Using Data Analytics to Identify Risk Factors for Aspiration Pneumonitis

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Background and Description

Aspiration pneumonitis (AP) is a common complication for hospitalized patients. AP results in a mortality rate between 15%-56%. Numerous patient-level factors have been related to AP, but their relative contribution to development of the condition is unknown. They have not been classified as dependent or independent variables.

An interprofessional research team appraised the literature to determine common predictors of AP. Nine predictor variables were identified.

**Methods**

- A retrospective case control study was performed using EMR review of adult medical-surgical patients with and without a diagnosis of aspiration pneumonitis. Details include:
  - Query for N=90 with AP diagnosis
  - Aspiration pneumonitis anytime during admission
  - Participant had a medical diagnosis of aspiration pneumonitis. Details include:
    - COPD diagnosis
    - Respiratory compromise
    - Dysphagia
    - Dependent feeding
  - Tube feeding

**Results**

**Logistic Regression Table**

<table>
<thead>
<tr>
<th>Variable(s) entered on step 1: Age Greater Than 70, Impaired Consciousness, Altered Oral Integrity, Malnutrition, COPD Diagnosis, Respiratory Compromise, Dysphagia, Dependent Feeding, Tube Feeding.</th>
<th>Odds ratio - Exp. (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD diagnosis</td>
<td>2.895 100809</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>.336 .749 .201 1 .654 1.400</td>
</tr>
<tr>
<td>Tub feeding</td>
<td>1.232 .915 2.050 1 .171 5.945</td>
</tr>
<tr>
<td>Age greater than 70</td>
<td>5.106 .116 1.988 .888 5.013 1 .025 7.299</td>
</tr>
<tr>
<td>Impaired consciousness</td>
<td>1.988 .888 5.013 1 .025 7.299</td>
</tr>
<tr>
<td>Altered oral integrity</td>
<td>1.188 .803 1.622 1 .109 2.957</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>.336 .749 .201 1 .654 1.400</td>
</tr>
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</tbody>
</table>

**Variable definitions**:

- Age greater than 70
- Impaired consciousness
- Altered oral integrity
- Malnutrition
- COPD diagnosis
- Respiratory compromise
- Dysphagia
- Dependent feeding
- Tube feeding

**Purpose**

Research question: Do the following risk factors predict AP in adult medical-surgical patients?

- Advanced age
- Impaired consciousness
- Dysphagia
- Altered oral integrity
- Malnutrition
- COPD diagnosis

**Goal**: Clinical Decision Support

Create a best practice alert, to be triggered by interprofessional documentation of risk factors. The EMR will alert nurses to risks, allowing them to:

1. Order aspiration precautions (a banner placed on report views)
2. Place a care plan with interventions aimed at reducing the incidence of AP

**Discussion: Next Steps**

- Impaired consciousness, respiratory compromise, dysphagia and tube feeding are shown to be predictors of AP in this sample.
- Nurses with impaired consciousness were seven times more likely to have AP than those without.
- The risk-factors can be further studied and incorporated into an automated predictive scale. This could help nurses identify patients at risk for AP based on existing clinical documentation.
- Predictive model research facilitates progression from data to wisdom, integrating nursing informatics metastructures into practice. This project is innovative to the nursing field, leveraging evidence-based practice and data analytics to identify what is known and unknown about AP and designing an automated system solution that can improve health outcomes.

The Relationship of Data, Information, Knowledge, and Wisdom and Automated Systems: version 2

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Increasing interactions and interrelationships

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