The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 2, 2025

FREQUENCY AND ASSOCIATED FACTORS OF ASPIRATION PNEUMONIA AMONG PATIENTS IN THE ICUS OF HAYATABAD MEDICAL COMPLEX, PESHAWAR

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DOI: https://doi.org/10.5281/zenodo.14942566

Keywords
Aspiration pneumonia, ICU, risk factors, nasogastric tube, patient positioning, feeding methods

Article History
Received on 18 January 2025
Accepted on 18 February 2025
Published on 28 February 2025

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Abstract

Background: *Aspiration pneumonia (AP) arises from the inhalation of oropharyngeal or gastric contents into the lungs, leading to significant morbidity and mortality. It predominantly affects ICU patients with comorbid conditions impairing consciousness, swallowing, or lung clearance. This study investigates the frequency and associated factors of AP in the ICUs of a tertiary care hospital in Peshawar, Pakistan.*

Objectives: *To determine the frequency of aspiration pneumonia among ICU patients, To identify associated risk factors such as patient demographics, feeding methods, and positioning.*

Methods: *This cross-sectional study included 196 patients admitted to the ICUs of Hayatabad Medical Complex. Data were collected using a structured questionnaire and analyzed using SPSS v22. Descriptive statistics and chi-square tests were applied to identify associations.*

Results: *The frequency of AP was 16.3%, Risk factors significantly associated with AP included nasogastric tube placement (11%), intermittent feeding (50%), and supine positioning (100%), AP was more common among patients with moderate to severe disabilities (40.6%).*

Conclusion: *Aspiration pneumonia is a prevalent concern in ICU settings, with identifiable and modifiable risk factors. Preventative strategies such as improved feeding practices, patient positioning, and early disability management are critical to reducing its incidence.*

INTRODUCTION

Aspiration pneumonia (AP) is a serious respiratory condition caused by the inhalation of foreign materials such as food, liquids, or gastric contents into the lungs (1). This condition leads to inflammation and infection, significantly affecting patient outcomes, especially in vulnerable populations such as critically ill patients in intensive care units (ICUs) (2). AP accounts for a substantial portion of hospital-acquired infections and is associated with high morbidity and mortality rates globally (3).

Patients in ICUs are particularly susceptible to aspiration pneumonia due to factors such as impaired consciousness, dysphagia, prolonged

immobilization, and reliance on mechanical ventilation (4). The presence of nasogastric tubes and other feeding aids, while essential for patient care, further increases the risk of aspiration by compromising the natural protective mechanisms of the upper airway (5). The role of patient positioning, sedation levels, and comorbidities also cannot be overstated when assessing the risk factors for AP (6).

Globally, the incidence of aspiration pneumonia varies, with elderly populations showing higher prevalence rates due to age-related declines in swallowing reflexes and increased comorbid conditions (7). In developing countries like Pakistan, limited data on aspiration pneumonia pose a challenge for healthcare providers to implement effective preventative measures (8). Existing studies highlight the need for localized research to understand the unique factors contributing to AP in these settings (9).

The Hayatabad Medical Complex, a leading tertiary care hospital in Peshawar, provides critical care services to a diverse patient population (11). This study aims to explore the frequency and associated factors of aspiration pneumonia among ICU patients in this hospital, with the objective of identifying modifiable risk factors and providing actionable insights for clinicians (12).

Aspiration pneumonia often overlaps with other respiratory infections, making its diagnosis and management challenging (13). Unlike community-acquired pneumonia, AP has distinct pathophysiological mechanisms, primarily involving the introduction of bacteria-laden or chemical-laden materials into the lungs (14). The inflammatory response triggered by these materials can lead to complications such as pneumonitis, abscess formation, and acute respiratory distress syndrome (ARDS) (15).

A notable risk factor for AP is dysphagia, which is commonly observed in patients with neurological disorders, head injuries, or stroke. Poor oral hygiene and the use of sedatives further exacerbate the risk (16). Feeding methods, such as bolus feeding and intermittent feeding, have been shown to influence the likelihood of aspiration, as have prolonged hospital stays and the severity of underlying disabilities (17). Identifying and addressing these risk factors is critical for improving patient outcomes (18).

In Pakistan, where healthcare resources are limited and ICU care is often constrained by high patient volumes, understanding the epidemiology of aspiration pneumonia is essential for optimizing care delivery (19). This study contributes to the growing body of knowledge by examining the prevalence of AP in a tertiary care setting and analyzing its associated risk factors (20). The findings aim to guide the development of evidence-based interventions and policies to reduce the burden of AP in similar healthcare settings (21).

Methodology

Study Design

A cross-sectional study design was used to assess the frequency and risk factors of AP.

Setting and Population

The study was conducted in the ICUs of Hayatabad Medical Complex, Peshawar, including medical, surgical, and cardiac ICUs. A total of 196 patients were included.

Sampling Technique

Systematic random sampling was employed.

Inclusion and Exclusion Criteria

- **Inclusion:** ASA Class II-IV patients with ICU stays exceeding four days.
- **Exclusion:** Patients in stable or alert states and those undergoing day-case surgeries.

Data Collection Tools

Data were collected using a structured questionnaire, which included demographic details and clinical parameters.

Data Analysis

SPSS v22 was used for data analysis. Descriptive statistics summarized the data, while chi-square tests identified significant associations.

Ethical Considerations

Ethical approval was obtained from the research committee, and informed consent was secured from participants.

Results

Demographics

The study included 196 patients with a mean age of 36.49 ± 15.76 years. Among these, 47.4% were male (n=93) and 52.6% were female (n=103).

Frequency of Aspiration Pneumonia

Aspiration pneumonia was diagnosed in 16.3% of patients (n=32). Female patients showed a slightly higher prevalence (18.4%) compared to males (14%).

Key Risk Factors

- **Nasogastric Tube Placement:** 79.1% of patients were on nasogastric tubes, with 11% (n=17) developing AP. Patients with feeding jejunostomies showed a higher risk (75%).
- **Feeding Methods:** Intermittent feeding was associated with a higher AP rate (50%), compared to bolus feeding (34.4%).
- **Patient Positioning:** All AP cases occurred in patients positioned supine.
- **Patient Disabilities:** Moderate to severe disabilities were present in 40.6% of AP cases.

Hospital Stay and AP

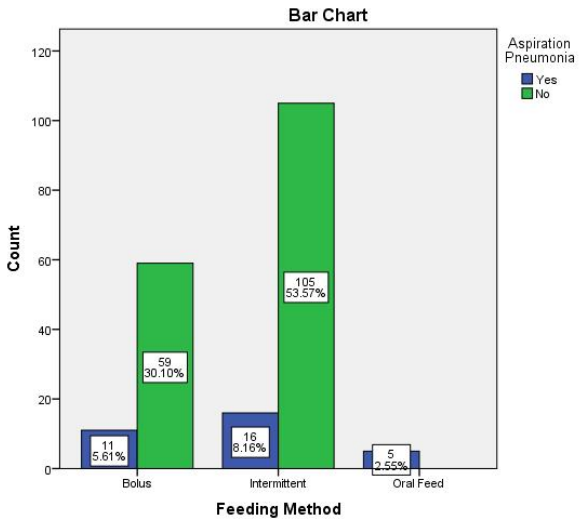
Patients with shorter hospital stays (4-10 days) had a higher AP rate (27.5%) compared to those with prolonged stays. This contrasts with prior literature associating extended stays with increased AP risk.

Risk Factor	Frequency (%)
Nasogastric Tube Placement	11.0%
Intermittent Feeding	50.0%
Supine Positioning	100.0%
Moderate to Severe Disabilities	40.6%

Cross-tabulations and Statistical Associations

- **Gender and AP:** Chi-square analysis indicated no significant association between gender and AP (p=0.398).
- **Smoking and AP:** Smoking history showed a significant association with AP (p<0.05), despite a lower incidence in smokers.
- **Sedation Levels:** Deep sedation was associated with AP in 28.1% of cases, while light sedation accounted for 40.6%. Chi-square tests confirmed significant associations (p<0.05).

Graphical Representations



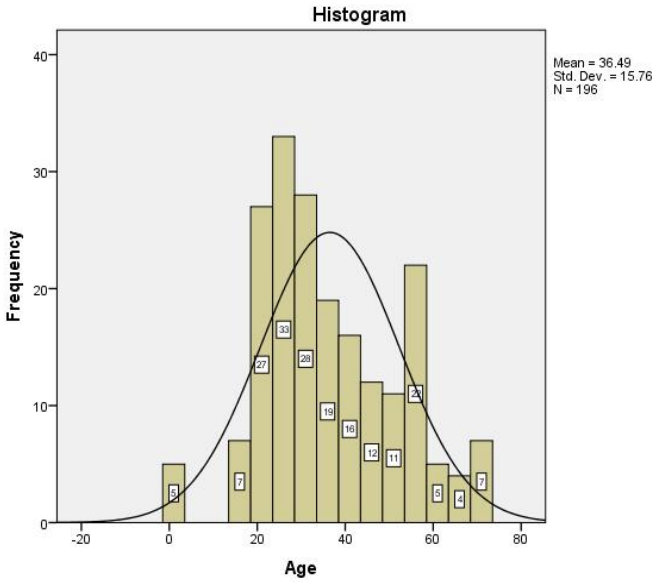


Figure 1: Age-wise Distribution of AP Cases

Figure 2: Feeding Methods and AP Incidence

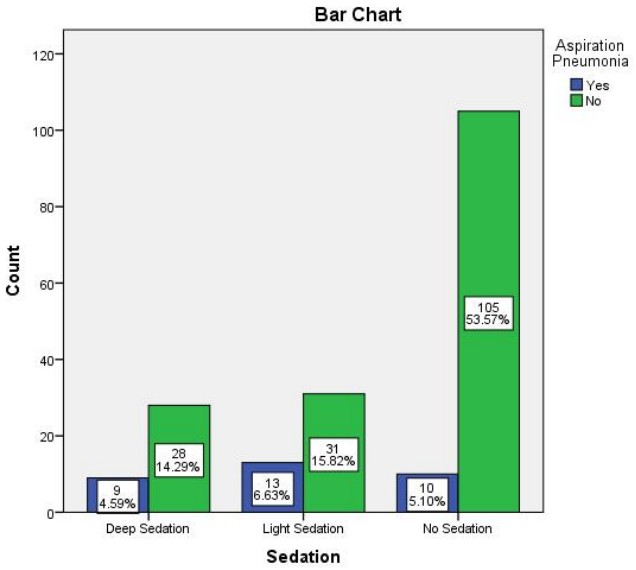


Figure 3: Sedation Levels and AP

Discussion

This study provides valuable insights into the prevalence and associated risk factors of aspiration pneumonia (AP) in ICU settings. Key risk factors identified include nasogastric (NG) tube placement, feeding methods, patient positioning, and sedation levels.

Nasogastric tube use was a significant factor, with 11% of patients on NG tubes developing AP. This aligns with global findings that highlight the importance of proper tube management and alternative feeding methods to mitigate risks. Feeding methods, particularly intermittent feeding, were also found to increase the likelihood of aspiration compared to bolus feeding. Modifying feeding protocols and closely monitoring gastric residual volumes could reduce this risk.

Supine positioning was universally associated with AP, emphasizing the critical need for semi-recumbent positioning in ICU patients to minimize aspiration events. The association between deep sedation and AP further highlights the importance of maintaining light sedation levels to preserve protective reflexes.

These findings underscore the need for targeted interventions, including staff training, implementation of evidence-based feeding practices, and regular patient monitoring. While the study provides significant insights, its single-center design and cross-sectional nature limit the generalizability of the results. Future multi-center studies are recommended to validate these findings and explore additional preventative measures.

Conclusion

Aspiration pneumonia is a significant health issue in ICU settings, with modifiable risk factors. Preventative measures targeting feeding methods, patient positioning, and early disability management can substantially reduce its prevalence. This study underscores the need for policy changes and clinical training to improve patient care.

REFERENCES

Gupte T, Knack A, Cramer JD. Mortality from aspiration pneumonia: Incidence, trends, and risk factors. Dysphagia. 2022 Jun.

Liantonio J, Salzman B, Snyderman D. Preventing aspiration pneumonia by addressing three key risk factors: Dysphagia, poor oral hygiene, and medication use. Ann Long-Term Care. 2014;22(10):42–8.

Bayeh TL. Incidence and predictors of aspiration pneumonia among stroke patients in Western Amhara Region, North-West Ethiopia: A retrospective follow-up study. 2022.

Ashford JR. Pneumonia: Factors beyond aspiration. Perspect Swallowing Disord. 2005;14(1):10–6.

Son YG, Shin J, Ryu HG. Pneumonitis and pneumonia after aspiration. J Dent Anesth Pain Med. 2017;17(1):1.

Gamache J, Hoo S. Aspiration pneumonitis and pneumonia. 2021;1–19.

Yoshimatsu Y. A paradigm shift in the diagnosis of aspiration pneumonia in older adults. 2022.

Ebihara S, Sekiya H, Miyagi M, Ebihara T, Okazaki T. Dysphagia, dystussia, and aspiration pneumonia in elderly people. 2016;8(9):632–9.

Teramoto S. High incidence of aspiration pneumonia in community- and hospital-acquired pneumonia. J Am Geriatr Soc. 2008.

Outlook P, Symptoms F. Everything you need to know about aspiration pneumonia. 2022;1–20.

Kim JW, Choi H, Jung J, Kim HJ. Risk factors for aspiration pneumonia in patients with dysphagia undergoing videofluoroscopic swallowing studies: A retrospective cohort study. Medicine (Baltimore). 2020;99(46):e23177.

Cruz-Jentoft AJ. Aspiration pneumonia. Eur Geriatr Med. 2011;2(3):179.

Langmore SE, Terpenning MS, Schork A, Chen Y, Murray JT, Lopatin D, et al. Predictors of aspiration pneumonia: How important is dysphagia? Dysphagia. 1998;13(2):69–81.

Stenlund M, Sjödahl R, Yngman-Uhlin P. Incidence and potential risk factors for hospital-acquired pneumonia in an emergency department of surgery. Int J Qual Health Care.

Bartlett JG, Gorbach SL. The triple threat of aspiration pneumonia. Chest. 1975;68(4):560–6.

El-Solh AA, Pietrantoni C, Bhat A. Colonization of dental plaques: A reservoir of respiratory pathogens for hospital-acquired pneumonia in institutionalized elders. Chest. 2003;124(3):1039–50.

Marik PE. Aspiration pneumonitis and aspiration pneumonia. N Engl J Med. 2001;344(9):665–71.

Drakulovic MB, Torres A, Bauer TT. Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: A randomized trial. Lancet. 1999;354(9193):1851–8.

Metheny NA, Clouse RE, Chang YH. Tracheobronchial aspiration of gastric contents in critically ill tube-fed patients: Frequency, outcomes, and risk factors. Crit Care Med. 2006;34(4):1007–15.

Jeon I, Jung GP, Seo HG. Proportion of aspiration pneumonia cases among patients with community-acquired pneumonia: A single-center study in Korea. 2019;43(2):121–8.

Driver BE, Klein LR, Schick AL, Prekker ME, Reardon RF, Miner JR. The occurrence of aspiration pneumonia after emergency endotracheal intubation. Am J Emerg Med. 2018;36(2):193–6. Available from: https://pubmed.ncbi.nlm.nih.gov/28760377/.