

Acute respiratory distress syndrome research paper examples

[Sociology](#), [Community](#)



Abstract

The acute respiratory distress syndrome is a form of injury to the lungs that impedes the supply and uptake of oxygen from the alveoli resulting in a state of severe hypoxemia, dyspnea, anxiety, and tachypnea. This review has established that genetics may be playing a role in increasing one's susceptibility to acute respiratory distress syndrome (ARDS). Moreover, biomarkers would also play a significant role in the diagnosis and treatment of the disease. However, it still remains unclear on the type of genes and biomarkers that play a role in causing ARDS. It has also been established that young children (less than 2 years old) and older persons (more than 60 years of age) are more susceptible to developing ARDS. On gender, male especially blacks are at a higher risk of developing ARDS than females. Performing oral care to hospitalized ARDS patients using an antiseptic solution can reduce oropharynx colonization and hence prevention complications. Nurses also play a role in ensuring adequate nutrition, prone positioning, fluid supplementation, and administration of antibiotic therapy in the intensive care unit as this promotes recovery of patients. Monitoring of vital signs and oxygen saturation levels is also imperative to the prevention of complications. Despite being a common disease in the community, individuals at risk and families should utilize preventive, home health, and social services present in the community as this can protect the community members from ARDS. However, researchers need to work extra hard to establish the exact type of genes and biomarkers that play a role in causing ARDS.

KEY WORDS: acute respiratory distress syndrome, community, oral care, biomarkers, oxygen

Introduction: Overview of ARDS

According to Blume and Byrum (2009), acute respiratory distress syndrome (ARDS) is a type of lung injury that is characterized hypoxemia and can easily cause respiratory failure. The National Heart, Lung and Blood Institute (NHLBI) indicate that acute respiratory distress syndrome contributes to more than 190, 000 deaths per year in the United States (Blume and Byrum, 2009) while the prevalence rate is estimated at 2-70 cases per 100, 000 people in the general population (Matthay, Song, Bai, and Jones, 2013). However, mortality among ARDS patients is usually to multiple organ failures secondary to severe ischemia and not just because of respiratory failure. Some of the causes of lung tissue injury include prolonged exposure to toxic substances like smoke, respiratory infection like pneumonia, gastric aspiration, shock, embolism, high oxygen concentration, head injury, and cardiopulmonary bypass among others (Koh, 2014; Marraro, 2012). Most of the patients present at the accident and emergency department within 48 hours following the exposure to lung injury. On the assessment, the patient would have fast breathing (tachypnea), high FiO₂ (fraction of inspired oxygen), increased heart rate (tachycardia). However, these symptoms are usually non-specific to ARDS (Bauer, Ewig, Rodloff and Muller, 2006). In addition to the above, some patients may present also with hypothermia or hyperthermia, hypotension, and peripheral cyanosis. On radiological and laboratory investigations, there may be respiratory alkalosis

on blood gas analysis while a chest X-ray may indicate the presence of infiltrations or consolidations (Armola and Halm, 2009).

According to Bakowitz, Bruns, and McCunn (2012), the manifestations of ARDS often start with sudden difficulty in breathing (dyspnea) that is confirmed by hypoxemia on angiography and infiltrations of lung tissue on examination of a chest X-ray. This symptom is often experienced within 48 hours following the exposure to injury (direct or indirect). The patient would also experience rapid but shallow breathing, hypotension, crackles, cyanosis, respiratory alkalosis, and intercostal's withdrawal.

The pathophysiology of ARDS starts when one is exposed to an injurious substance or event. The injury reduces lung perfusion, and this leads to aggregation of platelets on subsequent production of bradykinin, serotonin, and histamine. These inflammatory substances then cause damage to the capillary membrane leading to increased permeability of the capillaries. Consequently, fluid and proteins move into the interstium causing pulmonary edema. It damages the ability of the alveoli to produce surfactant and facilitate gaseous exchange. Exchange of gases is impeded, but oxygen flow to the blood is more affected than exhalation of carbon dioxide. It then leads to fibrosis and further compromise of gas exchange in the alveoli. For this reason, ARDS has three phases of development (Koh, 2014).

The initial stage, being the oxidative phase, is followed by proliferative and fibrotic phases. The alveoli may collapse leading to decreased lung compliance that often causes hypoxemia. Bleeding the cell death may result causing mismatch between ventilation and perfusion in the lung tissue (Matthay, Song, Bai, and Jones, 2013). The patient may end up losing a

significant part of the lung tissue due to fibrosis and may experience difficulty in engaging in the activities of daily living.

The treatment protocol for acute respiratory distress syndrome will involve assisted respiratory care in the intensive care unit. In the ICU, the patient is supplemented with oxygen through mechanical ventilation. Moreover, nutritional care and drug therapy is initiated to prevent complications.

However, Bakowitz, Bruns, and McCunn (2012) indicates that about one-third of ARDS patients end up dying but a significant proportion end up with some form of permanent lung damage and low quality of life mostly due to damage the brain was exposed to.

This manuscript examines how age, gender, and genetics impact the risk for acute respiratory disease and impact on the care provided to patients. It will also examine how maintenance of oral hygiene can impact on the overall care and disease progression in ARDS. Lastly, this submission will look at the role of the nurse in promoting recovery from ARDS and how he/she can influence utilization of community resources.

Impact of demographic factors (age, gender, genetics) on care provided to ARDS patients

Haro, Martin-Loeches, Torrents, and Artigas (2013), argue that researchers have tried to establish a correlation between genetics and the risk for ARDS. Variation in up to 30 genes has been linked to the risk of developing acute lung injury and consequently acute respiratory distress syndrome. The genes that have been examined include those that control inflammatory processes, production of oxygen special, cellular death, and genes that regulate vascular permeability.

According to Koh (2014), individuals of African descent are more susceptible to ARDS than the whites. Genes that control angiotensin two have also been associated with an increased risk for acute lung injury. However, the exact genome factors that increase the risk of developing ARDS remains unclear. Matthay, Song, Bai, and Jones, (2013) also indicate that there is no single biomarker that has been identified or linked to the detection and progression of ARDS.

On the age, Koh (2014) and, Marraro (2012) indicate that children below two years and the elderly (more than 50 years old) are at increased risk for ARDS. It is because they get frequent bouts of pneumonia and influenza infections, which if not promptly managed can complicate to an acute lung injury or ARDS. Besides, this group of persons does not have a strong immunity to fend off respiratory tract infections. Haro et al. (2013) also add that advanced age (more than 65 years of old) increase one's risk of ARDS. Findings and Meta analyses have established that the males and especially African American men are more susceptible to developing ARDS than females. Black men also tend to experience a higher mortality and morbidity rate than black women or women from other races with ARDS (Hare et al. 2013). However, women of African descent have higher morbidity and mortality rate than white women with ARDS. In support of this, Bakowitz, Bruns, and McCunn (2012) and Koy (2014) argue that the estrogen, which is present in females, may have some immunologic or protective properties against acute respiratory distress syndrome.

Other factors that increase the risk for ARDS are excessive intake of alcohol and chronic cigarette smoking. Cigarette smoke and alcohol have been

found to enhance endothelial inflammation and reduce platelet and neutrophil function in the lungs.

Evidence based practice of oral care and care of ARDS patients

The patient is placed in the prone position and started on enteral feeding.

Adequate proteins and calories are supplemented. However, fat calories are supplemented in higher amounts than calories from carbohydrates. This is a precaution to reduce production of carbon dioxide.

According to Armola and Halm (2009), patients at risk for nosocomial infections, for example, patients on mechanical ventilation should be put on oral hygiene care plan that includes the use of oral solutions with antiseptic agents. Cleaning the oral cavity oral antiseptic solutions helps to mobilize and remove microbial colonization and dental plaques that could contribute to patient's complications during the artificial respiratory support.

Frequent turning is also done. However, the patient is encouraged to cough frequently so as to mobilize secretions that are constantly suctioned.

Suctioning not only clears the airway but also makes the oral cavity free of secretions that may be habitats for microbial growth. The endotracheal tubes are also cleaned on a regular basis since they may harbor fomites that may cause nosocomial infections. According to Dirkes, Dickinson, and Havey, (2012) oral hygiene is a medium to high priority care among patients in the intensive care unit. Thus, critical care nurses should routinely assess the oral cavity for cleanliness, dental plaques, and potential for oropharyngeal colonization.

A Meta analysis conducted by Armola and Halm (2009) established that the

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oral care among patients on mechanical ventilation could be achieved through three ways. One of them is actual brushing of the teeth with toothpaste. This removes debris and plaque through mechanical efforts. The second way is by using an antiseptic solution as the iodine mouthwash (10%) or chlorhexidine (1-2%). This solution mechanically and biologically eliminates oral cavity colonization. The third way is by use of both actual mechanical brushing of teeth and application of an antiseptic solution. This method leaves the mouth both fresh and free of colonization (Armola, and Halm, 2009; Blume, and Byrum, 2009).

Role of the nurse in promoting health and recovery of ARDS patient

On the assessment of the patient, respiratory crackles and intercostals retraction are obviously observed. The patient or relative may also report a previous episode of acute lung injury or ARDS risk factors (Bakowitz, Bruns, and McCunn, 2012). On the evaluation of the oxygen saturation level, the SpO₂ may be less than 95%, while the ratio of PaO₂ (partial pressure of arterial oxygen) to FiO₂ (fraction of inspired oxygen) is almost less than 200mmHg.

Thus, monitoring of vital signs like pulse rate, temperature, oxygen saturation, and blood pressure should be done on frequent and regular basis. Blood pressure monitoring can help detect a decrease in cardiac output, which is common in mechanically ventilated patients. Rise in temperature may indicate a severe inflammatory process or impending septicemia. The nurse also plays a role in turning and positioning the patient. 2-4 hourly turning of the patient can help improve blood flow to the lungs and hence

ventilation. Turning also prevents the development of pressure sores and ulcers. Putting the patient in the prone position for a significant period (Dirkes, Dickinson, and Havey, 2012) improves lung volume during expiratory phase and oxygen supply to the patient. Dirkes, Dickinson, and Havey (2012) argue that prone positioning improves oxygenation to up to 80% of ARDS patients. However, this prolonged prone positioning can lead to complications like sudden extubation, kinking of tubes and back problems to nurses. Thus, caution should be exercised at all times while turning of the patient.

The nurse ensures adequate fluid and nutritional supplementation to ensure homeostasis. Thus, the nurse maintains an input and output chart to ensure adequate fluid and electrolyte supplementation as well as normal urinary output.

The nurse administers drugs like antibiotics to eliminate impending infection, oxygen therapy to relieve hypoxemia among other prescribed drugs.

Moreover, monitoring for complications of ARDS and mechanical ventilation or endotracheal intubation is done. Assessment and monitoring of mental functions to ensure there is no deviation from the normal.

The patient is always anxious and with disturbed sensory perception because of risks associated with severe hypoxemia and difficulty in breathing (Gallagher, 2009). For this reason, the nurse should explain and reassure the patient about his/her well-being. The patient should also be well rested including administering sedatives and/or neuromuscular blocking drugs. However, sedation and paralysis should not be done for a prolonged time because of its related complications. Thus, the nurse should also explain the

purpose of the paralysis and sedation to the family so as to relieve anxiety and promote coping.

Community resources the patient and family may require (rehabilitation, social, home health services)

In the case of the patient's condition worsens, he/she may require more specialist attention in a more specialized critical care unit. This may also necessitate referral to a more specialized respiratory care unit with a 24 hour monitoring by a lung specialist. The nurse, being the patient's advocate should strive to advocate and support health care decision that will be of extra benefit to the patient (Marraro, 2012). Among health services provided by the community hospital include following up, and community based care services. Discharged patients are followed up and given revisits to the respiratory care unit to check on how they are recuperating after the intensive care.

Nurses also act as community health educators and, therefore, have an advisory role where they encourage patients and their families to adopt positive health seeking and maintenance habits including seeking early treatment and care for pre-existing respiratory conditions.

Patients who have pre-existing respiratory disorders or infections are taught on the proper use of medical devices (for example, inhalers) and drugs.

Health education is also done on how to check for complications of drug use (for example, corticosteroids) and infections.

Patients at risk of ARDS should also utilize the immunization services available in the community health facilities by obtaining vaccination against pneumonia and influenza, which are common respiratory infections

especially among children and the aged (Koh, 2014). However, community vaccination must follow the recommendations of Centre for Disease Control and Prevention.

People who are above 50 years, those who have diabetes, cardiovascular disease, immunosuppressive illness, and health workers should annually seek to be vaccinated against influenza. It is meant to remove respiratory infections, which is a risk factor for ARDS.

The patient and the entire community could also benefit from other preventive health services available in the community centers. Examples include; counseling, health education, and rehabilitative services especially for chronic cigarette smokers and alcoholics (Gallagher, 2009). Moreover, individuals with any form of infection/sepsis should seek early treatment to prevent systemic spread of infections to the respiratory system. Early detection of sepsis and its treatment with antibiotics can reduce disease progression to ARDS.

Family and relatives of the patient with ARDS often suffer severe emotional and psychological stress because of the financial constraints and the need to withstand the site of a loved one on artificial respiratory support. This, therefore, necessitates the need to provide psychological counseling and emotional support to the affected families. Thus, such services could be utilized in the community and affected persons can also be linked with support groups where they can share the experiences and possible coping mechanisms (Matthay, Song, Bai, and Jones, 2013).

Area of nursing research

Further studies need to investigate how genetics influences the risk for ARDS and the impact of biological markers in diagnosis or treatment of ARDS. Few studies have established that patients with ARDS have a high amount of plasminogen activator inhibitor one and low protein C levels. These proteins play a key role in blood clotting. However, little is known on the role of these proteins in causing organ failure among ARDS patients. If the actual mechanism is known, then this can provide an avenue for new treatment that can be used to reduce mortality and enhance the quality of life of patients with ARDS.

Conclusion

It is obvious that acute respiratory distress syndrome and other acute lung injuries contribute to a significant proportion of morbidity and mortality among hospitalized patients. Good recognition of risk factors among susceptible individuals is important for early prevention and management of the illness. Moreover, critical care nurses play a crucial role in ensuring recovery and prevention of complications during intensive care of patients with ARDS. However, non-affected and families of affected persons should utilize a myriad of health and social services available in the community.

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