (*n* = 4,105)	Poor (*n* = 10,977)	
Age (years)	51.43 ± 16.74	47.04 ± 16.50	53.07 ± 16.54	< 0.001
19–29	1,816 (17.07)	713 (6.77)	1,103 (10.30)	
30–39	2,308 (16.90)	769 (5.61)	1,539 (11.29)	
40–49	2,723 (19.54)	851 (6.10)	1,872 (13.44)	
50–59	2,882 (19.85)	735 (5.11)	2,147 (14.74)	
60–69	2,791 (14.18)	586 (3.11)	2,205 (11.07)	
≥ 70	2,562 (12.44)	451 (2.30)	2,111 (10.14)	
Survey year				< 0.01
2014	2,845 (18.22)	764 (5.09)	2,081 (13.14)	
2016	3,262 (20.14)	858 (5.63)	2,404 (14.50)	
2018	3,315 (20.79)	899 (5.96)	2,416 (14.83)	
2020	2,920 (20.18)	761 (5.58)	2,159 (14.61)	
2022	2,740 (20.67)	823 (6.75)	1,917 (13.92)	
Residential area				< 0.001
Urban	12,266 (85.57)	3,532 (25.80)	8,734 (59.77)	
Rural	2,816 (14.43)	573 (3.20)	2,243 (11.23)	
Household income				< 0.001
Quartile 4	4,219 (30.01)	1,520 (10.95)	2,699 (19.06)	
Quartile 3	4,120 (29.07)	1,194 (8.66)	2,926 (20.42)	
Quartile 2	3,731 (24.04)	876 (6.09)	2,855 (17.95)	
Quartile 1	3,012 (16.87)	515 (3.31)	2,497 (13.56)	
Education level				< 0.001
≥High school graduation	9,965 (73.29)	3,301 (24.62)	6,664 (48.66)	
< High school graduation	5,117 (26.71)	804 (4.38)	4,313 (22.33)	
Occupation				< 0.001
Non-manual worker	3,228 (23.92)	1,168 (8.63)	2,060 (15.29)	
Service and sales worker	2,284 (15.88)	650 (4.71)	1,634 (11.17)	
Manual worker	2,332 (13.72)	510 (3.12)	1,822 (10.60)	
None	7,238 (46.48)	1,777 (12.55)	5,461 (33.93)	
Marital status				< 0.001
Living together	12,822 (80.23)	3,282 (21.53)	9,540 (58.70)	
Living alone	2,260 (19.77)	823 (7.48)	1,437 (12.29)	
Current smoker[2]	1,707 (12.35)	384 (2.87)	1,323 (9.48)	< 0.001
Alcohol consumption[3]				< 0.001
Non-drinker	3,037 (19.12)	713 (4.75)	2,324 (14.38)	
Non-hazardous alcohol intake	11,252 (75.07)	3,151 (22.45)	8,101 (52.63)	
Hazardous alcohol intake	793 (5.81)	241 (1.82)	552 (3.99)	
Physical activity[4]	7,430 (48.08)	1,786 (12.44)	5,644 (35.64)	< 0.001
Obese[5]	2,674 (17.31)	575 (4.05)	2,099 (13.26)	< 0.001
Stress perception				< 0.001
Low	10,911 (71.30)	3,400 (23.72)	7,511 (47.58)	
High	4,171 (28.70)	705 (5.29)	3,466 (23.41)	
Depression [6]				< 0.001
No	14,045 (93.27)	4,037 (28.49)	10,008 (64.78)	
Yes	1,037 (6.73)	68 (0.52)	969 (6.21)	
Chronic diseases[7]				
Yes[8]	5,148 (28.43)	822 (4.64)	4,326 (23.78)	< 0.001
Hypertension	3,521 (18.94)	537 (2.94)	2,984 (15.99)	< 0.001

Table 1 (continued)

Variables	Total (*n* = 15,082)	Perceived health status[1]		*P*-value
		Good (*n* = 4,105)	Poor (*n* = 10,977)	
Diabetes	1,333 (7.26)	144 (0.73)	1,189 (6.53)	< 0.001
Dyslipidemia	3,175 (17.62)	481 (2.79)	2,694 (14.83)	< 0.001

PHQ-9, Patient Health Questionnaire-9

P values were calculated using Pearson chi-square test (categorical variables) and the t test (general linear model; continuous variables); values of $P < 0.05$ were considered statistically significant. All statistical analyses were conducted on the basis of a complex sampling design

[1]Categorical variables are expressed as unweighted N (weighted %), while continuous variables are shown as mean ± standard error (SE)

[2]Defined as meeting both of the following criteria: (1) having smoked more than five packs of cigarettes (100 cigarettes) over a lifetime, and (2) currently engaging in regular smoking

[3]Hazardous alcohol intake was defined as consuming an average number of ≥ 5 drinks two or more times a week, and individuals who drink alcohol but do not meet this criterion were classified as having non-hazardous alcohol intake

[4]Defined as they performed at least 150 min of moderate-intensity or 75 min of high-intensity physical activity per week, or an equivalent combination of both

[5]Defined as a body mass index ≥ 25 kg/m^2

[6]Diagnosed depression using a PHQ-9 score cut-off of 10

[7]Diagnosed by a physician

[8]Defined as having at least one of the following physician-diagnosed conditions: hypertension, diabetes, and dyslipidemia

crude model, the OR was 5.25 (95% CI, 3.91–7.04) with a *P*-value of < 0.01. In the adjusted models, Model 1 was adjusted for age and showed an OR of 5.62 (95% CI, 4.20–7.51); Model 2 was adjusted for multiple sociodemographic factors including age, survey year, residential area, household income, education level, occupation, marital status, current smoking status, alcohol consumption, physical activity, obesity, and stress perception, and had an OR of 3.24 (95% CI, 2.42–4.35); Model 3 was further adjusted for chronic diseases such as hypertension, diabetes, and dyslipidamia had an OR of 3.18 (95% CI, 2.37–4.27). All results were significant in the adjusted models with a *P*-value of < 0.01 and the highest OR was in Model 1.

As the severity of depression increased, the OR for poor PHS progressively increased. Notably, in cases of severe depression (PHQ-9 score of 20–27), the OR reached 31.7 compared to no depression (PHQ-9 score of 0–4) (See Additional file 1: Supplementary Table 1). The association with PHS was significant for both depression and chronic diseases individually, with higher OR observed for depression. However, no significant interaction effect between depression and chronic disease on PHS was found (See Additional file 1: Supplementary Table 2), and the number of individuals with both conditions was 449 (2.31%). Furthermore, the *P* for nonlinearity value of 0.06 confirms that the relationship between depression and PHS is linear (See Additional file 2: Supplementary Fig. 1).

Discussion

This cross-sectional study revealed an inverse association between depression and PHS in Korean adult women, highlighting the need for managing depression to improve PHS. The positive PHS rate was 29.0%, which closely matched the 29.8% positive PHS rate reported for Korean women in the OECD subjective health status data, considering that the OECD data was based on Korean women older than 14 years in 2019 [5]. However, the differences in the reported depression rates may be attributed to the period of data collection, as the OECD data was collected during the early stages of the COVID-19 pandemic (March–April 2020) [9], whereas the KNHANES used in this study was conducted in mid-to-late 2020 [28]. Notably, the findings of this study were consistent with those of other studies utilizing national data [11, 29]. Our findings align with previous studies conducted in other countries [7, 8]. Depression has been consistently linked with poor PHS across various demographic groups. For example, a Brazilian longitudinal study has shown that older adults with depressive symptoms report poorer health compared to their non-depressed counterparts (OR 1.35, 95% CI 1.31–1.39) [30]. In a study involving cancer survivors based on the U.S. National Health Interview Survey data, depression was significantly associated with poor PHS. For each 1-point increase in the PHQ-8 score, the odds of reporting a higher rank of PHS decreased by 13.7% [31]. While our association between depression and poor PHS was in line with those studies, our finding shows a significantly higher impact in Korean women with an OR of 3.18. Notably, depression had a stronger association with poor PHS than even major chronic diseases that reduce quality of life such as hypertension, diabetes, and dyslipidemia in the fully adjusted model. This strong association remained consistent across multiple sensitivity analyses, with a progressive increase in the OR as depression severity increased.

Several potential mechanisms may explain this observed impact of depression on poor PHS. First, depression can lead to actual deterioration in physical health, resulting in poorer PHS. Depression is closely

Table 2 Association of general characteristics with poor perceived health status in study participants

Variables	Crude OR (95% CI)	Adjusted[1] OR (95% CI)
Age (years)		
19–29	1	1
30–39	1.323 (1.134–1.542)***	1.389 (1.130–1.708)**
40–49	1.450 (1.261–1.667)**	1.612 (1.313–1.979)***
50–59	1.898 (1.637-2.200)***	1.730 (1.381–2.167)***
60–69	2.340 (1.998–2.741)***	1.363 (1.060–1.753)*
≥ 70	2.902 (2.462–3.420)***	1.083 (0.821–1.428)
Residential area		
Urban	1	1
Rural	1.513 (1.33–1.722)***	1.169 (1.030–1.326)*
Survey year		
2014	1	1
2016	0.997 (0.864–1.150)	0.980 (0.853–1.125)
2018	0.964 (0.838–1.109)	0.906 (0.789–1.040)
2020	1.014 (0.879–1.171)	0.963 (0.828–1.121)
2022	0.798 (0.684–0.932)**	0.749 (0.641–0.875)***
Household income		
Quartile 4	1	1
Quartile 3	1.355 (1.218–1.509)***	1.246 (1.113–1.396)***
Quartile 2	1.692 (1.512–1.895)***	1.389 (1.231–1.567)***
Quartile 1	2.357 (2.056–2.702)***	1.435 (1.220–1.687)***
Education level		
≥High school graduation	1	1
< High school graduation	2.578 (2.337–2.845)***	1.765 (1.521–2.046)***
Occupation		
Non-manual worker	1	1
Service and sales worker	1.339 (1.174–1.527)***	0.970 (0.842–1.119)
Manual worker	1.919 (1.657–2.223)***	1.105 (0.937–1.304)
None	1.527 (1.369–1.703)***	1.060 (0.941–1.194)
Marital status		
Living together	1	1
Living alone	0.603 (0.54–0.672)***	1.052 (0.884–1.252)
Current smoking status		
Non-smoker	1	1
Current smoker[2]	1.402 (1.222–1.609)***	1.321 (1.130–1.546)***
Alcohol consumption[3]		
Non-drinker	1	1
Non-hazardous alcohol intake	0.828 (0.736–0.932)	0.904 (0.805–1.015)
Hazardous alcohol intake	0.794 (0.635–0.992)	0.794 (0.633–1.005)
Physical activity		
Yes[4]	1	1
No	1.342 (1.236–1.457)***	1.218 (1.116–1.329)***
Obesity		
Non-obese	1	1
Obese[5]	1.418 (1.265–1.588)***	1.153 (1.014–1.311)*
Stress perception		
Low	1	1
High	2.207 (1.986–2.451)***	2.174 (1.948–2.426)***
Chronic diseases[6]		
Hypertension		
No	1	1
Yes	2.581 (2.305–2.890)***	1.527 (1.337–1.744)***

Table 2 (continued)

Variables	Crude OR (95% CI)	Adjusted[1] OR (95% CI)
Diabetes		
No	1	1
Yes	3.896 (3.179–4.775)***	2.054 (1.643–2.568)***
Dyslipidemia		
No	1	1
Yes	2.483 (2.210–2.790)***	1.579 (1.378–1.810)***

OR, odds ratio; CI, confidence interval; PHQ-9, Patient Health Questionnaire-9

*P-value < 0.05; **P-value < 0.01; ***P-value < 0.001

P-values were calculated using multivariate logistic regression analysis

[1]Adjusted for age, survey year, residential area, household income, education level, occupation, marital status, current smoking status, alcohol consumption, physical activity, obesity, stress perception, PHQ-9 score, and chronic diseases (hypertension, diabetes, and dyslipidemia)

[2]Defined as meeting both of the following criteria: (1) having smoked more than five packs of cigarettes (100 cigarettes) over a lifetime, and (2) currently engaging in regular smoking

[3]Hazardous alcohol intake was defined as consuming an average number of ≥ 5 drinks two or more times a week, and individuals who drink alcohol but do not meet this criterion were classified as having non-hazardous alcohol intake

[4]Defined as they performed at least 150 min of moderate-intensity or 75 min of high-intensity physical activity per week, or an equivalent combination of both

[5]Defined as a body mass index ≥ 25 kg/m^2

[6]Diagnosed by a physician

Table 3 Association between depression[1] and poor perceived health status in crude and adjusted models

	OR	95% CI	*P*-value
Crude	5.246	3.913–7.035	< 0.001
Model 1[2]	5.617	4.201–7.511	< 0.001
Model 2[3]	3.244	2.420–4.349	< 0.001
Model 3[4]	3.182	2.370–4.271	< 0.001

OR, odds ratio; CI, confidence interval;

P-values were calculated using multivariate logistic regression analysis

[1]Diagnosed depression using a PHQ-9 score cut-off of 10

[2]Adjusted for age

[3]Adjusted for the variables in Model 1, including survey year, residential area, household income, education level, occupation, marital status, current smoking status, alcohol consumption, physical activity, obesity, and stress perception

[4]Adjusted for the variables in Model 2, including diagnosis of chronic diseases such as hypertension, diabetes, and dyslipidemia

associated with increased inflammation and dysregulation of the immune system, with amygdala hyperactivity being one of the key mechanisms involved. The amygdala plays a crucial role in regulating the stress response during threat detection, and depression induces its hyperactivity. Hyperactivity of the amygdala activates the hypothalamic-pituitary adrenal (HPA) axis and the sympathetic nervous system, leading to increased secretion of stress hormones such as cortisol, which in turn contributes to immune system dysregulation. As a result of this process, levels of inflammatory cytokines such as IL-1α, IL-6 and TNF-α increase, triggering chronic inflammation and further deteriorating physical health. If this process persists, chronic inflammation and physical dysfunction can become more severe, ultimately creating a vicious cycle in which depression and immune system dysregulation reinforce each other [32, 33]. A study reported that individuals across all age groups with depression have a higher likelihood of experiencing multiple physical health conditions, highlighting the association between mental and physical health [34]. Second, depression can lead to a negative bias in self-assessment of health. Individuals with depression exhibit increased activity in both the ventromedial prefrontal cortex (vmPFC) and dorsomedial prefrontal cortex (dmPFC). This elevated activation enhances self-referential information processing mechanisms. Based on previous model analyses, it is likely that the information processed in this state tends to be predominantly negative, which may result in individuals perceiving their PHS as poorer than their actual health condition [33]. Conversely, other studies indicate the impact of PHS on depression [26, 35]. Older adults with poor PHS are more likely to develop negative attitudes toward aging, increasing the likelihood of depression [35]. During the COVID-19 pandemic, it was reported that pre-existing medical conditions and poor PHS are associated with a higher risk of worsening mental health [26]. Therefore, further research on the deeper mechanisms is needed to

establish a clear causal relationship between depression and PHS.

Given that poor PHS and depression are more frequent among women than men, this study focused on women. Women are particularly vulnerable to depression during periods of significant hormonal fluctuations, such as the premenstrual, postpartum, and perimenopausal phases [36]. These hormonal changes can lead to increased stress hormone levels, triggering physiological responses such as fatigue, sleep disturbances, and pain, which may ultimately contribute to overall health deterioration. In particular, hormonal fluctuations throughout the reproductive cycle can result in dysregulation of the serotonergic and noradrenergic systems, affecting mood and behavior [36, 37]. Furthermore, women in Korean society tend to bear primary responsibilities for household and caregiving duties, with 85% of elder caregivers reported to be women. As life expectancy increases, the burden of elder care has intensified, leading to a 'double burden' as women juggle both professional and domestic roles. This growing burden limits leisure time, increases stress and burnout, and reduces life satisfaction, potentially contributing to cardiovascular disease, immune system dysfunction, and mental health issues, all of which are associated with poor PHS [38]. A notable example of this cultural influence is Hwa-byung, a culture-bound syndrome that predominantly affects Korean women. It is characterized by physical symptoms such as respiratory distress, chest tightness, and digestive discomfort, which result from repressed anger and stress [39]. This suggests that unresolved emotions can manifest as physical symptoms and ultimately contribute to poor PHS [11].

In Korea, cultural and structural factors such as stigma and barriers to psychiatric services significantly affect mental health treatment [40]. Despite the high prevalence of depression, only 22% of people with mental illness seek professional help during their lifetime [41]. In a previous study based on the KNHANES in 2014, individuals with suicidal ideation often visited clinics for diseases of the musculoskeletal system and connective tissue [42]. Another study in Korea found that individuals with mental and behavioural disorders who visited a medical facility for injury, poisoning, and various other external causes faced a significantly higher risk of death by suicide [43]. Failing to properly treat mental disorders can lead to physical symptoms [44] associated with poor PHS and increased medical expenses or other social costs [3].

To address these challenges, nationwide campaigns and public education programs to reduce the stigma associated with mental illness and encourage mental health discussions are essential. Therefore, the Korean government has recently introduced the National Mind Investment Support project in Korea aims to provide mental health support and resources for the entire population [45]. Additionally, implementing clinical policies to identify unrecognised mental illness via primary screening in primary care settings can help manage mental health issues more effectively [40]. To improve PHS in women with depression, a multi-faceted approach is needed. This includes not only treating the depressive symptoms but also addressing the underlying social determinants of health such as poverty, education, and social support. Integrating mental health services into primary care can help identify and treat depression early, thereby improving PHS. As a previous study has indicated that suicide victims are highly likely to visit a primary care provider within one month before the suicide event [42], executing clinical policies to identify unrecognised mental illness through screening in primary care may also be a solution. For instance, if primary care physicians paid careful attention to patient mood and conduct screening to determine the risk of mental illness, those at risk of mental health issues could be more effectively identified. If such appropriate measures and policies are effectively implemented and established, it is believed that they will help improve not only mental health issues but also PHS, which has a strong association with mental health as indicated by the results of this study.

This study has some limitations. First, due to its cross-sectional design, a causal relationship could not be established; therefore, further prospective longitudinal studies with larger sample sizes are required to validate the findings. Second, recall and reporting biases might have occurred due to the use of self-reported questionnaires, though efforts were made to obtain consistent and reliable answers. Nevertheless, this study is the first to quantitatively investigate the association between depression and PHS in Korean adult women using large contemporary population data from KNHANES. These findings provide valuable insights into the role of depression in PHS, particularly among women.

Conclusions

This study demonstrated a significant inverse association between depression and PHS in Korean adult women, with depression found to exert a more pronounced impact on PHS than major chronic diseases. The findings underscore the importance of efficacious depression management to improve PHS in women. Future longitudinal studies are needed to further validate the relationship between depression and PHS and to elucidate the underlying mechanisms.

Abbreviations

CI	Confidence interval
KNHANES	Korean National Health and Nutrition Examination Survey
OR	Odds ratio
PHS	Perceived health status
SE	Standard error
WHO	World Health Organisation

Supplementary information

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Additional file 1

Additional file 2

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Not applicable.

Author contributions
Ji-Min Hong contributed to study concept and design, interpreting the data, composed the statistical dataset, performed the analyses, and wrote the manuscript. Woo-young Shin contributed to study concept and design, data interpretation, and critical revision of the manuscript. Soo Hyun Cho contributed to data interpretation and critical revision of the manuscript. Jung-Ha Kim contributed to study concept and design, data interpretation, and critical revision of the manuscript. All authors reviewed and approved the final version, and no other person made a substantial contribution to the paper.

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Data availability
Data were obtained from the 2014, 2016, 2018, 2020 and 2022 Korea National Health and Nutrition Examination Survey (KNHANES). The KNHANES is a nationwide population-based survey conducted by the Korean Ministry of Health and Welfare and the Division of Chronic Disease Surveillance of the Korean Centers for Disease Control and Prevention. All data used in the analyses are fully available without restriction. All data files are available from the KNHANES database. https://knhanes.kdca.go.kr/knhanes/main.do.

Declarations

Ethics approval and consent to participate
All participants provided written informed consent before participating in the study. The KNHANES was conducted following ethical approval by the institutional review board of the Korea Centers for Disease Control and Prevention. However, the KNHANES was exempt from an ethics review based on the Bioethics and Safety Act of 2016, No. 2013-12EXP-03–5 C in 2014, 2018-01-03-P-A in 2018, 2018-01-03–2 C-A in 2020, and 2018-01-03–4 C-A in 2022. This work is in accordance with the Declaration of Helsinki. The present study was exempt from review by the Institutional Review Board of Chung-Ang University (1041078-20240522-HR-126) approved on June 7, 2024.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interest.

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