What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety?
An Integrative Review of the Evidence

Recommendations

Nurses who are experiencing fatigue pose a very serious threat to the safety of their patients and may cause harm or even death, but a systematic review done in 2003 gleaned insufficient evidence on work schedules, length of work shift, medical errors and patient safety. Since the 2003 report, an updated integrative review on nurse fatigue, hours worked, and patient safety was conducted in August 2008. Eight studies and multiple recommendations from experts such as the Agency for Healthcare Research and Quality (AHRQ), American Association of Critical Care Nurses (AACN), American Nurses Association (ANA) and the Institute of Medicine (IOM) accessed data that provided recommendations relating to hours worked, nurse fatigue and patient safety. Based on the grading standards used by Kaiser Permanente the results from the body of evidence were found to be insufficient to fair.

Based on the reviewed evidence, the following recommendations from the experts are offered for consideration:

Nurse Executives and Ambulatory Care Directors:
- Employers have an ethical responsibility to provide safe and high quality nursing care for their patients (9).
- Assess the organizational fatigue awareness culture, including its attitude toward fatigue in health care workers; this should include both clinicians and management (8, 16, and 14).
- Develop specific policies regarding length of work times in direct patient care that are based on the individual setting, patient and provider needs. In all circumstances policies should avoid any nurse work time of more than 12.5 consecutive hours (1, 5, 6, 12, 14, and 16) and no more than 60 hours in a 7 day period (26, 27).
- Encourage the exchange of ideas for quality care, policy development, and fatigue prevention through partnerships across the organization (23, 27).

Nurse Managers:
- Provide a system with a work schedule that provides adequate rest between scheduled work, breaks time, safe work hours, and minimum shift rotation (23, 26, and 14).
- Be aware of staffing patterns, amount of OT, the number of hours individual nurses are working (25) and the efficiency of shift change/report (8).
- Limit “on-call” time and requests for OT (26).
- Nurse Managers should not schedule nurses for 12-hour shifts (28).
- Provide education for all shift workers regarding the hazard of shift work (14); the negative impact of OT, no rest breaks, and total hours worked on patient safety (20, 23, 24); and the measures that can be taken to mitigate these hazard and promote healthy sleep and wake patterns (14).
- Realize the connection between budget and nurse fatigue that includes excessive and mandatory OT, agency use, understaffing, sick calls--all that can affect patient outcomes and occupational injuries (23, 20).
Staff Nurses
- Have an ethical responsibility to practice safely (9, 20, 22, 23, and 25).
- Must speak up when fatigue is a concern, and even before patient safety is compromised (7, 8).
- Need to seriously evaluate working more hours, either voluntary or mandatory, if they have not had enough rest (8, 14, 16, and 25).
- Must communicate to their nurse managers, directors, or administrators when they or their colleagues have worked extended shifts and double-back for on-call emergencies during the night (7).
- Need to be active participants in bringing awareness of the dangers associated with fatigue in the healthcare setting (8, 14, and 24).
- Nurses should get 7-8 hours of sleep each day (24-hour period) before they go to work (28).

Recommendation for Research
- Continue research efforts to gain additional knowledge about the impact of shift work and overall hours worked on patient and nurse safety (16, 18, 21, 23, 24, and 28).

Linda L. Coy, RN, BSN
MSN candidate
2008 Nursing Research Resident
Southern California Kaiser Permanente
Linda.L.Coy@kp.org
What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety?  
An Integrative Review of the Evidence

Summary of the Evidence

Based on Kaiser Permanente’s Quantitative Evidence Grading Scale System (29), the overall quality of the body of evidence on nurse fatigue, hours worked, and patient safety is insufficient. The grade of insufficient evidence promotes the recommendation for more research on these variables, subsequent outcomes, and effective preventative countermeasures.

Methodology:
The following databases were included in the search: Cochrane Collaboration, Joanna Briggs Institute, CINAHL, OVID, PubMed, Google, and National Guideline Clearinghouse. Individual sites searched through publication references include nurse experts, the Institute of Medicine (IOM), American Nurses Association (ANA), Agency for Healthcare Research and Quality (AHRQ), and American Association of Critical care Nurses (AACN). Nurse fatigue and at least one of the following two concepts hours worked and/or patient safety were inclusion criteria for relevance. Articles related to staffing issues/ratios, patient fatigue, nurse safety/outcomes, and resident/MD fatigue were excluded. Searches were limited to the years 2002-2008. Two project leads will appraise literature and together plan on summarizing the evidence. Recommendations based on the strength of the evidence will be compared to guidelines and position statements from IOM, ANA, AHRQ, and AACN.

Findings:
- Reviews or integrative reviews found.
- 9 articles are reports of individual research studies
- 1 literature review
- 15 guideline and/or commentary articles from professional organizations
- 6 from individual nurse experts

Key Summary of the Evidence:
- Weekly work schedules of staff nurses are varied and unpredictably prolonged (1, 3).
- The risk of error is three times higher when nurses work 12.5 hours or more (1, 5, 6, 7, 12, 14, 16).
- Working overtime increases the risk of making at least one error, regardless of original shift length (1).
- Breaks and meals do not make a difference in the risk of error, but may decrease subjective fatigue (2).
- For surgical nurses, reduction of charting errors occurred after reducing their call schedule and limiting consecutive work hours in a day to twelve (4).
- Hospitals and nursing leaders cannot ignore the accumulating evidence that links fatigue with medical errors, including tragic irreversible errors (11).
- For critical care nurses, there is a significant positive relationship between chronic fatigue and sleep quality, depression, and anxiety (17).
- Nurses who worked nine hours reported more fatigue than working eight (18).
- Insufficient evidence is present on the effectiveness of fatigue countermeasures (27).
- Hospital staff nurses are inextricably linked to patient safety. Higher staff ratios promote positive patient outcomes while nursing OT compromises them (12).
What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety?
An Integrative Review of the Evidence

- To reduce the effects of nurse fatigue, nurses and employers need to create a culture that encourages nurses not to work when fatigued (9, 8).
- The continued use of 12-hour shifts cannot be recommended given the current working conditions, including the almost daily need for nurses to stay beyond the end of their schedule shifts, the frequent absence of break during the workday, and the higher risk of errors associated with 12-hour shifts (28).

### Key Search Terms (2002-2008)

<table>
<thead>
<tr>
<th>Search Results</th>
<th>Cochrane Central Register of Controlled Trials</th>
<th>Joanna Briggs Institute</th>
<th>Ovid Journals</th>
<th>PubMed</th>
<th>CINAHL</th>
<th>Google</th>
<th>National Guideline Clearing-house</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue and nurse</td>
<td>3</td>
<td>83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>Nurse Fatigue and Safety</td>
<td></td>
<td></td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Nurse Fatigue and Hours worked</td>
<td>2</td>
<td></td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Nurse, safety, hours</td>
<td></td>
<td></td>
<td>0</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse hours worked and patient safety</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse, safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>Nurse, fatigue, and hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6,400,000 Google Scholar 16,000</td>
</tr>
<tr>
<td>Burnout and Nurse</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>68</td>
</tr>
<tr>
<td>Nurse fatigue, hours worked, and patient safety</td>
<td>0</td>
<td>7</td>
<td>12</td>
<td>8</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Nurse fatigue and Patient safety</td>
<td>57</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Relevant Total 27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCORE</th>
<th>LEVELS OF STUDIES</th>
<th>RELEVANT ARTICLES</th>
<th>ARTICLE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Meta-Analysis of Randomized Controlled Trials</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>Large Sample Randomized Controlled Trials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Small Sample Randomized Controlled Trials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Non-random, Controlled Prospective Studies</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Non-random, Controlled Retrospective Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cohort Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Case-Controlled Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Non-Controlled, Clinical, Descriptive Studies</td>
<td>7</td>
<td>17, 18, 1, 2, 3, 5, 6</td>
</tr>
<tr>
<td>2</td>
<td>Case Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Expert Consensus, Manufacturers Recommendations (Literature Reviews)</td>
<td>19</td>
<td>7, 8, 9, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28</td>
</tr>
<tr>
<td>0</td>
<td>Anecdotes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>28</td>
</tr>
</tbody>
</table>
What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety?
An Integrative Review of the Evidence

References


What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety?
An Integrative Review of the Evidence


Created by Linda Coy, RN, BSN, MSN(c), ©Kaiser Permanente, SCAL Regional Nursing Research Program
What is the Quality of the Evidence on Nurse Fatigue, Hours Worked, and Patient Safety? 
An Integrative Review of the Evidence


29. System for Grading the Strength of a Body of Evidence
Approved by National Clinical Content Network Review Board 10/28/03
http://cl.kp.org/pkc/national/ref/ebwebsite/evidencetools/docs/evidencegrading12pt20060427.htm
Purpose/intended Audience

Because we want everyone in our communities to have the healthiest lives possible, we are making our evidence reviews available to the communities we serve to help Californians and others lead healthier lives.

Integrative reviews and evidence summaries are provided as a community service for reference purposes only, and must be used only as specified in this disclaimer. These documents are intended for use by clinicians. If you are not a clinician and are reading these documents, you should understand that the information presented is intended and designed for use by those with experience and training in managing healthcare conditions. If you have questions about them, you should seek assistance from your clinician. The information contained in the evidence reviews is not intended to constitute the practice of medicine or nursing, including telemedicine or advice nursing.

Limitations On Use

These documents have been developed to assist clinicians by providing an analytical framework for the effective evaluation and treatment of selected common problems encountered in patients. These documents are not intended to establish a protocol for all patients with a particular condition. While evidence reviews provide one approach to evaluating a problem, clinical conditions may vary significantly from individual to individual. Therefore, clinicians must exercise independent professional judgment and make decisions based upon the situation presented.

Kaiser Permanente's documents were created using an evidence-based process; however, the strength of the evidence supporting these documents differs. Because there may be differing yet reasonable interpretations of the same evidence, it is likely that more than one viewpoint on any given healthcare condition exists. Many reviews will include a range of recommendations consistent with the existing state of the evidence.

All of the Kaiser Permanente integrative reviews and evidence summaries were developed from published research and non-research evidence and do not necessarily represent the views of all clinicians in Kaiser Permanente. These documents may also include recommendations that differ from certain federal or state health care mandates.

Intellectual Property Rights

Unless stated otherwise, all of these materials are protected by copyright and should not be reproduced or altered without express written permission from Kaiser Permanente. Permission is granted to view and use these documents on single personal computers for private use within your hospital or hospital system. No portion of these materials in any form may be distributed, licensed, sold or otherwise transferred to others.

The organizations within Kaiser Permanente retain all worldwide rights, title and interest in and to the documents provided (including, but not limited to, ownership of all copyrights and other intellectual property rights therein), as well as all rights, title and interest in and to their trademarks, service marks and trade names worldwide, including any goodwill associated therewith.
No Endorsement or Promotional Use

Any reference in these documents to a specific commercial product, process, or service by trade name, trademark, or manufacturer, does not constitute or imply an endorsement or recommendation by Kaiser Permanente. The views and opinions expressed in these documents may not be used for any advertising, promotional, or product endorsement purposes.

Disclaimer of All Warranties and Liabilities

Finally, although Kaiser Permanente believes that all of the information provided in its documents is accurate, specific recommendations derive from combining the best available evidence. Although we have sought to ensure that the documents accurately and fully reflect our view of the appropriate combination of evidence at the time of initial publication, we cannot anticipate changes and take no responsibility or assume any legal liability for the continued currency of the information or for the manner in which any person who references them may apply them to any particular patient. Kaiser Permanente does not assume any legal liability or responsibility for the completeness, clinical efficacy or value of any apparatus, product, or process described or referenced in the documents. We make no warranties regarding errors or omissions and assume no responsibility or liability for loss or damage resulting from the use of these documents.