

## Patient Information Regarding Pneumonia: Providing Comprehensive Nursing Intervention

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### Abstract

**Background:** Patient knowledge regarding pneumonia plays a vital role in treatment adherence, empowerment, self-management, anxiety reduction, communication, quality of life, disease management and health literacy. **Aim:** Assess patient information regarding pneumonia and providing comprehensive nursing intervention. **Research design:** A descriptive research design was used to achieve the aim of this study. **Subjects:** One hundred thirty two adult male and female patients, from 18 to less than their ages ranged or equal to 65 years. **Setting:** This study was conducted inpatient in chest hospital at Assiut city. **Tool:** Interview questionnaire included demographic, medical and questions regarding patient's knowledge assessment. **Results:** 73.5% the studied group were 55 to ≤ 65yrs old, regarding to gender 59.8% of the studied sample were female. (97.0%) of studied sample had shortness of breathing, hypertension in(50%) and abnormal chest x-ray in (74.2%). **Conclusion:** It was concluded that the majority of patients had poor information level regarding pneumonia and they were statistical significance different between educational level and level of information, occupation and patient information. **Recommendations:** A tailored intervention program designed and implemented to increase the knowledge about pneumonia.

**Keywords:** *Nursing intervention, Patient information & Pneumonia*

### Introduction

A variety of bacteria, viruses, and fungi can cause infections that result in pneumonia, which makes the lungs enlarge and leak fluids. Pneumonia can also occur when the immune system tackles an infection in the small sacs of the lung (alveoli) (**American lung Association, 2022**).

Community-acquired pneumonia (CAP) remains the biggest reason for infection-related mortality globally, despite significant advancements in anti-infective medicines and vaccine development technologies (**Anderson & Feldman, 2023**).

450 million cases each year, pneumonia is a major source of illness and mortality globally of these cases, 1.3 million occur in children and 1.6 million in individuals over the age of 60 (**Heo et al., 2018**).

The World Health Organization (WHO) reports that lower respiratory tract infections, which include pneumonia, account for 3.8% of disability-adjusted life years globally and pneumonia was the fourth leading cause of death globally in 2019 with close to 2.5 million deaths (**WHO, 2019**).

Each year, influenza and pneumonia cause around 60,000 fatalities. Additionally, pneumonia is the eight most common cause of mortality in the US. Over 915, 000 episodes of CAP are thought to occur in persons 65 yrs and older in the United States (**Marianne, 2023**).

Pneumonia is caused by an infection in the tiny pockets of the lung known as alveoli. This causes the lungs to expand and leak fluid. Many bacteria, viruses, and fungi can cause pneumonia infections. (**American lung Association, 2022**).

Patient knowledge plays a vital role in treatment adherence, empowerment, self-management, anxiety reduction, communication, quality of life, disease management and health literacy. Healthcare providers should prioritize patient education as an integral component of comprehensive care (**lu et al., 2019**).

A nurse's role in caring for a patient with pneumonia includes teaching them about proper hygiene practices to stop the infection from spreading, educating them about how to prevent recurrence by taking their medication as directed, scheduling follow-up appointments, getting recommended vaccinations, encouraging rest to speed up recovery, encouraging adequate fluid intake, maintaining a healthy diet, encouraging coughing exercises and chest physiotherapy, and providing simple pain relief to lower fever and discomfort (**saud et al., 2022**).

Pneumonia is treated with a comprehensive approach. Besides to taking antibiotics, these patients often require counseling on nutrition, physical therapy to help recover muscle mass and dental care (**Sattar et al., 2023**).

**Significant of the study**

The incidence of pneumonia in chest hospital at Assiut city was (200) patients during period of (2019). It observed that most of the hospitalized patients with pneumonia suffer from inadequate information and skills regarding prevention and management of pneumonia. Therefore the study was conducted to assess patient information needed regarding pneumonia and providing comprehensive nursing intervention to meet patient's needs.

**Aims of the study**

- Assess patient information regarding pneumonia.
- Providing comprehensive nursing intervention regarding pneumonia.

**Research question**

What are patients information regarding pneumonia?

**Research design:**

A descriptive research design was employed to fulfill the study's aims.

**Study setting:**

This study was conducted inpatient in chest hospital at Assiut city.

**Subjects:**

One hundred thirty two adult male and female patients, their ages varied from 18 to 65 years who admitted chest department at Assiut city hospital.

**Sample size:**

The sample of 132 patients was selected by using the following equation according to **Steven & Thompson (2012)**:

$$n = \frac{N \times p(1-p)}{\left[ \left[ N - 1 \times (d^2 \div z^2) \right] + p(1-p) \right]}$$

N=total patient population size of 200 who attended in chest hospital at Assiut city. During year 2019.

Z= confidence levels is 0.95 and is equal to 1.96

D= The error ratio is = 0.05

P= The property availability ratio and neutral = 0.50

**Tool of the study:**

This tool was created by the researcher according to the available literature review to assess patient's condition, which included a **structured interview questionnaire**. It consisted of three parts:

**Part (1): Demographic data:** It was including code, age, gender, residence, educational level, smoking, occupation, marital status.

**Part (2): Medical data:** It was including past and present history, chronic and chest diseases, diagnostic studies, smoking and family history.

**Part (3): Patient's knowledge assessment:** It was created by the researcher to evaluate the patients' knowledge regarding definition of pneumonia, risk factor, signs and symptoms, causes, complications, treatment, daily living activities, diet, fluid intake, nutrition, breathing and cough exercise, medication and follow up visits.

**Scoring system:**

If the question is answered correct, it was scored 1, while incorrect answer it will be scored zero.

The total score was graded as:  $\geq 60\%$  is satisfactory, while  $< 60\%$  is unsatisfactory.

**Comprehensive nursing care:**

It was developed by the researcher according to the available literature review and included the following:

- Care for patient with pneumonia.
- Nursing instructions include.
- Definition of pneumonia.
- Causes and risk factors of pneumonia.
- Treatment of pneumonia.
- Complications of pneumonia
- Nursing instructions regarding daily living activities, diet, fluid intake, nutrition, breathing and cough exercise, medication and follow up visits and preventive measures .....etc.

**Procedure:**

This study was carried out in two phases

**Preparatory phase:****Tool development:**

Tools were developed by reviewing current, past, local, and international literature in a variety of fields, including books, papers, periodicals, magazines, and references.

**Validity and Reliability**

A panel of five experts (3 professors of Medical Surgical Nursing staff and 2 professors of medical staff) evaluated the tools' validity for clarity, relevance and applicability, comprehensiveness, and ease of implementation. Based on their feedback, minor modifications were implemented.

Test reliability of the tools was confirmed by Cronbach's alpha (0.89) for tool I, part 3.

**Pilot study**

It was carried out on 10% of the study participants (13 patients) to assess the tools' applicability and simplicity. The data from the pilot study were assessed; no modifications were done to the tools, hence the study incorporated 10% of the pilot study in the total sample.

**Ethics considerations:**

The Faculty of Nursing's ethical committee approved the conduct of this study. An official Permission was taken from the Head of the Chest Department in order to collect the appropriate data. After discussing the nature and aim of the study, patients provided an oral consent to participate in the study. The study participants were not at risk during the research's application. Confidentiality and anonymity were ensured. The study participants had the right to reject to participate in the trial and/or withdraw without explanation at any time.

**Implementation phase:**

- The researcher began data collection after obtaining approval to proceed with the study.
- Data was collected in a single meeting with each patient from Saturday to Wednesday between 8 a.m. and 8 p.m., during morning and afternoon shifts.
- The researcher interviewed patient individually to collect the required data using interview questionnaire. The time spent filling out the questionnaire ranged from 10 to 15 minutes.
- During the interview, the researcher introduced herself, explained the study's goal, and gained oral consent from patient to participate voluntarily. Furthermore, the researcher completed the tool and took care to simplify the questions so that they were understandable to patients. Additionally, the researchers provided explanations whenever questions arose.
- Collecting data lasted from August 2023 to January 2024.

- After completion the questionnaire from the patients. The researcher gave the information which the patients need regarding definition of pneumonia, risk factor, signs and symptoms, causes, complication, treatment, daily living activities, diet, fluid intake, breathing and cough exercise and follow up visits.

**Statistically analysis**

The SPSS version 23 statistical software applications was used to evaluate, code, analyze, and tabulate data. Frequencies and percentages were used as descriptive data. Qualitative data were reported as numbers and percentages (n, %). The mean and standard deviation (SD) of quantitative data were used. To analyze the association between two or more qualitative variables, the Chi square ( $\chi^2$ ) test was utilized.

$P$ -value  $\leq 0.05$  was established as the significant level

**Results**

**Table (1): Personal characteristics of frequencies and percentages distribution among patients (n= 132)**

Variables	N	%
<b>Age</b>		
25- < 40	12	9.1
40- < 55	23	17.4
55- ≤ 65	97	73.5
<b>Gender</b>		
Male	53	40.2
Female	79	59.8
<b>Marital status</b>		
Single	2	1.5
Married	96	72.7
Divorced	4	3.0
Widow/er	30	22.7
<b>Educational level</b>		
Illiterate	107	81.1
Primary education	9	6.8
Secondary education	10	7.6
High education	6	4.5
<b>Occupation</b>		
Not work	128	97.0
Working	4	3.0
<b>Residence</b>		
Rural	103	78.0
Urban	29	22.0
<b>Smoking</b>		
No	104	78.8
Yes	28	21.2

**Table (2): Distribution of patients as regard medical data (n = 132)**

Variables	Yes	
	N	%
<b>Present history symptoms</b>		
Chest Pain	102	77.3
Fever	60	45.5
Shortness of breathing	128	97.0
Tachycardia	6	4.5
Cough	111	84.1
Headaches	27	20.5
<b>Past history</b>		
Previous hospital admission with pneumonia	85	64.4
Previous surgery	14	10.6
<b>Chronic disease</b>		
Diabetes	42	31.8
Hypertension	66	50.0
Other disease (cancer, heart diseases)	6	4.5
<b>Diagnostic studies</b>		
Chest X – ray		
Normal	34	25.8
Abnormal	98	74.2

**Table (3): Comparison of mean scores regarding lab investigation among studied group (n=132)**

Variables	Minimum	Maximum	Mean	Std. Deviation
<b>CBC</b>				
RBC	2.28	7.17	4.4811	808.32
WBCS	3.36	22.00	11.68	5.43
HB	8.00	14.50	12.17	1.52
PLATELETES	101.00	512.00	293.53	105.16
<b>ABG</b>				
PH	7.45	7.53	7.47	029
PCO2	19.00	67.00	35.43	9.18
O2	50.00	80.00	79.34	3.56
HCO3	14.50	44.00	24.389	4.569

**Table (4): Frequencies and percentages distribution among Patient's total information regarding pneumonia (n= 132)**

Variables	Frequency	Percent
Poor information $\leq 60$	126	95.5
Good information $\geq 60$	6	4.5
Total	132	100.0

**Table (5): Relation between demographic data and information among patients (n= 132)**

Variables	unsatisfactory $\leq 60$ (N %)		Satisfactory $\geq 60$ (N %)		p. v
<b>Age</b>					
25- < 40	11	8.3	1	0.8	.455
40- < 55	23	17.4	0	0.0	
55- $\leq 65$	92	69.7	5	3.8	
<b>Sex</b>					
Male	50	37.9	3	2.3	.684
Female	76	57.6	3	2.3	
<b>Marital status</b>					
Single	2	1.5	0	0.0	.502
Married	90	68.2	6	4.5	
Divorced	4	3.0	0	0.0	
Widow	30	22.7	0	0.0	

Variables	unsatisfactory≤60 (N %)		Satisfactory≥60 (N %)		p. v
<b>Educational level</b>					
Illiterate	105	79.5	2	1.5	.001**
Primary education	9	6.8	0	0.0	
Secondary education	9	6.8	1	0.8	
High education	3	2.3	3	2.3	
<b>Occupation</b>					
Not work	124	93.9	4	3.0	.010*
Working	2	1.5	2	1.5	
<b>Residence</b>					
Rural	100	75.8	3	2.3	.120
Urban	26	19.7	3	2.3	
<b>Smoking</b>					
No	98	74.2	6	4.5	.341
Yes	28	21.2	0	0.0	

**Table (6): Relation between medical data and information among patients (n= 132)**

Variables	Unsatisfactory (N %)		Satisfactory (N %)		P.V
	N	%	N	%	
Chest Pain	69	72.7	6	4.5	336.
Fever	59	44.7	1	0.8	220.
Shortness of breathing	122	92.4	6	4.5	1.000
Tachycardia	6	4.5	0	0.0	1.000
Cough	107	81.1	4	3.0	243.
Headaches	26	19.7	1	0.8	1.000
Previous hospital admission with pneumonia	80	60.6	5	3.8	421.
Previous surgery	14	%10.6	0	0.0	1.000
<b>Do you suffer from the following chronic disease</b>					
Diabetes	14	31.1	1	0.8	664.
Hypertension	65	49.2	1	0.8	208.

**Table (1):** Shows that 73.5% the studied group were 55 to ≤ 65 yrs old, regarding to gender 59.8% of the studied sample were female, the majority of them were married (72.7%), regarding to educational level the highest Percentage were illiterate (81.1%), regarding to occupation were not work (97.0%), residence were rural (78.0%), (78.8%) of the studied group were nonsmoker.

**Table (2):** Reveals that (97.0%) of studied sample had shortness of breathing, hypertension in (50%) and abnormal chest x-ray in (74.2%).

**Table (3):** Regarding laboratory investigation shows highest percentage of mean CBC were platelet (293.53), highest percentage of mean ABG were O<sub>2</sub> (79.34).

**Table (4):** Shows the majority of patients had poor information level (95.5) regarding pneumonia.

**Table (5):** Shows that they are statistical significance different between educational level and level of information at p-value (001), occupation and patient information at p-value (010).

**Table (6):** Shows there were statistical significance different between information and shortness of breath

(1.000), tachycardia (1.000), headache (1.000), and previous surgery (1.000).

## Discussion

The common reason of infection-related death worldwide is still community-acquired pneumonia (CAP), despite significant advancements in anti-infective treatments and vaccine research technologies **Anderson & Feldman (2023)**.

Comprehending the cause of pneumonia is crucial for directing preventative measures, enhancing compliance with treatment plans, and reducing the emergence of medication resistance (**lu et al., 2019**). Regarding socio-demographic data of the studied patients, the current study revealed that the majority of the studied patients between 55-65 years, more than half of the studied patients were female & married and the majority of them were illiterate, not working and nonsmoker. These results agree with **Fagerli et al., (2023)** who conducted their study to assess pneumonia in hospitalized adults aged 18 or older in four regions of Ulaanbaatar, Mongolia; and reported that more than half of the studied patients between 45-65 years & female.

Also in the same line with **Ali et al., (2020)** who reported that around two thirds of the studied sample were illiterate and non-smokers with a mean age ( $52.40 \pm 14.40$ ) in a study. Also with **lu et al., (2019)** who reported that more than half of the participants were female with a mean age of 62 years in a study conducted to estimate prevalence of pneumococcal pneumonia among adults with severe acute respiratory illness in Thailand.

According opinion of the researcher, this result might be due to the elevation of the incidence of pneumonia among the old age and in females than males, the increased incidence of pneumonia among older adults and females compared to males can be attributed to several factors. Ageing leads to a natural decline in immune function, making older individuals less capable of fighting off infections, including pneumonia. Additionally, age related health conditions such as diabetes, heart disease, and chronic respiratory issues further heighten susceptibility. In females, hormonal changes, particularly after menopause, may weaken the immune response, increasing the risk of respiratory infections. Women are also likely to suffer from autoimmune diseases, which can compromise the immune system and necessitate immunosuppressive treatments. Furthermore, environmental and social factors such as the caregiving roles often assumed by women may expose them to higher risks of infection. This explanation was supported by **heo et al., (2018)** who reported that the incidence of pneumonia was high, particularly in older persons in a study to estimate the incidence of community-acquired pneumonia (CAP) and pneumococcal diseases among Korean adults. Also supported by **Almirall et al., (2017)** who concluded that age was a definitive risk factor for community-acquired pneumonia.

On the contrary of **Dumyati et al., (2018)** who reported that the majority of the studied sample was male in a study to assess Knowledge. This might be due to difference in a study place.

Regarding past medical history, the majority of studied sample had half of them had hypertension. This conclusion was corroborated by **Zekavat et al., (2021)** who concluded that increased blood pressure raises the risk of pneumonia and suggested that maintaining optimal blood pressure control, in addition to other interventions, may minimize the risk of pneumonia. Also in the same line with the study of **Tam & McHugh (2023)** who found that older persons hospitalized with community-acquired pneumonia (CAP) frequently have a history of hypertension.

Additionally **Mulugeta et al., (2023)** who conducted a study to identify the determinants of community-acquired pneumonia among adult patients

visiting Debre Berhan University Hospital in Ethiopia and reported that the common comorbidities were heart failure, chronic obstructive pulmonary disease and asthma hypertension, diabetes mellitus and a history of pulmonary tuberculosis.

This result could be explained as follows: Patients with pulmonary hypertension have damaged heart and lungs, making them more susceptible to the development of further lung illnesses such as pneumonia. To avoid pneumonia, patients are encouraged to have a pneumococcal pneumonia vaccine as well as yearly flu immunizations. Similarly, the majority of patients with severe and prolonged pneumonia develop pulmonary hypertension as a result of lung instability.

Regarding patient's information regarding pneumonia, the current study revealed that the majority of patients had unsatisfactory information level regarding pneumonia.

This result is consistent with **Alharbi et al., (2022)** who found that poor knowledge in most of the participants about pneumonia risk factors and the essential value of pneumonia vaccine.

Also in the same line with **Schafer et al., (2015)** who found knowledge gaps about pneumonia in older adults highlighting need for educational programs .

In addition to **Hong et al., (2024)** who found that general population had moderate knowledge .Also in the same line with **Dumyati et al., (2018)** who found poor knowledge about pneumonia among Algerian Hajj Pilgrims.

From the researcher's point of view, these results show the importance of nurses' role in educating patients about pneumonia, ensuring they understand the condition, its treatment, and preventive measures. Education begins with a comprehensive explanation of pneumonia, covering its causes, symptoms, and potential complications. Nurses should also clarify misconceptions and provide tailored information based on the patient's needs and understanding level. Nurses should also emphasize infection control measures, such as hand hygiene and cough etiquette, to prevent the spread of pneumonia to others.

Regarding Relation between socio-demographic data and knowledge among the studied sample, the current study revealed that there was statistical significance difference between educational level and level of knowledge at p-value (001), occupation and patient knowledge at p-value (010).This result is consistent with **Alharbi et al., (2022)** who concluded that the high education, male gender , young age, and being a health worker were significant factors that affect the Knowledge .Also in the same line with **Hong et al., (2024)** who concluded that high education and occupation were independent associated with the knowledge.

The relationship between educational level and patient knowledge is well-documented in healthcare research. Most studies have consistently shown that higher educational attainment is associated with greater health literacy and knowledge about diseases as supported with **Sarkar et al., (2022) & Orkin et al. (2020)** shown that higher educational attainment is associated with greater health literacy and knowledge about diseases.

### Conclusion

It was concluded that the information regarding pneumonia was poor and inadequate that need to be addressed and highlighting the need of educational intervention for these patients.

### Recommendations

- A tailored intervention program was designed and implement to increase the information about pneumonia.
- Future study was needed to identify and address pneumonia triggers.
- Application of the same study on a large sample in other geographic regions to ensure data generalizability.

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