The relationship between sleep and mood states in nurses working in two-shift system—A continuous evaluation for 8 weeks—

Ehime University, Graduate School of Medicine, Nursing & Health Science Course
Yuka SAEKI, RN, Ph.D.

**Purpose**

It is said that over 20% of general adults in Japan have some kinds of sleep disorder. Sleep is also related to mental or physical stress and fatigue, and interacts with each other. In particular, nurses work in shift system, so a wide range of research in nurses has been conducted on the relationship between sleep and fatigue, the relationship between sleep and mood, and the difference between night-shift and three-shift works. Most of the studies on nurse sleep have been evaluated by one survey, one week, or four weeks at maximum, and there were no reassessments continuously investigated for more than one month. The purpose of this study was to investigate the relationship between mood and sleep states for 8 weeks in nurses who work in two-shift system.

**Method**

1. **Participants**
   Nine nurses working in two-shift system at a University Hospital

2. **Instruments**
   1) Profile of Mood States (2nd edition) (POMS2):
      - **Total Mood Disturbance (TMD)**
      - **Anger—Hostility (A—H)**
      - **Confusion—Bewilderment (C—B)**
      - **Depression—Dejection (D—O)**
      - **Vigor—Activity (V—A)**
      - **Fatigue—Inertia (F—I)**
      - **Depression—Depression (D—O)**
      - **Hostility (A—H)**
      - **Bewilderment (C—B)**
      - **Friendliness (F)**
   2) Athens Insomnia Scale (AIS, 0–24 points):
      - **Sleep initiation**: difficulty falling asleep
      - **Sleep duration**: total time spent asleep
      - **Sleep quality**: overall quality of sleep
      - **Awakening during the night**: number of times awakened
      - **Sleep efficiency**: percentage of time spent in bed that is actually spent asleep

3. **Protocol**
   Participants were asked to fill in POMS2 and AIS once a week. In addition, they were asked to fill out a sleep diary (bedtime, awakening time, holidays, night shift, etc.) every day.

4. **Statistical Analysis**
   Descriptive statistics were used for scores in each item of POMS2 and AIS. Spearman’s rank correlation coefficient was used for the correlation between the score in each items of POMS2 and AIS, and significant level was p<0.05.

**Ethical Consideration**

This study was conducted after receiving the approvals of Ethical Committees of Ehime University Graduate School of Medicine, Nursing Course and Institutional Review Board at Ehime University Hospital.

**Discussion**

Since an average score of AIS was 3.1 and each mood state in POMS2 was 45.6–51.7 throughout measurement, the participants of this study must not have the major problems in sleep and mood states. However, there were significant and positive correlation between AIS and several negative moods in POMS2, indicating that negative mood may cause sleep disturbance. Therefore, it must be important that the workplace improve and keep so that vigor and vitality can be kept.

It is difficult to be generalized with only seven people in this study, and it will be necessary to increase the number of the subjects in future.

**Acknowledgment**

This work was supported by Grant-in-Aid for Exploratory Research, JSPS KAKENHI Grant Number 15K15795.

**Results**

**Demographic characteristics**

Two participants were excluded from analysis due to incomplete POMS2 or cancellation, and data obtained from 7 participants were analyzed.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Minimum</th>
<th>Lower quartile</th>
<th>Median</th>
<th>Upper quartile</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Mood Disturbance (TMD)</td>
<td>39</td>
<td>46</td>
<td>51</td>
<td>54</td>
<td>69</td>
</tr>
<tr>
<td>Anger—Hostility (A—H)</td>
<td>35</td>
<td>40</td>
<td>43</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>Confusion—Bewilderment (C—B)</td>
<td>34</td>
<td>43</td>
<td>48</td>
<td>53</td>
<td>60</td>
</tr>
<tr>
<td>Depression—Dejection (D—O)</td>
<td>39</td>
<td>44</td>
<td>47</td>
<td>51</td>
<td>63</td>
</tr>
<tr>
<td>Fatigue—Inertia (F—I)</td>
<td>37</td>
<td>40</td>
<td>49</td>
<td>50</td>
<td>57</td>
</tr>
<tr>
<td>Hostility (A—H)</td>
<td>37</td>
<td>40</td>
<td>49</td>
<td>50</td>
<td>58</td>
</tr>
<tr>
<td>Vigor—Activity (V—A)</td>
<td>33</td>
<td>44</td>
<td>47</td>
<td>49</td>
<td>50</td>
</tr>
<tr>
<td>Friendliness (F)</td>
<td>32</td>
<td>44</td>
<td>47</td>
<td>51</td>
<td>59</td>
</tr>
</tbody>
</table>

**Score of POMS2**

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum</th>
<th>Lower quartile</th>
<th>Median</th>
<th>Upper quartile</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMD</td>
<td>39</td>
<td>46</td>
<td>51</td>
<td>54</td>
<td>69</td>
</tr>
<tr>
<td>A—H</td>
<td>35</td>
<td>40</td>
<td>43</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>C—B</td>
<td>34</td>
<td>43</td>
<td>48</td>
<td>53</td>
<td>60</td>
</tr>
<tr>
<td>D—O</td>
<td>39</td>
<td>44</td>
<td>47</td>
<td>51</td>
<td>63</td>
</tr>
<tr>
<td>F—I</td>
<td>37</td>
<td>40</td>
<td>49</td>
<td>50</td>
<td>57</td>
</tr>
<tr>
<td>H</td>
<td>37</td>
<td>40</td>
<td>49</td>
<td>50</td>
<td>58</td>
</tr>
<tr>
<td>V—A</td>
<td>33</td>
<td>44</td>
<td>47</td>
<td>49</td>
<td>50</td>
</tr>
<tr>
<td>F</td>
<td>32</td>
<td>44</td>
<td>47</td>
<td>51</td>
<td>59</td>
</tr>
</tbody>
</table>

**Correlation with POMS2 and AIS**

- **TMD vs. AIS:**
  - Significant and positive correlations were found between the AIS and negative moods in POMS2 including TMD, C—B, D—O, F—I, or T—A.
  - A significant and negative correlation was found between AIS and V—A in POMS2.

- **C—B vs. AIS:**
  - Significant and positive correlations were found between the AIS and negative moods in POMS2 including D—O, F—I, or T—A.

- **D—O vs. AIS:**
  - Significant and negative correlations were found between the AIS and positive moods in POMS2 including T—A.

- **F—I vs. AIS:**
  - Significant and positive correlations were found between the AIS and negative moods in POMS2 including D—O, F—I, or T—A.

- **T—A vs. AIS:**
  - Significant and negative correlations were found between the AIS and positive moods in POMS2 including TMD, C—B, D—O, F—I, or T—A.

- **V—A vs. AIS:**
  - Significant and negative correlations were found between the AIS and positive moods in POMS2 including TMD, C—B, D—O, F—I, or T—A.