Effect of sleep deprivation on cognitive function of medical residents and interns in Riyadh, KSA

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Abstract

Medical residents' work hours in KSA are intense and long, interfering with their sleep. Nighttime sleep duration is characteristic of, on-call residents. This leaves them susceptible to sleep deprivation. Fatigue, acute and chronic sleep deprivation have been shown to influence resident's social lives as well as professional lives, by Frosen, Parg and others, in Korea and USA. The study objectives are to estimate the prevalence of sleep deprivation amongst medical interns and residents in Riyadh. Sleep deprivation will be graded according to severity level and its impact on their cognitive abilities will be assessed. Online survey with relevant questions will be emailed to medical interns and residents from KFSH&RC. We will assess their mean sleep hours, level of sleep deprivation and effects on performance, such as increased error rate, difficulty in thinking, learning, and memory. In addition, we will note any variations in the main outcome with age, gender, year of training and academic standing. If the survey indicates potential impact on professional development, as well as threat posed to the delicate nature of the job of an intern, then the ministry of health will be advised to take significant steps to impose restrictions on the maximum amount of working hours allowed per week.

Introduction

▶ There is a high prevalence of medical errors in Saudi Arabia, according to the Ministry of Health -

<table>
<thead>
<tr>
<th>Region</th>
<th>Medical Errors</th>
<th>Deaths due to Medical Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riyadh</td>
<td>21%</td>
<td>15%</td>
</tr>
<tr>
<td>Jeddah</td>
<td>19%</td>
<td>14%</td>
</tr>
<tr>
<td>Makkah</td>
<td>17%</td>
<td>12%</td>
</tr>
<tr>
<td>Ta'if</td>
<td>14%</td>
<td>10%</td>
</tr>
<tr>
<td>Asser</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>Qaseem</td>
<td>13%</td>
<td>7%</td>
</tr>
<tr>
<td>Al-Ahsa</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>Medina</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>Eastern</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Al-Faisal</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

▶ Current shift hours of medical residents and interns are prolonged with 24 hours on call duty frequently.

▶ We suspect this possibly causes disruption of sleep rhythms, sleep deprivation and other effects documented by research such as:

1. Poor concentration and fatigue!
2. Burnout!
3. For 24 hour on call duty versus normal shift hours2
   - More attention failures
   - More serious medical errors
   - More fatigue related medical errors that lead to death of patients
4. Increased probability of being involved in a motor vehicle accident4
   - 24 hours on call medical residents and interns have 2.3 times higher probability
   - Monthly risk of crash increased by 16% with extended shift hours
5. Residents on heavy calls made more errors when sustained attention & vigilance was demanded, compared to residents on mental intoxicants such as alcohol5.

Objective

▶ To measure the level of sleep deprivation in medical interns and residents at King Faisal Specialist Hospital & Research Center.
▶ To find the effect of sleep deprivation on their cognitive functions.
▶ To suggest ways of preventing deterioration of their mental abilities and hence reduce medical errors.

Theory

Medical residents and interns in Saudi Arabia, specifically in KFSH&RC, experience sleep deprivation and disruption of sleep cycle due to prolonged shift hours. This leads to a deterioration in their cognitive functions.

Method

Participants: Survey link will be emailed to all the medical interns and residents in KFSH&RC.

Survey content:
- Personal Information: to measure sleep deprivation by measuring daytime sleepiness level.
- Pittsburgh Sleep Quality Index: to measure sleep quality, sleep disturbances and day time dysfunction.
- Stroop Test: to measure selective attention, cognitive flexibility and processing speed.
- Continuous Performance Test (CPT): to measure reaction time, impulsivity and attention in both boring and demanding situations.

Survey format:
- The tests will be uploaded on a custom built website.
- Tests will be timed and results will be recorded to be later retrieved.

Analysis:
- Find mean sleep hours and level of sleep deprivation.
- Rate level of cognitive abilities of the participants by averaging score from the tests.
- Find correlation between level of sleep deprivation and deterioration in cognitive functions.
- Note any variations in the main outcome with age, gender, year of training and academic standing.

Future Plan

▶ Expand the research to other teaching hospitals both inside and outside of Riyadh, KSA.
▶ Inform the Ministry of Health of any significant findings that may help better adjusting shift hours of medical interns and residents for attaining optimal mental and physical performance and to reduce medical errors.

Bibliography