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Nurses' knowledge and attitudes associated with nutrition education for malnutrition prevention in patients with chronic obstructive pulmonary disease

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Abstract

Background: Malnutrition is one of the major complications among patients with chronic obstructive pulmonary disease (COPD) due to increased energy requirements and chronic systemic inflammation. This condition may worsen respiratory function, increase the risk of exacerbations, and reduce patients' quality of life. Nutritional education plays an important role in preventing malnutrition; however, its implementation by nurses remains suboptimal.

Purpose: To identify the relationship between nurses' knowledge and attitudes and the implementation of nutritional education for malnutrition prevention among patients with COPD.

Method: A cross-sectional study was conducted among 65 respondents providing nursing care to patients with COPD at Dr. H. Abdul Moeloek Regional General Hospital, Lampung, using a total sampling technique. Data were analyzed using Spearman's correlation test and multiple linear regression.

Results: There was a significant relationship between knowledge and the implementation of nutritional education ($r=0.443$, $p<0.001$), as well as between attitude and the implementation of nutritional education ($r=0.718$, $p<0.001$). No significant relationships were found between age, gender, educational level, length of employment, history of nutrition training, or experience in providing care for patients with COPD and the implementation of nutritional education ($p>0.05$). Attitude was identified as the variable most strongly associated with the implementation of nutritional education.

Conclusions: Nurses' knowledge and attitudes were significantly associated with the implementation of nutritional education as an effort to prevent malnutrition among patients with COPD. Attitude was the most dominant factor associated with the implementation of nutritional education.

Keywords: Chronic Obstructive Pulmonary Disease; Knowledge; Malnutrition; Nurses' Attitudes; Nutritional education.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung disease characterized by persistent respiratory symptoms, including dyspnea, chronic cough, and sputum production, resulting from abnormalities of the airways (bronchitis and bronchiolitis) and/or alveoli (emphysema) that cause persistent and progressive airflow limitation (Indonesian Society of Respiriology, 2023). Globally, COPD affects more than 300 million people and is

the third leading cause of death, accounting for approximately 3.2 million deaths annually (Momtazmanesh, Moghaddam, Ghamari, Rad, Rezaei, Shobeiri, & Ibitoye, 2023). In Indonesia, the prevalence of COPD is estimated at 5.6% of the population and is largely attributed to high exposure to risk factors, particularly cigarette smoking and air pollution (PPDI, 2023).

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in patients with chronic obstructive pulmonary disease

Malnutrition is a common complication among patients with COPD and is associated with impaired respiratory function, loss of muscle mass, increased frequency of exacerbations, prolonged hospital stays, and higher mortality rates (Collins, Nathan, Roberts, & Wilkinson, 2021; Deng, Lu, Zhang, Bian, Zhou, & Hou, 2023). The prevalence of malnutrition among hospitalized patients with COPD has been reported to be as high as 77.8% (Ting, Chan, Luk, To, Wong, & Choo, 2020). In Indonesia, the prevalence of malnutrition among patients with COPD ranges from 20% to 60%, particularly among hospitalized patients (Soenarto & Idealistiana, 2023). Similar findings have been reported at Dr. H. Abdul Moeloek Regional General Hospital, Lampung Province, where approximately 60% of hospitalized COPD patients were identified as malnourished, particularly those admitted with acute exacerbations, based on the 2024 hospital medical records.

Preventing malnutrition requires a multidisciplinary approach involving physicians, nurses, dietitians, and other healthcare professionals. According to the Decree of the Indonesian Minister of Health No. HK.01.07/MENKES/393/2019, nurses play an essential role in nutritional risk screening, monitoring patients' nutritional status, providing nutrition education, and collaborating with dietitians in implementing nutritional interventions. The Indonesian Nursing Intervention Standards (SIKI) further emphasize that nutrition education delivered by nurses should include information on nutritional requirements, caloric needs, recommended and restricted foods, and dietary management tailored to patients' clinical conditions to improve knowledge and adherence to nutritional therapy.

Nutrition education is one of the key interventions for preventing malnutrition among patients with COPD. Effective nutrition education has been shown to improve energy and protein intake, enhance nutritional status, improve quality of life, and reduce the risk of COPD exacerbations (Mancin, Khadhraoui, Starace, Cosmai, Petrelli, Sguanci, & Mazzoleni, 2024). However, the implementation of nutrition education by nurses remains challenging due to inadequate nutritional knowledge, limited training opportunities, heavy workloads, time constraints, and insufficient educational resources

(Linnavuori, Inkeroinen, Kostylev, Seel, Virmajoki, Virtanen, & Leino-Kilpi, 2024; Al Reza, Rahim, Azad, Biswas, Rahman, Al Amin, & Adrita, 2023; Van Noort, Heinen, Van Asseldonk, Ettema, Vermeulen, & Huisman-de Waal, 2020). Previous studies have also reported that nurses' nutritional knowledge ranges from low to moderate (Al Reza et al., 2023; Sitoayu, Utami, Dewanti, Ronitawati, & Wahyuni, 2022). Furthermore, some nurses continue to perceive nutritional management as primarily the responsibility of dietitians, resulting in less favorable attitudes toward nutritional care and suboptimal involvement in nutrition education (Bonetti, Terzoni, Lusignani, Negri, Frolidi, & Destrebecq, 2021).

Although nutrition education is recognized as an important strategy for preventing malnutrition in patients with COPD, its implementation in clinical practice remains suboptimal. Previous studies have demonstrated that nurses' knowledge and attitudes regarding nutritional care are still inadequate. However, evidence regarding the relationship between nurses' knowledge and attitudes and the implementation of nutrition education for malnutrition prevention among patients with COPD remains limited, particularly in Indonesia. Therefore, this study aimed to examine the relationship between nurses' knowledge and attitudes and the implementation of nutrition education as an effort to prevent malnutrition among patients with COPD

RESEARCH METHOD

This study employed an analytical correlational design with a cross-sectional approach. The study was conducted in the inpatient wards of Dr. H. Abdul Moeloek Regional General Hospital, Lampung Province, Indonesia, between July and August 2025. The study population comprised all registered nurses who provided nursing care to patients with COPD. Total sampling technique was employed, resulting in a final sample of 65 participants.

The inclusion criteria were registered nurses who provided direct nursing care to patients with COPD, were actively employed in the pulmonary outpatient clinic, pulmonary inpatient ward, or intensive care unit (ICU), and were willing to participate in the study. Nurses who were on leave, off duty, on sick leave, or held structural or managerial positions were excluded from the study.

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Data were collected using self-administered questionnaires distributed either electronically via google forms or in paper-based format, depending on the participants' preferences and availability. Demographic characteristics included age, sex, educational level, length of employment, history of nutrition-related training, and experience in providing nursing care to patients with COPD. Age was categorized into young adulthood and middle adulthood. Length of employment was classified as <5 years, 5–10 years, and >10 years. Experience in providing nursing care to patients with COPD was classified into four categories: <1 year, 1–3 years, 3–5 years, and >5 years.

Three research instruments were used in this study. Nurses' nutritional knowledge was assessed using the nutrition knowledge questionnaire which was originally administered among nurses with bachelor's, master's, and doctoral degrees in nursing at hospitals in Ankara, Türkiye (Ozcelyk, Surucuoglu, & Akan, 2007). The questionnaire consisted of 20 multiple-choice items assessing knowledge of nutrition, with each item containing three response options. The instrument was modified to better align with the objectives of the present study. Each correct response was scored as 1, whereas incorrect responses were scored as 0. Total scores were categorized as very good (17–20), good (13–16), sufficient (9–12), and poor (0–8).

Nurses' attitudes toward nutritional nursing care were assessed using the staff attitude to nutritional nursing care (SANN) scale, which was originally developed in Sweden to evaluate nurses' attitudes toward nutritional care and their perceptions of nutrition as an essential component of patient care (Christensson, Unosson, Bachrach-Lindström, & Ek, 2003; Christensson, & Bachrach-Lindström, 2009). The original instrument consisted of 19 items representing five domains based on Fishbein and Ajzen's theory of attitude. It was subsequently refined into an 18-item instrument while retaining the same five domains. Total scores ranged from 18 (most negative attitude) to 90 (most positive attitude). Attitudes were categorized as negative (≤ 57), neutral (57–71), and positive (≥ 72).

The implementation of malnutrition prevention through nutrition education was assessed using a modified version of the patient education

implementation scale, adapted specifically to evaluate nutrition education as a strategy for preventing malnutrition among patients with COPD. The original instrument was developed and validated using a sample of 583 nurses working in Türkiye (Şenyuva, Kaya, & Can, 2020). The modified questionnaire consisted of 25 statements covering nurses' competencies in educational needs assessment, educational assessment, educational planning, implementation of patient education, evaluation, and documentation of education provided. Responses were measured using a five-point Likert scale. Total scores were categorized as very good (100–125), good (75–99), sufficient (50–74), and poor (25–49).

All instruments underwent content validity and face validity assessments before being used in the study. Content validity was assessed to determine the relevance and appropriateness of the instrument items to the study objectives, yielding a content validity ratio (CVR) of 1.00. Face validity was assessed to evaluate the readability, clarity, and comprehensibility of each instrument item from the respondents' perspective. Construct validity testing demonstrated that all instrument items met the validity criteria. Instrument reliability was assessed using internal consistency analysis with Cronbach's alpha, yielding coefficients of 0.821 for the nutrition knowledge questionnaire, 0.933 for the staff attitude to nutritional nursing care scale, and 0.978 for the patient education implementation scale.

Data were analyzed using IBM SPSS statistics version 25. Descriptive statistics were used to summarize respondents' demographic characteristics and the distribution of study variables using frequencies, percentages, means, and standard deviations, as appropriate. Pearson's correlation analysis was performed to examine the relationships between nurses' nutritional knowledge, attitudes toward nutritional nursing care, and the implementation of nutrition education. Spearman's rank correlation analysis was used to examine the associations between potential confounding variables and the implementation of nutrition education. Variables with a p -value of <0.25 in the bivariate analysis were entered into a multiple linear regression model to identify the factor most strongly associated with the implementation of nutrition

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education. Prior to regression analysis, the assumptions of normality of residuals, linearity, absence of multicollinearity, and homoscedasticity were assessed and confirmed. Statistical significance was established at $p < 0.05$. Ethical

approval for this study was obtained from the Ethics Committee of Dr. H. Abdul Moeloek Regional General Hospital, Lampung Province, Indonesia (Approval No. 541/KEPK-RSUDAM/II/2025).

RESEARCH RESULTS

Table 1. Distribution of Research Variables (N=65)

Variables	Results
Age (n/%)	
Early Adulthood	26/40
Middle Adulthood	39/60
Gender (n/%)	
Male	23/35.4
Female	42/64.6
Level Education (n/%)	
Ners	24/36.9
D3/Vocational	41/63.1
Length of Work (n/%)	
<5 years	16/24.6
5–10 years	13/20
>10 years	36/55.4
Nutrition Related Training History (n/%)	
Ever been	7/10.8
Never	58/89.2
Experience in Providing Nursing Care to COPD Patients (n/%)	
<1 year	11/16.9
1–3 years	22/33.8
3–5 years	10/15.4
>5 years	22/33.8
Knowledge (n/%)	
Very good	27/41.5
Good	26/40
Sufficient	10/15.4
Poor	2/3.15
Attitude (n/%)	
Negative	12/18.5
Neutral	24/36.9
Positive	29/44.6
Implementation of Education (n/%)	
Very good	26/40
Good	28/43.1
Sufficient	8/12.3
Poor	3/4.6

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Table 1 shows that those providing care to COPD patients are predominantly middle-aged adults (60%), female (64.6%), have diploma/vocational education (63.1%), have worked for more than 10 years (55.4%), have never attended nutrition-related training (89.2%), have experience in providing nursing care to COPD patients for 1–3 years (33.8%) and more than 5 years (33.8%). Respondents providing care to COPD patients delivered nutritional education with a frequency of every day during treatment (29.2%), the most frequently used education method is discussion (29.2%), the material most frequently conveyed by respondents is the benefits of nutrition for COPD patients (67%). Respondents who provide nursing care to COPD patients have very good knowledge about nutrition and the implementation of nutritional education for COPD patients (41.5%), have a positive attitude (44.6%), and those who provide good nutritional education are 43.1%.

Table 2. Relationship between Knowledge and Attitudes (N = 65)

Variables	n	r	p-value
Knowledge	65	0.443	0.000
Attitude	65	0.718	0.000

Table 2 shows that knowledge has a statistically significant relationship with the implementation of nutrition education as an effort to prevent malnutrition in COPD patients ($p < 0.001$), with a moderate strength of relationship ($r = 0.443$). The positive correlation coefficient value indicates that the better the nurses knowledge, the better the implementation of the nutrition education provided.

Attitude also had a statistically significant relationship with the implementation of nutrition education as an effort to prevent malnutrition in COPD patients ($p < 0.001$), with a strong relationship ($r = 0.718$). The positive correlation coefficient indicates that the more positive the nurse's attitude toward nutrition education, the better the implementation of nutrition education.

*) Meaningful if $p\text{-value} < 0.05$.

Table 3. Final Multivariate Modeling T-Test

Model	B	Standardized Coefficients (β)	t	Sig
(1)				
Constant	25.307		1.410	.164
Knowledge	-.065	-.009	-.080	.937
Attitude	1.088	.718	6.354	.000
Nutrition related training history	-2.985	-.042	-.464	.645
(2)				
Constant	24.709		1.528	.131
Attitude	1.080	.712	7.985	.000
Nutrition related training history	-2.892	-.041	-.461	.647
(3)				
Constant	18.612		2.018	.048
Attitude	1.089	.718	8.194	.000

Table 4. Final Multivariate Modeling Determination Coefficients

Model	Predictor Variables	R	R-Square
(1)	Nutrition related training history, attitudes, knowledge	.719	.518
(2)	Training history related to nutrition, attitude	.719	.518
(3)	Attitude	.718	.516

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Table 3 shows that the results of the bivariate analysis, variables with a p-value <0.25 were selected as candidates for multivariate analysis using multiple linear regression. Variables that met this criterion were knowledge, attitudes, and history of nutrition-related training. These three variables were then analyzed together to identify the variables most closely associated with the implementation of nutrition education as an effort to prevent malnutrition in COPD patients.

The variable most closely related to the implementation of nutrition education was attitude. After controlling for knowledge and training history related to nutrition, attitude remained significantly related to the implementation of nutrition education ($\beta=0.718$; $p<0.001$). The positive beta coefficient value indicates that the more positive the nurses' attitudes toward nutrition education, the better the implementation of nutrition education provided to COPD patients. The final model had a coefficient of determination (R^2) of 0.516, indicating that the model was able to explain 51.6% of the variation in the implementation of nutrition education, while the remaining 48.4% was influenced by other factors not examined in this study.

DISCUSSION

Relationship Between Nurses' Knowledge and the Implementation of Nutrition Education

The results of this study indicate a significant positive relationship between nurses' knowledge and the implementation of nutrition education for preventing malnutrition among patients with COPD ($r=0.443$, $p<0.001$). These findings suggest that respondents' with higher levels of nutritional knowledge are more likely to provide effective nutrition education to patients.

Previous research found a positive correlation between nurses' knowledge and educational competence ($r=0.448$, $p<0.001$), and that nurses' knowledge was being significantly related to nutritional care practices ($r=0.273$, $p<0.001$) (Pueyo-Garrigues, Pardavila-Belio, Canga-Armayor, Esandi, Alfaro-Díaz, & Canga-Armayor, 2022; Shakhshir & Alkaiyat, 2023). Overall, these findings indicate that knowledge is an important determining factor that supports nurses' ability to provide effective patient education.

Knowledge provides the basic for accurate clinical decision-making and the appropriate implementation of nursing interventions (Seriga, Hassan, & Sansuwito, 2024). In Indonesia, SIKI identifies nutrition education as an essential nursing intervention aimed at improving patients' ability to meet their nutritional needs independently. According to these standards, respondents' are responsible for educating patients about nutritional requirements, energy and caloric needs, recommended and restricted foods based on individual clinical conditions, dietary management, monitoring food intake, and recognizing the signs and symptoms of nutritional disorders. Consequently, adequate knowledge is essential to ensure that nutrition education is evidence-based, clinically appropriate, and tailored to patients' individual needs.

The findings of this study indicate that adequate knowledge enables respondents' to implement nutrition education in accordance with professional nursing standards. Nurses with greater nutritional knowledge are better equipped to provide accurate information, explain dietary and energy requirements according to patients' clinical conditions, and deliver education that supports the goals of nursing interventions (Bastable, 2021; Ministry of Health of the Republic of Indonesia, 2019). Conversely, insufficient knowledge may result in incomplete or inaccurate educational information, thereby reducing the effectiveness of nutrition education and limiting patients' ability to manage their nutritional needs effectively (Pueyo-Garrigues et al., 2022; Shakhshir & Alkaiyat, 2023).

These findings are further supported by patient education theory, which defines education as a learning process designed to enhance patients' knowledge, skills, and capacity for self-care (Bastable, 2023; Potter, Perry, Stockert, & Hall, 2017). Among patients with COPD, nutrition education extends beyond improving understanding of energy and protein requirements. It also promotes adherence to dietary recommendations, helps maintain nutritional status, and supports effective self-management of the disease. Previous research has shown that nutritional education contributes to improved nutritional status, enhanced quality of life, and a reduced risk of COPD exacerbations (Mancin

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et al., 2024). Therefore, respondents' with stronger nutritional knowledge are more capable of providing comprehensive nutrition education, thereby contributing to the prevention of malnutrition among patients with COPD.

Despite this significant association, the moderate strength of the correlation ($r=0.443$), indicates that factors beyond knowledge alone influence the implementation of nutrition education. This finding suggests that additional individual and organizational factors may contribute to educational practice. Consistent with the multivariable analysis conducted in this study, nurses' attitudes emerged as the strongest factor associated with the implementation of nutrition education. Therefore, improving the quality of nutrition education requires not only strengthening respondents' knowledge through continuing education and professional training but also fostering positive professional attitudes that support nurses' roles as patient educators.

Relationship Between Nurses' Attitudes and the Implementation of Nutrition Education

This study found a significant positive relationship between respondents' attitudes and the implementation of nutrition education for preventing malnutrition among patients with COPD ($r=0.718$, $p<0.001$). These findings indicate that respondents' with more positive attitudes toward nutrition education are more likely to implement nutrition education effectively in clinical practice.

Previous research has shown a positive correlation between nurses' personal attributes and educational competence ($r=0.687$, $p<0.001$), and that nurses' attitudes are significantly associated with patient education practices ($r=0.412$, $p<0.01$) (Pueyo-Garrigues et al., 2022). Overall, these findings suggest that attitude is an important factor influencing respondents' involvement in patient education. Attitude reflects an individual's tendency to respond positively or negatively toward a particular object or behavior. Within the nursing context, a positive attitude toward nutrition education reflects nurses' belief that patient education is an essential component of nursing care and contributes to improving patients' health outcomes.

These findings are consistent with the theory of planned behavior, which proposes that attitudes toward a behavior influence an individual's

behavioral intention to perform that behavior. The more favorable an individual's attitude, the stronger the intention to engage in the behavior and, consequently, the greater the likelihood that the behavior will be translated into practice (Ajzen, 1991). In the present study, positive attitudes toward the importance of nutrition education may have encouraged respondents to provide more comprehensive information regarding nutritional requirements, dietary management, energy and protein needs, and strategies for preventing malnutrition among patients with COPD in accordance with professional nursing standards.

The findings further indicate that attitudes are associated not only with recognizing the importance of nutrition education but also with their willingness to fulfill their role as patient educators. Nurses with positive attitudes are more motivated to integrate nutrition education into routine nursing care, actively involve patients in the educational process, and encourage patients to develop the knowledge and skills necessary for effective self-management (Bastable, 2021; Potter et al., 2017). Conversely, negative or less supportive attitudes may reduce nurses' initiative to provide nutrition education, resulting in suboptimal implementation (Pueyo-Garrigues et al., 2022).

However, positive attitudes alone do not guarantee optimal implementation of nutrition education. Previous research has shown a gap between nurses' positive attitudes toward nutritional care and their actual clinical practices, including nutritional screening and patient education (Soenarto & Idealistiana, 2023). This finding suggests that nutrition education is also influenced by other factors, such as knowledge, communication skills, professional training, organizational support, workload, and time availability (Majid, 2020; Alsalim, 2023; Shakhshir & Alkaiyat, 2023; Van Noort et al., 2020).

Notably, the correlation between nurses' attitudes and the implementation of nutrition education was strong ($r=0.718$), exceeding the strength of the association observed between knowledge and educational practice. This finding indicates that attitude plays a particularly important role in promoting nurses' engagement in nutrition education. Therefore, strategies to improve the quality of

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nutrition education should extend beyond increasing nurses' knowledge through continuing education and training to include interventions that foster positive professional attitudes, such as supportive supervision, reflective learning, and organisational cultures that emphasise patient education as a fundamental component of high-quality nursing care.

Factors Most Strongly Associated with the Implementation of Nutrition Education

Nurses play a pivotal role in health education by improving patients' knowledge and self-management skills. Through health education interventions, nurses empower patients to better understand their health conditions, effectively manage self-care, and make informed decisions that promote healthier lifestyles. By facilitating patient empowerment, nurses contribute substantially to effective disease management and improved quality of life.

The multiple linear regression analysis demonstrated that nurses' knowledge, attitudes, and history of nutrition-related training collectively influenced the implementation of nutrition education, as indicated by the significant overall F-test ($p < 0.05$). However, the individual parameter estimates revealed that only attitude remained a statistically significant predictor of nutrition education implementation. In the final regression model, after controlling for nurses' knowledge and history of nutrition-related training, attitude remained the strongest factor associated with the implementation of nutrition education ($p < 0.001$, $t = 8.194$, standardized $\beta = 0.718$). This finding indicates that nurses with more positive attitudes were more likely to implement nutrition education effectively.

These findings are supported by a previous study involving 198 nurses at Siti Khadijah Hospital, Palembang, which applied the theory of planned behavior. The study demonstrated that attitude and perceived behavioral control significantly influenced nurses' intentions to share professional knowledge (Septiani, Heroza, Indah, Cahyani, & Bernova, 2020). This suggests that respondents who recognize the importance of knowledge sharing and feel confident in their ability to perform educational activities are more likely to engage actively in patient education. The present findings reinforce the importance of cultivating positive professional attitudes as a strategy to improve the implementation of nutrition education in clinical practice.

CONCLUSION

This study demonstrated that nurses' knowledge and attitudes were significantly associated with the implementation of nutrition education for preventing malnutrition among patients with COPD. Higher levels of knowledge and more positive attitudes were associated with better implementation of nutrition education. Among the variables examined, nurses' attitudes emerged as the strongest factor associated with nutrition education implementation after controlling for knowledge and history of nutrition-related training. These findings suggest that successful implementation of nutrition education depends not only on nurses' knowledge but also on their professional attitudes toward recognizing patient education as an integral component of nursing care.

Improving the quality of nutrition education should therefore focus on strengthening both nurses' nutritional knowledge and professional attitudes through continuing professional education, clinical supervision, and the development of standardized nutrition education guidelines within healthcare institutions. Future studies are recommended to employ observational methods to evaluate the implementation of nutrition education more objectively and to investigate additional organisational and individual factors that may influence nutrition education practices among nurses caring for patients with COPD.

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