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Fatigue, stress and physical activity in Polish nurses: interrelation and selected determinants

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Abstract:

Nowadays, modern nursing imposes high requirements on new adepts. Huge workload, working shifts, responsibility, exposure to stressful situations and other threats are possible risk factors for adverse effects on the health and functioning of those practicing this profession. The study included 314 women practicing nursing. The mean age of the respondents was 37.22 years (SD = 11.63), whereas mean working experience was 14.59 years, with SD = 12.24. The research tool was the author's questionnaire consisting of questions concerning fatigue and stress. Physical activity was assessed using the Baecke questionnaire (SEWL). No relation was found between age and working experience and indicators of fatigue, exhaustion, and stress. Compared to work in other places, working in a hospital requires more effort ($p < 0.01$) and generates greater fatigue ($p < 0.001$). The level of physical activity (HPAI) is low and its main component is physical exertion during work. Working different shifts causes more fatigue than in those working fixed hours ($p < 0.01$), with greater effort indicating lower levels of physical activity ($p < 0.0001$) and no feeling of rest after the night ($p < 0.05$). Work as a nurse predisposes to disturbances in the natural circadian cycle, which in turn causes the appearance of chronic fatigue, concentration disorders, and sleep deprivation. This may have long-term effects in the form of burnout syndrome. The level of physical activity of Polish nurses is unsatisfactory.

Keywords: body posture, faulty posture prevention, physical activity

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Introduction

Modern nursing is a profession that functions in the health care system, whose task is to care for the individual, family, and society. The aim of this care is to achieve, maintain and sustain optimal health and quality of life. In the past, the duties of this profession were most often limited to meeting care functions. Nowadays, the scope of competences was substantially expanded, e.g. by the performance of educational, health-promoting and rehabilitation tasks [1,2]. This profession requires having high qualifications. In Poland, it is required that nurses have to graduate from universities, at least at the bachelor level. After graduation, they often have to complete several specialist training courses [3]. In many countries, in addition to their typical nursing duties, people working as nurses perform diagnostic tasks, prescribe drugs and provide other forms of therapies. In addition to professional qualifications, a wide range of very different abilities and aptitudes are required to pursue this profession. Key characteristics include responsibility, independence, decision-making skills, and commitment [4].

People who practice this profession are often exposed to various types of stressors: sudden deterioration in the patient's condition, activities of basic life support, or dying patients, which significantly affect their emotional state [5,6]. In many cases, long-term exposure to these or other stressors may cause a decrease in the body's adaptation abilities and consequently lead to occupational burnout syndrome [7]. Due to physical exercise load, nursing is classified as medium-heavy work [8,9]. Many nursing procedures require strength and physical fitness. Furthermore, work organization, shift work, long hours of on-call duty or combining work in several workplaces contribute to the often excessive workload [10].

This study aimed to assess the severity of fatigue during and after work in nurses. It was analyzed to what extent such variables as age, working experience, place of work, working shifts, self-assessed susceptibility to stress and physical strain are related to the feeling of fatigue during and after completion of performing work duties.

Material and Methods

The research was conducted in the Silesian Voivodeship in southern Poland. The study examined 314 female nurses. Among the respondents, 257 people (81.83%) worked in hospitals in different wards and 57 people (18.17%) worked in non-hospital health care facilities.

The tool used in the study was a survey questionnaire, consisting of the respondent data, author's questions about selected aspects of work and Baecke physical activity questionnaire [11]. In the respondent data section, the respondents were asked about their age and working experience in years.

They were also asked whether they were chronically ill (continuous treatment and taking medication). Further questions concerned the place of work (hospital or other health care facility) and whether they worked shifts.

The author's questions were of a closed-ended character and concerned fatigue during work, rest after work, exhaustion and the frequency of stress experienced during work. The answers were formulated on the Likert scale in order to determine the intensity of the examined variable: 1 - never; 2 - rarely; 3 - sometimes; 4 - often; 5 - very often.

These questions were:

To what extent do you feel tired during your work on a day shift?

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To what extent do you feel tired during your work on a night shift?
How often do you generally feel exhausted/ weakened?
How often do you feel tired getting up to work in the morning?
Do you often experience stress (tension, nervousness) at work?

The level of physical activity was determined using the SEWL (Subjective Experience of Work Load) questionnaire [11]. This tool, based on the self-assessment of the respondents, estimates the level of physical activity in three areas: professional work, sport, and leisure time (without sport). The sum of calculated activity indices in these three areas makes it possible to estimate the total physical activity of the respondents.

In the area of professional activity, the questions concerned the profession performed, the position at work, intensity and frequency of effort and the comparison of the workload with others. The questions about sport referred to the type of sport, the number of hours practiced during the week and the number of months a year during which the respondent practiced sport. The remaining activity was assessed based on the answers to questions about passive rest, cycling, and walking. The value of the use of this questionnaire was confirmed by physiological methods i.e. *doubly labelled water* (DLW) method [12,13].

Statistical analysis

Descriptive statistics of variables were used. The analysis concerned the groups of nurses working in hospitals and non-hospital facilities. Non-parametric statistics were used in the analyses. The relationships between the variables studied were examined using Spearman's rank correlation.

The differences were calculated by comparing the two groups using Mann Whitney's U test. The significance level was set at $p<0.05$.

Results

The vast majority of respondents i.e. 285 people (90.76%) worked shifts. Only 29 people (9.24%) worked only day shift.

The comparison of the respondents (workplace as a grouping variable) revealed differences in age and working experience. Nurses working in non-hospital facilities were older and had greater working experience. Differences in day work fatigue and WI (Work Indicator) were also noted.

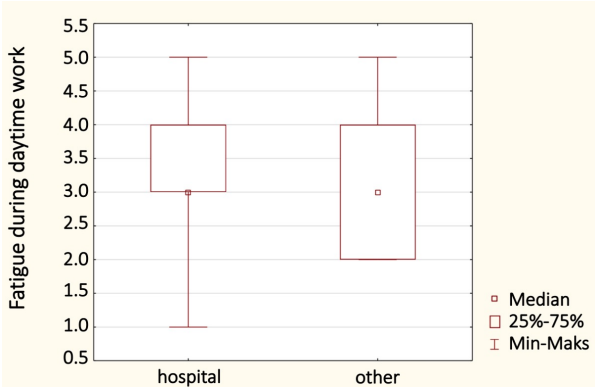

Figure 1. Day work fatigue in nurses working in hospitals and other health care facilities

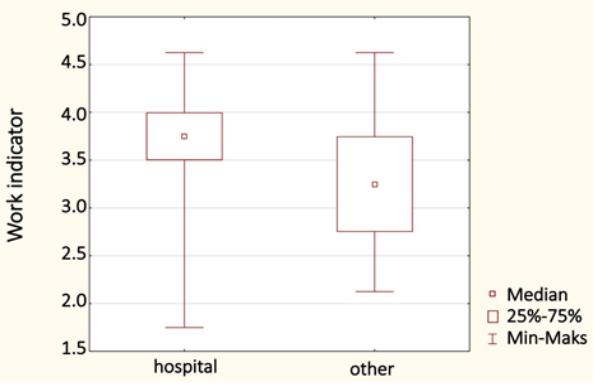

Figure 2. WI in nurses working in hospitals and other health care facilities

HPAI (Habitual Physical Activity Indicator) in both groups can be assessed as low. The slightly higher indicator was

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found in the nurses working in hospitals. More fatigue during day work and more physical strain were declared by nurses working in hospitals (Fig. 1., Fig. 2.).

Correlations between the variables studied were then analyzed. Age was correlated with working experience in both study groups, which is natural, with very high correlation indices ($r>0.9$; $p<0.05$). In nurses working in hospitals, day work fatigue was correlated with stress ($r=0.350$; $p<0.05$). The perceived stress at work was correlated with exhaustion in women working in non-hospital facilities ($r=0.672$; $p<0.05$) and the lack of rest during sleep in both groups ($r=0.388$; $p<0.05$, $r=0.373$; $p<0.05$). Working shifts was reflected in the correlations of fatigue/exhaustion with day and night work both in hospital workers ($r=0.523$; $p<0.05$) and those working in other facilities ($r=0.526$; $p<0.05$).

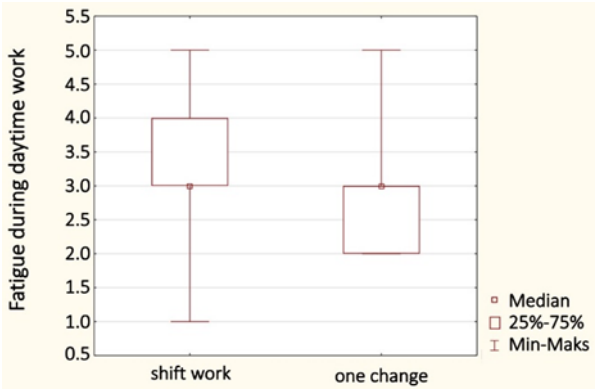

Figure 3. Working shifts and fatigue

The analysis also showed correlations of day work and night work fatigue with WI. The correlation coefficients of nurses working in hospitals were lower ($r=0.320$; $p<0.05$ and $r=0.391$; $p<0.05$) than those working in non-hospital facilities ($r=0.550$; $p<0.05$; and $r=0.590$; $p<0.05$).

A comparison of nurses working different shifts with those working only one shift showed differences in day work fatigue ($p<0.01$), see Fig. 3; work indicator ($p<0.0001$), Fig. 4 and fatigue after sleeping ($p<0.05$), see Fig. 5.

Nurses working shifts were younger than those working one shift ($p<0.001$) and had less working experience ($p<0.01$). Means for nurses working shifts: age: 36.43 years; working experience: 13.89 years. Nurses working only one shift: age: 44.76 years; working experience: 21.41 years.

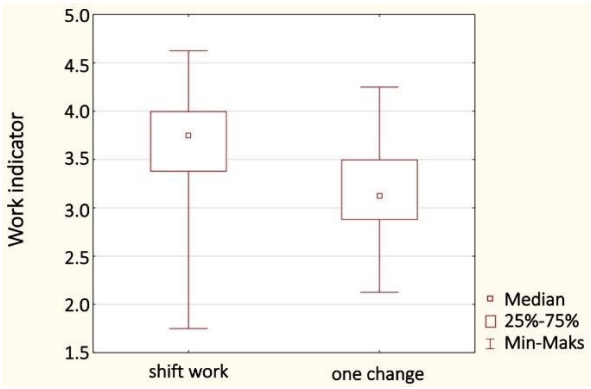

Figure 4. Working shifts and work indicator

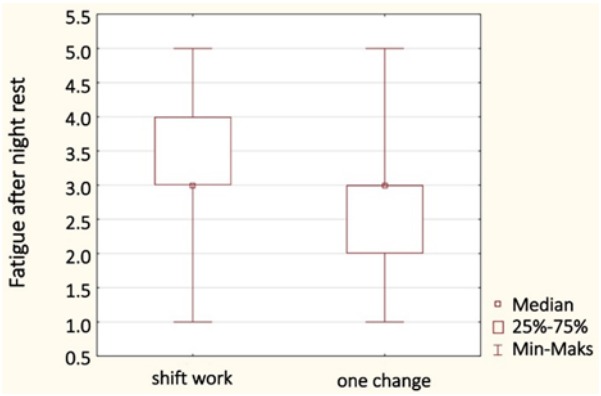

Figure 5. Fatigue after a night rest

Discussion

The process of nursing the patients is the basic task of the health care system, which is the responsibility of the major part of employees in this system i.e. nurses [14]. The profession of a nurse requires constant full psychophysical availability. This is justified by the need to ensure patient safety and the highest possible quality of medical care [15,16]. Although the main tasks of this occupational group are similar, the specificity of individual workplaces may require not only

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Table 1. Descriptive statistics of the variables studied and comparison by workplace

Variable	Hospital			Other facilities			P
	Mean (SD)	±95% CI	Median	Mean (SD)	±95% CI	Median	
Age	35.66 (11.21)	34.28-37.05	32.00	43.86 (10.91)	41.71-45.00	45.00	**
Work experience	13.08 (11.85)	11.62-14.54	8.00	21.10 (11.84)	18.02-24.19	24.00	**
Stress	3.79 (0.84)	3.68-3.89	4.00	3.63 (0.76)	3.43-3.83	4.00	Nss
Fatigue after day shift	3.48 (0.87)	3.37-3.59	3.00	3.05 (0.97)	2.80-3.30	3.00	*
Fatigue after night shift	3.78 (1.02)	3.65-3.90	4.00	3.47 (1.14)	3.11-3.82	3.00	Nss
Fatigue/ Exhaustion	2.59 (0.83)	2.49-2.69	2.00	2.80 (0.87)	2.57-3.02	3.00	Nss
Rest	3.28 (1.01)	3.15-3.40	3.00	3.10 (0.94)	2.86-3.35	3.00	Nss
WI	3.72 (0.47)	3.66-3.77	3.75	3.30 (0.65)	3.13-3.47	3.25	**
SI	2.45 (1.11)	2.31-2.59	2.00	2.45 (1.16)	2.15-2.75	2.14	Nss
LTI	3.20 (0.71)	3.11-3.29	3.25	3.10 (0.74)	2.91-3.29	3.00	Nss
HPAI	9.36 (1.60)	9.17-9.56	9.02	8.86 (1.62)	8.44-9.28	8.80	Nss

*Legend: WI – work indicator; SI – sport indicator; LTI – leisure time indicator; HPAI – habitual physical activity indicator; Nss – not statistically significant; *p<0.001; **p<0.0001*

specialized competencies but also the intensification of specific personality aptitudes. In some hospital wards, work is more dynamic e.g. work in emergency rooms or surgical and intensive care wards. In such departments, there is a greater need for repeated substantial physical effort, constant concentration, making quick decisions and mental resilience [17]. In other workplaces, such as outpatient clinics, internal medicine, oncology or psychiatric wards, the work has a more steady character. Empathy, communication skills, and patience are more required there [18-20].

The above study contains potential limitations that may affect the statistical and practical value of the study. The groups compared were heterogeneous in size. The group of nurses working in hospital wards was twice as large as those working in non-hospital units.

The results of the presented study indicate a higher workload (SEWL - WI)

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and higher day work fatigue in women working in hospitals compared to those working in other health care facilities. Taking into account the mean age and work experience, where differences between these groups of respondents were observed, this may indicate the functioning of a defensive mechanism that consist in changing the workplace with age and work experience. The argument for this thesis is the correlation of stress with day work fatigue in nurses working in hospitals and lack of rest during sleep. An additional argument is an observation that there were no differences in the other areas of activity and the habitual physical activity indicator (HPAI). However, although the overall 'activity pool' is relatively similar, there is a tendency (probably due to age) to decrease activity. Furthermore, in both groups, the largest part of the HPAI was WI. This is consistent with the observation by Bergier et al. [21].

The factor that is very burdensome for nurses is their working shift, usually consisting of 12-hour on-call duties [22,23]. Despite some acceptance on the part of nurses, associated with longer rest periods between on-call time and a generally lower number of duties per month [24], the natural circadian cycle is disturbed, negatively affecting the physical capacity and continuity and effectiveness of work [25]. The effects of working shifts were also reflected in the presented results. Nurses working shifts experienced more workload and reported higher fatigue. This confirms the observations by Ksylewicz et al., who demonstrated that the energy expenditure during a 12-hour shift at the position of a unit nurse is higher than during an 8-hour shift. Longer working hours increase fatigue, reduce work efficiency and cause increased somatic symptoms. This may adversely affect the quality of patient care [27].

In conclusion, the nurses working in hospitals were younger and had shorter working experience than those working in other health care facilities. Working in a hospital requires more physical effort and causes more fatigue after work compared to other nursing workplaces. Regardless of where it is done, shift work requires more physical effort and makes it difficult to recover during sleep. The level of habitual physical activity of the nurses is rather low, and its main component is an effort at work.

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