



Factors affecting the impact of health literacy on depression in older adults

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Abstract

This study aimed to examine the relationship between health literacy and depression among older adults in South Korea, focusing on gender differences and the moderating effect of subjective health perception. Methods: Using data from the 9th Korea National Health and Nutrition Examination Survey (KNHANES, 2023), a total of 1,552 participants aged 65 and above (695 men and 857 women) were analyzed. Complex sample analyses, including descriptive statistics, chi-square tests, t-tests, ANOVA, and hierarchical regression analyses, were conducted using SPSS WIN 25.0. Significant gender differences were observed in marital status, health insurance type, smoking behavior, health literacy, and depression levels. Men demonstrated higher health literacy, whereas women reported higher subjective health perception and depression scores. Health literacy showed a significant moderating effect on depression in both genders—higher health literacy was associated with lower depressive symptoms (men: $\beta = -.16$, $p < .001$; women: $\beta = -.12$, $p < .001$). Subjective health perception also significantly influenced depression across both groups. Conclusion: Health literacy plays a crucial role in mitigating depression among older adults and interacts with perceived health status. Gender-specific and cognitively tailored interventions are needed to enhance health literacy and promote mental health in the aging population. Developing accessible and understandable health information is essential to prevent depression and support psychological well-being among older adults in the digital era.

Keywords: Health literacy, Depression, Older adults, Gender differences, Subjective health perception, Korea

Introduction

The World Health Organization (2023), in the Shanghai Declaration, defined health literacy as an essential element of health and emphasized the development, implementation, and monitoring of strategies at national and regional levels to strengthen health literacy [1]. Health literacy plays a crucial role in managing health across the life cycle, especially in older adulthood. It is considered a core competency for maintaining and promoting health in later life, including the ability to search for, understand, and use health information [1]. Older adults with low health literacy often struggle to manage their health effectively and may have difficulty recognizing symptoms of depression, leading to challenges in seeking appropriate help [2][3]. Research also shows that lower health literacy is associated with a faster decline in physical functioning [4]. One study with 3,260 older adults reported that those with low health literacy had a 1.2 times higher risk of developing depression [5]. A meta-analysis of 11 studies analyzing the relationship between health literacy and depression found that higher health literacy was associated with

a 20–30% lower risk of depression [6]. This confirms that health literacy significantly influences both perceived health status and depressive symptoms in older adults [7]. It is necessary to examine how this association manifests among Korean older adults and to adopt a more detailed approach based on the characteristics of the elderly.

In Korea, where the proportion of the elderly population is rapidly increasing—having recently entered a super-aged society with over 10 million seniors—there is a growing concern over issues like poverty, dementia, depression, isolation, and suicide among the elderly [8][9]. Korea already has the highest elderly suicide rate among OECD countries, and depression prevalence per 1,000 people increases with age: 20.7 in their 60s, 31.9 in their 70s, and 31.6 in those aged 80 or above—well above the national average of 18.1[10][11]. Over the past 10 years, the number of older adults diagnosed with depression has increased by 58%, highlighting the growing severity of this issue [12].

According to the Health Insurance Review & Assessment Service (2021), older adults aged 60+ account for 35.7% of all depression patients,

emphasizing the significance of depression as a major mental health issue in this age group [13,31]. Research involving 2,731 elderly participants revealed that symptoms of depression were more prevalent among older women, single individuals, those living alone, and those dissatisfied with their finances [14]. Depression is also a major predictor of cognitive decline [15], which in turn is influenced by various factors, including social participation, subjective health perception, physical activity, daily functioning, and sociodemographic characteristics such as gender, age, education, marital status, and socioeconomic activity [16][17][18].

The relationship between health literacy and depression among older adults is not merely correlational but holds significant implications for health behavior, healthcare utilization, psychosocial resources, and policy/intervention strategies. In South Korea as well, the “5th National Health Promotion Comprehensive Plan (HP2030)” has designated health literacy as a key task under the objective of “creating a health-friendly environment,” establishing specific action plans to enhance health literacy. It defines this competency as essential for individuals to correctly understand and utilize health information in order to maintain and promote a healthy life [19,30].

Understanding this relationship provides important academic evidence for promoting mental health equity and developing tailored health information strategies for the elderly. Notably, historical gender disparities in educational opportunities in Korea—where many older women have lower levels of education compared to men—result in significant differences in literacy and numeracy, affecting health literacy levels [20]. Traditionally, women were more engaged in caregiving and domestic roles, which limited their exposure to formal health information sources, whereas men often had greater access through employment and institutional channels. Consequently, women are more likely to rely on informal or oral sources of health information [21].

Therefore, social, educational, psychological, and biological gender-related factors may interact in complex ways, influencing both health literacy levels and depression symptoms differently in men and women.

Thus, this study aims to examine how subjective health perception and health literacy affect depression in older adults by gender, and provide foundational data for reducing gender-based disparities in depression among the elderly.

Research Methodology

1. Research data

This study used raw data from the 9th (2023) Korea National Health and Nutrition Examination Survey (KNHANES), conducted by the Korea Disease Control and Prevention Agency. The sample for the Korea National Health and Nutrition Examination Survey (KNHANES) was selected using a two-stage stratified cluster sampling design, ensuring a representative basis for the population residing in South Korea. In accordance with the Personal Information Protection Act and the Statistics Act, KNHANES only discloses data with all personally identifiable information removed. For this study, anonymized data that do not allow identification of individuals were downloaded from the KNHANES website [22].

A total of 1,836 individuals aged 65 and older initially responded to the survey; however, those who responded insincerely or did not respond were excluded. As a result, the final sample for analysis consisted of 1,552 participants, comprising 695 men and 857 women [22].

2. Analytical Variables

1) General characteristics

In this study, a total of eight variables were used as control variables, including demographic, socioeconomic, and health-related factors: gender, age, marital status, type of health insurance, presence of private health insurance, smoking status, perceived stress level, and food intake (g)[22].

Demographic factors included gender and age. Gender was categorized as 'male' and 'female,' and age was defined based on international age as '65 years and older'[22,29].

Socioeconomic factors included marital status, type of health insurance, and presence of private insurance. Marital status referred to the response to

the question "Have you ever been married?" with answers coded as (1: Yes, currently living with a spouse; 2: No, has a spouse but not living together due to death, divorce, or separation).

Health insurance type referred to the response to "What type of health insurance are you enrolled in?" with answers coded as (1: National Health Insurance—regional subscriber, 2: National Health Insurance—employee subscriber, 3: Medical Aid Type 1 or 2). Presence of private health insurance referred to the response to "Are you enrolled in private health insurance that supplements medical expenses such as cancer insurance, cardiovascular disease insurance, or accident coverage insurance sold by insurance companies?" with answers coded as (1: Enrolled, 2: Do not know or not enrolled) [22].

Health factors included smoking status, perceived stress level, and food intake. Smoking status referred to the response to the question "Do you currently smoke cigarettes?" with answers coded as (1: smoke daily, 2: smoke occasionally, 3: used to smoke but do not currently smoke). Perceived stress level was measured using a 4-point scale based on the question "How much stress do you usually feel in your daily life?" with scores ranging from 1 (feel very much stress) to 4 (feel almost no stress), where lower scores indicate higher perceived stress. Food intake referred to the response to "On average, over the past year, excluding kimchi and pickled vegetables, how often did you consume vegetables, mushrooms, and seaweed (such as gim, miyeok, etc.)? This includes all forms such as side dishes, soups, and stews."

The response options were (1: three or more times per day, 2: twice per day, 3: once per day, 4: 5-6 times per week, 5: 2-4 times per week, 6: once per week, 7: 2-3 times per month, 8: once per month, 9: rarely or less than once per month) [22].

2) Subjective health perception

In this study, subjective health perception was measured by the response to the question, "How do you usually perceive your own health?" with answers originally scored from 1 (very good) to 5 (very poor). These scores were reverse-coded (1: very poor to 5: very good), so that higher scores indicate a higher subjective health perception [22].

3) Health literacy

Health literacy in this study was measured using 10 items assessing difficulties experienced in understanding and utilizing health information. Each item was rated on a 4-point scale (1: not at all true to 4: very true), with lower total scores indicating lower health literacy [21].

4) Depression

In this study, depression was measured by the question, "How depressed have you felt in the past two weeks?" using a 4-point scale (1: not depressed at all to 4: always depressed), with higher scores indicating a greater degree of depression [22].

3. Ethical considerations

The raw data from KNHANES is a statutory survey conducted under Article 16 of the National Health Promotion Act to investigate the public's health-related awareness, behaviors, and food and nutrition intake status. It is a government-designated official statistic based on Article 17 of the Statistics Act (Approval No.: 2022-11-16-R-A). According to Article 2, Clause 1 of the Bioethics and Safety Act and Article 2, Paragraph 2, Subparagraph 1 of its Enforcement Rules, KNHANES is classified as "research directly conducted by the state for public welfare," and is therefore exempt from review by a separate Institutional Review Board. The researcher reviewed the regulations on the use of publicly available raw data before downloading and analyzing the data [22].

4. Data analysis

The data analysis in this study was conducted using SPSS WIN 25.0, taking into account the complex sampling design of the Korea National Health and Nutrition Examination Survey (KNHANES) by applying appropriate sampling weights. The specific analysis methods were as follows:

- 1) Descriptive statistics were conducted to examine the general characteristics of the study participants based on the complex sample design.
- 2) Complex sample chi-square tests, independent t-tests, and ANOVA were used to analyze gender differences in key variables.

- 3) To examine the moderating effect of health literacy on depression by gender among older adults, a hierarchical regression analysis was conducted using the complex sample design.

5. Results

1. General characteristics of the study participants

The general characteristics, health literacy, perceived health status, and depressive symptoms of older adults by gender are shown in Table 1. Significant gender differences were found in marital status, type of health insurance, and smoking status.

Regarding marital status, 55% of men (n = 606) had a spouse, which was higher than the 45% of women (n = 496), indicating that men were more likely to have a spouse, while the proportion of women with a spouse was lower (t = 160.23, p < .001). In terms of health insurance type, 49.6% of men (n = 298) were regional subscribers, 42.4% (n = 362) were workplace subscribers, and 35.7% (n = 35) received medical aid. For women, 50.4% (n = 303) were regional subscribers, 57.6% (n = 491) were

workplace subscribers, and 64.3% (n = 63) received medical aid. Thus, men had a higher proportion of regional subscribers, while women had higher rates of workplace insurance and medical aid subscription (t = 10.76, p < .005). Regarding smoking status, among men, 89.9% (n = 124) smoked daily, 16.4% (n = 161) smoked occasionally, and 94.3% (n = 410) were former smokers. Among women, 10.1% (n = 14) smoked daily, 83.6% (n = 818) smoked occasionally, and 5.7% (n = 25) were former smokers. These results show that men were more likely to smoke, whereas women had a higher rate of non-smoking (t = 180.24, p < .001).

Subjective health perception was higher among women (3.09) than men (2.87) (t = 1.557, p < .001), while health literacy was higher among men (28.12) compared to women (27.07) (t = 12.14, p < .001). Depression levels were higher in women (1.60) than in men (1.42) (t = 5.89, p < .001), and food intake was greater in men (1388.46 g) than in women (1099.97 g) (t = 13.40, p < .001). No significant gender differences were found in age (t = 0.22, p = .466), private health insurance status (t = 1.84, p = .096), or perceived stress level (t = 4.59, p = .286).

Table 1. General characteristics of study participants (N: 1,552)

Variables		Men (n= 695) n (%) / M±SD	Women (n= 857) n (%) / M±SD	χ ² or t/F	p
Age(year)		72.37(5.05)	72.18(5.00)	0.22	0.466
Marital Status	Yes	606(55.0)	496(45)	160.23	<.001
	No	89(19)	361(80.2)		
Health Insurance	Community	298(49.6)	303(50.4)	10.76	0.005
	Employee	362(42.4)	491(57.6)		
	Medical Aid	35(35.7)	63(64.3)		
Private Health Insurance	Yes	417(43.4)	543(56.6)	1.84	0.096
	No	278(47.0)	314(53.0)		
Smoking Status	Daily smoker	124(89.9)	14(10.1)	180.24	<.001
	Regular smoker	161(16.4)	818(83.6)		
	Former smoker	410(94.3)	25(5.7)		
Perceived Health Status		2.87(1.01)	3.09(1.01)	1.56	<.001
Health Literacy		28.12(5.47)	27.07(6.01)	12.14	<.001
Depression		1.42(0.71)	1.60(0.83)	5.89	<.001
Perceived Stress		0.14(0.35)	0.16(0.37)	4.59	0.286
Dietary Intake(g)		1388.46(633.20)	1099.97(539.03)	13.4	<.001

The results of examining the moderating effect of health literacy on depression by gender are as follows

(Table 2). Prior to conducting the regression analysis, assumptions regarding normality, independence, and

homoscedasticity of the error terms were assessed. The P-P plot showed that the points did not deviate significantly from the reference line, confirming the assumption of normality. Additionally, the residual scatterplot revealed that residuals were randomly distributed without any clear pattern, satisfying the assumptions of independence and homoscedasticity. Multicollinearity was checked, with tolerance values ranging from 0.78 to 0.98, all above the 0.1 threshold, and variance inflation factors (VIF) ranging from 1.01 to 1.31, well below the cutoff of 10, indicating no multicollinearity issues. The regression model was statistically significant ($F = 13.29$, $p < .001$). For males, in Model 0, subjective health perception was

significant ($\beta = .16$, $p < .001$, $R^2 = 13.4\%$). In Model 1, health literacy was added and found significant ($\beta = -.17$, $p < .001$, $R^2 = 13.7\%$). In Model 2, both subjective health perception ($\beta = .14$, $p < .001$) and health literacy ($\beta = -.16$, $p < .001$) were included, increasing the explanatory power to $R^2 = 15.7\%$. For females, in Model 0, subjective health perception was significant ($\beta = .17$, $p < .001$, $R^2 = 12.1\%$). In Model 1, health literacy was added and found significant ($\beta = -.13$, $p < .001$, $R^2 = 11.0\%$). In Model 2, both subjective health perception ($\beta = .16$, $p < .001$) and health literacy ($\beta = -.12$, $p < .001$) were included, with an explanatory power of $R^2 = 13.4\%$.

Table 2. Association of health literacy on depressive symptoms by gender (n: 1,552)

Variables	Men (n= 695)			Women (n=857)			
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	
	$\beta(p)$	$\beta(p)$	$\beta(p)$	$\beta(p)$	$\beta(p)$	$\beta(p)$	
Age(year)	.02(.644)	.01(.831)	.01(.826)	-.01(.722)	-.03(.438)	-.03(.501)	
Marital Status (ref: Yes)	-.13(.001)	-.11(.002)	-.12(.001)	-.03(.398)	-.01(.893)	-.02(.651)	
Health Insurance (ref:Community)	-.03(.416)	-.03(.484)	-.03(.440)	-.05(.146)	-.05(.139)	-.05(.139)	
Private Health Insurance (ref:Yes)	.02(.630)	-.01(.816)	-.01(.970)	-.01(.815)	-.01(.799)	.01(.871)	
Perceived Stress Rate	.27(.001)	.29(.001)	.27(.001)	.24(.001)	.26(.001)	.24(.001)	
Daily smoker	.04(.334)	.02(.514)	.02(.513)	.11(.001)	.12(.001)	.11(.001)	
Drinking status (ref:Yes)	.03(.359)	.04(.254)	.04(.265)	.06(.064)	.06(.060)	.06(.059)	
Dietary intake(g)	-.01(.720)	-.01(.966)	.01(.868)	.01(.767)	.01(.941)	.02(.601)	
Perceived health status(A)	.16(.001)	-	.14(.001)	.17(.001)	-	.16(.001)	
Health literacy(B)		-.17(.001)	-.16(.001)		-.13(.001)	-.12(.001)	
$R^2(p)$	1) 13.4	2) 13.7	3) 15.7	12.1	11	13.4	

Discussion

Using nationally representative data from the Korea National Health and Nutrition Examination Survey (KNHANES), this study investigated the gender differences in the moderating effect of health literacy on depression among older adults. The findings revealed several notable distinctions.

First, a moderating effect was observed whereby higher health literacy was associated with reduced levels of depression.

The results of this study showed significant differences in the moderating effects of health literacy and subjective health perception on depression for both men and women. Higher health literacy was linked to alleviation of depressive symptoms, consistent with previous studies targeting rural elderly populations. This finding supports the importance of health literacy as a key factor influencing depression [23]. A study on elderly individuals in Hong Kong revealed that cognitive and physical functioning affect health literacy, which in turn acts as a mediator or moderator between quality

of life and mental health among older adults [24]. Additionally, analyses of health information-seeking behavior and digital health literacy among the elderly found that higher health literacy leads to more positive self-assessments of health and lower depression levels [7]. Furthermore, health literacy has been reported to serve as a crucial mediator in the relationship between social support and depression [5].

Health literacy refers to an individual's knowledge and capacity to access, understand, and utilize information and services to maintain and improve their own and their community's health and well-being. It is influenced by organizational structures and resource availability and is accumulated through everyday life and social interactions, with effects extending across generations [25]. A survey of health literacy among adults in South Korea found that only 60.4% of the population had an adequate level of health literacy [26]. Notably, socioeconomically vulnerable groups demonstrated relatively lower levels of health literacy. Older age, lower educational attainment, and lower household income were significantly associated with poorer health literacy, highlighting the importance of improving health literacy in later life [27]. Especially for individuals with low information comprehension skills, the inability to accurately recognize health problems or respond appropriately can exacerbate depressive symptoms. Therefore, interventions aimed at enhancing health literacy should be implemented.

Second, subjective health perception in this study showed a negative effect on depression for both men and women. Specifically, higher subjective health perception was associated with increased levels of depression, which contradicts prior research conducted on community-dwelling older adults where depression was found to be the most significant factor influencing subjective health status [28].

Subjective health perception reflects one's physical self-awareness or expectations, such as feeling "I am healthy," whereas depression captures emotional states like loneliness, loss, and lethargy. Therefore, even if physical health is maintained, feelings of psychological isolation or emotional deprivation may lead to depressive symptoms. This suggests that individuals who perceive themselves as healthy can

still experience depression due to external factors such as living conditions or social isolation. This finding may be interpreted as a limitation of the current analysis, which did not control for such intrinsic factors. Consequently, future research should employ more sophisticated methods, such as propensity score matching, to control for confounding variables and conduct a more rigorous analysis.

In conclusion, this study empirically demonstrated that health literacy serves as an important moderating factor in reducing depression among older adults. Moreover, it identified the interaction between health literacy and perceived health status as significantly affecting depression levels in later life. These findings underscore the need for gender-sensitive, cognitively tailored mental health interventions for older adults. Given that the way individuals' access and use health information, their health perceptions, and emotional responses may differ by gender, a more nuanced and segmented approach should be adopted in future programs and policies targeting elderly mental health.

Conclusion

Conclusion and recommendations

This study, using KNHANES sample data, found that health literacy in older adults influences depression. Based on these findings, it suggests the necessity of providing easy-to-understand health information tailored for the digital age to enhance health literacy and thereby promote mental health among the elderly.

Since this study utilized cross-sectional data, caution is needed when generalizing the relationships between variables. Therefore, healthcare service providers are encouraged to actively incorporate health literacy enhancement programs that consider the unique characteristics of older adults into community health initiatives to help prevent depression in this population.

References

1. World Health Organization. Health promotion: health literacy: definition of health literacy. 2023. Available from:

- https://www.who.int/teams/health-promotion/enhanced-wellbeing/ninth-global-conference/health-literacy
2. Liu X, Gan X, Ren G, Mao Z, Hu J, Sha C, et al. Path analysis of the influence of digital health literacy on self-management behaviour among elderly patients with chronic diseases in rural China. *BMC Geriatr*. 2025;25(1):293. <https://doi.org/10.1186/s12877-025-05952-3>
3. Jung SD, Lee MW, Park CR, Lim JS. Factors affecting mental health literacy using Andersen and Newman model. *J Korean Gerontol Soc Welf*. 2016;71(3):193–218.
4. Smith SG, O'Connor R, Curtis LM, Waite K, Deary IJ, Paasche-Orlow M, et al. Low health literacy predicts decline in physical function among older adults: findings from the LitCog cohort study. *J Epidemiol Community Health*. 2015;69(5):474–80.
5. Shih YL, Hsieh CJ, Lin YT, Wang YZ, Liu CY. The mediation effect of health literacy on social support with exchange and depression in community-dwelling middle-aged and older people in Taiwan. *Healthcare (Basel)*. 2021;9(12):1757. <https://doi.org/10.3390/healthcare9121757>
6. Li X, Yin X, Guan Z, Qian Y, Loux T. Association between health literacy and risk of depression: a systematic review and meta-analysis of observational studies. *Public Health*. 2025;242:179–85. <https://doi.org/10.1016/j.puhe.2025.03.001>
7. Nutakor JA, Zhou L, Larnyo E, Addai-Dansoh S, Cui Y. Impact of health information seeking behavior and digital health literacy on self-perceived health and depression symptoms among older adults in the United States. *Sci Rep*. 2024;14(1):31080. <https://doi.org/10.1038/s41598-024-82187-z>
8. Park MS, Kim YT. A study on social isolation and life satisfaction of Korean elderly: statistical analysis using the National Old Age Security Panel Survey. *J Soc Integr Stud*. 2024;5(2):1–41.
9. Hong SH, Shin YM, Kim HS. Analysis of research trends on artificial intelligence in health and care for the elderly in Korea: a scoping review. *J Korean Gerontol*. 2025;45(1):1–22.
10. Park EA, Kim HG. The relationship between physical function decline and mental health in the elderly. *J Korean Community Nurs*. 2022;33(1):89–101.
11. Cho MJ. Relationship between depression level and subjective health status among the elderly. *J Korean Acad Psychiatr Ment Health Nurs*. 2023;32(1):1–11.
12. National Center for Mental Health. Annual statistical report on mental disorders. Ministry of Health and Welfare; 2023.
13. Health Insurance Review and Assessment Service. 2021 statistics on depression and anxiety disorders treatment. 2021. Available from: <https://www.hira.or.kr>
14. Ow YSY, Wei CS, Li YT. The moderating effect of social participation on the relationship between health status and depressive symptoms in older adults. *Front Public Health*. 2025;13:1458961.
15. Jung SY, Kim EK, Park HO. A longitudinal analysis of risk factors for cognitive impairment in the elderly. *J Korean Gerontol Welf*. 2022;74:55–74.
16. Ma X, Zheng P, Guo R, Du M, Ran L. Does social participation affect the association between depression and cognitive function among older adults in China? A secondary analysis based on CHARLS. *J Gerontol Geriatr Med*. 2023;9:1–10.
17. Mohammad Hanipah J, Mat Ludin AF, Singh DKA, Subramaniam P, Shahar S. Low health literacy increases the likelihood of cognitive frailty among older adults. *BMC Geriatr*. 2024;24(1):840.
18. Xiao S, Li Y, Chen X. Depression, social support, and cognitive function among community-dwelling older adults. *BMC Psychiatry*. 2023;23:82. <https://doi.org/10.1186/s12888-023-04670-8>
19. Sung HY, Ji HE, Kyung WO. Status of performance indicators in the nutrition sector of the 5th National Health Promotion Comprehensive Plan. 2024.
20. Moon S, Choi Y, Kim H, Kim J. Influencing factors on health literacy and the influence of health literacy on healthcare utilization. *Health Soc Welf Rev*. 2024;44(4):130–50. <https://doi.org/10.15709/HSWR.2024.44.4.130>

21. Yong JY, Stvilia B, Mon L. Cultural influences on quality health information seeking: an exploratory study of Korean communities. *J Libr Inf Sci.* 2012;34(1):45–51.
22. Korea Disease Control and Prevention Agency (KDCA). The 9th Korea National Health and Nutrition Examination Survey (KNHANES) 2024. KDCA; 2024.
23. Kim SJ, Kim MH, Kim SH. The effect of health literacy on depression among rural elderly. *J Korean Gerontol Welf.* 2020;75(1):159–81.
24. Chow BC, Jiao J, Duong TV, Hassel H, Kwok TCY, Nguyen MH, et al. Health literacy mediates the relationships of cognitive and physical functions with health-related quality of life in older adults. *Front Public Health.* 2024;12:1355392. <https://doi.org/10.3389/fpubh.2024.1355392>
25. World Health Organization. Health promotion glossary of terms 2021.
26. Choi S, Kang Y, Kim H, Oh K. Health literacy in Korea: findings from the 2023 Korea National Health and Nutrition Examination Survey. *Epidemiol Health.* 2025; e2025037. <https://doi.org/10.4178/epih.e2025037>
27. Bae JY, Kim HY. The current status of health literacy and policy implications based on the Korea Health Panel. *Health Welf Forum.* 2023;316:81–94.
28. Lee YJ. Factors affecting subjective health status among community-dwelling older adults. *J Korea Acad Ind Technol Soc.* 2025;26(2):252–63.
29. Masih, S., Punchanathan, U. E., Naqshbandi, M. M., & Ahmed, F. (2025). How inclusive leadership drives change-oriented extra-role behaviors via leader-member exchange and trust in leadership. *Global Knowledge, Memory and Communication.*
30. Mansoor, M., Jam, F. A., & Khan, T. I. (2025). Fostering eco-friendly behaviors in hospitality: engaging customers through green practices, social influence, and personal dynamics. *International Journal of Contemporary Hospitality Management,* 37(5), 1804-1826.
31. Fatima, T., Bilal, A. R., Imran, M. K., & Jam, F. A. (2025). Developing Entrepreneurial Orientation: Comprehensive Skill Development Guide for Software Industry in South Asia. In *Entrepreneurship in the Creative Industries* (pp. 132-157). Routledge.