

Age Differences in the Effects of Depression and Health Status on Work Productivity Among Korean Workers

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Objective: This study examined how depression and self-reported health status are associated with work productivity among Korean workers aged 20–49 years and whether these relations differ by age group. **Methods:** A total of 1000 employees participated in a cross-sectional survey assessing absenteeism, presenteeism, and overall work impairment. Depression was measured with the Patient Health Questionnaire-9, and health status was evaluated across physical, mental, social, and spiritual domains. Analyses were conducted separately for workers younger than 35 years and those aged 35 years or older using logistic regression. **Results:** Depression was the most consistent predictor of productivity loss across all outcomes. The influence of specific health domains differed by age. **Conclusion:** These findings support the need for workplace programs that combine universal depression management with age-appropriate wellness strategies.

Keywords: absenteeism, age, depression, health status, presenteeism, workplace health

Employee health and wellness is a critical driver of organizational productivity, with far-reaching implications for economic outcomes and societal costs.^{1,2} Health-related productivity loss is typically assessed through three complementary indicators: *absenteeism* (workdays missed owing to health problems), *presenteeism* (reduced on-the-job productivity linked to health limitations), and *overall work impairment*, which reflects the combined impact of both absence from work and impaired performance while present.³ These indicators have gained widespread acceptance as essential metrics for evaluating the influence of employee health on workplace productivity across diverse industries.^{4,5} Globally, sustainable corporate competitiveness increasingly depends on fostering employee health and wellness, as organizations recognize its pivotal role in enhancing productivity, reducing health-related costs, and ensuring long-term growth.⁶

Prior research has consistently demonstrated that mental health conditions, particularly depression, as well as subjective health status—including physical, mental, social, and spiritual dimensions—are associated with absenteeism and presenteeism.^{7,8} However, the magnitude and nature of these associations may vary by demographic factors, especially age. Younger employees are frequently characterized as being more vulnerable to productivity loss from minor depressive symptoms or physical discomfort, and older

LEARNING OUTCOMES

- Readers will gain an understanding of how depression and different dimensions of self-reported health status relate to absenteeism, presenteeism, and overall work impairment among workers in early to mid-adulthood.
- Readers will be able to identify health domains that play a protective role within each age group and consider how these findings can inform age-sensitive workplace strategies.
- Readers will recognize how study results can be applied in developing mental health and wellness initiatives aimed at improving productivity in diverse organizational settings.

employees as maintaining performance through accumulated experience or psychosocial resources.^{9–11} However, such age-related differences in work productivity remain inconsistently reported in the literature.^{11,12}

The global workforce is undergoing profound demographic and structural changes, including unprecedented population aging, delayed retirement, and increasing job insecurity among younger adults.^{13,14} At the same time, mental health challenges—particularly depression—have become a leading cause of productivity loss worldwide.^{15–17} Subjective health status, encompassing perceptions of physical, mental, social, and spiritual well-being, has emerged as a robust predictor of workplace productivity, often surpassing objective clinical indicators.^{8,18–21} Despite this recognition, few studies have comprehensively examined how depression and multi-dimensional subjective health status jointly influence absenteeism, presenteeism, and overall work impairment across age groups in the working-age population.

This cross-sectional study investigates the relations between depression, self-reported physical, mental, social, and spiritual health status, and three key productivity outcomes—absenteeism, presenteeism, and overall work impairment—among employees from diverse industries. The findings aim to provide empirical evidence to inform age-tailored workplace health and wellness strategies in the context of a globally aging workforce.

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Data Availability: Data used in this study are available from the authors upon reasonable request.

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METHODS

Study Design and Participants

This cross-sectional study targeted employed adults in their 20s–40s working in various occupational sectors. The survey link was distributed to 4452 eligible individuals, of whom 1052 agreed to participate. A total of 1000 individuals completed the full questionnaire between January 12 and January 31, 2024. Eligibility criteria included being currently employed, aged between 20 and 49 years. The survey was designed to capture demographic information, depressive symptoms, multidimensional health status, and work productivity indicators. This study was reviewed and approved by the Institutional Review Board of Seoul National University Hospital (IRB No. E-2401-129-1505).

The study was guided by a conceptual framework in which depression and multidimensional health status (physical, mental, social, and spiritual domains) were examined as factors associated with work productivity outcomes, including absenteeism, presenteeism, and overall work impairment. Age group (<35 years vs. ≥35 years) was considered in stratified analyses to explore potential differences in these associations (Fig. 1).

Measurement

Work productivity outcomes were assessed using three validated indicators from the Work Productivity and Activity Impairment questionnaire (WPAI) framework: absenteeism, presenteeism, and overall work impairment.^{3,22} *Absenteeism* refers to the percentage of work time missed owing to health problems, *presenteeism* denotes reduced effectiveness while at work because of health issues, and *overall work impairment* reflects the combined effect of absenteeism and presenteeism on total productivity loss. For analysis, each outcome was dichotomized into a “work loss” group and

a “no work loss” group using the sample mean value as the cut-off; participants with values greater than or equal to the mean were classified as having work loss, while those below the mean were classified as having no work loss. Similar approaches have been used in previous studies examining absenteeism and presenteeism using WPAI measures.

Depression was measured using the Korean version of the Patient Health Questionnaire-9, a widely used screening tool for depressive symptoms.^{23,24} Each item is rated on a 4-point Likert scale, yielding a total score of 0–27; scores of ≥10 indicate the presence of clinically relevant depressive symptoms, consistent with established diagnostic thresholds.

Health Status

Employees’ health status was assessed using the 5 Health Status Questionnaire, which was adapted from the general health status item of the Medical Outcomes Study Short Form-36²⁵ to evaluate 5 domains: physical, mental, social, spiritual, and general health.^{8,26} Each domain was measured using a single-item question rated on a 5-point Likert scale (1 = Excellent, 2 = Very good, 3 = Good, 4 = Bad, 5 = Very bad). For analysis, health status in each domain was dichotomized into “good” (ratings of good, very good, or excellent) and “poor” (ratings of bad or very bad). In this study, only 4 domains—physical, mental, social, and spiritual health—were included in the analyses.

Statistical Analysis

Descriptive statistics were used to summarize the sociodemographic and health-related characteristics of the participants, stratified by age group (<35 years and ≥35 years), corresponding to the participants’ mean age. Continuous variables were expressed as means and standard deviations, and categorical variables as

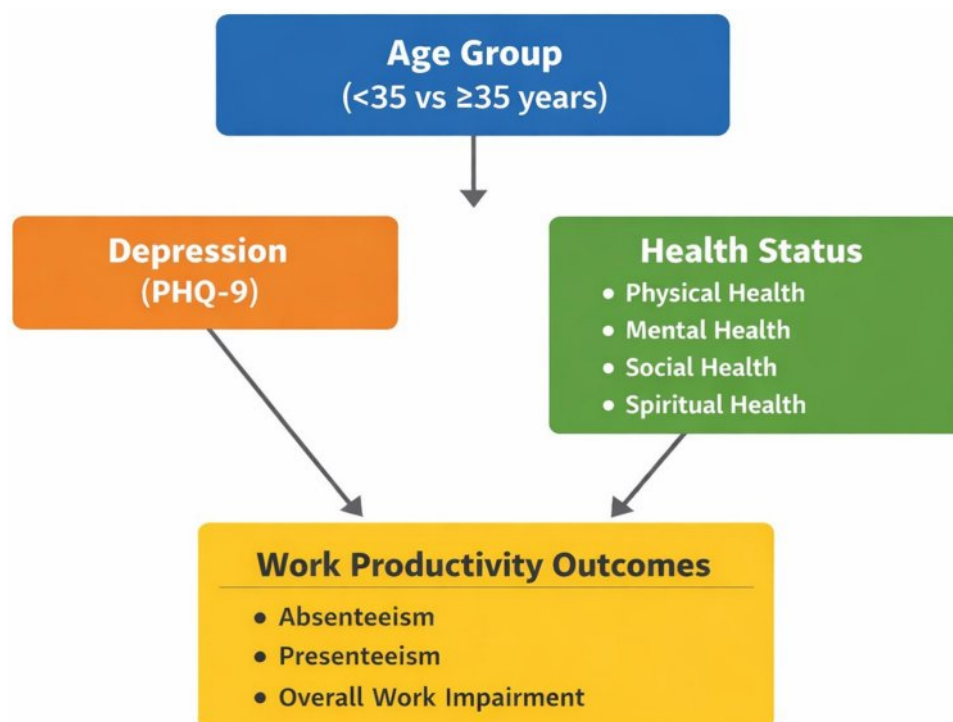


FIGURE 1. Conceptual framework of the study. The framework illustrates the hypothesized associations of depression and multidimensional health status (physical, mental, social, and spiritual) with work productivity outcomes, including absenteeism, presenteeism, and overall work impairment. Participants were stratified into 2 age groups (<35 and ≥35 years) to examine potential differences in these associations.

frequencies and percentages. To examine the association between potential predictors and work productivity loss outcomes—absenteeism, presenteeism, and overall work impairment—univariate logistic regression analyses were first performed separately for each age group. Variables with a P value < 0.05 in the univariate analysis were subsequently entered into multivariate logistic regression models to estimate adjusted odds ratios (aORs) and 95% confidence intervals (CIs), controlling for relevant covariates (eg sex, educational level, monthly income).

All tests were 2-tailed, and a P value of < 0.05 was considered statistically significant. Statistical analyses were conducted with SAS OnDemand for Academics (2025 version; SAS Institute Inc., Cary, NC).

RESULTS

Descriptive Analysis

Of the 1000 participants, 48.9% were younger than 35 years ($n = 489$) and 51.1% were aged 35 years or older ($n = 511$). Monthly income, educational attainment, workplace location, marital status, and company size significantly differed between the 2 groups (all $P < 0.05$). The prevalence of depressive symptoms (Patient Health Questionnaire-9 ≥ 10) was higher among younger employees (54.0%) compared with older employees (46.0%, $P = 0.03$). Younger employees were more likely to report good physical health (52.1% vs. 47.9%, $P = 0.003$) and reported better social and spiritual health than older employees (both $P = 0.02$). Absenteeism was substantially higher among younger employees (6.8% vs. 3.3%, $P = 0.0001$), while differences in presenteeism (36.3% vs. 32.9%, $P = 0.05$) and overall work impairment (39.5% vs. 34.4%, $P = 0.01$) were also statistically significant (Table 1).

Univariate Analysis

Univariate Logistic Regression of Sociodemographic and Occupational Factors

In the ≥ 35 years group, female employees demonstrated higher overall work impairment (OR = 1.45, 95% CI: 1.01–2.07, $P = 0.04$). Other sociodemographic and occupational factors, including monthly income, educational attainment, workplace location, marital status, and company size, were not significantly associated with absenteeism, presenteeism, or overall work impairment (Table 2).

In the < 35 years group, employees with higher monthly income ($\geq 4,000,000$ KRW) reported lower presenteeism (OR = 0.65, 95% CI: 0.45–0.93, $P = 0.02$) and lower overall work impairment (OR = 0.63, 95% CI: 0.44–0.91, $P = 0.01$). In addition, those with a university degree or higher showed lower absenteeism (OR = 0.48, 95% CI: 0.28–0.82, $P = 0.01$). No other significant associations were identified in this age group (Table 2).

Univariate Logistic Regression of Depression and Health Status

In the ≥ 35 years group, depression and all 4 health status domains—physical, mental, social, and spiritual—were significantly associated with absenteeism, presenteeism, and overall work impairment ($P < 0.05$ for all). Depression showed the strongest associations, with odds ratios (ORs) ranging from 3.25 to 4.99 across the three work productivity outcomes. Better health status in each domain was generally associated with a lower likelihood of work loss, with ORs between 0.29 and 0.48 (Table 3).

In the < 35 years group, depression, physical, mental, social, and spiritual health were significantly related to presenteeism and overall work impairment. However, these factors were not consistently associated with absenteeism, except for depression, which

showed strong associations across all outcomes (ORs: 3.56–5.82) (Table 3).

Multivariate Analysis

In the ≥ 35 years group, depression was significantly associated with all 3 outcomes—absenteeism, presenteeism, and overall work impairment—with the strongest effect for presenteeism and overall work impairment (aORs: 2.89–4.84). Mental health status was significantly related to presenteeism and overall work impairment, with good mental health reducing the odds by about 68% (aORs = 0.32). Spiritual health was significantly associated only with absenteeism, with good spiritual health reducing the odds by nearly 60% (aOR = 0.41, $P = 0.004$). Sex was also a significant factor for overall work impairment, with females exhibiting higher overall work impairment compared with males (aOR = 1.54) (Table 4).

In the < 35 years group, depression was significantly associated with all 3 outcomes, with the highest OR for absenteeism (aOR = 5.42) and similar magnitudes for presenteeism and overall work impairment (aORs: 2.13–2.43). Younger employees' good physical health reduced the odds of presenteeism and overall work impairment by about half (aORs: 0.52 each), and good mental health was protective for presenteeism (aOR = 0.59). Social health was associated only with overall work impairment (aOR = 0.50) (Table 4).

DISCUSSION

This study explored the age-stratified associations between depression, multidimensional self-reported health status (physical, mental, social, and spiritual), and three indicators of work productivity—absenteeism, presenteeism, and overall work impairment—among Korean employees in the prime working-age group, representing diverse occupational sectors. The results highlight depression as the most consistently associated factor with work productivity outcomes across age groups, while the associations of specific health domains varied between younger and older employees.

Our findings demonstrate that depression was significantly associated with all 3 productivity outcomes in both age groups, corroborating prior research indicating the substantial workplace burden of depressive symptoms. Studies have shown that depression is linked to reduced work functioning, higher absence rates, and diminished presenteeism performance.^{27,28} Depression has been reported to be associated with reduced cognitive functioning, lower motivation, and impaired interpersonal functioning, which may contribute to decreased work productivity.²⁹ The magnitude of the odds ratios observed in our study—particularly for absenteeism in younger workers—underscores the urgent need for targeted mental health strategies in the workplace.

The influence of specific health domains on productivity loss was found to differ between age groups. Among employees aged ≥ 35 years, good mental health was protective against presenteeism and overall work impairment, while good spiritual health reduced absenteeism risk. These findings align with literature suggesting that older workers often draw upon psychological resources and a sense of purpose to maintain performance despite health challenges.⁹

In contrast, younger workers (< 35 years) showed stronger associations between physical and social health and productivity outcomes, consistent with the hypothesis that physical vitality and workplace social integration are critical drivers of engagement and output at earlier career stages. These results support prior findings that physical well-being and social connectedness significantly affect younger workers' presenteeism and resilience under stress.^{30–32}

TABLE 1. Sociodemographic and Occupational Characteristics

Features	Category	<35 years (n = 489)		≥ 35 years (n = 511)		P value
		N (or Mean)	% (or SD)	N (or Mean)	% (or SD)	
Sex	Male	287	47.8	313	52.2	0.41
	Female	202	50.5	198	49.5	
Monthly income (KRW)	<4,000,000	278	67.8	132	32.2	<0.0001
	≥4,000,000	211	35.8	379	64.2	
Educational attainment	<University graduates	78	60.9	50	39.1	0.004
	≥University graduates	411	47.1	461	52.9	
Workplace location	Others	204	52.9	182	47.2	0.048
	Seoul, Gyeonggi-do	285	46.4	329	53.6	
Marital status	Single	408	19	166	81	<0.0001
	Married	81	71.1	345	28.9	
Company size	Mid-sized, small-sized	317	62.8	188	37.2	<0.0001
	Large	172	34.8	323	65.3	
Depression	PHQ-9<10	327	46.7	373	53.3	0.03
	PHQ-9≥10	162	54	138	46	
Physical health status	Bad	129	41.8	180	58.2	0.003
	Good	360	52.1	331	47.9	
Mental health status	Bad	157	47	177	53	0.4
	Good	332	49.9	334	50.1	
Social health status	Bad	94	42	130	58	0.02
	Good	395	50.9	381	49.1	
Spiritual health status	Bad	94	42	130	58	0.02
	Good	395	50.9	381	49.1	
Absenteeism (%)		6.8 (16.4)		3.3 (12.3)		0.0001
Presenteeism (%)		36.3 (28.4)		32.9 (27.1)		0.05
Overall work impairment (%)		39.5 (30.1)		34.4 (28.2)		0.01

SD, standard deviation; KRW, South Korean Won.

TABLE 2. Univariate Logistic Regression Analysis of Sociodemographic and Occupational Factors Associated with Absenteeism, Presenteeism, and Overall Work Impairment by Age Group

Variables	Age ≥35 years group						Age <35 years group					
	Absenteeism			Presenteeism			Absenteeism			Presenteeism		
	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value
Sex												
Male	1	0.19	1	0.08	1	0.04	1	0.29	1	0.9	1	0.9
Female	1.47 (0.83–2.61)		1.37 (0.96–1.96)		1.45 (1.01–2.07)		0.79 (0.50–1.22)		1.02 (0.71–1.47)		0.98 (0.68–1.40)	
Monthly income (KRW)												
<4,000,000	1	0.66	1	0.79	1	0.87	1	0.14	1	0.02	1	0.01
≥4,000,000	0.87 (0.46–1.64)		0.95 (0.64–1.41)		0.97 (0.65–1.44)		0.71 (0.46–1.11)		0.65 (0.45–0.93)		0.63 (0.44–0.91)	
Educational attainment												
<Univ. graduates	1	0.69	1	0.86	1	0.95	1	0.01	1	0.29	1	0.12
≥Univ. graduates	0.83 (0.34–2.06)		1.06 (0.59–1.90)		1.02 (0.57–1.83)		0.48 (0.28–0.82)		0.77 (0.47–1.25)		0.68 (0.41–1.11)	
Workplace location												
Others	1	0.07	1	0.24	1	0.32	1	0.62	1	0.53	1	0.97
Seoul, Gyeonggi-do	0.58 (0.33–1.04)		1.24 (0.86–1.79)		1.21 (0.84–1.73)		1.12 (0.72–1.73)		1.12 (0.78–1.61)		0.99 (0.69–1.43)	
Marital status												
Married	1	0.24	1	0.26	1	0.18	1	0.87	1	0.13	1	0.28
Single	1.42 (0.79–2.54)		1.24 (0.86–1.80)		1.29 (0.89–1.86)		1.05 (0.59–1.88)		1.45 (0.90–2.34)		1.30 (0.81–2.09)	
Company size												
Large	1	0.46	1	0.48	1	0.45	1	0.2	1	0.23	1	0.23
Mid-sized, Small-sized	0.87 (0.61–1.25)		0.88 (0.61–1.26)		0.80 (0.45–1.43)		0.79 (0.54–1.14)		0.80 (0.55–1.16)		0.75 (0.47–1.19)	

CI, confidence interval; OR, odds ratio; KRW, South Korean Won.

TABLE 3. Univariate Logistic Regression Analysis of Depression and Health Status Associated with Absenteeism, Presenteeism, and Overall Work Impairment by Age Group

Variables		Age ≥35 Years Group						Age <35 Years Group					
		Absenteeism		Presenteeism		Overall Work Impairment		Absenteeism		Presenteeism		Overall Work Impairment	
		Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value	Univariate OR (CI)	P value
Depression	PHQ-9<10	1	<.0001	1	<.0001	1	<.0001	1	<.0001	1	<.0001	1	<.0001
	PHQ-9≥10	3.25 (1.82-5.80)		4.64 (3.02-7.10)		4.99 (3.23-7.72)		5.82 (3.66-9.24)		3.56 (2.37-5.35)		4.79 (3.10-7.38)	
Physical health status	Bad	1	0.01	1	<.0001	1	<.0001	1	0.61	1	<.0001	1	<.0001
	Good	0.44 (0.25-0.79)		0.47 (0.33-0.68)		0.47 (0.33-0.68)		0.88 (0.55-1.43)		0.40 (0.26-0.62)		0.40 (0.26-0.62)	
Mental health status	Bad	1	0.01	1	<.0001	1	<.0001	1	0.82	1	<.0001	1	0.0003
	Good	0.47 (0.26-0.83)		0.30 (0.20-0.44)		0.29 (0.20-0.42)		0.95 (0.60-1.50)		0.44 (0.30-0.66)		0.48 (0.32-0.71)	
Social health status	Bad	1	0.01	1	<.0001	1	<.0001	1	0.2	1	0.0001	1	<.0001
	Good	0.48 (0.26-0.86)		0.34 (0.23-0.52)		0.34 (0.22-0.51)		0.71 (0.42-1.20)		0.39 (0.24-0.63)		0.35 (0.21-0.57)	
Spiritual health status	Bad	1	0.0002	1	<.0001	1	<.0001	1	0.61	1	0.049	1	0.03
	Good	0.34 (0.19-0.60)		0.42 (0.28-0.62)		0.39 (0.26-0.59)		0.88 (0.53-1.45)		0.65 (0.42-0.99)		0.61 (0.40-0.95)	

Table 4. Multivariate Logistic Regression Analysis of Factors Associated with Absenteeism, Presenteeism, and Overall Work Impairment by Age Group

Variables	Age ≥35 years group						Age <35 years group					
	Absenteeism		Presenteeism		Overall Work Impairment		Absenteeism		Presenteeism		Overall Work Impairment	
	Adjusted OR (CI)	P value	Adjusted OR (CI)	P value	Adjusted OR (CI)	P value	Adjusted OR (CI)	P value	Adjusted OR (CI)	P value	Adjusted OR (CI)	P value
Sex												
Male					1	0.03						
Female					1.54 (1.04-2.29)							
Educational attainment												
<Univ. graduates							1	0.04				
≥Univ. graduates							0.55 (0.31-0.98)					
Monthly income (KRW)												
<4,000,000												
≥4,000,000												
Depression												
PHQ-9 < 10	1				1	<.0001	1	<.0001	1	0.0001	1	<.0001
PHQ-9 ≥ 10	2.89 (1.60-5.25)	0.001	4.78 (3.07-7.43)		4.84 (3.09-7.58)		5.42 (3.31-9.98)		2.13 (1.46-3.21)		2.43 (1.61-3.65)	
Physical health status												
Bad	NS		NS		NS							
Good												
Mental health status												
Bad	NS		1	<.0001	1	<.0001						
Good			0.32 (0.22-0.48)		0.32 (0.21-0.48)							
Social health status												
Bad	NS		NS		NS							
Good												
Spiritual health status												
Bad	1				NS							
Good	0.41 (0.23-0.75)	0.004	NS		NS							

*NS" not significant in multivariate analyses despite a univariate correlation.

“.” no correlation in univariate analyses.

KRW, South Korean Won.

The age-dependent patterns observed suggest that workplace health and wellness interventions should adopt differentiated strategies. For younger employees, workplace programs targeting physical health (eg exercise programs or ergonomic improvements) and social connectedness (eg team-building or peer mentorship) may be relevant strategies for addressing factors associated with productivity outcomes. For older employees, programs focusing on mental resilience (eg cognitive behavioral interventions, stress management) and spiritual engagement (eg mindfulness, purpose-driven activities) could be more effective.

Moreover, given that depression emerged as a cross-cutting determinant in both age groups, universal workplace mental health screening, early intervention, and stigma reduction campaigns should be prioritized.^{33,34} Evidence suggests that such approaches can reduce productivity loss and improve organizational outcomes.³⁵

Several limitations should be noted. First, because this study used a cross-sectional design, the observed relations should be interpreted as associations rather than causal effects. Longitudinal studies are needed to better understand the temporal relations among depression, multidimensional health status, and work productivity outcomes. Second, all variables were assessed using self-reported measures, which may introduce recall or social desirability bias. In addition, multidimensional health status was measured using single-item questions for each domain. Although this approach helped reduce respondent burden in a large-scale workplace survey, single-item measures may not fully capture subtle differences in health status across individuals or age groups. Future studies using more comprehensive multi-item measures, together with objective indicators such as relevant biological or clinical markers, may help provide a more detailed assessment of these health domains. Moreover, work productivity outcomes were dichotomized using the sample mean to distinguish employees with relatively higher versus lower levels of productivity loss, which may help identify groups potentially in need of targeted workplace health interventions. However, dichotomization may reduce statistical information compared with analyses using continuous measures, and the findings should therefore be interpreted with this consideration in mind. Third, although participants were recruited from a range of industries, the findings may not be generalizable to all occupational groups, particularly those in informal or gig economy sectors. Finally, differences in occupational distribution between younger and older workers—for example, younger employees being more concentrated in small enterprises and service-oriented industries, while older employees were more represented in large corporations and professional sectors—may have influenced the observed associations (Table S1, Supplementary material, <https://links.lww.com/JOM/C473>). Future research could further examine these relations by considering industry type and company size.

CONCLUSION

This study provides novel evidence that the associations between depression, multidimensional self-reported health status, and work productivity loss differ by age among Korean workers. While depression remains a universal and powerful predictor, the relative importance of physical, mental, social, and spiritual health varies between younger and older employees. These findings highlight the need for integrated, age-sensitive workplace health interventions that address both mental health and broader well-being dimensions to safeguard employee productivity and organizational sustainability.

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