

Research Article

Research and Effect Evaluation of the Role of Health Education in Obtaining Care for Acquired Pneumonia in Elderly Communities

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Abstract

Objective: The objective of this study was to explore the role and effectiveness of a comprehensive health education intervention in improving disease management and quality of life outcomes among elderly patients with community-acquired pneumonia (CAP).

Methods: This prospective study enrolled 80 elderly CAP patients admitted to the hospital between July 2019 and July 2022. The patients were randomly allocated to a control group ($n=40$) and a health education group ($n=40$). The control group received routine standard of care, while the health education group received structured health education in addition to the standard of care. The following outcome measures were assessed: (1) Disease knowledge; (2) Symptom relief; (3) Quality of life; (4) Therapeutic effectiveness.

Results: The health education group demonstrated significantly better disease knowledge compared to the control group ($P<0.05$). While there was no significant difference in the time for fever relief between the groups ($P>0.05$), the health education group had shorter relief times for respiratory rate and cough compared to the control group ($P<0.05$). Additionally, the health education group had higher quality of life scores across the physical, psychological, and overall health domains ($P<0.05$). The total effective rate, defined as the proportion of patients with marked effectiveness and effectiveness, was significantly higher in the health education group compared to the control group ($P<0.05$).

Conclusion: This study provides compelling evidence that a comprehensive health education intervention integrated into the nursing care of elderly CAP patients can effectively improve their disease knowledge, accelerate symptom relief, and enhance overall quality of life. The findings underscore the importance of incorporating structured health education as a key component of the holistic management of elderly CAP patients in clinical practice. Further research is warranted to explore the long-term impacts and cost-effectiveness of such health education interventions in this vulnerable patient population.

Keywords: health education, elderly CAP, role and effectiveness

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1 INTRODUCTION

Pneumonia refers to the infectious inflammation of the alveoli, distal airways, and lung interstitium caused by factors such as bacteria, viruses, and other pathogens. Community-acquired pneumonia (CAP) refers to pneumonia in patients who are infected by bacteria, viruses, or other pathogens outside of the hospital and are still in the incubation period, but develop pneumonia after admission due to other reasons^[1,2]. The disease is mainly transmitted through droplets, aspiration of upper respiratory tract colonized bacteria, and hematogenous spread from extrapulmonary infection sites. Patients often present with typical symptoms such as sore throat, fever, cough, nasal congestion, and headache during the initial onset. In severe cases, complications such as pneumonia-like pleural effusion, respiratory failure, septic shock, and multiple organ failure may occur^[3,4]. Due to the decline in various physiological functions, decreased immune function, and the presence of other serious underlying diseases, elderly individuals are more susceptible to bacterial and viral threats^[5]. Furthermore, CAP in the elderly has insidious onset and rapid progression, making the condition difficult to detect. Even if detected, it is prone to misdiagnosis, and delayed detection and treatment can lead to poor prognosis and high mortality rates. Therefore, it is crucial to implement effective prevention and treatment measures for CAP in the elderly^[6,7]. The primary treatment approach for CAP focuses on antimicrobial therapy. Depending on the patient's condition, antibiotics such as doxycycline, minocycline, and amoxicillin are administered, or symptomatic treatments such as ibuprofen and acetaminophen are provided^[8]. Traditional Chinese medicine has also shown promising therapeutic effects, and studies have demonstrated that integrated traditional and Western medicine treatments effectively improve clinical symptoms and quality of life in patients^[9]. However, implementing relevant treatment strategies alone is not sufficient. It is also essential to emphasize the importance of health from both a physical and psychological perspective, strengthen health education, and prevent and reduce the occurrence of CAP^[10]. While progress has been made in the medical treatment of CAP in the elderly, there remains a knowledge gap in how comprehensive health education interventions can improve clinical outcomes and quality of life for elderly CAP patients. This study aimed to evaluate the impact of a holistic health education intervention on improving disease understanding, symptom alleviation, and quality of life in elderly CAP patients.

2 MATERIALS AND METHODS

2.1 Study Population

A total of 80 elderly CAP patients admitted to our hospital from July 2019 to July 2022 were included as

the study population. Based on different nursing models, the patients were divided into a control group and a study group, with 40 patients in each group. The control group received routine nursing care, while the study group received health education nursing care in addition to the routine care. A follow-up period of 3 months after discharge was conducted for both groups.

This study adheres to the ethical guidelines set forth by Declaration of Helsinki. The study protocol was reviewed and approved by the ethics committee before the commencement of data collection.

Informed consent was obtained from all participants involved in the study. Prior to their participation, participants were provided with detailed information regarding the purpose of the study, the procedures involved, potential risks and benefits, as well as their rights as participants. They were assured of the confidentiality and anonymity of their data, and they were informed of their right to withdraw from the study at any time without penalty or loss of benefits.

2.2 Inclusion and Exclusion Criteria

2.2.1 Inclusion Criteria

Meeting the diagnostic criteria for CAP; Age ≥ 50 years; Patients with good treatment compliance.

2.2.2 Exclusion Criteria

Patients with comorbidities affecting cardiac, hepatic, or renal function; Patients with mental disorders or communication barriers; Patients who withdrew from the study during the course.

2.3 Methods

The control group received routine nursing care, including close monitoring of vital signs, health education on treatment measures and prognosis, medication guidance, and dietary counseling.

The study group received health education nursing care in addition to the routine care, including the following aspects: (1) Admission guidance, providing information about the hospital environment, attending physicians, and instructions for relevant examinations, explaining the purpose and necessity of the tests, etc. (2) Health education, based on the patient's clinical manifestations, cultural level, cognitive ability, etc., comprehensive and systematic health education was conducted using verbal explanations, multimedia audio, lectures, etc. The education covered the pathogenesis, clinical symptoms, prevention and treatment methods, prognosis, etc., of CAP. Patient inquiries were patiently addressed and answered. (3) Respiratory care, closely observing the

patient's airway patency, promptly clearing respiratory secretions, and providing oxygen inhalation for patients with respiratory distress. Attention was given to opening windows for ventilation to maintain fresh air in the ward and ensure smooth breathing for patients. (4) Psychological care, promptly assessing the patient's psychological state and changes, initiating communication when adverse psychological conditions were detected, providing emotional support, and actively encouraging patient cooperation and support for nursing work. (5) Guiding patients in proper coughing techniques, such as taking a deep breath using diaphragmatic breathing, holding the breath briefly, and then coughing. Physical percussion techniques, such as cupping both hands together and rapidly tapping the chest in the various lung lobes, were used until sputum was expectorated. (6) Providing a light diet, encouraging the intake of foods high in vitamins and protein, and supplementing calcium and potassium. After the patient's condition stabilized, guiding the patient to engage in moderate exercise and emphasizing the importance of a balance between rest and activity to prevent complications caused by prolonged bed rest. Instructing patients to take medication as prescribed.

2.4 Outcome Measures

2.4.1 Disease Knowledge Assessment

A self-designed 50-item health education evaluation scale was used to assess the patients' understanding of disease pathogenesis (10 items), treatment options (10 items), medication management (10 items), exercise recommendations (10 items), and dietary guidance (10 items). Each item was scored on a 2-point scale (0 = incorrect, 2 = correct), resulting in a total score range of 0-100 points. A score of ≥ 85 indicated complete mastery, 60-84 indicated basic mastery, and < 60 indicated non-mastery. The scale was administered through face-to-face interviews by trained nurses at baseline and upon completion of the health education program.

2.4.2 Symptom Alleviation Evaluation

The time (in days) for alleviation of key symptoms, including fever, cough, sputum production, and shortness of breath, was recorded and compared between the health education group and the control group. Symptom alleviation was defined as the resolution or significant improvement of the symptom, as assessed by the attending physician.

2.4.3 Quality of Life Assessment

The SF-36 Health Survey was used to evaluate the patients' quality of life. This 36-item questionnaire assesses eight domains: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Each domain is scored on a 0-100 scale, with higher scores indicating better quality of life. The questionnaire was administered through structured interviews by trained research staff at baseline and upon completion of the health education program.

2.4.4 Therapeutic Effectiveness Evaluation

The overall therapeutic effectiveness was assessed by the attending physician based on the following criteria: Marked effectiveness: Significant clinical improvement, with a reduction of $\geq 50\%$ in the extent of pulmonary shadows observed on chest radiography or computed tomography; Effectiveness: Partial absorption of pulmonary lesions, with a reduction of 30-49% in the extent of pulmonary shadows; Ineffectiveness: No improvement or worsening of the condition, with $< 30\%$ reduction in the extent of pulmonary shadows. The total effective rate was calculated as the proportion of patients with marked effectiveness and effectiveness.

2.5 Statistical Analysis

Data were analyzed using SPSS 22.0 statistical software. Normally distributed continuous data were expressed as mean \pm standard deviation ($\pm s$), and group comparisons were performed using t-tests. Categorical data were expressed as frequencies (percentages), and group comparisons were performed using chi-square tests. A significance level of $P < 0.05$ was considered statistically significant.

3 RESULTS

3.1 Baseline Characteristics

The control group ($n=40$) included 25 males and 15 females, with a mean age of (62.27 ± 5.20) years and an average duration of illness of (2.12 ± 0.46) years. The infection types were as follows: bacterial pneumonia (19 cases), atypical pneumonia (11 cases), and other pathogenic pneumonia (10 cases). The observation group ($n=40$) included 22 males and 18 females, with a mean age of (61.45 ± 5.43) years and an average duration of illness of (1.98 ± 0.51) years. The infection types were as follows: bacterial pneumonia (20 cases), atypical pneumonia (12 cases), and other pathogenic pneumonia (8 cases). There were no significant differences in clinical data between the two groups ($P > 0.05$) (Table 1).

This suggests that the two groups were well-matched and comparable at the beginning of the study, minimizing potential confounding factors. The similar baseline characteristics of the two groups enhance the validity of the subsequent comparisons and strengthen the reliability of the study results.

3.2 Mastery of Disease Knowledge

The mastery of disease knowledge in the study group was significantly higher than that in the control group ($P < 0.05$) (Table 2).

The study group demonstrated significantly better disease knowledge acquisition compared to the control group. A higher percentage of participants in the study group achieved complete mastery of the knowledge, while fewer

Table 1. Comparison of Baseline Characteristics Between the Two Groups

Group	Gender		Age	Duration of Illness (years)	Infection Type		
	Male	Female			Bacterial Pneumonia	Atypical Pneumonia	Other Pathogen Pneumonia
Control group (n=40)	25	15	62.27±5.20	2.12±0.46	19	11	10
Study group (n=40)	22	18	61.45±5.43	1.98±0.51	20	12	8
t/x ²	0.464		0.690	1.289	0.050		
P	0.496		0.492	0.201	0.823		

Table 2. Comparison of Mastery of Disease Knowledge Between the Two Groups [n (%)]

Group	Complete Mastery	Basic Masteryg	Unclear Mastery	Total Mastery Rate
Control group (n=40)	11 (27.5)	16 (40.0)	13 (32.5)	27 (67.5)
Study group (n=40)	23 (57.5)	12 (30.0)	5 (12.5)	35 (87.5)
x ²	-	-	-	4.588
P	-	-	-	0.032

Table 3. Comparison of Relief of Clinical Symptoms Between the Two Groups (mean±SD)

Group	Temperature Relief Time (days)	Respiratory Rate Relief Time (days)	Cough Relief Time (days)
Control group (n=40)	2.42±1.13	3.30±1.15	4.50±2.63
Study group (n=40)	2.05±1.02	2.65±1.34	3.27±2.51
t	1.537	2.328	2.140
P	0.128	0.023	0.036

Table 4. Comparison of Quality of Life Scores Between the Two Groups (mean±SD, points)

Group	Physical Health		Psychological Health		Health Changes	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Control group (n=40)	55.49±5.75	65.90±5.84	55.67±5.86	71.25±4.76	53.68±5.55	70.43±7.60
Study group (n=40)	56.10±5.57	75.45±7.06	56.24±5.79	80.50±5.44	55.00±4.62	78.56±6.95
t	0.482	6.592	0.438	8.093	1.156	4.993
P	0.631	0.001	0.663	0.001	0.251	0.001

participants had unclear understanding. The findings indicate that the educational intervention implemented in the study group effectively improved the participants' understanding and knowledge regarding the disease. Enhancing disease knowledge can empower individuals to make informed decisions about their health and potentially lead to better disease management outcomes.

3.3 Relief of Clinical Symptoms

There was no significant difference in the time of temperature relief between the two groups ($P>0.05$). However, the study group had shorter relief times for respiratory rate and cough compared to the control group ($P<0.05$) (Table 3).

Although there were no significant differences in temperature resolution time between the two groups, the study group showed shorter durations of respiratory rate

normalization and cough relief compared to the control group. The faster relief of respiratory symptoms and cough observed in the study group suggests that the implemented intervention may have contributed to better clinical outcomes, potentially reducing the duration of discomfort and promoting a quicker recovery.

3.4 Quality of Life

The study group had higher scores for quality of life compared to the control group ($P<0.05$) (Table 4).

This includes improvements in physical health, psychological well-being, and perceived health changes. The intervention provided to the study group appears to have positively impacted various domains of participants' quality of life. The improvements in physical and psychological health, as well as perceived positive health changes, suggest that the intervention may have enhanced

Table 5. Comparison of Health Education Effects Between the Two Groups [n (%)]

Group	Significant Effect	Effective	Ineffective	Total Effective Rate
Control group (n=40)	10 (25.0)	19 (47.5)	11 (27.5)	29 (72.5)
Study group (n=40)	21 (52.5)	17 (42.5)	2(5.0)	38 (95.0)
χ^2	-	-	-	7.440
P	-	-	-	0.006

overall well-being and satisfaction with health status.

3.5 Health Education Effect

The health education effect in the study group was superior to that in the control group ($P<0.05$) (Table 5).

A higher percentage of participants in the study group achieved significant and effective results, while fewer participants showed no improvement. The findings indicate that the health education intervention implemented in the study group effectively improved participants' knowledge and behaviors related to health. The higher effectiveness rate suggests that the intervention was successful in promoting positive changes and empowering individuals to adopt healthier practices.

4 DISCUSSION

According to the seventh national census report in China, the population aged 60 and above accounts for approximately 18.70% of the total population, with the population aged 65 and above accounting for 13.50%. This indicates that China has entered a stage of mild population aging, and health issues among the elderly are becoming increasingly prominent^[11,12]. Pneumonia is one of the common infectious diseases in the elderly population and a leading cause of death among the elderly. Data shows that CAP patients aged 65 and above account for about 12% of the population, with a mortality rate as high as 1%-5%. The high incidence and mortality rate of CAP seriously impact the health and well-being of residents and impose a significant disease burden on patients, their families, and society. Therefore, reducing the incidence and mortality rate of CAP in the elderly is a significant challenge for China in its aging society^[13,14]. This not only requires effective treatment strategies for elderly CAP but also comprehensive health education and nursing measures. Studies have shown that high-quality health education and nursing measures can promote the recovery of elderly CAP patients and provide assistance to healthcare professionals in their work^[15,16].

The results of this study showed that the mastery of disease knowledge in the study group was significantly higher than that in the control group ($P<0.05$). There was no significant difference in the time of temperature relief between the two groups ($P>0.05$), but the study group had shorter relief times for respiratory rate and cough compared to the control group ($P<0.05$). A similar study conducted by Eekholm, S using health education combined with

routine nursing care showed a significant improvement in health knowledge among patients compared to before nursing care, as well as shorter symptom relief time and hospital stay compared to patients in the routine nursing care group, which is consistent with the findings of this study^[17]. Additionally, this result also indicates that health education can effectively improve patients' mastery of health knowledge, reduce symptom and sign relief time. This can be attributed to the comprehensive and systematic health education, which enhances patients' understanding of the disease and improves treatment compliance, thereby enhancing treatment outcomes^[18]. Furthermore, guiding patients in using physical expectoration techniques can promote vibration in the lungs and skin, facilitating the expulsion of inflammatory secretions. Proper guidance on coughing can help patients respond correctly to sudden situations such as difficulty in coughing^[19,20]. In addition, the study group had higher scores for quality of life compared to the control group ($P<0.05$), and the health education effect in the study group was superior to that in the control group ($P<0.05$). A retrospective study by Eröss showed that after health education, CAP patients experienced a significant improvement in their quality of life compared to before treatment, and overall nursing satisfaction was higher than with routine nursing care, which is similar to the findings of this study^[21]. This suggests that "health education can effectively improve the physical and mental health of CAP patients, thereby enhancing quality of life and treatment outcome". The reason behind this conclusion is that timely emotional support can effectively alleviate patients' anxiety and unrest, helping them maintain a positive attitude towards disease treatment^[22]. Additionally, health education enables patients to understand their own disease, disease progression, prevention and control measures, and encourages them to maintain healthy behaviors after discharge, promoting the recovery process^[23,24].

The findings of this study demonstrate that the implementation of a comprehensive health education intervention had a favorable impact on the care of elderly patients with CAP, as evidenced by several key mechanisms and explanations: (1) Improved Disease Understanding: The superior disease knowledge exhibited by the study group compared to the control group can be attributed to the tailored health education program. This educational approach likely enabled patients to develop a deeper comprehension of the underlying etiology, clinical manifestations, and management strategies for

CAP. Enhanced health literacy empowered patients to make more informed decisions and actively participate in their own care, which is a crucial determinant of treatment adherence and self-management behaviors. (2) Accelerated Symptom Relief: The significantly shorter relief times for respiratory rate and cough observed in the study group may have stemmed from the health education interventions. The educational content may have equipped patients with effective self-management techniques, such as breathing exercises, cough suppression methods, and early recognition of symptom improvement. This facilitated more timely self-reporting and healthcare-seeking behaviors, leading to earlier clinical stabilization. (3) Enhanced Quality of Life: The higher quality of life scores reported by the study group receiving health education can be attributed to the synergistic effects of improved disease understanding and more effective symptom management. The educational approach may have fostered a greater sense of empowerment and self-efficacy in patients, which are crucial determinants of physical, mental, and social functioning. By enabling patients to better comprehend their condition and engage in self-care strategies, the health education interventions likely contributed to better overall quality of life. (4) Synergistic Health Education Effects: The superior outcomes observed in the study group suggest that the comprehensive health education approach, encompassing the impartation of knowledge, skills, and coping strategies, had a synergistic effect on patient care. The tailored, interactive nature of the educational program may have been more effective in motivating behavior change and promoting active engagement in the care process compared to routine care alone.

While the present study demonstrates the beneficial effects of health education on the care of elderly patients with CAP, there are several limitations that should be acknowledged: (1) Sample size and single-center design: The study was conducted at a single medical center with a relatively small sample size of 80 participants. A larger, multicenter trial with a more diverse patient population would be necessary to enhance the generalizability of the findings. (2) Short-term follow-up: The evaluation of outcomes was limited to the acute care phase, with no long-term follow-up. Assessing the sustained impact of health education on patient self-management, healthcare utilization, and long-term clinical outcomes would provide a more comprehensive understanding of its effectiveness. (3) Lack of standardized health education curriculum: The health education intervention in this study was tailored by the research team, but a more standardized, evidence-based educational program may be needed to ensure consistency and reproducibility across different settings. (4) Subjective outcome measures: While the study employed validated quality of life scales, the assessment of disease understanding and symptom relief relied on self-reported measures. Incorporating more objective clinical endpoints,

such as biomarkers or imaging findings, could strengthen the evaluation of the health education program's impact. (5) Absence of cost-effectiveness analysis: The current study did not evaluate the potential economic benefits or cost-effectiveness of the health education approach. Future research should explore the associated healthcare utilization and resource implications to inform policy and resource allocation decisions.

To address these limitations and expand the understanding of health education's role in elderly CAP care, several future research directions can be considered: (1) Larger, multicenter randomized controlled trials to validate the findings and enhance generalizability. (2) Longitudinal studies with extended follow-up periods to assess the long-term impact of health education on patient outcomes and healthcare utilization. (3) Development and evaluation of standardized, evidence-based health education curricula for elderly CAP patients. (4) Incorporation of objective clinical endpoints and biomarkers to provide a more comprehensive assessment of the intervention's effectiveness. (5) Economic evaluations to determine the cost-effectiveness of health education programs and their potential for healthcare system-wide implementation.

Addressing these research gaps will contribute to a deeper understanding of the mechanisms and long-term benefits of health education in the management of CAP among the elderly population, ultimately informing clinical practice and healthcare policies.

The results of this study have several important clinical implications for the management of elderly patients with CAP: (1) Incorporation of tailored health education: The demonstrated benefits of the comprehensive health education intervention, including improved disease understanding, accelerated symptom relief, and enhanced quality of life, suggest that this approach should be integrated into the standard of care for elderly CAP patients. Implementing tailored educational programs within clinical settings can empower patients, promote self-management, and ultimately lead to better treatment outcomes. (2) Multidisciplinary care approach: The synergistic effects observed in the health education group highlight the importance of a multidisciplinary care model for elderly CAP patients. This should involve not only physicians, but also nurses, pharmacists, and other healthcare professionals who can collectively deliver a coordinated educational program and support patients throughout the care continuum. (3) Personalized care delivery: The study findings underscore the need for individualized, patient-centered approaches to health education. Clinicians should assess the unique learning needs, health literacy levels, and personal preferences of each elderly CAP patient to design and deliver educational content that is most impactful and engaging. (4) Continuity

of care and follow-up: The potential long-term benefits of health education, such as sustained self-management behaviors and reduced healthcare utilization, emphasize the importance of continuous care and close follow-up for elderly CAP patients. Integrating health education as a core component of transitional care and post-discharge planning can further enhance the overall effectiveness of the intervention. (5) Interprofessional collaboration: The successful implementation of comprehensive health education programs requires close collaboration between clinicians, allied health professionals, and community-based resources. Establishing strong interprofessional networks and referral pathways can facilitate the seamless delivery of tailored educational support for elderly CAP patients.

By implementing these clinical strategies, healthcare systems can leverage the power of targeted health education to improve the care and outcomes of elderly patients with CAP, ultimately enhancing their quality of life and reducing the burden on the healthcare system.

5 CONCLUSION

In conclusion, this study provides compelling evidence that targeted health education implemented within the nursing care of elderly CAP patients can effectively improve their disease knowledge, accelerate symptom resolution, and enhance overall quality of life. These findings underscore the importance of integrating comprehensive health education as a key component of the holistic management of elderly CAP patients in clinical practice. Further research is warranted to explore the long-term impacts and cost-effectiveness of such health education interventions in this vulnerable patient population.

Acknowledgements

Not applicable.

Conflicts of Interest

The authors declared no conflict of interest.

Ethical Statement

This study was approved by the Institutional Review Board of Shiyan Maternal and Child Health Hospital.

Author Contribution

Yu J designed the research study. Shen X performed the research, conducted experiments and analyzed the data. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Abbreviation List

CAP, Community-acquired pneumonia

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