Work stress and sleep disturbances among internship nursing students

Samah Rabei*, Ghada Mourad and Alaa El Din Hamed

Abstract: Background: Nurses are one of the most vulnerable professional groups to occupational stress and sleep problem. A relation between occupational stress and sleep problem is suggested and needs to be investigated. The aim of this descriptive study is designed to assess work stress and sleep disturbances among internship nursing students and the relation between them.

Results: A total of 95 nursing internship students were subjected to Pittsburgh Sleep Quality Index (PSQI) and Expanded Nursing Stress Scale (ENSS). The greater the number of patients a nurse cares for, the greater the nursing stress. Greater number and duration of shifts worsen sleep. Problems related to peers worsen sleep quality. Demanding patients and their families lessen the actual sleep duration of nurses. Demanding patients and their families, work load, discrimination, and uncertainty regarding treatment lessen the habitual sleep efficiency of nurses.

Conclusion: Nurses with higher workload experience more sleep disturbances.

Background
Nursing is considered as a stressful occupation. Stress has an implication for health and the satisfaction level of the nurses involved which eventually has an impact on the quality of care for the patients they attend to. It is financially costly to any health care organization. Negative outcomes of job stress among nurses include absenteeism and staff turnover; also, stress is associated with impaired individual functioning in the workplace, decline in overall quality of care, reduced efficiency, decreased capacity to perform, dampened initiative, reduced interest in working, increased rigidity of thought, a lack of concern for the organization and colleagues, and a loss of responsibility [1]. Description of the nursing internship is the transitional program of new graduated; they last longer and are more comprehensive than traditional hospital orientation programs for new staff nurses. The goals of nursing internship are to ease the transition from the student role to the staff nurse role and to guide new nurses in developing basic and specialized nursing skills [2]. Sleep disturbance in nurses represent highly common phenomena that, in severe forms, can interfere with daily activities and work performance. It is estimated that more than 25% of nurses experience significant sleep problem during the day. National sleep disorder research reported that 12 h shifts are associated with less effective performance, and there is very large, strong body of evidence showing that insufficient sleep has adverse effect on cognition, performance, and mood of registered nurses [3]. In a study analyzing the association between stress and life quality, they reported that there is a correlation between stress and sleep disturbance [4]. In another study developed at seven hospitals in Shanghai, the authors observed that the stress at work was correlated to the impairment of the nurses’ sleep [5, 6].

Methods

(A) Setting: in College of Nursing Helwan University, Badr University Hospital, Ain-Shams University Hospital, Wadi El Nil Hospital, El Salam International Hospital, and Nile Badrawy Hospital

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Subject: 95 students in the five hospitals collected in a stratified random method for a descriptive design.

Timetable: between June and December 2016.

Tools for data collection: demographic data questionnaire, Pittsburgh Sleep Quality Index (PSQI) and Expanded Nursing Stress Scale (ENSS) were used.

Sociodemographic Questionnaire: developed by the researchers which includes age, sex, religion, marital status, and monthly income.

The Pittsburgh Sleep Quality Index (PSQI): developed by Buysse et al. [7] and revised by Smyth [8]. It consists of seven domains: sleep quality, latency, duration, efficiency, nigh sleep disturbance, use of sleep medication, and daytime sleepiness over the last month. Each scored from 0 to 3, which sum results in a global score that may range from 0 to 21. Scores above 5 suggest poor sleep quality, and higher scores indicate sleep of lowest quality.

Expanded Nursing Stress Scale (ENSS): developed by Gray-Toft and Anderson [9] and revised by French [10]. It contains 57 items in nine subscales: death and dying, conflict with physicians, inadequate emotional preparation, problems relating to peers, problems relating to supervisors, workload, uncertainty concerning treatment, patients and their families, and discrimination. The questionnaire is a 57-item 5-point Likert scale. The responses were “never stressful” (1), “occasionally stressful” (2), “Frequently stressful” (4), “extremely stressful” (4), and does not apply (5). The does not apply score of (5) was considered (0) in the statistical analysis. The higher the score, the more the respondent agreed that the situation was stressful. A total and sub-scale mean score is derived from this instrument which ranges from 0 to 4. There are no specific cut scores or published mean norms for the ENSS that determine whether an individual is stressed or not. However, higher scores indicate higher levels of stress.

Statistical analysis was done using SPSS version 14.

Results (Tables 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10)

Discussion

The percentage of nurses in the current study who scored global sum of 8 PSQI more than 5 points (considered to have sleep disturbance) is 90.53%. Most studies showed a lower prevalence of sleep disturbance than this study. Two studies showed only 6.5% and 27.8% of subjects self-reporting as getting poor sleep [11, 12]. However, there are other studies that showed a prevalence of sleep disturbance of more than 50% [13, 14]. Our findings are nearly close to the results of a study which reported that 72% of nurses self-reported as getting insufficient sleep [15]. The extreme difference in the results maybe because of the use of different questionnaires as measures and that the studies of sleep quality were conducted in different cultures with different conditions of work and environment.

| Table 1 | Distribution of demographic characteristics of the studied nurses |
|---------|---------------------------------------------------------------|
| Demographic | Number | Percent |
| Sex | | |
| Male | 32 | 34 |
| Female | 63 | 66 |
| Religion | | |
| Muslim | 87 | 92 |
| Christian | 8 | 8 |
| Marital status | | |
| Single | 61 | 64 |
| Engaged | 23 | 24 |
| Married | 11 | 12 |
| Residence | | |
| Urban | 50 | 52 |
| Rural | 45 | 48 |
| Income | | |
| Sufficient | 70 | 74 |
| Insufficient | 25 | 26 |

| Table 2 | Distribution of work conditions for the studied nurses |
|---------|---------------------------------------------------------------|
| Work conditions | Number | Percent |
| Hospital type | | |
| Governmental | 32 | 34 |
| Private | 63 | 66 |
| Shifts/week | | |
| 3 shifts | 27 | 28 |
| 4 shifts | 41 | 44 |
| > 4 shifts | 27 | 28 |
| Hours/shift | | |
| 6 h | 2 | 2 |
| 12 h | 90 | 95 |
| 24 h | 3 | 3 |
| Night shifts/week | | |
| 1–2 | 54 | 56 |
| 3–4 | 26 | 27 |
| > 4 | 15 | 17 |
| Nurse patient ratio | | |
| 1 for 1 to 2 | 37 | 39 |
| 1 for 3 to 4 | 12 | 13 |
| 1 for > 4 | 46 | 48 |
| Payment | | |
| Acceptable | 64 | 67 |
| Not | 31 | 33 |

Nursing stress as to total score of ENSS (7.37% severe stress, 58.95% moderate stress, 33.68% mild stress)
resources. It may also be because people suffer from a greater stress level compared with the past years, because of the increasing demand of service. Results of the study shows that demographic circumstances do not have a significant relation neither to sleep quality nor work stress. This is consistent with a study which

Table 3 Percent of total expanded nursing stress sub-scales score (n = 95)

| Stress Level                          | Never stressed (%) | Occasionally stressed (%) | Frequently stressed (%) | Extremely stressed (%) | Always occurring stress (%) |
|---------------------------------------|--------------------|----------------------------|-------------------------|------------------------|-----------------------------|
| A. Death and dying                    | 19.6               | 34.3                       | 23.75                   | 11.6                   | 10.75                       |
| B. Conflict with physician            | 23.6               | 30.8                       | 26                      | 10.8                   | 8.8                         |
| C. Inadequate emotional preparation   | 22.67              | 40.67                      | 23                      | 9.33                   | 4.33                        |
| D. Problems related to supervisor     | 17.5               | 34.3                       | 26.5                    | 14.3                   | 7.2                         |
| E. Problems related to peers          | 25.1               | 31.9                       | 27                      | 12                     | 4                           |
| F. Work load                          | 18.6               | 32.8                       | 26.4                    | 13.1                   | 9.1                         |
| G. Uncertainty concerning treatment   | 13.2               | 35.34                      | 27.5                    | 16                     | 8                           |
| H. Patients and their families        | 16.6               | 37.3                       | 26.7                    | 12.1                   | 7.3                         |
| I. Discrimination                     | 16.67              | 34.33                      | 30.33                   | 10                     | 8.67                        |
| Total                                 | 19.3               | 34.6                       | 26.4                    | 12.13                  | 7.57                        |

Table 4 Percent of sub-scales of Pittsburgh Sleep Quality Index (n = 95)

| PSQI sub scales                  | Not during the past month (%) | Less than once a week (%) | Once or twice a week (%) | Three or more times a week (%) | Total |
|----------------------------------|-------------------------------|---------------------------|--------------------------|-------------------------------|-------|
| Subjective sleep quality         | 11.6                          | 45.3                      | 28.4                     | 14.7                          |       |
| Sleep latency                    | 20                            | 33.7                      | 29.5                     | 16.8                          |       |
| Actual sleep duration            | 10.5                          | 34.7                      | 45.3                     | 9.5                           |       |
| Habitual sleep efficiency        | 60                            | 31.6                      | 6.3                      | 2.1                           |       |
| Sleep disturbances               | 2.1                           | 62.1                      | 35.8                     | 0.00                          |       |
| Use of sleeping medication       | 70.5                          | 16.8                      | 9.5                      | 3.2                           |       |
| Daytime dysfunction              | 16.8                          | 37.9                      | 27.4                     | 17.9                          |       |
| Total                            | 27.35                         | 37.44                     | 26.03                    | 8.87                          |       |

Table 5 Relationship between demographic data and level of stress manifestation

| Demographic data | Total level of stress manifestation | X2  | P value |
|------------------|-------------------------------------|-----|---------|
|                  | Mild | Moderate | Severe |     |
| Sex              |     |          |      |     |
| Male             | 9   | 28.12    | 21   | 65.63 | 2 | 6.25 |
| Female           | 23  | 36.51    | 35   | 55.56 | 5 | 7.93 |
| Religion         |     |          |      |     |
| Muslim           | 28  | 32.2     | 52   | 59.8  | 7 | 8   |
| Christian        | 4   | 50       | 4    | 50    | 0 | 0   |
| Marital status   |     |          |      |     |
| Single           | 26  | 41.9     | 31   | 50    | 5 | 8.1 |
| Engaged          | 2   | 9.1      | 19   | 86.4  | 1 | 4.5 |
| Married          | 4   | 36.4     | 6    | 54.5  | 1 | 9.1 |
| Residence        |     |          |      |     |
| Urban            | 15  | 29.4     | 31   | 60.8  | 5 | 9.8 |
| Rural            | 17  | 38.64    | 25   | 56.82 | 2 | 4.54|
| Monthly income   |     |          |      |     |
| Sufficient       | 27  | 38.6     | 37   | 52.9  | 6 | 8.57|
| Insufficient     | 5   | 20       | 19   | 76    | 1 | 4   |

Table 6 Relationship between demographic data and sleep quality

| Demographic data | Total sleep quality | X2  | P value |
|------------------|---------------------|-----|---------|
|                  | Good | Poor |     |
| Sex              |     |      |     |
| Male             | 2   | 6.2  | 30   | 93.8 |
| Female           | 7   | 11.1 | 56   | 88.9 |
| Religion         |     |      |     |
| Muslim           | 8   | 9.2  | 79   | 90.8 |
| Christian        | 1   | 12.5 | 7    | 87.5 |
| Marital status   |     |      |     |
| Single           | 7   | 11.3 | 55   | 88.7 |
| Engaged          | 1   | 9.5  | 21   | 95.5 |
| Married          | 1   | 4.1  | 10   | 90.9 |
| Residence        |     |      |     |
| Urban            | 4   | 7.8  | 47   | 92.2 |
| Rural            | 5   | 11.4 | 39   | 88.6 |
| Monthly income   |     |      |     |
| Sufficient       | 9   | 12.9 | 61   | 87.1 |
| Insufficient     | 0   | 0    | 25   | 100  |
Table 7 Relationship between work conditions of studied sample and level of stress

| Work conditions          | Total level of stress manifestation | X2     | P value |
|--------------------------|-------------------------------------|--------|---------|
|                          | No. | Mild | % | Moderate | No. | % | Severe | No. | % |        |
| Hospital type            |     |      |   |          |     |    |        |     |    |        |
| Governmental             | 10  | 30.3 | 19 | 57.58    | 4   | 12.12 | 1.738 | ≥ 0.05 |
| Private                  | 22  | 35.48| 37 | 59.68    | 3   | 4.84  |        |        |
| Shift number/week        |     |      |   |          |     |    |        |     |    |        |
| 3 shifts/week            | 10  | 35.7 | 15 | 53.57    | 3   | 10.7  | 1.844 | ≥ 0.05 |
| 4 shifts/week            | 15  | 37.5 | 23 | 57.5     | 2   | 5     |        |        |
| > 4 shifts/week          | 7   | 25.93| 18 | 66.67    | 2   | 7.41  |        |        |
| Shift hours              |     |      |   |          |     |    |        |     |    |        |
| 6 h/shift               | 1   | 50 | 0  | 0        | 1   | 50    | 6.602 | ≥ 0.05 |
| 12 h/shift              | 30  | 33.33| 2  | 66.67    | 6   | 6.67  |        |        |
| 24 h/shift              | 1   | 33.33| 2  | 66.67    | 0   |       |        |        |
| Night shifts/week       |     |      |   |          |     |    |        |     |    |        |
| 1–2/week                | 21  | 38.18| 29 | 52.72    | 5   | 9.1   | 2.266 | ≥ 0.05 |
| 3–4/week                | 7   | 28 | 17 | 68       | 1   | 4     |        |        |
| > 4/week                | 4   | 26.67| 10 | 66.67    | 1   | 6.67  |        |        |
| Nurse/patient ratio     |     |      |   |          |     |    |        |     |    |        |
| Nurse/1–2               | 19  | 51.35| 13 | 35.14    | 5   | 13.51 | 14.846| ≤ 0.01**|
| Nurse/3–4               | 3   | 23.1 | 10 | 76.92    | 0   | 0     |        |        |
| Nurse/> 4               | 10  | 22.22| 33 | 73.34    | 2   | 4.44  |        |        |
| Payment                 |     |      |   |          |     |    |        |     |    |        |
| Acceptable              | 22  | 34.92| 38 | 60.32    | 3   | 4.76  | 1.869 | ≥ 0.05 |
| Non acceptable          | 10  | 31.25| 18 | 56.25    | 4   | 12.5  |        |        |

**High statistical significance

Table 8 Relationship between work condition of studied sample and level of sleep quality

| Work conditions          | Total sleep quality | X2     | P value |
|--------------------------|---------------------|--------|---------|
|                          | No. | Good | % | Poor | No. | % |        |
| Hospital type            |     |      |   |      |     |    |        |        |
| Governmental             | 4   | 12.1 | 29 | 87.9 | 0.413 | ≥ 0.05 |
| Private                  | 5   | 8.1  | 57 | 91.9 |        |        |
| Shift number/week        |     |      |   |      |     |    |        |        |
| 3 shifts/week            | 2   | 7.1  | 26 | 92.9 | 6.008 | ≤ 0.05*|
| 4 shifts/week            | 7   | 17.5 | 33 | 82.5 |        |        |
| > 4 shifts/week          | 0   | 0    | 27 | 100 |        |        |
| Shift hours              |     |      |   |      |     |    |        |        |
| 6 h/shift               | 1   | 50 | 2  | 50  | 6.123 | ≤ 0.05*|
| 12 h/shift              | 7   | 7.8  | 90 | 92.2 |        |        |
| 24 h/shift              | 1   | 33.3 | 3  | 66.7 |        |        |
| Night shifts/week       |     |      |   |      |     |    |        |        |
| 1–2/week                | 7   | 12.7 | 48 | 87.3 | 1.690 | ≥ 0.05 |
| 3–4/week                | 1   | 4    | 24 | 96   |        |        |
| > 4 shifts/week         | 1   | 6.7  | 14 | 93.3 |        |        |
| Nurse/patient ratio     |     |      |   |      |     |    |        |        |
| Nurse/1–2               | 5   | 13.5 | 32 | 86.5 | 1.166 | ≥ 0.05 |
| Nurse/3–4               | 1   | 7.7  | 12 | 92.3 |        |        |
| Nurse/> 4               | 3   | 6.7  | 42 | 93.3 |        |        |
| Shift payment           |     |      |   |      |     |    |        |        |
| Acceptable              | 5   | 7.9  | 58 | 92.1 | .515  | ≥ 0.05 |
| Not                     | 4   | 12.5 | 28 | 87.5 |        |        |

*Statistical significance
assumed that none of the socio-demographic variables had a statistical impact on sleep quality in nursing students [16].

In this study, one of the findings is that greater number and duration of shifts per week worsens nurses’ sleep quality. This parallels the results of a study which assumed that there is a significant relationship between number of hours per shift and stress [17]. As regards to nurse-patient ratio, nearly half of the studied subjects worked as one nurse for more than four patients, while more than one third of them working as one nurse for one to two patients. According to the relationship between nurse-patient ratio and level of stress, there was a significant statistical relationship which is consistent with previous study [18, 19].

As regards the number of night shifts per week, it was noticed that more than two-thirds of the studied subjects (44%) were working four shifts per week, while more than one quarter (28%) of them working three shifts per week and the same percentage working more than four shifts per week. Concerning the relationship between night shifts per week and sleep quality, results of the present study revealed that globally, the relationship between night shifts per week and sleep quality was not significant, which is in the same line with [20]; however, this finding is not in line with previous studies done by [21, 22] and more recent study [23] which reported that there is a significant effect of working in night schedule on sleep disturbance as a whole.

### Table 9: Relationship between level of stress and sleep disturbance

| Level of stress | Total sleep quality | X2   | P value |
|-----------------|---------------------|------|---------|
|                 | Good % | Poor % |       |         |
| Mild            | 5 15.6 | 27 84.4 | 2.707 | ≥ 0.05  |
| Moderate        | 3 5.4  | 53 94.6 |       |         |
| Severe          | 1 14.3 | 6 85.7  |       |         |

### Table 10: Correlation between stress and sleep disturbance, total score, and sub-scales

| Sleep                      | Stress | Subjective sleep quality | Sleep latency | Actual sleep duration | Habitual sleep efficiency | Sleep disturbances | Use of sleeping medications | Day time dysfunction | Total PSQI |
|---------------------------|--------|--------------------------|---------------|-----------------------|----------------------------|---------------------|-------------------------------|----------------------|------------|
| Death and dying           | R 0.116| 0.064                    | − 0.065       | 0.138                 | 0.081                      | 0.144               | − 0.099                       | 0.092                |
|                           | P 0.263| 0.535                    | 0.533         | 0.184                 | 0.435                      | 0.165               | 0.341                        | 0.373                |
| Conflicts with physicians | R − 0.051| − 0.116                 | − 0.15        | 0.076                 | 0.003                      | − 0.037             | 0.057                         | − 0.094               |
|                           | P 0.627| 0.262                    | 0.147         | 0.464                 | 0.981                      | 0.72                | 0.586                        | 0.364                |
| Inadequate emotional preparation | R 0.04  | 0.017                    | 0.073         | 0.039                 | 0.044                      | 0.132               | 0.026                         | 0.06                 |
| Problems related to the supervisor | R − 0.075| 0.091                   | 0.003         | 0.201                 | − 0.072                    | − 0.048             | 0.029                        | 0.027                |
|                           | P 0.475| 0.386                    | 0.097         | 0.052                 | 0.492                      | 0.649               | 0.778                        | 0.797                |
| Problems related to peers | R − 0.226| − 0.049                 | 0.014         | 0.231                 | − 0.119                    | − 0.043             | 0.116                        | 0.026                |
|                           | P 0.028| 0.64                     | 0.89          | 0.024                 | 0.253                      | 0.681               | 0.263                        | 0.805                |
| Workload                  | R − 0.079| 0.012                   | 0.048         | 0.304                 | − 0.044                    | 0.07                | 0.056                        | 0.066                |
|                           | P 0.45 | 0.909                    | 0.649         | 0.003                 | 0.672                      | 0.504               | 0.59                         | 0.528                |
| Uncertainty regarding treatment | R − 0.08  | 0.088                   | − 0.03        | 0.253                 | − 0.04                     | − 0.071             | 0.113                        | 0.052                |
|                           | P 0.44 | 0.398                    | 0.74          | 0.013                 | 0.7                        | 0.496               | 0.275                        | 0.617                |
| Patients and their families | R 0.016| − 0.035                  | 0.226         | 0.313                 | − 0.109                    | − 0.1               | − 0.024                       | 0.078                |
|                           | P 0.88 | 0.735                    | 0.027         | 0.02                  | 0.295                      | 0.927               | 0.816                        | 0.454                |
| Discrimination            | R 0.078| − 0.071                  | 0.098         | 0.205                 | − 0.021                    | 0.105               | 0.195                        | 0.164                |
|                           | P 0.455| 0.495                    | 0.347         | 0.046                 | 0.839                      | 0.31                | 0.058                        | 0.113                |
| Total ENSS                | R − 0.096| 0.028                   | − 0.029       | 0.262                 | − 0.034                    | 0.011               | 0.052                        | 0.115                |
|                           | P 0.353| 0.791                    | 0.782         | 0.01                  | 0.745                      | 0.914               | 0.614                        | 0.269                |

Greater number of patients a nurse cares for increases the nursing stress
Greater number and duration of shifts worsen sleep. Demanding patients and their families lessen the actual sleep duration of nurses
Demanding patients and their families, workload, discrimination, and uncertainty regarding treatment lessen is the habitual sleep efficiency of nurses. Problems related to peers worsen sleep quality
Boldface indicates statistical significance
Conclusion
Designing programs to detect, prevent, manage, and follow up nurses with nursing stress and sleep disturbances, as well as service training and continuing education, should be provided for all nursing internships during working in the hospital, and self-awareness programs should be applied. Organizing seminars, workshops, conferences, debates, and lectures and opening chat channels is essential to create awareness. Policymakers should be addressed to push toward legalizations and importing resources to handle such phenomena.

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