Up in the Air: How Do Mattresses Affect Pressure Ulcer Incidence Rates?
Avy Contreras, Maria Hoogendorn, Katie Shaw, Michael Thury

Background
Pressure ulcers are a preventable complication that occur in healthcare facilities. Some interventions to reduce pressure ulcer incidences include patient repositioning and the use of an air mattress. Air mattresses allow patients to have less pressure on certain at-risk areas such as the sacral, elbow, and ankles. Currently, there are few studies addressing the direct effects of air mattresses. This literature review addresses the effects air mattresses have in the prevention of developing pressure ulcers in the bed bound patient population.

PICO Question
- Population: Bed bound patients
- Intervention: Air mattress
- Comparison: Regular mattress
- Outcome: Pressure ulcer incidence rate

Question: In bed bound patients, how do air mattresses compared with regular mattresses affect pressure ulcer incidence rates?

Evidence Search Method
Search Databases:
1. PubMed
2. EBSCOhost
3. CINAHL
4. Cochrane Library

Search Terms:
1. Bed wound
2. Bed bound
3. Pressure ulcer
4. Static air mattress

Restrictions used to narrow the search: not acute, foam mattress versus air mattress, blow-up mattress, air trap

Evidence Table

<table>
<thead>
<tr>
<th>Study Author(s)</th>
<th>Study Design/ Evidence Level</th>
<th>Sample # &amp; Setting</th>
<th>Findings related to the PICO question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahtiala, M., et al. (2020).</td>
<td>Non-Experimental Level 3</td>
<td>8,956 adult patients in a Finland ICU</td>
<td>The significant reduction in pressure ulcer incidence was concomitant with a reduction in foam mattresses from 53% to 4% and an increase in non-alternating MPA mattresses as the first mattress from 0% to 57.2%. The incidence of pressure ulcers among patients on MPAs was significantly lower than on any of the other mattresses.</td>
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<td>Gleeson, D. (2016).</td>
<td>Non-Experimental Level 3</td>
<td>adult participants with restricted mobility in an acute stroke unit in the UK</td>
<td>When combined with a pressure ulcer prevention plan inclusive of repositioning, this mattress is effective in preventing PUs. At the end of the 10 weeks, none of the patients had developed pressure ulcers.</td>
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<td>Shi, C., et al. (2021).</td>
<td>Systematic Review with Meta-Analysis Level 1</td>
<td>32 studies with 9058 adults in acute care and long-term care international settings</td>
<td>Air mattress surface ulcer incidence rate (83/1125 (7.4%)) versus foam mattress (117/1122 (10.4%). Evidence suggests active air is better than foam (Relative Effect 0.63 (0.34 - 1.17)</td>
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<td>Tomova-Simitchieva, et al. (2018).</td>
<td>Randomized Control Trial Level 1</td>
<td>15 female adult (60-80 years) participants in Germany</td>
<td>Immediately after loading, the maximum extensibility (Uf) was higher compared with baseline, indicating decreased stiffness. Erythematous response was 3 times higher in the foam group (61 AU), compared with the gel and air mattresses (21 and 18 AU).</td>
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<tr>
<td>Van Leen, M., et al. (2011).</td>
<td>Randomized Controlled Trial Level 1</td>
<td>83 elderly adults living in a nursing home in the Netherlands</td>
<td>4.8% pressure ulcers occurred in static air group and 17.1% in the cold foam group. Pressure ulcer incidence in the intervention group (static air mattress) was lower than in the control group (2 versus 7; p=.088 Fisher’s exact test).</td>
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Results
In regards to the PICO question, the evidence demonstrated a decreased incidence rate of pressure ulcers in hospitalized patients with limited bed mobility with the use of air mattresses. 1-5

Recommendation
The Braden Scale should be used to identify moderate risk (Score <15) patients who are hospitalized with limited bed mobility. Those patients who are at moderate or higher risk for pressure ulcers should use a static air mattress in congruence with patient repositioning as part of the intervention.

Proposed Evaluation

<table>
<thead>
<tr>
<th>Measure</th>
<th>How will it be measured?</th>
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<tr>
<td>Incidence rate</td>
<td>Take the person-time incidence rate of new pressure ulcers in patients</td>
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