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Management Of Pneumonia Among the Elderly

A systematic review

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DEGREE ABSTRACT

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Abstract

This research study explores the role of a nurse in the management and prevention of pneumonia among the elderly. Health Promotion Theory was adopted and used to guide data collection and analysis processes. And taking qualitative descriptive systematic review methodological stance, a total of ten (10) peer reviewed articles were reviewed. Content analysis tool was employed to do this analysis. The results of the analyses showed that, a nurse may support patients in managing and prevention pneumonia in the following ways. They are, (1) the support for fundamental needs, including, good oral care, nutritional needs and more, (2) Clinical guidance and support. This includes, nursing assessment and evaluation, and patient education. Lastly, (3) the immune function support. This involves pharmacological and aseptic supports. The study concludes that health promotion theory is consistent with the results of this study, as its principles, the process of supporting, encouraging or empowering individuals, community, and society do make a positive impact on their health and wellbeing were being felt in the result of this study. For this matter, the theory is relevant and must be used by nursing students, researchers, and academicians who what to make differences in people lives.

Language: English
Key Words: Pneumonia, Nursing intervention, Nursing care Management, Elderly, pneumonia complication, systematic Literature Review.

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1 Introduction

Pneumonia is one of the common infections in nursing home populaces with high rate of mortality and morbidity among the elderly in this population (Hoogendijk, Del Campo, Rolland, Demougeot, Gérard, & Vellas, 2016; Safdar, Dezfulian, Collard, & Saint, 2005). Studies have shown that, pneumonia mortality rate is very high in children under the age of five years and adults aged 75 and above than any other disease (Dadonaite & Roser, 2018; World Health Organization, 2014). In 2013, it was estimated pneumonia took the lives of over one million children around the world, most occurring in developing poor countries or settings (World Health Organization, 2014). Furthermore, it has been reported pneumonia accounts for about 13 – 48% of all infections in the nursing home setting (El Solh, Akinnusi, Alfarah, & Patel, 2009), having a death rate of 7.3% in the United States and Canada and 13.3% in the Latin America (Shin, Kim, Jeong, Jung, Lee, & Chung, 2018).

Over the years, several studies conducted on pneumonia in the nursing homes have focused on hospitalization and mortality as the main outcomes (Chan, Walter, Brazil, & Loeb, 2007; El-Solh & Drinka, 2010; Ewig, Klapdor, Pletz, Rohde, Schütte, & Schaberg, 2012; Polverino, Dambrava, Cillóniz, Balasso, Marcos, & Esquinas, et al., 2010). It is reported the fifth leading cause of mortality and the second cause of hospitalization among the elderly around the world, causing more than 600,000 hospitalizations yearly (Safdar, Dezfulian, Collard & Saint, 2005). In addition, it is the leading cause of hospitalization in children under five years and adults over the age of 65 worldwide (Faverio, Compagnoni, Della, Zoppa, Pesci, & Cantarutti, et al., 2020; WHO, 2021).

Pneumonia is an infection in the lower respiratory tract that leads to the inflammation of the lung parenchyma (Thiem, Heppner, & Pientka, 2011). Severe pneumonia in the elderly is caused by various risk factors such as age, chronic diseases, immunosuppressive therapy, institutionalization, lifestyle example, smoking, alcoholism, and environmental factors such as use of medications. The elderly is more vulnerable to pneumonia and can die easy from this than the younger people. The outcome of the disease is usually poor, and they can die very fast. Respiratory insufficiency is usually the main cause of pneumonia death (Mandell, Wunderink, Anzueto, Bartlett, Campbell, & Dean, et al., 2007; Kawai, Ochi, Nakagawa, & Goto, 2004).

The high rate of pneumonia mortality and morbidity among the elderly has become a public health concern and makes it current topic for discussion. Pneumonia mostly occurs

among the elderly above the ages of 65years due to their reduced immune systems and the multimorbidity. (Safdar, et al., 2005).

Management of pneumonia among the elderly was selected for this thesis due to its high mortality and morbidity rate and its high rate of hospitalization and complications associated with it.

2 Background

This chapter explains the meaning of pneumonia, highlights the causes, risk factors, Diagnoses, categories, complications, symptoms of the disease and managements to help in understanding of the disease pneumonia.

2.1 Pneumonia

According to World Health Organisation, pneumonia is a form of respiratory infectious disease that attacks the lungs. The alveoli are normally filled with fluid or pus leading to cough accompanying with phlegm, fever, chills, and difficulty with breathing (WHO, 2021). Moreover, pneumonia normally occurs when the immune system is not able to fight the causative organism, and as one ages, their immune system becomes weak therefore the elderly has high risk of getting pneumonia (Henig, & Kaye, 2017).

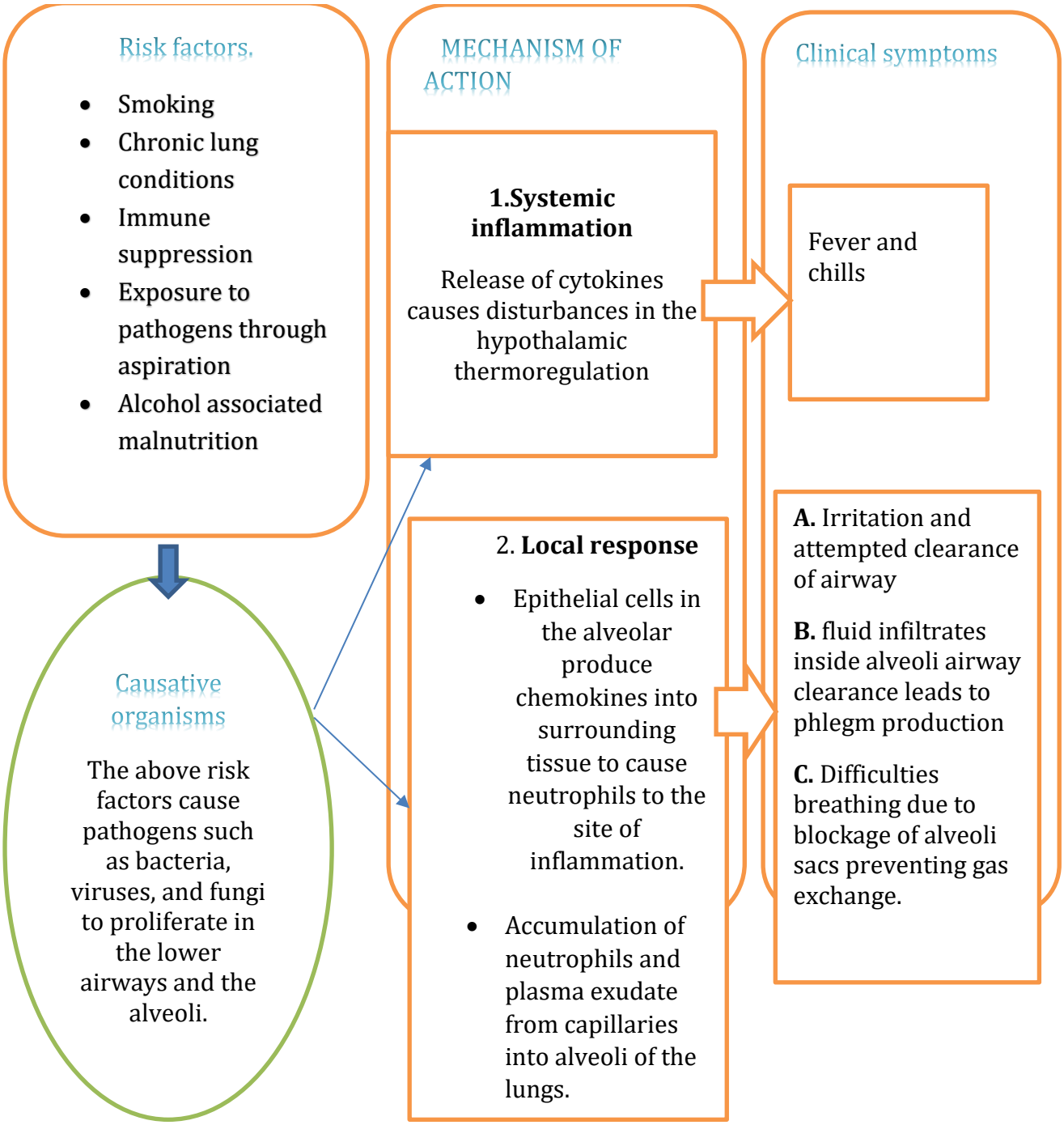
Furthermore, pneumonia is one of the deadly infectious diseases which claims lives of many adults over the ages 65 year and people with pre-existing health problems such as heart or lung disease, dementia around the globe is most risk of getting this disease (Dadonaite & Roser, 2018; World health organization, 2021). It is the leading cause of hospitalization and mortality among adults (Kaplan, Angus, Griffin, Clermont, Scott-Watson & Linde-Zwirble, 2002).

Also, pneumonia can be caused by three main organisms such as bacteria, virus, and fungi. To explain further**,** bacterial Pneumonia is caused by organisms which include Staphylococcus aureus, Haemophilus influenzae, Moraxella catarrhalis, Escherichia coli, and Klebsiella pneumoniae, and Methicillin resistant staphylococcus (MRSA) such as mycoplasma Pneumonia, Chlamydophila pneumonia which normally antibiotic resistant (Sattar, Sharma, & Headley, 2021).

Viral pneumonia is also caused by organisms such as respiratory syncytial virus, varicella pneumonia, influenza type A H3N2 or B Influenza virus normally causes pneumonia during the winter (Falsey, & Walsh, 2006). And fungal pneumonia which includes Pneumocystis carinii pneumonia can spread through different ways including droplets of fluid, cough, sneezing, through blood during childbirth when they contain the bacteria, virus, or fungi (WHO, 2021). Community acquired and nosocomial pneumonias are caused by fungi is very small and normally occurs in patients with immunosuppression. Another example of this fungi pneumonia includes pneumocystis pneumoniais which is caused by

pneumocystis. Curvularia lunata can also cause pneumonia but not very common (Dharmic, Nair, & Harish, 2015).

Figure 1 Pathophysiology and clinical symptoms of pneumonia



Source:(Vardhmaan, Rishik, Gizem, & Abhishek, 2022).

Understanding the pathogenesis of pneumonia, risk factors such as smoking, chronic lung disease, immunosuppression unveils the lungs to foreign pathogens through inhalation, aspiration, or contiguous mechanism. The foreign pathogens could be virus, bacteria, or fungi. When the resident organisms detect the foreign pathogens, they create an immune response to fight the foreign pathogens causing systemic or local inflammatory response such as fever, chills, accumulation of fluid in the alveoli and thickening of the alveoli walls. Irritation in the alveoli walls causes dry cough and, phlegm secretion is because of fluid infiltration. Difficulties in breathing is also because of blocked alveolar sacs by fluid accumulation (Vardhmaan, Rishik, Gizem, & Abhishek, 2022).

2.2 Risk factors

There are several risk factors of pneumonia, and these include, Smoking, alcohol consumption, environmental factors, institutionalization, and these are explained further below.

Smoking both current and previous smoker are at increased risk of pneumonia. As the world's population is increasing, the number of smokers who are over the 65 years and over is also increasing (Lugo, La, Boccia, Murisic, & Gallus, 2013). Frequent Smoking can lead to chronic obstructive pulmonary disease which is also another risk factor for community acquired pneumonia (Braeken, Rohde, Franssen, Driessen, van, Souverein, et al., 2017).

Alcohol consumption has 83% increase to the risk of community acquired pneumonia and can lead to long hospital stay (Bhatty, Pruett, Swiatlo, & Nanduri, 2011; Gili-Miner, López-Méndez, Béjar-Prado, Ramírez-Ramírez, Vilches-Arenas, & Sala-Turrens, 2015). Alcohol has a sedative property and taking too much alcohol can lower the oropharyngeal tone and then can lead to high risk of aspiration of microbes. Also, high consumption can change the alveolar macrophage work and may not be able to fight against infections as it normally thus. Moreover, as alcohol is often associated with malnutrition, it can lead to low immune system and can increase the risk of pneumonia (Mehta, & Guidot, 2012).

Environmental factors such as exposure to nitrogen dioxide has shown to be associated with elderly pneumonia (Neupane, Jerrett, Burnett, Marrie, Arain, & Loeb, 2010). The elderly people most often have many diseases at the same time that may need several drugs and some of these drugs include, immunosuppressive therapy, oral steroids, gastric acid suppressants, histamine 2 receptor antagonist, inhaled corticosteroids, antipsychotics and

several systematic review articles have shown that they have increased risk to pneumonia (Gau, Acharya, Khan, Heh, Mody, & Kao, 2010 ; Jackson, Neuzil, Yu, Benson, Barlow, & Adams, et al, 2003). Medications such as anticholinergics and antipsychotics has a great benefit, but when they are over abused can have bad effect especially on the elderly people. Example sedatives, anticholinergic, has shown to slow peristaltic movement leading to aspiration pneumonia (Trifirò, Gambassi, Sen, Caputi, Bagnardi, & Brea, et al, 2010). Furthermore, antipsychotics either typical or atypical which are usually used for the management of behavioural and psychological symptoms of dementia is a high risk for developing pneumonia due to their extrapyramidal effects (Huybrechts, Rothman, Silliman, Brookhart, & Schneeweiss, 2011).

2.3 Diagnosis

As part of the diagnoses for pneumonia, it is important to take the history of the patient, do physical examination, and observe for signs and symptoms such as cough, dyspnoea, pleural pain, sweating, aches, pain, tachypnoea, confusion, loss of appetite and abnormal temperature (Eshwara, Mukhopadhyay, & Rello, 2020).

Microbiological testing can be done based on the severity of the clinical symptoms. Example of microbial diagnostic testing include sputum gram's stain, culture in CABP, however, this test may be difficult to do in the elderly patient as they may not be able expectorate good quality sputum (Mandell, Wunderink, Anzueto, Bartlett, Campbell, & Dean, et al., 2007).

Invasive technique such as thoracocentesis, transthoracic needle aspiration of the infected lung site. Bronchoscopy protected specimen brush which is inserted to take sample from the lungs and bronchoalveolar lavage which is used to take fluid for laboratory examination can be used in severity state of pneumonia (Alikhan, Cohen, Combe, Samama, Desjardins, & Eldor, et al., 2004). Urinary Antigen test can be done to detect causative organisms such as streptococcus Pneumoniae and legionella Pneumophila (Eshwara, Mukhopadhyay, & Rello, 2020). C-reactive protein which is a kind of blood test used to find out the state of inflammation in the body is also a strong test to diagnose pneumonia (Halm, Horowitz, Silver, Fein, Dlugacz, & Hirsch, et al, 2004**).** Chest radiograph can be use in diagnoses of pneumonia in elderly but there come challenges with it due to poor film quality because of poor cognitive status, poor muscle strength and inability to maintain posture. Also, when a patient with chronic diseases such as chronic

obstructive pulmonary disease, malignancies, interstitial disease, lung diseases, chest radiograph may not be the right diagnostic tool, but a computed tomography scan can give a better result (Henig, & Kaye, 2017).

2.4 Prevention of pneumonia among elderly

Respiratory physiotherapy, one measure that could help patient to do deep breathing exercises and coordinated breathing to help prevent the risk of getting pneumonia. The assisted cough aids the patient to remove secretions from the airway. It was discovered that non-invasive ventilation and continuous positive airway pressure used before abdominal high-risk elective surgeries could minimize the risk of post-operative pulmonary complication example pneumonia and atelectasis (Millett, Quint, Smeeth, Daniel, & Thomas, 2013). Post-operative pulmonary complications and minimized period of stay at the hospital could be reduce if preoperative inspiratory muscle training in adults undergoing cardiac and major abdominal surgery is established (Katsura, Kuriyama, Takeshima, Fukuhara, & Furukawa, 2015). A study proved that pulmonary rehabilitation exercise started on the day after surgery reduced the incidence of pneumonia in elderly patients treated for hip fracture (Chang, Lai, Lu, Lin, Wang, & Lo, et al., 2018).

Furthermore, early rehabilitation could help reduce the length of stay at the hospital for elderly patients with aspiration pneumonia (Momosaki, Yasunaga, Matsui, Horiguchi, Fushimi, & Abo, 2015). Mobilization lowers the risk of complications in connection with bed rest (Castelino, Fiore, Niculiseanu, Landry, Augustin, & Feldman, 2016).

Moreover, considering good oral health as a prevention of pneumonia in the elderly, periodontal disease caused by Veillonella sp. and Porphyromonas gingivalis causes an increase in the mass and the destruction of the tissues surrounding the teeth (Mombelli, 2018). It is characterized by an inflammatory cascade. Frail patients with or without pneumonia were at risk of being infected with respiratory pathogens than health patient (Ortega, Sakwinska, Combremont, Berger, Sauser, & Parra, et al., 2015).

An age-related reduction in anaerobic infection increased the susceptibility to pneumonia. Bacterial load of oropharyngeal microbiota was increased in elderly pneumonia patients in comparison to elderly without pneumonia (De Steenhuijsen, Piters, Huijskens, EWyllie, Biesbroek, & Van et al., 2016).

2.5 Complications of pneumonia.

Pneumonia can interrupt normal gaseous exchange and may lead to respiratory failure due to the lungs being filled with fluid. Furthermore, bacteria that causes this disease can sometimes get into the blood and this can lead to septic shock and very low blood pressure. Moreover, build-up in the lungs can also lead to lung abscess (Restrepo, Faverio, & Anzueto, 2013).

Also, pneumonia can cause rehospitalization, thus within 30days after the first admission. Some of the contributing factors for readmission include gender thus males are mostly affected with pneumonia than women, chronic aspirin therapy, people with multiple chronic diseases, duration of stay during the first hospital admission and older age (Faverio, et al., 2020).

2.6 Categories of pneumonia

There are several classifications of pneumonia, and it is categorised upon how it is gotten, but this study discusses the three classifications of pneumonia according to American thoracic society which includes, community-acquired, hospital-acquired and aspiration pneumonia (Mackenzie, 2016; Vardhmaan, Rishik, Gizem, & Abhishek, 2022).

2.6.1 Community acquired pneumonia (CAP)

Community acquired pneumonia (CAP) is an infection of the lung parenchyma which causes inflammation and is develop outside the hospital. The high rate of CAP is due to antibiotic resistance, age, chronic disease. Multi- drug resistance bacteria have made it very difficult to treat CAP (Shen, Wang, Liu, Shi, Takahashi, & Wang, 2021).

When it comes to the number of patients who withstand community-acquired pneumonia, the dissimilarity is not exactly measured. A one year follow up research study on community-dwelling elderly who have or not community -acquired pneumonia was conducted to extract their health-related quality of living as much as health is concerned (Mangen, Huijts, Bonten &Wit, 2017).

There are economic constraints and appreciable ailments which are because of community -acquired pneumonia; in Netherlands, the CAP rate is about 295/100,000 residents having

about 50,000 incidents in every year with tolerable differences amidst the age groups, of which about 45% CAP incidence affect people less than 65 years (Rozenbaum, Mangen, Huijts, Werf, & Postma, 2015).

community acquired pneumonia is highly correlated to cardiovascular diseases like stroke after the patient has recovered, having influence on health associated wholesomeness of life (Eurich, Johnstone, Minhas-Sandhu, Marrie & Majumdar, 2012; Reyes, Martinez, Valles, Cases & Menendez, 2008).

Another research study by (Pillai, Sabnis, & Biswas, 2019) suggest that community acquired pneumonia in elderly can lead to diagnosis dalliance which eventually delays early antibiotic medication; this is due to the unusual clinical symptoms that differ from confusion to drastic respiratory affliction and the lenient variations of patient overall condition.

2.6.2 Hospital acquired pneumonia (HAP)

This type of pneumonia occurs at the hospital 48 – 72hours after being admitted to the hospital and often associated with ventilator associated pneumonia (VAP). HAP has a high morbidity and mortality rate, and this makes it a health concern. HAP is the second most common infection at the ICU. The epidemiology is about 3.1 to 18.6 cases per 1,000 hospital admission. Ventilator acquired pneumonia and nosocomial pneumonia are classified under HAP. It is usually caused by bacteria, and it can start as early as 4days after admission. Some risk factors for hospital acquired pneumonia include depressed consciousness, length of stay at the hospital, if one has got iv therapy within the past 90days or visiting the hospital for the past 3month, possible contact with multidrug-resistant pathogen, people with chronic diseases, neurological problems, people on enteral nutrition and intrahospital transportation. Some clinical symptoms of lower blood haemoglobin, neutropenia, and immature white blood cell (Siempos, 2013).

Hospital acquired pneumonia is usually deadly with the elderly people. The main room for infection is the mouth and it is caused by staphylococcus aureus. Mouth hygiene care help in HAP prevention. The study association among preceding and HAP on oral carriage of potential respiratory microbes and heavy dental plaques in the elderly who has fractures of the lower limb to show the aim for care plan studies; they used a time sequence of tongue swabs in the general hospital from 90 limb fracture patients with ages 65-101 in the

Northeast of England around April 2009 to July 2010 (Ewan, Sails, Walls, Rushton, & Newton, 2015).

According to Krumholz (2013), the chance of rehospitalization and death are very high in the instantly post-released era and decreases in time. The timing of risk and the extent differ over the diagnoses on readmission thinking that getting out from the HAP and frangibility prior to discharge vary by physiologic structure. The after-hospital syndrome defines a phase of provisional, over-all risk that come prior hospital release.

2.6.3 Aspirative pneumonia

Aspiration pneumonia is a higher form of community -acquired and hospital acquired pneumonia. It is the leading cause of death among the elderly. This occurs in the elderly with pre-existing diseases. Risk factors of aspiration pneumonia is multifactorial, and it include, sputum suctioning, impaired swallowing function, dehydration, dementia, abnormal cough reflex, host immune defence, sleeping drugs and pathological factors (Manabe, Teramoto, Tamiya, Okochi, & Hizawa, 2015; Marik, 2001). A study conducted by (Manabe et al., 2015), reported that, lower BMI, lower C-reactive protein, a lower ratio of homestay before hospitalization, a higher complication rate of cerebrovascular disease, dementia, and neuromuscular disease were risk factor for aspirated pneumonia.

2.7 Management of pneumonia among the elderly

Antimicrobials can be the most common therapy given to people facing community infected pneumonia at any given society over specific period (Yoshikawa, & Marrie, 2000). Before any treatment it is important to assess the patient to find out if the patient will be treated as inpatient or outpatient (Ayede, Karolos, Fowobaje, Williams, Bakare, & Oyewole, et al., 2018).

Again, non-antibiotics measures may be also put in place to treat people living with pneumonia, especially among elderly patients in any given society over a period. (Tupka, Mortensen, Anzueto, & Restrepo 2009; Kaysin, & Viera, 2016).

The following additional management treatments, including, fluids, rest, oxygen therapy, and the used of the heat and humidity treatment are means to manage pneumonia among aged adults suffering with the pneumonia disease (World Health Organisation, 2021; Kaysin, & Viera, 2016; Healthline, 2022).

2.7.1 Pharmacological treatment

Bacteria caused pneumonia among elderly in any given geographical location over a given period can be treated by using antibiotics depending on the severity of the case of the individual (Yoshikawa, & Marrie 2000; Healthline, 2022).

The type of antibiotics used depends on the nature of bacteria which causes this disease (Kaysin, & Viera, 2016). The antibiotics recommended by physicians include one or two of the following drugs, such as: macrolides, beta lactams and fluoroquinolones (Healthline, 2022).

Aminopenicillin such as amoxicillin can be used with a B-lactamase inhibitor. Monotherapy with macrolides can be used but should be used with caution because of macrolide resistance. In severe pneumonia, broad-spectrum cephalosporin, macrolides, and fluoroquinolones can be used (Thiem, Heppner, & Pientka, 2011).

However, virus caused pneumonia cannot be treated or cured with these above-mentioned drugs and health professionals should take note of this precaution, viral pneumonia normally resolves on it on. (Kaysin, & Viera, 2016).

2.7.2 Non-Pharmacological treatment

Regular fluid intake has been recommended by health practitioners as means to manage and control pneumonia cases among the elderly (World Health Organization, 2021). This is true because, it is important for aged adults suffering from pneumonia to take adequate fluid such as water regularly to help body movements and blood circulation (Kaysin, & Viera, 2016).

According to international health line that collates tropical peer reviewed articles from renewed scholars within health profession has established that regular water intake of persons living with pneumonia helps improve their body temperatures, transport food nutrients into the blood streams, lubricant the body joints and finally supports blood circulation of such victims (Healthline, 2022). This means that, the body cannot perform its normally duties effectively if an aged pneumonia patient is dehydrated and therefore, fluid

intake has been recommended as an alternative to manage an aged adults with pneumonia (Kaysin, & Viera, 2016).

Adequate rest, especially sleeping helps the body to react against infections. Therefore, it recommended that adults aged suffering from pneumonia must have enough sleep not less than eight hours a day for the body to respond to infections and repair the worn-out tissues of the body (World Health Organization, 2021).

More so, an oxygen therapy may be used on hospitalized adult patients with pneumonia for the patients to have enough oxygen needed for the body to respond to infections associated by pneumonia and its complications (Healthline, 2022).

Finally, warm beverages may be given to elderly patients with pneumonia to help them to loosen mucus in their throat and chest. These measures act lubrications to the body as well as help prevent dehydration of the body (Tupka, Mortensen, Anzueto, & Restrepo 2009; Kaysin, & Viera, 2016).

3 The aim of the study

The aim of this study is to attain better knowledge in the care management and prevention of pneumonia with the elderly and to explore the importance of using holistic approach in the nursing care management.

Research question

- What are the nurse's roles in management and prevention of pneumonia among the elderly?

4 Theoretical Framwork

This section highlights the theoretical understanding of this study. It highlights importance of using a theory or theories in research.

Theory provides the basic skills and knowledge for researchers, professionals, academicians, and students about the need to dig deep in a phenomenon beyond perceptions to establish the cause, and the effect of relationships. Theory assesses health behaviours of individual or a person and prescribes interventions that is based on behaviour understanding. Again, a theory serves as a web map to understand a particular situation, through analysis, proposes ways and interventions to address such a phenomenon and its success in each community (Alligood, 2010).

Creswell (2018) describes theory as evidence-based principles or set of ideas intend to explain a particular problem or a phenomenon in each society over a period. It may predict future developments, through experiments, which are scientifically verifiable (Creswell, 2018). Graner, Wagner and Kawulick (2009), establishes that theories are general principles and ideas about a subject and, an opinion that a person or group of persons hold or think as true (Collins, & Stockton, 2018). These set of principles or ideas are important in nursing research.

Pender's health promotion model establishes that a person or group of persons sociocultural environment, skills, knowledge, and experience has or have something to do with his or her action in the society (Pender, 2021). Galloway (2003) noted that health promotion involves process of supporting, encouraging or empowering individuals, community, and society at large to make a positive lifestyle change that will enhance their health and wellbeing within a particular area. As such, interactions play important role between an individual and his or her immediate surroundings during a behavioural change and processes. The understanding here is to support an individual, community, and society to adopt life choices that in effect will go a long way to improve their health outcomes (Pender, 2021).

Many scholars have classified Pender Health Promotion theory in many ways depending on the understanding of the individual. However, the common themes that run through most of the literatures, including, Health Belief Model, Health Promotion Model,

Transtheoretical model, Reason Action Model and finally Diffusion Model. Reading through all these models and aligning them to my research question, “the role of nurses in managing and prevention of pneumonia among the elderly” and my research topic “management of pneumonia among the elderly,” then Health Promotion Model could help answer my research question.

This model establishes that a person or group of person prior experience have impact on their action in the society. One, surroundings, sociocultural backgrounds, past and present experiences, skills, and knowledge may predict a person’s actions or behaviour in the community. Therefore, if nurses are knowledgeable with better roles that, they can play in managing pneumonia in the elderly, then pneumonia mortality, morbidity and their socio-economic effects will be reduced or prevented.

According to Alligood (2010), Pender’s health promotion theory makes it clear that, before there could be achievement of high liability in health practice then we need the help of nursing profession by using evidence-based practices. Health promotion is inspired by the aim to boost the health and to carry into effect human ability. (Alligood, 2010)

For example, an individual’s ability to lose weight but found himself or herself-eating a lot of calories diet or a high fat meal available will be more challenging.

For this reason, the situation requires interpersonal support from the family, community, and the society at large. This requires interpersonal communication and expectations, experience from others. For example, some advice from a health practitioner, family members, counsellors, peers may help a chain smoker to minimize smoking or quit smoking and finally, demographic features of an individual or group of persons have impact on his or action. Such features include, age, income, ethnic and racial, education background and may have effect on their actions. For example, when one income increases, there is likelihood to engage in preventive health care within a particular area over a period. (Pender, 2021)

5 Method

Research method involves the forms of data collection, analysis, and interpretation of results (Creswell, 2009). Data collection and organization of the method is done in this chapter.

5.1 Research design

This research is a qualitative one that, employs systematic review approach to gather data to address the main research question above.

For this reason, this study is qualitative research which seeks to understand and gives meaning to people personal experiences, opinions, ideas, values, interactions within a particular geographical context to explain a phenomenon at a period (Creswell, 2009).

As such, the author seeks to understand measures nurses put in place to manage and prevent pneumonia among the elderly. Various existing literatures on the research topic above were used to understand this phenomenon.

5.2 Systematic review

A systematic review research tool was employed and used to solicit data to answer the research questions above. A systematic review research approach is one that, the researcher formulates research questions and uses systematic ways to identify, select, and critically evaluate all relevant research, that is to collect and analysis data from the previous studies that are of importance to the researcher to review (Curtin University, 2022; Tawfik, Mohamed, Huy, Dila, Ahmed, & Tam, et al., 2019).

Yin (2010) describes systematic review in research as the one that, the researcher uses thorough and vivid investigation of all available existing evidence in literature to justify or to tell a story on a given topic over a period.

For Creswell, systematic review summarises all available evidence using existing literatures to address a particular research question on a particular topic for better understanding of the case understudy. (Creswell, 2009).

To choose the best suited review in qualitative research, the researcher must know the advantage and disadvantage of each one of the research tools he or she is using or operating in (Creswell, 2009).

Therefore, systematic review which is the research tool for this study has been credited as compressive (Creswell, 2009), reproducible and precise in stating the research results or outcomes for the understanding of readers (Yin, 2010).

This research tool in considered compressive because it involves a vivid search of all available material evidence including artefacts to address a topic of interest over a period and location (Creswell, 2009), It considers all available set of evidence in synthesizing the result outcomes. These robust approaches and process make this research tool credible in research study (Yin, 2010).

Reliable and accurate results. This method is considered reliable because of its transparency, accuracy, and replication in establishing the results outcomes (Creswell, 2009), The transparency nature of this approach reduces risk of biases that might come from the researcher (Yin, 2010). The researcher addresses specific question of interest of the study and the review is predefined to the last details of information to produce result outcomes (Creswell, 2009).

The data gathering approach is credited as reproducible. This so because each stage of the review is predetermined, made publicly opened and published (Yin, 2010). This degree of duplicability helps in establishing a high level of confidence in the review to products result outcomes of research study (Creswell, 2009).

On the other hand, this approach has been considered as time consuming in producing research outcomes, research biases if the method did not utilise the research instrument well (Yin, 2010).

In conclusion, systematic review research method has been established as compressive (Creswell, 2009), reproducible and precise in stating the research results or outcomes (Yin, 2010). Despite time consuming nature of the entire process in establishing results outcomes of the study (Yin, 2010).

5.3 Data collection

This part discusses the selection criteria of the articles adopted and used for data analysis in this research study. Peer reviewed articles were identified and used for this study. Those articles answer the main research questions above that was they used for this piece of research study. The articles were obtained from the EBSCO academic elites, CINHAL, and google scholar data bases.

The articles used were from the period between 2017- 2022. The articles selected were scientific article related to this study, had keywords such as pneumonia, nursing care or interventions, pneumonia prevention, elderly, hospital acquired pneumonia, aspiration pneumonia, community acquired pneumonia, pneumonia complication. The abstract of the initial search hit was read and peer reviewed articles which are relevant to the study was selected.

See the table below for the inclusion criteria for selecting the articles

Table 1 Inclusion criteria of the selected articles

Scientific peer reviewed articles that were available in English	Articles were linked to the aim of the thesis	Full text of the articles available	Must be a Qualitative or quantitative study articles	Must be in between 2017 – 2022

Furthermore, the table gives explanations on how some articles were rejected in the selection process. The rejection criteria or exclusion steps of the articles during the searching process.

Table 2 Exclusion criteria of the articles

The articles not in English language	The articles were not Systematic review once	The articles were not linked to the aim of the study	The articles do not have full text available	The articles were Non-scientific once	The articles were not peer reviewed	The articles were before year 2017	The articles were duplicate once

The table below contains the data bases sources where some articles were selected for analyses. It highlights the keywords used in search of the articles, the number of Hits to the articles and finally, the articles selected for analyses because of their relevance to the main research question.

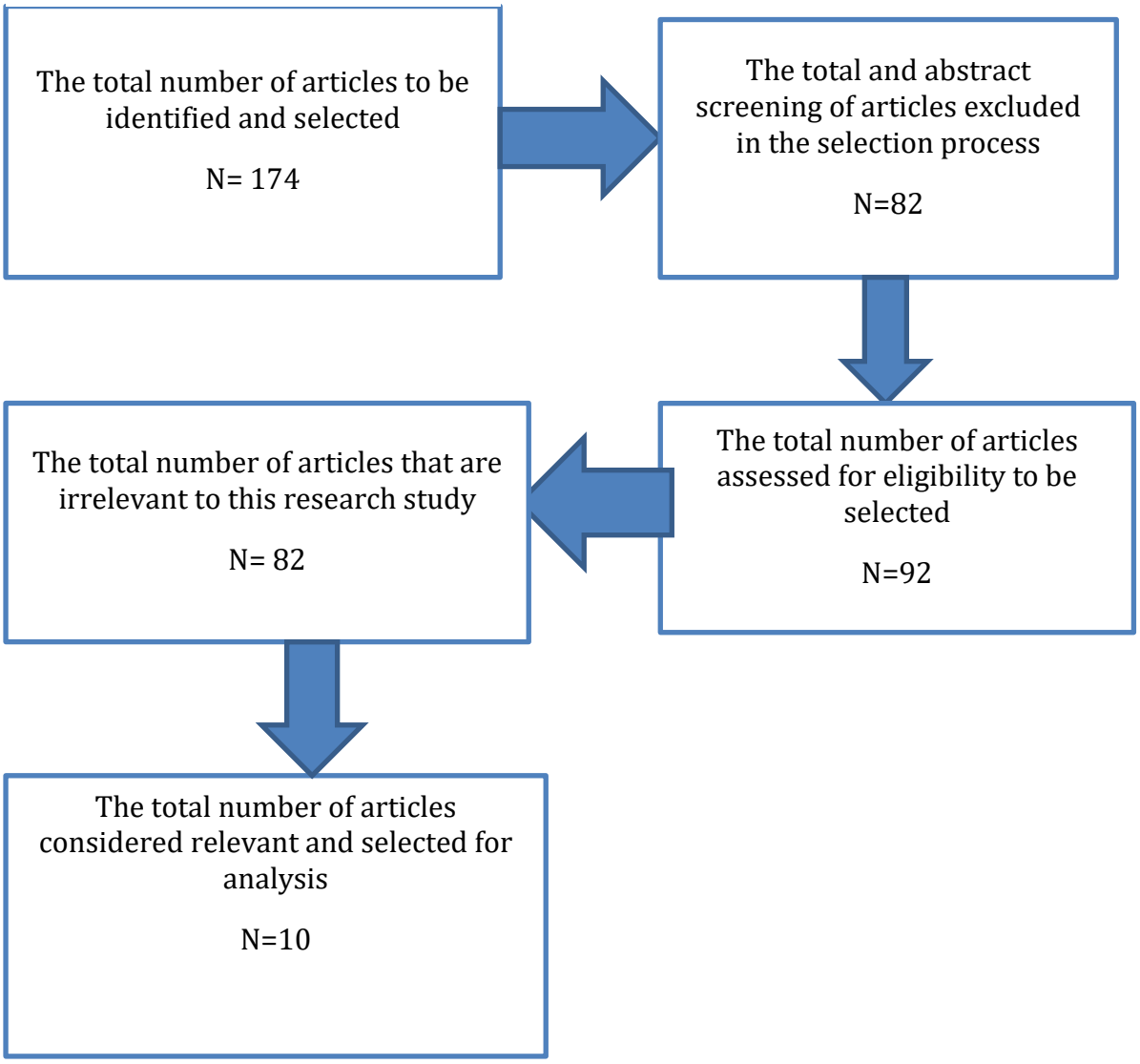
Table 3 Sources of articles selected and their total numbers

Source of articles	Keywords	Hits	Articles screened by topic	Articles read by abstract	Articles rejected	Articles selected
EBSCO Academic search Elite	Pneumonia, nursing role, prevention, elderly, geriatric, older adult.	1,111	50	32	46	4
Google Scholar	Pneumonia, elderly, management Nursing intervention.	17600	40	20	38	2
CINHAL	Pneumonia, Management, prevention Elderly, older, aged, geriatrics	1279	60	30	57	3
Ebsco Academic search Elite	Pneumonia, nursing intervention, strategies, best practices elderly or aged or older or geriatric	24	24	10	23	1
TOTAL		20,014	174	92	164	10

See Appendix 1, for the authors, aim, method and results of the ten (10) articles relevant to my research question.

See the figure below for the practical steps adopted and used to select the relevant articles that satisfy the research questions and analysed to understand the role of a nurse in management and prevention of pneumonia among the elderly.

Figure 2 Article selection flow chart



5.4 Content analysis

Qualitative content analysis involves the process of putting together data, making the hidden data's visible, structuring, and attributing consequences to precursors. The content analysis helps to verify and process the literature, make correction, modification, suggestion, and defence. Content Analysis involves step by step process of summarizing a large data to a meaningful content. Qualitative analysis involves first, organization of data, data is then converted to simpler units that can easily be retrieved and reviewed (Polit & Beck, 2010)

Hseih and Shannon, (2005) indicate the three main approaches to content analyses. They are Conventional, directed, and summative. Conventional content analysis first done by coding, sorting and categorization of text data. Also, the directed content analysis starts with a theoretical idea as basis for initial codes, sorting and categorization and lastly, summative approach involves counting and comparing and finally, the analysis of the core context (Hseih & Shannon, 2005).

This study aims to analysis peer reviewed articles that answers the research questions and met the aim of this study. Meaningful content was also extracted from the articles.

Practical steps adopted to analyses content of the articles

- First, the abstract results, conclusions, and the content of the ten articles that satisfy my research questions were read.
- Second, a table was created and the abstract, results, some conclusion and content of the articles that answered my research questions were copied and pasted on the tables (please see appendix 2).
- Third, the researcher read the extracts from the article pasted on the table carefully and assigned codes to each of the concept or an idea in each of the extracts (please see appendix 2).
- The researcher grouped the coded concepts from the extracts by putting the like and unlike concepts and ideas together.
- The researcher further reduced the grouping to get three main categories and seven sub- categories that address the research topic of the study.

The content analysis helps to understand how the 10 articles for the study were extracted (please see figure 2), and analysis to answer the research question and the aim of this study.

5.5 Ethical consideration

This section discusses the ethical issues to make this piece of study free from the research own biases to contribute to the academic body of knowledge.

Nursing research involves human beings and is therefore important that researchers ensure that ethical principles or guidelines are applied, there are three main ethical principle from Belmont Report that serves as guidelines in nursing research, and these are beneficence, human dignity, and Justice. Furthermore, to elaborate more on these guidelines, it is important to ensure that, there is less harm and more benefits to the participants, this principle of beneficence is mostly used in qualitative study which seeks to go details into participants' personal matter. it is also obligatory for the researcher to hide the identity of participants and the participants have the right to partake or decline to request. However, whether a participant accept or decline to a request, they have the right to be treated fairly (Polit &Beck,2017, p.118 - 130).

Also, it is the responsibility of the researcher to ensure participant understand what they are about to participate in, has been given enough time to think about the decision and has voluntary agreed to be a participant. Vulnerable people such as prisoners, children, the disabled, pregnant women maybe involved in a study and it is the responsibility of the researcher to protect these people (Polit & Beck,2017, p.131 -132).

Conducting risk-benefits assessment as another ethical guideline ensures that the choose of a particular topic has more probability to promote patient care and this should be the first thing to do when about to conduct research. Plagiarism or false data is considered as a research misconduct and therefore should be avoided (Polit & Beck,2017, p.134).

6 Results

Ten articles which seeks to answer the research question the role of nurses in the management and prevention of pneumonia in elderly patients, were selected for the analysis. The articles selected for the review were from 2017 to 2022. Details of the ten articles can be found in Appendix 1.

Three main categories resulted from the Analysis which are, Support for fundamental needs, clinical guidelines, and immune support function. See Appendix 2 for more details.

Table 4 Main categories and subcategories

Category	Subcategory
Support for fundamental needs	• oral management • Nutritional support • Early mobilization
Clinical guidelines	• nursing assessment • patient education
Improved immune function	• Pharmacological support, and other treatments • Aseptic techniques

6.1 Support for fundamental Needs

In Analysing the 10 articles, oral hygiene immerged almost throughout the whole article which show how important it is in preventing pneumonia. To ensure good management of pneumonia nurses needs to ensure good nutrition to help in early recovery. Good oral care in one way or the other is associated with oral intake, as poor oral hygiene can cause swallowing problems which may results into aspiration pneumonia as well as poor nutrition. Poor oral hygiene can cause a lot of microorganisms in the mouth and can move to the trachea and the lungs leading to pulmonary infection (Huffnagle, Dickson, & Lukacs 2017).

6.1.1 Oral management

Oral management is the management of oral function, oral care, and the treatment of the oral cavity (Yoshimi, Nakagawa, Momosaki, Yoshimi, Nakane, & Tohara, 2021). Pneumonia prevalence is lower in nursing homes residents who have good oral hygiene than those who do not. Moreover, good oral hygiene helps to reduce pneumonia hospitalization and poor oral hygiene can lead to sarcopenia, malnutrition, and reduce activity of daily living. It is therefore essential to carry out oral management to help with swallowing function, nutritional status, and general condition (Azzolino, Passarelli, De Angelis, Piccirillo, D'Addona, & Cesari, 2019).

"Oral management at the hospital, do not only enhance oral hygiene but has good medical effect on the patient. Furthermore, to establish safe oral intake for inpatients, evaluation of the general condition and swallowing function, "oral management," appropriate oral evaluation, and nutritional management are indispensable" (Yoshimi, Nakagawa, Momosaki, Yoshimi, Nakane, & Tohara, 2021).

Oral management is good not only for the elderly who take food orally but also for the elderly with other means of feeding. For example, parental route feeding. Furthermore, oral motor exercise promotes saliva flow and helps with good oral intake (Wu, Xu, Wang, Ku, Chan, & Lee, et al., 2019).

Also, to prevent postoperative pneumonia, it is important to ensure preoperative oral hygiene as poor oral hygiene can cause aspiration of the causative organism in the saliva (Soutome, Hasegawa, Yamguchi, Aoki, Kanamura, & Mukai, et al., 2020).

6.1.2 Early rehabilitation

Elderly patients with Pneumonia at the hospital often has reduced activity of daily living *(ADL).* It is therefore important for nurses to ensure early mobilization to prevent pneumonia in the elderly. Early mobilization or rehabilitation helps the elderly to gain independence, prevent disability and long hospital stay (Loyd, Markland, Zhang, Fowler, Harper, & Wright, et al., 2020).

*"Early mobilization and postoperative pulmonary exercises are recommended non-pharmacological interventions for the prevention of postoperative pneumonia" (*Geerds, Folbert, Visschedijk, Klunder, Vollenbroek-Hutten, & Hegeman, 2022).

*"An exercise program that seeks to prevent additional decrease and aiding in rehabilitation process was initiated. Immobility patients with weak physical ability and poor cognition should be granted a higher consideration by health workers in time of admission" (*Woo, Aoki, Kataoka, Yamashita, Yoshitake, & Morishita, et. al, 2021).

Activities such as deep breathing exercise, breathing exercise, physical therapy and pulmonary muscle stretching helps in early rehabilitation after post operation *(*Woo, Aoki, Kataoka, Yamashita, Yoshitake, & Morishita, et. al, 2021).

6.1.3 Nutritional support

To prevent malnutrition, which is very common in elderly patients with pneumonia, it is important to make nutritional diet plan for patients who are unable to eat on their own (Fan, Chu, Jiang, & Du, 2021). Nutritional assessment tools such as Nutritional risk screening tool 2002 (NRS), can be used to assess patients' nutritional status to know appropriate intervention to prevent malnutrition. Feeding methods other than oral feeding, example, Nasojejunal enteral nutrition, parental nutrition can also help to prevent malnutrition (Du, Zhao, Yin, Liu, Cui, & Zhang, 2021).

*"One risk factor that can be prevented at the ward is malnutrition. This has been shown to increase incidence of hospital acquire pneumonia and can be monitored and prevented with early involvement of dietitians" (*Wilkinson, Singal, & Ramadan, 2021).

"The nutritional status of patients was assessed using Nutritional Risk Screening 2002 (NRS2002). Nasojejunal enteral nutrition (EN) was used for patients undergoing invasive ventilation, to protect the gastrointestinal system" (Bai, Yang, Shi, & Huang, 2022).

Furthermore, bedhead angles should be raised during feeding, proper use of adult feeding cups to drinking straws; and helping patients out of bed for meals helps to prevent aspiration of food and microorganisms (Bai, Yang, Shi, & Huang, 2022).

*"Therefore, dysphagia screening and interventions such as maintaining an upright sitting position while eating might be an interesting addition to the postoperative pneumonia prevention protocol" (*Geerds, Folbert, Visschedijk, Klunder, Vollenbroek-Hutten, & Hegeman, 2022).

6.2 Clinical Guidelines

This category explains the nursing assessments, the nursing care, to prevent pneumonia from occurring, and the education to help prevent and manage pneumonia. In other to manage pneumonia, it is the responsibility of nurses to implement daily medication orders, to ensure good treatment and assessment (Huang, Lu, Pang, Zhang, Su & Ding, 2021).

6.2.1 Nursing assessment and evaluation

Nursing assessments including temperature, pulse Spo2, blood pressure serves as a basic measurement which is used as a base line for treatment. It is important to maintain a pipeline such as aseptic wound dressing, ensuring patient has free bowel motion and good documentation of all these assessments to ensure continuity of care. Prevention of ventilated associated pneumonia is effective by ensuring good air bag management, maintaining aseptic technique with the use of cannulas. To prevent the build-up of secretion and sputum, cannula which has subglottic suction function can be used to prevent bacteria invasion and therefore preventing pneumonia (Bai, Yang, Shi, & Huang, 2022).

"Electrocardiograph (ECG) and pulse oxygen monitoring were performed to maintain continuous low flow oxygen inhalation. Mechanical ventilation was used for patients with blood oxygen saturation" (Bai, Yang, Shi, & Huang, 2022).

After caring for patients with all these interventions, it is also very important to get feedback from patients in other to ensure quality care is being rendered (Bai, Yang, Shi, & Huang, 2022).

"The study found that the scores of nursing satisfaction in terms of service attitude, health education, psychological intervention, medical environment, and professional ability were significantly higher" (Bai, Yang, Shi, & Huang, 2022).

It is therefore the responsibility of nurses to ensure good and safe treatment, ensuring application of medical orders and various assessment for the management and prevention of pneumonia (Huang, Lu, Pang, Zhang, Su & Ding, 2021).

6.2.2 Patient education

Nurses counselling patients on pneumonia risk factors, causes, will help to create awareness about pneumonia. Furthermore, educating patients family on the need for mobilization and keeping a clean environment can help with early recovery from pneumonia (Bai, Yang, Shi, & Huang, 2022).

"Patients' negative feelings were easily alleviated through nursing education, and this influence their consent treatment. Apart from patient's basic information learned by the nurses, severe pneumonia education and publicity were built up in the nursing process." (Bai, Yang, Shi, & Huang, 2022).

Leaflet on the causes, risk factors, prevention and management of pneumonia can be handed over to patient and their family as part of preventing pneumonia among the elderly. Educating patient on pneumonia can also help patients to be cooperative with cares. Moreover, patients' mental health should also be taken into consideration by counselling patients and families and addressing any negative feelings that could have bad effect on their treatment journey (Bai, Yang, Shi, & Huang, 2022).

6.3 Improved immune function

The use of appropriate antibiotic use, fluid therapy, oxygen therapy and good aseptic technique by nurses can boost the immune function of the elderly with pneumonia.

6.3.1 Pharmacological and other supports

One treatment or management of pneumonia is the use of appropriate antibiotics such as fluoroquinolone, penicillin combination, cephalosporin, tetracycline, and macrolide. Other treatment for managing pneumonia include the use of bronchodilators, corticosteroids, fluid therapy and oxygen supplementation (Carnahan, Shearn, Lieb, & Unroe, 2021).

"Antibiotics were used to treat all pneumonia incidences and fluoroquinolone (53.7%) was largely used more than any other antibiotic in pneumonia treatment. The period of antibiotic administration was greater than 7 days in 39.0% of cases reviewed" (Carnahan, Shearn, Lieb, & Unroe, 2021).

Antibiotic is very helpful in the treatment of bacterial pneumonia but at the same time, caution should be taken to prevent antibiotic resistances, therefore it should be used in accordance with evidence-based guidelines. Also, Oxygen therapy can be very helpful for patients with breathing difficulties, and it should also be administered according to doctor's prescription. Moreover, fluid therapy is very helpful for patients who are not able to eat, but then should be given according to doctor's order and patients laboratory results (Eekholm, Ahlström, Kristensson, & Lindhardt, 2020).

6.3.2 Aseptic techniques

Aseptic technique such as sterilizing the skin before catheterization of a ventilator tube, disinfecting Cather joint, disinfecting surfaces, and ensuring good ventilation help in the management and prevention of elderly pneumonia *(*Fan, Chu, Jiang, & Du, 2021).

*"The ventilator pipes were replaced, and the ventilators were cleaned in time to avoid cross infection; the threaded pipe of the ventilator was changed every week, the condensed water in the respiratory pipe was cleaned in time" (*Fan, Chu, Jiang, & Du, 2021).

When central venous catheter is in use, it is important that nurses ensure good sterile field to prevent infection. Measures such as sterilizing the skin before catheterization, changing venous catheters within seven days, and changing also the internal jugular vein and

subclavian vein catheterization within 3weeks should be adopted in other to prevent microorganism invasion (Bai, Yang, Shi, & Huang, 2022).

"There is often changing of dressing and catheter joint sterilization by nurses. Evidence suggests that gauze dressings should be changed within 2 days and transparent dressings within 5-7 days" (Bai, Yang, Shi, & Huang, 2022).

All in all, it is the responsibility of nurses to ensure sterile and safe environment in other to prevent cross infection, considering, also patients' good environmental ventilation (Bai, Yang, Shi, & Huang, 2022).

7 Discussion

This section reports method used, the credibility, dependability, and transferability issues of this study. Lastly, it highlights and discusses results findings as well as theoretical understanding.

7.1 Discussion of method

Creswell (2009) points out that discussion section delves into the important meanings, constructs, ideas of the results of a particular study period. Furthermore, it evaluates and explains what the researcher finds as well as compares them to the existing literature reviewed. Relating this to existing literature helps the researcher make a sound argument in support of the overall results (Creswell, 2009).

The aim of this study is to attain better knowledge in the care management and prevention of elderly patients with pneumonia and, to explore the importance of using holistic approach in the nursing care management.

Based on the ten (10) peers reviewed articles which were selected and analysed, three main categories emerged from these analyses, and they are, fundamental needs support, Clinical guidelines and improved immune function.

Throughout the stages of this thesis, the credibility, dependability, and transferability issues which are important ethical considerations were adhered to and the following were practical steps adopted and used to ensure the trustworthiness of this study.

Patton (2001) reports that credibility in research deals with confidence issues which includes, trustworthiness in literature review, data gathering and reporting of findings and interpretation in research (Patton, 2001). This is to enhance the believability of data over time and condition (Creswell, 2009). Yin (2010) also highlights that credibility of research demonstrates the researcher understanding of the method used. That is how the researcher demonstrates his knowledge and experience in data collection and analyses.

Dependability in research shows a clear and vivid and sequential analyses and descriptions of research data (Patton, 2001). Under this, description is done in such a way that, another researcher who might be interested in this research could further repeat the same methods, and get same results or similar results (Yin, 2010).

Lastly, transferability simple demonstrates fairly representation of the data and its credibility including relevance and connection of the articles selected for analysis to the topic understudy (Patton, 2001). It involves showing the important linkage of the data collected and the data instrument used for collection, and its repeatability using the same set of data. (Creswell, 2009).

On this note, credibility, dependability, and transferability issues were delt in this piece of study in the following ways. First, the researcher searched and selected all articles from recognized academic data bases such as CINHAL, Elite Academic search and Google Scholar. Again, all the ten (10) articles selected and used for analyses were peer reviewed articles. As such, because of these processes adopted, and followed during the entire stages of this study, makes this research study credible, dependable, and transferable.

However, despite the numerous positive impacts of this study to the nursing profession and academia, the study has some form of limitations. These include.

- The small number of articles considered and used for analyses. That is the ten (10) articles which were considered relevant and used for analyses and present the findings. The researcher recommends that an individual who wants to extend this research use analyses more articles in future.

- Finally, Microsoft software was used for analyses especially coding, categorization and arriving the themes. These processes were time consuming, and I recommend to the future researcher who wants to extend this study to use an NIVO software to safe time.

In view of the above limitations, it did not affect the analyses in any negative way because of the availability of these support systems. These include ethical guidance according to Polit and Becks (2017) and Novia University of Applied Science thesis writing guidelines, and finally, my supervisors ‘guidance, support, and checks.

7.2 Discussion of results

Pneumonia associated with the elderly has been attributed as one of the leading causes of infection related deaths in the world according to the study conducted by the World Health Organization (WHO, 2021). For this point of view, it has been established that several factors for acquiring pneumonia disease at old age include alcoholism, smoking and many others (Schmidt-Ioanas, & Lode, 2006).

The role of a nurse is very crucial in management and prevention of pneumonia among elderly. For this motive, it emerged from almost all the ten articles that, the frail elderly patients who have declined in doing their basic needs such as, oral hygiene, having a good nutrition and exercise may need the help of a nurse to be able to fulfil these needs. For this reason, in preventing and management of pneumonia, these fundamental needs cannot be eliminated (El-Solh, Niederman, & Drinka, 2010).

Poor oral hygiene creates room for the growth of microorganisms such as, streptococcus pneumonae to grow in the mouth thereby causing aspiration pneumonia. It is therefore important that nurses help dependant elderly patient after each meal as recommended to maintain a good oral hygiene (El-Solh, Niederman, & Drinka, 2010). For example, artificial teeth should be taken from the mouth at night-time as it serves as a medium for bacterial breeding (Müller, 2015).

Furthermore, the elderly patients with pneumonia are at high risk of developing malnutrition, as they may lack the ability to eat by themselves (Tang, Shao, Chen, Zhu, He, & Lu, 2021). Therefore, the result showed that another role of a nurse is to assess and provide the recommended nutrition for the elderly, as good nutrition can help to boost the immune function, improve physiological function, and help in the good prognosis of the disease outcome, as malnutrition can prolong infection and have bad effect on pulmonary function (Müller, 2015). The elderly who cannot feed orally can also be assisted by other means such as enteral and parental feeding (Tang, Shao, Chen, Zhu, He, & Lu, 2021).

Moreover, pneumonia is associated with decline in activity of daily living in elderly patients and inactivity leads to long hospital to stay, high mortality and morbidity rate among the elderly. Early rehabilitation is very important to prevent disabilities in the elderly. Therefore, it is the responsibility of nurses to make daily activity plan for pneumonia patient or the elderly to promote an early recovery. Post operative patients' needs to be encourage by nurses for an early ambulation as inactivity can cause postoperative pneumonia *(*Woo, Aoki, Kataoka, Yamashita, Yoshitake, & Morishita, et al., 2021).

Also, to ensure good quality health care, and patients' satisfactions, nurses need to provide regular nursing assessments of the elderly, such as, checking vitals, signs, and symptoms of pneumonia frequently, assessing any sign of malnutrition especially in invasive ventilated patients using the nutritional risk screening (2002). This regular monitoring helps the nurses to be updated on their patients' conditions, thereby providing them with

first-hand information can help in the care process. This development will go a long way to minimize or prevent pneumonia among the elderly. It also came out from the results that, patient, and family educations, on exercise, nutrition, aseptic technique, easing negative feelings, help in treatment and prevention of pneumonia. Nurses can ensure education through social media and given patient leaflet. Again, through good communication with patient and family, nurses will be able to identify patients psychological and emotional needs and address or educate them accordingly (Bai, Yang, Shi, & Huang, 2022).

Lastly, from the results, to ensure good immune function of patients, nurses must ensure appropriate use of antibiotics. sterilizing the skin before central venous catheterization and ensuring safe environment such as keeping the environment ventilated. Ensuring good airway management during mechanical ventilation also helps to prevent infection by microorganisms, thereby boosting the immune system (Bai, Yang, Shi, & Huang, 2022).

In summing up, nurses' role in supporting the oral hygiene care and exercises, both physical and psychological needs and nutritional needs of patients with pneumonia will go a long way to improve their health conditions. Again, nursing assessment tool such as regular monitoring of signs and symptoms patients, monitoring symptoms of malnutrition and disorders associated with pneumonia may help minimizing and prevent pneumonia

It is also the duty of nurses to provide education on correct sitting and sleeping posture during feeding and psychological counselling. These positive practices and development of good habits may improve the health conditions of patients with pneumonia

These results findings discussed above do agree and is consistent with existing literature reviewed of this study. And finally, Health Promotion Theory that the researcher adopted and used aligned with the findings of this study. As its principles of supporting, advising or empowering individuals, community, and society to adopt positive lifestyles and behaviours do impacts on their health and wellbeing. These principles are exemplified in basic role of nurses in fighting and preventing pneumonia among elderly.

8 Conclusion

The study concludes that nurse's role in managing and prevention pneumonia among elderly includes, support for fundamental needs such as, good oral care support, nutritional needs, and mental and physical exercise support of patients. Again, clinical guidance and support has been established as nurse's role in helping to minimize and preventing pneumonia among the elderly. This support includes a periodic nursing assessment and report on each elderly patient, as well as giving them counselling and education. Lastly, the immune function support. This involves pharmacological treatment and aseptic technique.

In view of the above roles of a nurse in supporting patients with pneumonia, the study recommends that health promotion theory is consistent with the results of this study, as its principles of supporting, advising or empowering individuals, community, and society to adopt positive lifestyles and behaviours go a long way to have impacts on their health and wellbeing as felt in the results.

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Appendix 1.

Summary of article included in the analyses

	Database	Title,Author, Publication, year.	Aim	Method	Results
1.	Ebsco Academic research Elite	Early walking time is related to recovery of activities of daily living during admission at the hospital in the elderly patients with community-acquired pneumonia: A single-centre prospective study. Authors Woo, H., Aoki, H., Kataoka, H., Yamashita, J., Yoshitake, T., Morishita, T., Tanaka, T., Ishimatsu, Y., & Kozu, R. (2021).	The aims of the study were to investigate the following: (i) early physical activity time among older patients hospitalized with community-acquired pneumonia and (ii) the association of physical activity time with the recovery of activity of daily living.	A potential observational analysis was done in patients over 65 years admitted with community acquired pneumonia.	A total number of 87 patients were used in the analysis. Physical activity time was 69 minutes per day (43–103 minutes per day). In the multiple regression model, a higher daily walking time, greater cognitive and physical function, and activity of daily living at admission were independently related to rehabilitation effectiveness.

2	Google scholar	The clinical value of comprehensive nursing intervention in preventing ventilator-related pneumonia. Authors: Fan, Y., Chu, X., Jiang, L., & Du, X. (2021).	The aim of the article was to show the clinical value of comprehensive nursing intervention care in ventilator-related pneumonia prevention.	Equally observational group and randomized control group were selected. The observational group used complete nursing care and the control group focused on conventional nursing care.	After analysing the mechanical ventilation time, hospitalization time, psychological status VAP incidence, nursing satisfaction in both groups and quality of life, it showed how great comprehensive nursing was.
3	Ebsco Academic research Elite	Prevention of postoperative pneumonia by perioperative oral care in patients with oesophageal cancer undergoing surgery. Authors: Soutome, S., Hasegawa, T., Yamguchi, T., Aoki, K., Kanamura, N., Mukai, T., Yamazoe, J., Nishikawa, M., Isomura, E., Hoshi, K., & Umeda, M. (2020).	To assess perioperative oral care outcome on postoperative pneumonia reduction.	The article used a retrospective investigation, multicentre of the relationship between incidence of postoperative pneumonia and perioperative oral care in patients having oesophageal	The study identified that smoking habit, old age, lack of oral care intervention, lower haemoglobin, higher creatinine, and postoperative dysphagia were pneumonia`s independent risk factors. Oral care was highlighted to be highly effective

				cancer surgery.	as far as pneumonia prevention is concerned in hospitals.
4	Ebsco Academic research Elite	Pneumonia Management in Nursing Homes: Authors: Carnahan, J. L., Shearn, A. J., Lieb, K. M., & Unroe, K. T. (2021).	This article aimed at addressing six diagnoses connected with potentially avoidable hospitalization (PAHs): dehydration, exacerbation and cellulitis of obstructive pulmonary disease, heart failure, pneumonia, and urinary tract infection.	The article used assured project inclusion criteria (length of stay > 100 days: Medicare fee-for-service coverage). Paper medical records and electronic, lab results, optimistic project data chest x-ray readings and managed in Redcaps were part of the data sources.	Among cases reviewed, 70.7% of the inhabitants had 3 or more comorbidities elevated their risk for pneumonia progressing though 95.1% of them went on medication that elevates pneumonia risk.
5	CINAHL	Implementation of a pneumonia prevention protocol to reduce the prevalence of postoperative	The aim was to execute a dynamic postoperative pneumonia prevention agreement and	The care cohort data were correlated with a	In all, a sum of n=245 in the intervention

		pneumonia in patients after hip fracture surgery. Authors: Geerds, M. A. J., Folbert, E. C., Visschedijk, S. F. M., Klunder, M. B., Vollenbroek-Hutten, M. M. R., & Hegeman, J. H. (2022).	examine the occurrence of postoperative pneu monia in elderly pat ients (≥70 years of age) getting this agreement after the surgery of hip fracture versus those getting normal care prior the protocol's executions in our institution.	historical control cohort cured from July 2017 - June 2018. These treatments in cluded postoperative pulmonary exercises, oral care and intensifi ed physical therapy.	cohort) and 494 patients (n= 249 in the historical control cohort were part. A sum of 69 patients had postoperative pn eumonia. The postoperative pn eumonia inciden ce was importantly lower (6.7 percentage points) by the group getting the protocol of proactive postoperative pn eumonia prevent ion (17.3% in the historical control cohort and 10.6% in the intervention cohort; p=0.033). A dynamic postoperative pn eumonia prevent ion agreement identified promise in lowering the

					incidence that occur in elderly patients with postoperative pneumonia when hip fracture surgery is done.
6	Ebsco Academic research Elite	Gaps between present clinical practice and evidence-based guidelines for management and care of the elderly patients with Community Acquired Pneumonia Authors: Eekholm, S., Ahlström, G., Kristensson, J., & Lindhardt, T. (2020).	The aim is to describe gaps between regulations in evidence-based instructions for nursing interventions, diagnostic procedures and medical treatment for CAP older patients and latest clinical practice	Structured observations, audits of patient records and individual ad hoc interviews were done in three medical units and an emergency department. Data were examined by manifest content examination and descriptive statistics.	Accordance to recommendations was down for many nursing care interventions and central treatment for CAP patients with possible results for patients and resources used.
7	Google scholar	Effect of Plan Do Check- Act (PDCA) circulation nursing intervention on prognosis of patients	The aim is to investigate the outcome of a new nursing approach adding Plan-Do-Check-Act	98 patients from the clinical records got cured in the Second	Compared with regular nursing, PDCA care importantly rose the levels of oxygenation

		with severe pneumonia. Authors: Bai, L., Yang, L., Shi, X., & Huang, W. (2022).	broadcasting controlling care and nursing on the diagnosis of patients with extreme pneumonia.	Affiliated Hospital of Xi'an Jiao tong University in January 2019 - January 2021 were successively analysed. Patients were split up into the PDCA group (n=49) and the management group (n=49), which were interceded by regular nursing and PDCA nursing formed on regular nursing, by the same team of nursing staff respectfully	index and PaO2 and decreased $PaCO_2$, thus enhancing the ventilation function of the patients. PDCA intervention can effectively enhance the quality of nursing and the satisfaction of patients and take away patients' weak psychological emotions.
8	CINAHL	Simple steps to prevent hospital-acquired pneumonia in non-intubated patients	The aim of the article was to create that launched simple preventive	Audit cycles of three, learning a total of 222	In all, there were improvements in the three actions. Taking into

		Authors: Wilkinson, A., Singal, A., & Ramadan, G. (2021).	actions that could be applied by allied health professionals and ward nurses.	inpatients in an elderly care ward were accepted over a 6-month time interval to evaluate staff compliance at different phases of the project, with **actions of care** connecting each cycle. Some of the interventions included bedheads raising to 30°, patients sitting out of bed to eat, drinking with straws and regular mouth were discouraged.	account patients' percentage, the results showed 23% growth in patients with bedheads >30°, 26% increase in patients sitting out of bed to eat and 21% growth in adult feeding with cups than straws.
9	CINAHL	Effects of Oral Management on	The aim was to test the factors affecting the absence or	Observational study,	The study revealed that dental care

		Elderly Patients with Pneumonia. Authors: Yoshimi, K., Nakagawa, k., Momosaki, R., Yoshimi, K., Nakane, A., Tohara, H. (2021).	presence of dental care in pneumonia patients in an acute care, emphasizing on oral intake and the status.		assisted in oral intake and avoided long term hospital stay.
10	Ebsco academic elites	The effect of oral care intervention on pneumonia hospitalization, Staphylococcus aureus distribution, and salivary bacterial concentration in Taiwan nursing home residents. Author: Chiang, T.-C., Huang, M.-S., Lu, P.-L., Huang, S.-T., & Lin, Y.-C. (2020).	The aims of the article (quasi-experimental study) were to differentiate the concentration of bacterial in sputum and saliva, status of oral health, status of pneumonia before and after an oral care intervention done professionally and dispensation of Staphylococcus aureus,	A directive sample of inhabitants from 2 nursing homes was cut up into an intervention group that got a weekly oral care intervention done professionally and a control group. Oral bacterial absorption was intent on by real-time polymerase chain response. The	The intervention group got a lower yearly prevalence of pneumonia hospitalization significantly (1.24 ± 1.51 vs. 0.48 ± 0.59, $p = 0.01$), especially in inhabitants who's bacterial in saliva absorption outreached the median. However, the pneumonia hospitalization duration did not importantly vary connecting to the two groups.

				Staphylococcus aureus dissemination was intent on by bacterial matrix-assisted laser desorption/ionization-time of flight mass spectrometry and culture. After data collection, a statistical analysis was done to assess the interventional effect.	

Appendix 2.

Coding process of the selected articles

Articles (10)	**Abstract, content and conclusion of selected articles coding**	**Grouping same codes**	**Sub groupings**
Articles 1	*According to the multiple regression model, a higher daily walking time, greater cognitive and physical function, and activity of daily living at admission were independently related to rehabilitation effectiveness.*	Mental and physical excises	
Article 2	. *The observation group was tasked with comprehensive nursing intervention according to the treatment done in the control group which include, Cognitive and psychological nursing, Environment and posture nursing, Enhanced airway nursing. Ventilator duct nursing and Nutritional support.*	Physiological, environmental, posture, enhanced, ventilator and nutritional support	Exercise, personal hygiene, nutritional support, physiological environment
Article 3	*Preoperative care bundle which was made up of deep breathing exercise respiratory muscle stretching, professional oral teeth cleaning and tongue brushing, consuming proper food and stopping smoking*	Exercise including, Deep breathing, respiratory and personal hygiene, including,	

		brushing of teeth and tongue and good personal habit like quitting smoking and eating good diet	
Article 4	*All pneumonia cases were managed with antibiotics and greater than half were treated with a fluoroquinolone. The time antibiotics was given, was higher than 7days in 39% of cases reviewed. Supportive medical care was implemented in every case in both the clinical and the clinical plus payment buildings which includes, more frequent nursing assessments, checking of vital signs and help for oral hydration.*	Antibiotic treatment, supportive medical care, and more frequent nursing assessment	Antibiotic support and nursing assessment
Article 5	*From November 2018 - October 2019, the proactive postoperative pneumonia prevention protocol was installed. The treatment was among intensified physical therapy, postoperative pulmonary exercise, and oral hygiene, and usual surgical treatment for elderly patients with hip fracture. Early mobilization and postoperative pulmonary exercises are highly recommended non-pharmacological treatment for the prevention of postoperative pneumonia.*	Physical activity including postoperative pulmonary and oral care, surgical treatment, and non-pharmacological interventions	Postoperative, surgical treatment, non-pharmacological

Article 6	*The severity assessment tool (CURB-65) was used for 16.7% patients, right amount of antibiotic treatment prescribed for 13.3% and chest radiography (≤6 weeks post-discharge) prescribed for 22.2%. Fluid therapy, nutrition support and mobilisation plans were seen to be developed sporadically, and interventions to be done unsystematically and sparingly.*	Antibiotic treatment Fluid therapy	Pharmacological treatment.
Article 7	*Now, the intervention of severe pneumonia is mainly to kill pathogenic microorganisms, promote ventilation and the immune function of patients. To guide the treatment of patients, promote the quality of nursing, and restore the respiratory function of patients who have severe pneumonia, a lot of scholars have committed to the study of etiological assessment and clinical prognosis. During treatment, the nursing staff also play an important role in improving the curative effects. It is the responsibility of nurses to implement daily medical orders, safety treatment, communication, mediation, and coordinating with medical and technical departments, and thus irreplaceable for the treatment of severe pneumonia. Ward safety control. According to*	Ventilation care, daily medical care, safety communication, mediation, coordination with medical and technical departments disinfection	Good daily practices, ventilation, mediation, communication, and coordination Aseptic technique.

	roles of the ward, the pollution area and cleaning places were reasonably divided, and the access of personnel was strictly controlled to prevent cross infection		
Article 8	*Sitting patients out of bed at mealtimes* *Stopping the use of drinking straws and using other means such as non-spill adult feeding cups frequent mouth care and Early mobilisation*	Good eating habit, including good sitting posture of patient before, during and after mealtimes, avoid straw usage and good personal hygiene including mouth care and early mobilisation	Good eating and seating habit and personal hygiene
Article 9	*A study looking into the factors affecting oral intake in acute care hospital impatient found out that level of consciousness, activities of daily living and oral hygiene are associated with feeding status*	Daily living and oral hygiene	Daily living and good oral care
Article 10	*A professional oral care in nursing home residents can promote oral health, decrease levels of salivary bacteria and Staphylococcus aureus,*	Oral care intervention	

	and reduce the annual prevalence of pneumonia hospitalization		