Fatigue and Work Schedules

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Fatigue and Work Schedules

Abstract
Purpose: The purpose of this research is to investigate the relationship of fatigue in nurses and to determine what factors influence the self-reported fatigue levels. Background and Significance: Shift work is comprised of working outside of the standard 7am to 7pm. Many institutions have a day, evening, and night rotation. Much of the problem with rotating shifts comes from not getting enough sleep or not getting consistent sleep. It is understood that shift work causes fatigue among all professions. Shift work has other adverse health effects. There is research to support a positive correlation between shift work and fatigue, multiple sclerosis, ischemic, stroke, and breast cancer. It is important for continued research to try and decrease fatigue related to shift work. Sample/Setting: The sample 64 nurses varying nursing experience. Each participant utilized a nursing degree and employed at a health care facility. The nurses were asked to complete a questionnaire on SurveyMonkey.com. Methods: This evidence-based project will gather both qualitative and quantitative information. Data will be collected from questionnaires obtained through SurveyMonkey.com via Facebook and using the Swedish Occupation Fatigue Inventory. Implications: Fatigue affects many individuals who work shift work. Pearson correlation indicated - .417 between the SOFI and hours of sleep. This is a significant correlation to help identify one factor that influences nurse fatigue. More research must be completed to help decrease the negative affects fatigue has.

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Fatigue and Work Schedules

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Abstract

Purpose: The purpose of this research is to investigate the relationship of fatigue in nurses and to determine what factors influence the self-reported fatigue levels.

Background and Significance: Shift work is comprised of working outside of the standard 7am to 7pm. Many institutions have a day, evening, and night rotation. Much of the problem with rotating shifts comes from not getting enough sleep or not getting consistent sleep. It is understood that shift work causes fatigue among all professions. Shift work has other adverse health effects. There is research to support a positive correlation between shift work and fatigue, multiple sclerosis, ischemic, stroke, and breast cancer. It is important for continued research to try and decrease fatigue related to shift work.

Sample/Setting: The sample 64 nurses varying nursing experience. Each participant utilized a nursing degree and employed at a health care facility. The nurses were asked to complete a questionnaire on SurveyMonkey.com. The nursing sample was obtained through snowball sampling via social media (Facebook).

Methods: This evidence-based project will gather both qualitative and quantitative information. Data will be collected from questionnaires obtained through SurveyMonkey.com via Facebook and using the Swedish Occupation Fatigue Inventory.

Implications: Fatigue affects many individuals who work shift work. Pearson correlation indicated - .417 between the SOFI and hours of sleep. This is a significant correlation to help identify one factor that influences nurse fatigue. More research must be completed to help decrease the negative affects fatigue has.
Introduction

Nursing is a high demand profession that may require long hours and shift work. Shift work is an area of much concern to nurses. Shift work is comprised of working outside of the standard 7am to 7pm. Much of the problem of rotating shifts comes from not getting enough sleep or not getting consistent sleep. Rotating shifts from days to night can put a stain on the physical and mental health of many individuals. Rotating day and night shifts throughout the week or month can cause stress and fatigue for nurses. Fatigue has been associated with stress, safety, and performance declines in numerous work environments (Tuckert, Harris, Pipe, & Stevens, 2010). Fatigue is an issue for nurses that may lead to medical errors, degradation in performance, decreased mental acuity, and social problems. Insufficient restorative daytime sleep and inadequate recovery time from night work, as described in studies, may lead to sleep deprivation that may affect nurses’ ability to provide the high standard of care that nurses aspire to give to their patients (Nussbaum & Barker, 2010). Shift work disrupts the synchronous relationship between the body’s internal clock and environment. This disruption often results in problems, such as sleep disturbance, increased accidents and injuries, and social isolation. Rotating shifts is also associated with unhealthy eating. Work related stress has been associated with unhealthy eating, among many other problems (Tuckert et al., 2010). Research from the same study concluded that out of 3,132 nurses, half were overweight. Fifty percent met physical activity standards, more than two thirds reported a history of back or needle stick injuries, and 44% and 62% reported experiencing verbal abuse by colleagues and patients, respectively (Tuckert et al., 2010).
Significance of Research

Fatigue in nursing is a current issue in the health care field. Research has proven that fatigue leads to medical errors, degradation in performance, decreased mental acuity, and social problems. Fatigue is a factor that has been linked to performance declines in healthcare worker (Nussbaum & Barker, 2010). Due to the nature of the profession, nurses are extremely susceptible to fatigue that has been linked to patient safety. This researcher is investigating the possible correlation between nursing fatigue, nurses’ work schedules, and external factors influencing fatigue. By gaining knowledge and awareness of factors influencing fatigue, one may be able to adjust these factors to decrease fatigue. This will benefit all health care professionals.

Purpose of Research Question

The purpose of this research is to investigate the relationship of fatigue in nurses and to determine what factors influence the self-reported fatigue levels.

Literature Review

A literature review through CINHAL, MEDLINE and Business Source Complete databases using key words nurse, fatigue, and/or shift work was utilized. The search was limited to full text, academic journals, and articles from 2009-2014 only. This search resulted in 9,023 articles. This was further reduced to 97 articles when shift work and fatigue were searched in Subject Terms. Lastly, 20 articles were retrieved when shift work, fatigue, and nurse were searched in the Subject terms.

Nurses are notorious for working long hours. Nurses choose to work the 12-hour shifts in order to have more days off during the week, but sometimes at the expense of their own health
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and safety. Data was obtained from a sample of 25,924 nurses that responded to a questionnaire. The results indicated that nurses working alternating shifts and 10-hour shifts and night report more difficulties with their private and family lives. Nurses working extended hours of 10-12 hour day shifts or 12-hour shifts at night feel more tired and have a high burnout score more frequently (Estryn-Behar & Beatrice, 2012).

Much research has been completed involving fatigue. A study conducted in Taiwan investigated the fatigue of nurses who worked days compared to nurses who worked rotating shifts of days, evenings, and nights. Nurses completed a questionnaire developed by the Japanese Association for Industrial Health both prior to starting their shift and after their shift (Yoshitake, 1971). This questionnaire is one tool to measure fatigue. Symptoms of fatigue were classified into three fields: “drowsiness and a lack of energy, difficulty concentrating, and feel uncomfortable (Yoshitake, 1971, p.231)”. The study concluded that when comparing objective data of an eye critical flicker fusion (CFF) exam used to measure fatigue, and subjective data from the three fields, nurses who worked in rotating shifts were much more fatigued than nurses who worked during the day (Yuan, et al., 2011). The nurses who primarily worked day shifts had an average age of 31 years. The nurses who primarily rotated were an average of 28.4 years old. Day shift nurses were also comprised of 55.6% junior college graduates, and 73.3% of the rotating shifts were college graduates. A greater percentage of rotating shift nurses were single. Single nurses who rotate shifts make up 71.3% compared to 66.7% of the day shift nurses being single (Yuan et al., 2011).

Another evidence-based study related to fatigue demonstrated a correlation between fatigue and performance. In a 2010 study conducted by Barker & Nussbaum, mental fatigue levels were found to be higher than physical fatigue levels, and acute fatigue levels were higher
than chronic fatigue levels. The fatigue dimensions and states were correlated with performance measures, confirming the role of fatigue in nursing performance. Mental fatigue measures tended to have higher negative correlations with the performance measures than did either physical or total fatigue (Barker et al., 2010). It is important to understand those challenges of nursing and the high demand that it entails. Recognizing the relationship between the work environment, fatigue, and performance is critical.

**Methodology**

**Design and Sample**

This is an evidence-based project to research the contributing factors that may affect nurses' fatigue levels. A total of 64 nurses participated in this study. Each participant utilized a nursing degree and employed at a health care facility. The nurses were asked to complete a questionnaire on Surveymonkey.com. The nursing sample was obtained through snowball sampling via social media (Facebook). Because this data is being sent via Facebook with the intent of snowball sampling and directed to a survey monkey questionnaire, no individually identifying data is being collected. There is minimal demographic data being collected. Informed consent was used. The consent form is embedded on the second screen of the Surveymonkey questionnaire (after the cover letter explaining the study and the information about the researcher and supervising faculty). Subjects may have chosen to exit at any time by closing out of the survey and their data will not be included. They were informed on the consent that once they “submit,” their data it was included in the final analysis, as it is impossible to identify, and therefore, remove it from analysis.

Once completed, the questionnaires were separated into day, night, and rotating shifts. The information obtained was then analyzed.
**Inclusion Criteria**

- Registered Nurse or Licensed Practical Nurse
- Nurses currently working in a health care setting
- Male and female
- Able to read and speak English
- Age > 18 years
- Currently working in the United States
- Working non-self selected shift work (Cannot make their own hour lengths)

**Exclusion Criteria**

- Age < 18 years
- Diagnosis of chronic fatigue syndrome
- Not currently a practicing nurse
- Those who make their own hours

**Methods**

This evidence-based project will gather both qualitative and quantitative information. Nurses will be given a link on a request complete a questionnaire done on SurveyMonkey.com in relationship to fatigue. Qualitative data will be collected to provide additional data on the perceived level of fatigue of nurses in relationship to the shift worked. The nurses were asked to complete this questionnaire after working a six-week time block of day, night, or rotating shifts. Data was collected from a total of 64 nurses. Information was categorized into day, evening, night, and rotating shifts. Forty-three nurses stated they work strictly day shift; one nurse works evening shifts, 10 work night shifts, and 11 rotate shifts.
The participants were asked a series of questions to identify if there is a correlation to fatigue. The questions asked were: gender, years working as a nurse, current age, primary shift worked, hours worked weekly, average hours of sleep, participation in recreational activities, marital status, treatment for chronic fatigue, and a 25 part expression questionnaire using the SOFI tool. The SOFI was used to ask participants to what extent do the expressions describe how you feel after a 6 week work schedule. The expressions in the SOFI included palpitations, lack of concern, lazy, worn out, tense muscles, numbness, sweaty, exhausted, listless, falling asleep, spent, drowsy, passive, stiff joints, warm, indifferent, hurting, out of breath, yawning, drained, sleepy, overworked, aching, breathing heavy, and uninterested. The numbers vary from 0, not at all, to 10, to a very high degree.

Institutional Review Board approval was obtained through the college for this graduate student project. Data was obtained through snowball sampling via Facebook, and each participant remained anonymous. Because of the methodology being used, the primary investigator did not have access to information linking specific individuals to participation (it is not being collected).

Findings/Results (i.e., data analysis)

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). The SOFI scale can range from 0-250. A score of zero would indicate the least amount of stress. A score of 250 would indicate the most stressed. Sixty-four participants completed the survey, including the SOFI. Five respondents did not complete the SOFI, therefore n=59. The lowest cumulative score was a 3, and the highest cumulative score was 162. The minimum responses for all expressions were zero, and the maximum response for all but four responses was 10. The descriptive expression “palpitations” ranged from 0-7, “sweaty” ranged from 0-8, “warm”
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ranged from 0-9, and “out of breath” ranged from 0-5. Each of the remaining expressions ranged from 0-10. The mean for the descriptive statistics is 72.14 and standard deviation 44.27.

The percentage of male (n=3, 5%) and female (n=61, 95%) nurses and the mean age of respondents is 34.97. The minimum age is 22 and the oldest is 74 years old, standard deviation 11.682. Seventy percent of the participants state that they participate in recreational activities, and 28.1% indicate that they do not. Only 3% of nurses have been practicing less than one year. The majority of the nurses, 33%, claim to have greater to or equal to 5 but less than 10 years of experience. A little over half of the nurses surveyed hold a Bachelors of Science in nursing degree, making it 33 nurses. Two nurses are LPN’s, one LPN is in school for her RN, seven have their 2 year RN, one 2 year RN is in school for her BSN, 13 BSN nurses are in school for Master’s degrees, and 5 Master’s prepared nurses are in school for their Doctorate degrees.

The shifts that the nurses worked varied. The highest percentage of nurses worked 12-hour day shifts, making up 37.5%, followed by 21% 8-hour day shifts. Fifteen and six tenths of a percent of the nurses surveyed work 12-hour rotating shifts of day/nights. Almost 11% of nurses work 12-hour night shifts, 9.4% work 10-hour day shifts, 1.6% works 8-hour evenings, 1.6% work 8 hour nights, and 1.6% rotate 8-hour day/nights.

One of the questions asked of the participants, was if they participated in recreations activities. Out of 64 nurses, 45 stated “yes,” 18 stated “no” and one person did not answer the question. A total of 70.3% of the nurses are married. If this is broken down further, 29.7% are married or living with spouse/significant other and have no children. Nearly 41% are married or living with spouse/significant other and have children. Single parents make up the smallest population, accounting for 6.3%, while nurses claiming to be single without children total 23.4%.
On average, the amount of time spent sleeping was greater than 6 hours, but less than 8. Following this, 21.88% claimed to sleep more than 4 hour, but less than 6 hours. Individuals who state they sleep more than 8 hours but less than 10 accounts for 6.25%. One nurse sleeps less than 4 hours a night, and no one sleeps more than 10 hours a night.

Table 1

*Age of participants and hours of sleep*

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
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</thead>
<tbody>
<tr>
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<td>8</td>
<td>6</td>
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</tbody>
</table>

Table 2

*Shifts worked*

<table>
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<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hour day</td>
<td>14</td>
<td>21.9</td>
<td>21.9</td>
<td>21.9</td>
</tr>
<tr>
<td>10 hour day</td>
<td>6</td>
<td>9.4</td>
<td>9.4</td>
<td>31.3</td>
</tr>
<tr>
<td>12 hour day</td>
<td>24</td>
<td>37.5</td>
<td>37.5</td>
<td>68.8</td>
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<tr>
<td>8 hour evening</td>
<td>1</td>
<td>1.6</td>
<td>1.6</td>
<td>70.3</td>
</tr>
<tr>
<td>8 hour night</td>
<td>1</td>
<td>1.6</td>
<td>1.6</td>
<td>71.9</td>
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<tr>
<td>12 hour night</td>
<td>7</td>
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<td>10.9</td>
<td>82.8</td>
</tr>
<tr>
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<td>1.6</td>
<td>1.6</td>
<td>84.4</td>
</tr>
<tr>
<td>day/night 12 hr</td>
<td>10</td>
<td>15.6</td>
<td>15.6</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Discussion of Findings

From the 64 nurses who were surveyed, four had a SOFI score less than or equal to ten. Each one of them works 8 hour days, participated in recreational activities, and was married or living with spouse/significant other, female, and holds a BSN degree or higher. Two of the four were married or living with significant other with children living in the home, and the other two did not have children. The highest SOFI score was 162.

Pearson correlation indicated -0.417 between the SOFI and hours of sleep. The correlation is significant at the 0.01 level, and the (2-tailed) significance is 0.001. This data provides information that when sleep decreases, the SOFI increases. Nurses experience both mental and physical fatigue. Sleep plays a critical part in maintaining a healthy life. This is a significant finding that can help to prove sleep in a key factor in nursing fatigue. This provides quantitative data showing the effects sleep has on fatigue. Sleep is factor that can be improved, if adequate resources available.

Using SPSS and a Pearson correlation, sleep was the only significant factor that showed a significant correlation at the 0.01 levels. Marital status and the SOFI had a Pearson correlation of 0.068, indicating no significance. The SOFI score and participation in recreational activities Pearson correlation was 0.318. When comparing the SOFI and the amount of hours worked per week, the Pearson correlation was 0.571. The primary shifts worked in relationship to the SOFI had no significant correlation at 0.152. Lastly, the degree a nurse held or was in the process of obtaining did not show any significance when compared to the SOFI. The Pearson correlation for this was 0.794.
Limitation

Limitations of this study included a relatively small sample size and self-reporting instrument. Information gathered from the SOFI tool was all subjective. The participants may have been influenced by outside factors and stressors not related to nursing or work schedule. A total of 64 nurses completed the survey. Five of the participants were excluded from the survey due to answering “yes” to the question, treatment for chronic fatigue. A diagnosis of chronic fatigue is an exclusion criteria stated in the informed consent.

Nursing Implications

Shift work is an inevitable part of nursing. From this research, nurses rated themselves the least fatigued when working 8-hour day shifts. It is important for nurses to have some input on their work schedule and have the option to work 8 hour shifts versus the 12 hour shifts. Unpredictable outside factors can influence one’s stress and fatigue levels, and must be accounted for. The health care system must make every effort to decrease the stresses of nursing. This may include hiring more nurses to decrease the patient loads and allowing for a more desirable schedule for staff. Allowing nurses to have a more standardized schedule may decrease the stress and fatigue.

Recommendations for Future Research

Further studies are needed in this area to determine what other modifiable factors account for nursing fatigue. A study with the same people and ask the same questions in 5 years to see if their responses change would be helpful to further research the fatigue level. This may help to better understand how peoples’ fatigue levels change with life and work. Allowing nurses to choose their own work schedule is one step in the right direction to allow nurses to take a more proactive role in helping decrease fatigue.
Conclusion

Nursing is a demanding profession in which a person puts his or her own needs aside to take care of the ill. With the population aging and becoming more ill, nurses are working extra hard and extra-long to get all of their work done. Shift work can cause numerous disorders. Fatigue is an ailment that the health care industry can potentially lessen for nurses. By standardizing nurses’ schedules, we can decrease self-reported fatigue. It is important that more research be done in order to make nurses more content with their schedules, thus increasing their happiness. The negative effects associated with shift work cause unnecessary stress, and every effort should be made to fix this.

This study has the potential to influence how nursing management schedules a unit. It can greatly impact self-reported fatigue. If standardizing schedules can lessen the self-reported fatigue of nurses, this could increase the morale of nurses, decrease hospital errors, and lead to more efficient work by nurses, making patients and family members of patients more content. Alleviating some of the nursing fatigue work causes nursing will have a positive effect on the productivity of the health care facility. More research should be done in this area. It is an ever growing problem in the health care system.
References


Tucker, S J, Harris, M R, Pipe T B, & Stevens, S R, (2010). Nurses' ratings of their health and
professional work environments. *AAOHN Journal, 58*(6), 253--267. 10.3928/08910162-20100526-03


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Jamie Cucci RN, BSN

Timeline
Obtained approval on 9/13/13
"Fatigue and Work Schedules"
SOFI and Surveymonkey questionnaires posted on Facebook. November 2013
Data collection 1-3 months. Nov 2013-January 2014
Interpret/analyze data. February-April 2014
Disseminate information to the appropriate organizations.

Research question
Actual research question: The purpose of this research is to investigate the relationship of fatigue in nurses and to determine what factors influence the self-reported fatigue levels.

Original research question: The purpose of this project is to determine whether "nurse work schedules have an effect on self-reported symptoms of general fatigue and illness."
Problems associated with shift work

Shift work is comprised of working outside of the standard 7am to 7pm.
Many more workers have a day, evening, and night rotation.
Shift work has been associated with decreased sleep, depression, fatigue, and job burnout (Reboussin, Kang, & Kelsh, 2007).
Fatigue has been associated with stress, safety, and performance decrements in numerous work environments (O'Connor & Babcock, 2001).
Fatigue is an issue for nurses that may lead to medical errors, degradation of performance, decreased mental alertness, and social problems (Amir et al., 2007).
There is research to support a positive correlation between exposure to night work and increased risk of certain acute and chronic diseases in women.
Other diseases that are influenced by shift work include multiple sclerosis, ovarian storms, and breast cancer.
Weight gain is associated with night workers.

About my research...

Purpose: The purpose of this research is to investigate the relationship of fatigue in nurses and to determine what factors influence the self-reported fatigue levels.

Sample/Setting: A sample of 64 nurses with varying nursing experience.

Methods: This evidence-based project will gather both qualitative and quantitative information. Data was collected from questionnaires obtained through SurveyMonkey.com and Facebook, and using the validated Occupational Fatigue Inventory tool.
The results

Pearson correlation indicated -.417 between the SOFI and hours of sleep.

When sleep decreases, stress and fatigue increases.

Each of the other factors that I investigated such as gender, years working as a nurse, current age, years shift worked, hours per week worked, participation in recreational activities, and marital status did not show a significant Pearson correlation when compared to the SOFI fatigue tool.

About the study

A total of 64 nurses took the survey.

- 61 females, 3 males
- Minimum age 22, oldest age 74.
- SOFI score:
  - Ranged from 3-162. The lower the score the less self-reported stress.
  - Mean 72.14, standard deviation of 44.3.
  - Out of the 25 expressions on the SOFI, 21 had a minimum score of 0 and a max score of 10.
  - Palpitations 0-7, sweaty 0-8, warm 0-9, and out of breath 0-5.

Result tables
Conclusion
Pearson correlation indicated a significant correlation that when sleep decreases SOFL increases.
This is a modifiable factor given adequate resources to increase sleep.
More research needs to be conducted on nursing fatigue.

References

[References list]

[References list]

[References list]