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Exploring self-management's mediating role in health literacy and quality of life: evidence from COPD patients in Hunan, China

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Abstract

Purpose This study aimed to investigate the relationship between health information literacy and quality of life and to explore the mediating role of self-management in this relationship among COPD patients in Hunan, China.

Methods Following the STROBE guidelines, this cross-sectional study employed convenience sampling to recruit 432 COPD patients from six tertiary hospitals in Hunan Province, China, between December 2022 and August 2023. Data collection instruments included the Health Literacy Self-Assessment Questionnaire (HLSQ), the COPD Self-Management Scale, and the COPD Assessment Test (CAT). Descriptive statistics were used to summarize participants' characteristics. Pearson correlation analysis and SPSS 26.0's macro program for mediation analysis were used, with a significance level set at $p < 0.05$.

Results Health information literacy showed a strong positive correlation with both self-management ($r = 0.742$, $p < 0.001$) and quality of life ($r = -0.748$, $p < 0.001$). Additionally, self-management was positively associated with quality of life ($r = -0.861$, $p < 0.001$). Self-management significantly mediated the relationship between health information literacy and quality of life, accounting for 67.4% of the total effect.

Conclusions The mediating effect of self-management on the relationship between health information literacy and quality of life in COPD patients is established. Measures are needed to improve health information literacy, enhance self-management, and improve health outcomes.

Keywords Health literacy, Self-management, Quality of life, Pulmonary disease, Chronic obstructive, Mediation analysis

Introduction

Chronic obstructive pulmonary disease (COPD) is a major global health issue, contributing significantly to morbidity and mortality. It is marked by a gradual decline in lung function and persistent airflow limitation[1, 2]. Patients with COPD experience symptoms such as dyspnea, cough, sputum production, and wheezing, all of which severely affect their health-related quality of life (QoL)[3–5]. Effectively managing these symptoms through self-management practices is crucial for improving QoL, reducing hospitalizations and exacerbations, and lowering healthcare costs[6, 7].

Self-management includes behaviors such as smoking cessation, medication adherence, proper inhaler use, maintaining a healthy diet, and engaging in regular physical activity[8, 9]. It also empowers patients to monitor their symptoms, identify early signs of exacerbation, and adjust their treatment plans accordingly[10,

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11]. Evidence suggests that self-management interventions can significantly improve health outcomes for COPD patients, leading to better QoL and fewer hospital admissions[12].

A crucial factor in effective self-management is health information literacy (HIL), which the World Health Organization (WHO) defines as the cognitive and social skills that enable individuals to access, understand, and apply health information[13]. Low levels of HIL are linked to poor understanding of disease management and limited access to healthcare resources, both of which contribute to worse health outcomes in COPD patients[14, 15]. Research has shown that individuals with higher HIL are more likely to engage in self-management, follow treatment regimens, and experience better health outcomes[16].

Although studies have explored the relationship between health information literacy, self-management, and quality of life (QoL), there are still gaps in understanding how these factors interact in COPD patients. It is well-established that HIL influences self-management and that self-management is closely associated with improved QoL. For example, Geboers et al. [17]. found a significant link between HIL and self-management skills in elderly patients with chronic diseases, where lower HIL impaired self-management abilities. Similarly, O'Conor's [18]research showed that COPD patients with inadequate health literacy exhibited poorer self-management behaviors, such as lower medication adherence and incorrect inhaler use. Shao's study[19] further reinforced the strong relationship between self-management and QoL in COPD patients. Clinical guidelines also highlight the importance of early self-management interventions to reduce the negative impact of exacerbations on QoL[20]. However, few studies have integrated HIL, self-management, and QoL into a single framework, and even fewer have examined the mediating role of self-management between HIL and QoL.

The Information-Motivation-Behavioral Skills (IMB) theory[21] provides a valuable framework for understanding how HIL influences self-management and, in turn, QoL. According to the IMB theory, information (such as HIL) affects an individual's motivation and behavioral skills, which in turn influence health outcomes. In the case of COPD, the IMB theory suggests that higher HIL may increase patients' motivation to engage in self-management behaviors, ultimately leading to improved QoL (Fig. 1).

Based on the IMB theory, this study aims to examine how health information literacy influences self-management and how these affect the quality of life of COPD patients. Specifically, we propose the following hypotheses:

H1 Health information literacy positively impacts self-management in COPD patients.

H2 Health information literacy positively influences the quality of life in COPD patients.

H3 Self-management positively affects the quality of life in COPD patients.

H4 Self-management partially mediates the relationship between health information literacy and quality of life in COPD patients.

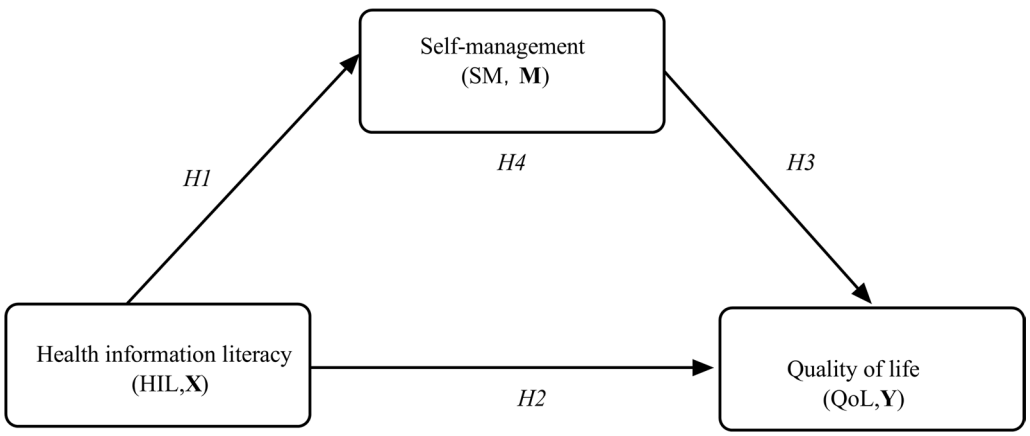

Fig. 1 Research hypothesis framework of a mediation model

Methods

Design, participants, and sample size

This study employed a convenience sampling method within a descriptive-analytical research design. A cross-sectional survey was conducted among 432 COPD patients recruited from six general hospitals in Hunan Province, China, between December 2022 and August 2023. Participants were selected from patient lists provided by hospital staff and approached to participate in the study. The inclusion criteria were: (a) age 18 years or older; (b) diagnosed with COPD according to the 2022 update of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines[22]; (c) stable disease phase; and (d) adequate communication and comprehension skills. Exclusion criteria included (a) the presence of other lung diseases such as bronchial asthma, interstitial pneumonia, or lung cancer and (b) the diagnosis of mental disorders or severe and end-stage disease.

To estimate the sample size required for estimating the overall mean $n = \left(\frac{\mu_{\alpha/2}\sigma}{\delta}\right)$[23], we conducted a pre-survey, which revealed that the standard deviation of HIL scores among COPD patients was 3.03 points. Using a significance level of $\alpha = 0.05$, $U_{0.05/2} = 1.96$, we calculated the minimum required sample size as 140 participants to ensure sufficient statistical power. To account for potential missing or incomplete data, we increased the sample size by 20%, resulting in a final required sample size of 168 participants.

Measurement scales

Socio-demographic information questionnaire

A general questionnaire was developed to gather participants' socio-demographic information. The data gathered included age, gender, marital status, education level, place of residence, personal monthly income, smoking history, duration of COPD, presence of other chronic conditions, number of hospitalizations due to COPD exacerbations in the past year, and pulmonary function classification.

Health information literacy

The Health Information Literacy Self-Assessment Questionnaire (HLSQ) was used to assess the health information literacy (HIL) levels of COPD patients in Hunan, China. This scale, developed by Wang Fu Zhi et al.[24]., evaluates five dimensions through a total of 29 items: (1) health information cognition (4 items), (2) health information search (12 items), (3) health information evaluation (5 items), (4) health information application (4 items), and (5) health information morality (4 items). The scale employs a combination of multiple-choice questions and a Likert-type scoring method. For single-choice questions, responses are scored on a 5-point Likert scale: "Strongly agree" = 1, "Agree" = 0.75, "Unsure" = 0.5, "Disagree" = 0.25, and "Strongly disagree" = 0. For multiple-choice questions, the score depends on the number of selected options: 1 option = 0.33, 2 options = 0.66, and 3 or more options = 1. The higher the score, the higher the patient's health information literacy level. The Cronbach's α coefficient was 0.847.

Self-management

Self-Management was measured using the Chronic Obstructive Pulmonary Disease Self-Management Scale, designed by Zhang Cai Hong[25]. This scale comprises 51 items across 5 dimensions: symptom management (8 items), daily life management (14 items), emotion management (12 items), information management (8 items), and self-efficacy (9 items). Each item is scored on a 5-point Likert scale, ranging from 5 ("completely consistent") to 1 ("completely inconsistent"). The total score ranges from 51 to 255 points, with higher scores indicating a better self-management level. The Cronbach's α coefficient was 0.920.

Quality of life

The quality of life (QoL) of COPD patients was assessed using the Chronic Obstructive Pulmonary Disease Assessment Test (CAT), developed by Professor Jones[26]. This questionnaire includes 8 items, 6 of which assess subjective indicators and 2 of which evaluate tolerance to physical activities. Patients rate each item based on their current condition using a 6-point Likert scale, ranging from 0 to 5. The total score ranges from 0 to 40, with higher scores representing a poorer quality of life. The Cronbach's α coefficient of 0.880. Its construct validity is supported by strong correlations with other established quality-of-life measures (e.g., SF-36), and its criterion validity has been affirmed by its ability to discriminate between different disease severity and symptom burdens.

Data collection

Between December 2022 and August 2023, this study employed a one-on-one questionnaire survey method administered on-site by uniformly trained investigators. Before completing the survey, participants were briefed on the study's purpose and content. COPD patients filled out the questionnaire independently, with the entire process taking approximately 20 to 25 min. Upon completion, all questionnaires were immediately collected and checked for completeness to ensure data integrity.

Quality control

To maintain data accuracy and reliability, four researchers received standardized training to ensure consistent

communication with participants when providing guidance on completing the questionnaire. After data collection, an on-site review of the questionnaires was conducted to identify and address any omissions or errors. Questionnaires were deemed invalid and excluded if the response time was less than 20 min, if contradictory responses were observed, or if answers were uniformly repetitive throughout the questionnaire.

Ethics statement

This study was approved by the Ethics Committee of Zhuzhou Central Hospital (Scientific Research ZZCHC). Written informed consent was obtained from all participants prior to their involvement in the study. To protect participant confidentiality, all personal information was anonymized using unique participant codes. Data were stored in password-protected files and accessible only to authorized research team members, ensuring compliance with data protection guidelines.

Statistical analysis

Data entry and management were conducted in Excel, while IBM SPSS Statistics 26.0 (IBM, USA) was used for data analysis. Descriptive statistics summarized quantitative data as mean ± standard deviation and presented categorical variables as frequencies and percentages. Pearson correlation analysis assessed relationships among health information literacy, self-management, and quality of life. Mediation analysis was conducted using the PROCESS macro (version 4.1, Model 4) with 5,000 bootstrap samples to estimate indirect effects. The mediating effect of self-management was considered statistically significant if the 95% bias-corrected confidence interval did not include zero, with a p-value of ≤ 0.05 indicating significance.

Results

Demographic characteristics

A total of 452 questionnaires were distributed, and 432 valid responses were obtained after excluding 20 questionnaires with incomplete information, yielding a response rate of 95.57%. Among the participants, with a mean age of 62.45 ± 8.23 years. Most participants were male (58.7%, $n = 254$). Further details regarding participant characteristics are presented in Table 1.

Table 1 Demographic characteristics of the respondents ($N = 432$)

Variables	Frequency *(n)*	Percentage (%)
Gender		
Men	254	58.7
Women	178	41.3
Age(years)		
≤ 44	8	1.9
45 ~ 59	142	32.9
60–74	256	59.3
≥ 75	26	5.9
Marital status		
Married	353	81.7
Unmarried/divorced/widowed	78	18.3
Educational level		
Primary and below	169	39.1
Junior high school	88	20.4
High school	125	28.9
University and above	50	11.6
Residency		
Rural	218	50.5
Urban	214	49.5
Personal monthly income (Yuan)		
≤ 3000	214	49.5
3001 ~ 5000	148	34.3
> 5000	70	16.2
Smoking history		
yes	313	72.5
No	119	27.5
COPD course(years)		
< 1	89	20.6
1 ~ 5	197	45.6
6 ~ 10	92	21.3
> 10	54	12.5
Suffering from chronic diseases		
< 2	275	63.7
≥ 2	157	36.3
Number of hospitalizations for COPD exacerbations in the past year		
None	77	17.8
1 ~ 2	197	45.7
3 ~ 5	121	28.1
> 5	37	8.4
Pulmonary function classifications		
Mild	72	16.7
Moderate	143	33.1
Severity	205	47.5
Extremely serious	12	2.7

Correlation among health information literacy, self-management, and quality of life

The mean scores for health information literacy (HIL), self-management (SM), and quality of life (QoL) in COPD patients were 15.22 ± 2.44, 138.88 ± 33.75, and 17.89 ± 6.70, respectively. Correlation analysis indicated a statistically significant moderate positive correlation between HIL and SM ($r = 0.742$, $p < 0.001$), a strong positive correlation between SM and QoL ($r = -0.861$, $p < 0.001$), and a moderate positive correlation between

Table 2 Correlations and descriptive analyses

Variables	Mean	SD	HIL	SM	QoL
HIL	15.22	2.44	1	0.742**	−0.748**
SM	138.88	33.75	0.742**	1	−0.861**
QoL	17.89	6.70	−0.748**	−0.861**	1

** $p < .001$

M: mean; SD: standard deviation; HIL: health information literacy; SM: self-management; QoL: quality of life

HIL and QoL ($r = -0.748$, $p < 0.001$). Pearson correlation coefficients and descriptive statistics are presented in Table 2.

Mediation effect model

Common method bias test

To assess potential common method bias, Harman's single-factor test was performed. Factor analysis showed that all factors had eigenvalues greater than 1, with the first factor explaining 38.2% of the variance, below the critical threshold of 40%. This indicates that common method bias is not a significant concern, permitting further detailed analysis.

Analysis of mediating effects between health information literacy, self-management, and quality of life in COPD patients

- **Step 1:** A linear regression analysis was performed with health information literacy (HIL) as the independent variable and quality of life (QoL) as the dependent variable. The results demonstrated that HIL significantly influenced QoL ($\beta = -0.748$, $p < 0.001$).
- **Step 2**: A second regression analysis was performed with HIL as the independent variable and self-management (SM) as the dependent variable. This analysis revealed a significant effect of HIL on SM ($\beta = 0.742$, $p < 0.001$).
- **Step 3**: A final regression analysis was conducted with QoL as the dependent variable and both HIL and SM as independent variables. The inclusion of SM reduced the effect of HIL on QoL ($\beta = -0.244$), but the effect remained statistically significant ($p < 0.001$). These results suggest that SM partially mediates the relationship between HIL and QoL. Detailed regression analysis results are presented in Table 3**.**

Testing the mediating effect of self-management between health information literacy and quality of life in COPD patients

Further analysis was conducted to assess the mediating role of self-management (SM) in the relationship between health information literacy (HIL) and quality of life (QoL) using a 95% confidence interval approach. The results confirmed that both the direct effect of HIL on QoL and the mediating effect of SM were statistically significant, with neither confidence interval including zero. This indicates that HIL not only has a direct impact on QoL in COPD patients but also influences it indirectly through the mediating role of SM. The estimated value of the mediating effect was −0.504, representing 67.4% of the total effect. Figure 2 illustrates this mediation model.

Discussion

Current situation of health information literacy, self-management, and quality of life in COPD patients

This study provides insights into the current state of health information literacy (HIL), self-management (SM), and quality of life (QoL) among COPD patients in Hunan, China. The results revealed that the level of health information literacy in this cohort was generally low, which aligns with previous studies highlighting the challenges faced by older populations with lower educational attainment in accessing, understanding, and applying health information[27]. The low levels of HIL in this study suggest that many patients face difficulties in managing their condition effectively, which may negatively affect their overall health outcomes. This finding is consistent with

Table 3 Linear regression analysis between health information literacy, self-management, and quality of life in COPD patients

Steps	Independent variable	Dependent variable	*β*	t	*p*	95%*CI*
Step 1[a]	HIL	QoL	−0.74	−23.40	< 0.001	(−0.81,−0.68)
Step 2[b]	HIL	SM	0.74	22.97	< 0.001	(0.67,0.80)
Step 3[c]	HIL	QoL	−0.24	−7.01	< 0.001	(−0.31,−0.17)
	SM	QoL	−0.68	−19.59	< 0.001	(−0.74,−0.61)

[a] $R = 0.74$, $R^2 = 0.56$, Adjusted $R^2 = 0.55$, $F = 54.73$, $p < .001$; [b] $R = 0.74$, $R^2 = 0.55$, Adjusted $R^2 = 0.55$, $F = 52.83$, $p < .001$; [c] $R = 0.87$, $R^2 = 0.76$, Adjusted $R^2 = 0.76$, $F = 95.88$, $p < .001$

HIL: Health information literacy; SM: Self-management; QoL: Quality of life

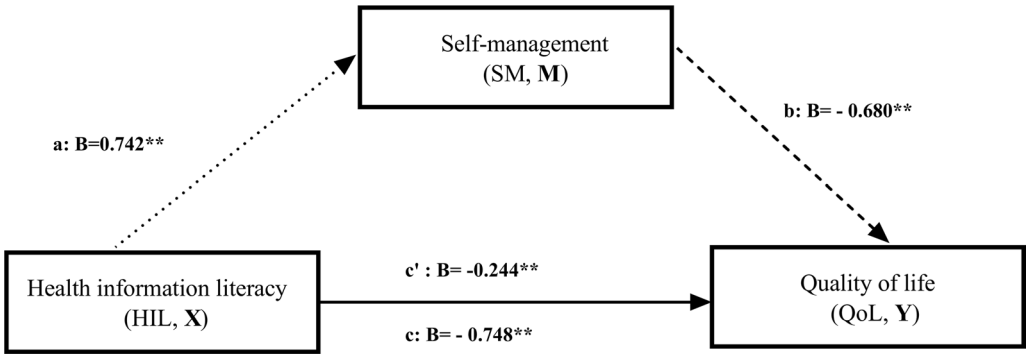

Fig. 2 Mediation model of how health information literacy influences the quality of life via self-management. *Note*: a = direct effect of X on mediator M; b = direct effect of mediator M on Y; c = total effect of X on Y; c' = direct effect of X on Y; ** $p < 0.001$

research by Riegel et al.[28]., which found that insufficient health literacy in COPD patients is linked to poorer self-management and reduced quality of life.

In terms of self-management, the study demonstrated that COPD patients who reported higher HIL were more likely to engage in proactive disease management, including medication adherence, symptom monitoring, and lifestyle modifications. These behaviors, in turn, contributed to improved QoL, corroborating findings from previous studies[7, 29] that have shown a strong association between self-management and better disease control in chronic conditions. Moreover, patients with higher HIL demonstrated greater confidence in managing their health, which is essential for effective self-management, especially in chronic diseases like COPD.

Relationship between health information literacy, self-management, and quality of life

The results of this study revealed a positive relationship between health information literacy (HIL) and quality of life (QoL) in COPD patients, aligning with earlier research. Higher levels of HIL enabled patients to understand their condition better[30, 31], access relevant health information, and make informed decisions about their care, all of which contribute to enhanced disease management and improved QoL. The findings suggest that improving HIL could serve as a key strategy for enhancing the quality of life for COPD patients by empowering them with the knowledge to manage their disease more effectively. This observation is consistent with the theoretical framework of the Information-Motivation-Behavioral (IMB) model, which emphasizes that the acquisition of health knowledge and the motivation to act on that knowledge are critical factors in influencing health behaviors and outcomes[21].

Furthermore, this study found that self-management (SM) significantly mediates the relationship between HIL and QoL. Higher HIL levels were linked to better self-management practices, such as adherence to treatment regimens, symptom monitoring, and maintaining physical activity, which led to improvements in QoL. This finding aligns with previous studies that have established self-management as a crucial determinant of QoL in COPD patients[32]. Improved self-management helps patients reduce exacerbations, prevent hospitalizations, and maintain functional independence, all contributing to a better quality of life. These findings highlight the importance of fostering self-management behaviors to enhance the overall well-being of COPD patients.

The mediating role of self-management in the relationship between health information literacy and quality of life

This study demonstrated that self-management (SM) partially mediates the relationship between health information literacy (HIL) and quality of life (QoL). The IMB model provides a valuable framework for understanding these findings, as it suggests that knowledge acquisition (HIL) and behavioral factors (SM) work synergistically to influence health outcomes. Patients with higher HIL are not only better equipped with disease-related knowledge but also more motivated and confident in managing their condition. This increased self-efficacy, in turn, leads to better self-management practices, which are crucial for improving QoL.

The mediating role of self-management is significant because it suggests that interventions to improve HIL should also focus on fostering self-management skills to achieve the best possible outcomes[33, 34]. For example, providing patients with easy-to-understand health materials, online resources, and access to disease management programs could enhance their knowledge and encourage active participation in their care. In turn, this would help patients manage symptoms more effectively, reducing the burden of the disease and improving their quality of life.

These findings underscore the need for healthcare providers to integrate self-management training into health literacy interventions, particularly in settings with low health literacy.

Strengths and limitations

One of the key strengths of this study is its use of a mediation model to investigate the relationships among health information literacy (HIL), self-management (SM), and quality of life (QoL). By employing the IMB model, this research confirmed the direct effect of HIL on QoL and identified SM as a crucial mediator in this relationship. These findings offer important clinical insights, demonstrating that improvements in HIL can enhance the QoL of COPD patients by fostering better self-management behaviors. This has substantial implications for designing personalized disease management interventions.

However, this study's sample was limited to patients from six tertiary hospitals in Hunan Province, selected through convenience sampling. This approach may introduce selection bias, limiting the ability to generalize the findings to a broader population. Although practical due to time and resource constraints, this sampling method may not adequately represent the diverse COPD patient population in China or globally. Future studies should consider expanding the geographic scope and using random sampling to enhance the representativeness and external validity of the results. Furthermore, the cross-sectional design of this study prevents causal inferences from being made. Longitudinal research is recommended to better understand the dynamic and causal relationships between health information literacy, self-management, and quality of life.

Conclusions

This study indicates that health information literacy (HIL) has a positive impact on both self-management (SM) and quality of life (QoL) in patients with COPD. Furthermore, SM was found to mediate the relationship between HIL and QoL, highlighting the critical role of self-management in translating health literacy into tangible quality-of-life improvements. These findings underscore the importance of enhancing HIL and SM as part of comprehensive COPD care strategies, suggesting that interventions aimed at improving HIL can significantly impact QoL through strengthened self-management behaviors.

Practice implications

The findings of this study highlight the necessity for healthcare providers to prioritize improving health information literacy (HIL) and self-management (SM) skills in COPD patients to improve their quality of life (QoL). Healthcare professionals should implement targeted interventions, including patient education programs, that develop both the cognitive and practical components of HIL. These programs can equip patients with the skills to effectively search for, evaluate, and apply health information, leading to improved self-management behaviors. Additionally, providing continuous support for self-management practices, including personalized care plans, regular monitoring, and reinforcement of symptom management techniques, is essential for sustaining long-term improvements in QoL. Integrating these strategies into routine clinical care can foster greater patient autonomy and better health outcomes.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s41043-025-00812-7.

Additional file 1.

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Author contributionS
Study conception and design: JHW, JMW Data collection: JHW, HB, LLW Data analysis and interpretation: JHW, HB Manuscript writing: JHW, JMW Critical revision of the article: JHW, JMW All authors reviewed the manuscript.

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Availability of data and materials
The data used and analyzed in this study are not publicly available due to ethical restrictions on protecting patient privacy and confidentiality. However, the data can be made available from the corresponding author upon reasonable request and with appropriate safeguards to protect participant information.

Declarations

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Christenson SA, Smith BM, Bafadhel M, Putcha N. Chronic obstructive pulmonary disease. Lancet. 2022;399(10342):2227–42. https://doi.org/10.1016/s0140-6736(22)00470-6.
2. Agustí A, Celli BR, Criner GJ, Halpin D, Anzueto A, Barnes P, et al. Global initiative for chronic obstructive lung disease 2023 report: gold executive summary. Eur Respir J. 2023. https://doi.org/10.1183/13993003.00239-2023.

3. Chang EM, Chen LS, Li YT, Chen CT. Associations between self-management behaviors and psychological resilience in patients with COPD. Respir Care. 2023;68(4):511–9. https://doi.org/10.4187/respcare.10416.
4. MacLeod M, Papi A, Contoli M, Beghé B, Celli BR, Wedzicha JA, et al. Chronic obstructive pulmonary disease exacerbation fundamentals: Diagnosis, treatment, prevention and disease impact. Respirology. 2021;26(6):532–51. https://doi.org/10.1111/resp.14041.
5. Mao R, Liu Z, Zhao Y, Du C, Zhou J, Wang Q, et al. Stable chronic obstructive pulmonary disease (COPD) management under a tiered medical system in China. Int J Chron Obstruct Pulmon Dis. 2022;17:181–94. https://doi.org/10.2147/copd.S333274.
6. Choi JY, Ryu EJ. Factors associated with non-adherence to self-management among patients with chronic obstructive pulmonary disease: a survey using the delphi technique and analytic hierarchy process. Int J Chron Obstruct Pulmon Dis. 2024;19:1247–59. https://doi.org/10.2147/copd.S451332.
7. Dennett EJ, Janjua S, Stovold E, Harrison SL, McDonnell MJ, Holland AE. Tailored or adapted interventions for adults with chronic obstructive pulmonary disease and at least one other long-term condition: a mixed methods review. Cochrane Database Syst Rev. 2021;7(7):Cd013384. https://doi.org/10.1002/14651858.CD013384.pub2.
8. Deshpande N, Wu M, Kelly C, Woodrick N, Werner DA, Volerman A, et al. Video-based educational interventions for patients with chronic illnesses: systematic review. J Med Internet Res. 2023;25: e41092. https://doi.org/10.2196/41092.
9. Liu YY, Li YJ, Lu HB, Song CY, Yang TT, Xie J. Effectiveness of internet-based self-management interventions on pulmonary function in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. J Adv Nurs. 2023;79(8):2802–14. https://doi.org/10.1111/jan.15693.
10. Born CDC, Bhadra R, D'Souza G, Kremers SPJ, Sambashivaiah S, Schols A, et al. Combined lifestyle interventions in the prevention and management of asthma and COPD: a systematic review. Nutrients. 2024. https://doi.org/10.3390/nu16101515.
11. Yadav UN, Lloyd J, Hosseinzadeh H, Baral KP, Bhatta N, Harris MF. Self-management practice, associated factors and its relationship with health literacy and patient activation among multi-morbid COPD patients from rural Nepal. BMC Public Health. 2020;20(1):300. https://doi.org/10.1186/s12889-020-8404-7.
12. Schrijver J, Lenferink A, Brusse-Keizer M, Zwerink M, van der Valk PD, van der Palen J, et al. Self-management interventions for people with chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2022;1(1):Cd002990. https://doi.org/10.1002/14651858.CD002990.pub4.
13. Nutbeam D, Lloyd JE. Understanding and responding to health literacy as a social determinant of health. Annu Rev Public Health. 2021;42:159–73. https://doi.org/10.1146/annurev-publhealth-090419-102529.
14. Zheng L, Sun H, Chen Q, Xie X, Jin H, Ding Y. Influential factors of adherence to inhalation drug therapy in patients with stable chronic obstructive pulmonary disease. J Eval Clin Pract. 2025;31(1): e14094. https://doi.org/10.1111/jep.14094.
15. van der Gaag M, Heijmans M, Valli C, Orrego C, Ballester M, Rademakers J. Self-management interventions for chronically ill patients with limited health literacy: a descriptive analysis. Chronic Illn. 2024;20(4):578–604. https://doi.org/10.1177/17423953231181410.
16. Kim K, Yang Y, Wang Z, Chen J, Barandouzi ZA, Hong H, et al. A systematic review of the association between health literacy and pain self-management. Patient Educ Couns. 2022;105(6):1427–40. https://doi.org/10.1016/j.pec.2021.09.037.
17. Geboers B, de Winter AF, Spoorenberg SL, Wynia K, Reijneveld SA. The association between health literacy and self-management abilities in adults aged 75 and older, and its moderators. Qual Life Res. 2016;25(11):2869–77. https://doi.org/10.1007/s11136-016-1298-2.
18. O'Conor R, Muellers K, Arvanitis M, Vicencio DP, Wolf MS, Wisnivesky JP, et al. Effects of health literacy and cognitive abilities on COPD self-management behaviors: a prospective cohort study. Respir Med. 2019;160:105630. https://doi.org/10.1016/j.rmed.2019.02.006.
19. Shao Y, Hu H, Liang Y, Hong Y, Yu Y, Liu C, et al. Health literacy interventions among patients with chronic diseases: a meta-analysis of randomized controlled trials. Patient Educ Couns. 2023;114: 107829. https://doi.org/10.1016/j.pec.2023.107829.
20. Ho CCY, Chan CWH, Li C, Xiao J, Ng MSN. Literature review and development of pictorial action plan to promote self-management of chronic obstructive pulmonary disease. Patient Educ Couns. 2023;115: 107923. https://doi.org/10.1016/j.pec.2023.107923.
21. Fisher JD, Fisher WA. Changing AIDS-risk behavior. Psychol Bull. 1992;111(3):455–74. https://doi.org/10.1037/0033-2909.111.3.455.
22. Li J, Chen R, Yu X, Liu H. Guidelines of integrated Chinese and western medicine for diagnosis and treatment of chronic obstructive pulmonary disease (2022). J Evid Based Med. 2023;16(4):565–80. https://doi.org/10.1111/jebm.12578.
23. Noordzij M, Dekker FW, Zoccali C, Jager KJ. Sample size calculations. Nephron Clin Pract. 2011;118(4):c319–23. https://doi.org/10.1159/000322830.
24. Wang FZ, Luo AJ, Xie WZ, Hu DH. Development of a self-evaluation scale for health information literacy and its reliability and validity test. Chin J Mod Med. 2013;23(30):89–93.
25. Zhang CH, He GP, Li JP, Cai XX, Zhang H, Wang HH. Compilation and evaluation of self-management scale for patients with chronic obstructive pulmonary disease. Chin Gen Med. 2011;14(28):3219–23.
26. Jones PW, Harding G, Berry P, Wiklund I, Chen WH, Kline LN. Development and first validation of the COPD Assessment Test. Eur Respir J. 2009;34(3):648–54. https://doi.org/10.1183/09031936.00102509.
27. Hirvonen N, Enwald H, Mayer AK, Korpelainen R, Pyky R, Salonurmi T, et al. Screening everyday health information literacy among four populations. Health Info Libr J. 2020;37(3):192–203. https://doi.org/10.1111/hir.12304.
28. Riegel B, Westland H, Iovino P, Barelds I, Bruins Slot J, Stawnychy MA, et al. Characteristics of self-care interventions for patients with a chronic condition: a scoping review. Int J Nurs Stud. 2021;116: 103713. https://doi.org/10.1016/j.ijnurstu.2020.103713.
29. Burge AT, Cox NS, Abramson MJ, Holland AE. Interventions for promoting physical activity in people with chronic obstructive pulmonary disease (COPD). Cochrane Database Syst Rev. 2020;4(4):Cd012626. https://doi.org/10.1002/14651858.CD012626.pub2.
30. Nie X, Li Y, Li C, Wu J, Li L. The association between health literacy and self-rated health among residents of china aged 15–69 years. Am J Prev Med. 2021;60(4):569–78. https://doi.org/10.1016/j.amepre.2020.05.032.
31. Zhang X, Hong X, Zhang Z. The mediating effect of traditional Chinese medicine (TCM) health literacy between TCM culture promotion and residents' health status. Front Public Health. 2024;12:1386085. https://doi.org/10.3389/fpubh.2024.1386085.
32. Lindh A, Giezeman M, Theander K, Zakrisson AB, Westerdahl E, Stridsman C. Factors associated with patient education in patients with chronic obstructive pulmonary disease (COPD)—a primary health care register-based study. Int J Chron Obstruct Pulmon Dis. 2024;19:1069–77. https://doi.org/10.2147/copd.S455080.
33. Borge CR, Larsen MH, Osborne RH, Aas E, Kolle IT, Reinertsen R, et al. Impacts of a health literacy-informed intervention in people with chronic obstructive pulmonary disease (COPD) on hospitalization, health literacy, self-management, quality of life, and health costs—a randomized controlled trial. Patient Educ Couns. 2024;123: 108220. https://doi.org/10.1016/j.pec.2024.108220.
34. Jeganathan C, Hosseinzadeh H. The role of health literacy on the self-management of chronic obstructive pulmonary disease: a systematic review. COPD. 2020;17(3):318–25. https://doi.org/10.1080/15412555.2020.1772739.

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