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Ergonomic work load and well-being of nurses working in shifts

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Abstract

Admission. Operating time is determinant of a healthy lifestyle. Shift work carries with it many negative health effects. Difficulties in adjusting to changing biological clock functioning day and night are the cause of stress and lack of tolerance by the body. Biological effects associated with the disorder are biological rhythms that contribute to sleep disorders. The aim of the study was to investigate health problems of nurses working in shifts resulting from nonergonomic workload.

Findings. Nurses report the occurrence of many symptoms of discomfort associated with shift work, which are not due to report after medical advice. The workload is greater in the group performing professional activities in non-standard times. Being is worse in the group of nurses working in shifts.

Conclusions

Among the most common health problems, up to 63.5% of nurses declares chronic fatigue, 40.6% of cardiovascular problems, and 28.1% gastrointestinal disorders. Employees working

in two shifts often have trouble sleeping, consisting of waking several times during the night, than who work in shift system. Physical activity and spending time with your family or loved ones reduces the frequency of problems. The vast majority (65.7%) of respondents among shift workers, occupational exposure has been associated with an accident or work.

Admission

The workload is "the degree to which a person is engaged in the pursuit of one or more tasks or effects of the exposure of his body " [1]. Considered in the context of the requirements that employees must meet in order to fulfill the tasks that puts his work, as well as the conditions under which professional activities will be implemented. While ergonomics are the subject of interest relationships and relationships occurring between the man and his work realized in a given environment, with a view to minimizing the consequences of the workload and the risks of the working environment, taking into account the possibility of using technology [2].

Among the many factors classified to a group of ergonomics is: working hours, shift system, the length of breaks, starting and ending time of work [3].

Working time of persons who are employees of therapeutic entities regulated by the Act of 15 April 2011r.o medical activity. Art.93. paragraph. 1 of that Act states that working time ,, not exceed seven hours 35 minutes a day and an average of 37 hours 55 minutes a week [...] ". The legislator assumes that this applies to five-day week taking into account the period, which was adopted. Article. 93.ust. 4. stressed that the reference period can not be longer than 3 months. Article. 94 section 1, it is mentioned that if the type of work or its organization requires other forms of working time is allowed to work 12 hours per day. Article. 97 paragraph. 3, it is noted that the employee has ,, every week entitled to at least 35 hours of uninterrupted rest, including at least 11 consecutive hours of daily rest ". [4] Much of the nurses working in shifts. Shift work and at night is associated with the destruction of the biological rhythms of the body. for people working for a long time (many years) shifts may be temporary debt ,, team. "it reveals exasperation with disorientation in time, problems in the field of sleep, abnormal bowel work [5].

Located in the hypothalamus, nerve cells are responsible for the biological clock, and in which is provided a human. There is a correlation between the pulses of the external environment, biological and circadian rhythm. This applies ,, cycle day - night. " It manifests itself activity, greater efficiency mental alertness during the day and a decrease in efficiency, a growing feeling of fatigue at night. Another cycle is necessary to synchronize biological clock to changes in the environment is light ,, - darkness. " In shift work important is the ability to adjust the internal clock to the current astronomical time. It is not possible to stabilize the complete internal rhythms for night work cycle ,, forces the sleep - wakefulness ", as working days following the process of re-synchronization activity on the day of [6].

Work done between the hours of 24.00 and 5.00 am done with the deficit readiness of the body to perform demanding physical or mental load, reduced psychophysical condition and the possibility of minor visual-motor function, increased need for sleep. This results in fatigue and an increased workload [6].

And night shift work causes many negative effects. Sociological are related to the impact on the family situation, relationships with loved ones are inadequate, particularly unfavorable for family members is to work on Saturday or Sunday. Followed by social isolation, it is a difficult social contacts, social, political and cultural, lack of time for physical activity. Biological effects associated with the disorder are biological rhythms that contribute to sleep disorders. Overload shift work often occurs in conjunction with other environmental stressors like the monotony of work, whether the deficit of time for which employees react differently depending on the individual characteristics of the human age, sex, level of education, their own value judgments. Working in such conditions sometimes cause depression, lack of job satisfaction, increased risk of cardiovascular diseases origin. Shift workers may feel discomfort on the part of the digestive system, it was noted that some people prefer to eat sweets than a value meal, which could undoubtedly have a negative impact on health [6].

Shift work, combined with insufficient rest after work or its passive form, moreover, the need to deal with the obligations arising from his role in the family are elements that favor the development of chronic fatigue syndrome [7].

Insufficient, and the worse the quality of sleep is undoubtedly the adverse effect of shift work on the body. It is estimated that the deficit of sleep in people who work at night may be 2-4 hours compared to people who do not work at night. This promotes more frequent

reaching for stimulants in the form of coffee, cigarettes, or alcohol. Characteristic of shift work are having trouble getting to sleep, which becomes the cause of sleeping medication [5,8].

Tolerance burden of shift work varies from individual to individual. Chronic type believed to be due to a sense of arduous work to change and at night. Morning hours are the best time to work for the people who are defined as larks ,, ", while the evening or night, is the best time for action ,,owls'. The ability to snooze ,, "is important to reduce fatigue due to a lack of sleep [6].

There is a relationship tolerate shift work and night from age and seniority. According to the recommendations of the World Health Organization on people over 45. F. They should not work at night [5,9]. It is estimated that 20% of workers are not able to adapt to shift work, in view of the rapid emergence of signs of intolerance forced to resign. A significant proportion of people working in such a system, despite burden (70%), only 10% did not complain about the shift system and night during their professional activity [5,7]

The aim of the research is to know the health problems of nurses working in shifts resulting from nonergonomic workload.

Material and methods

The study involved 110 women employed in nursing, the Independent Public Health Care in the province of Lublin. More than half of nurses (60.9%) had secondary education (School of Medical, Medical College). Almost one third of respondents (29.1%) received education at the undergraduate university level, and (10%) completed a master degree. The majority (58.2%) worked in the 12 - hour working time system (night work, Sundays and holidays). A large percentage of respondents (36.4%), persons employed in the 8 - hour work system. A small number, because only 6 of the respondents worked in the system 12 - hour, but without the night (5.5%).

The survey was conducted in the period from March to May 2015. For the evaluation of a questionnaire being used in PSI [10] and to assess the characteristics of the work environment questionnaire author. The statistical calculations were performed using IBM SPSS Statistics. The statistical tests used for and statistically significant when the value of the significance of the test for which: $p < 0.05$.

Findings:

In order to identify health problems of the respondents were used measurements of the physical symptoms of malaise (PSI), which allowed to know the discomfort felt during the last 30 days and if they decided to visit a doctor if they occur (table1).

Table 1. Measurement of the physical symptoms of malaise (PSI), in the last 30 days

Symptoms that respondents felt in the last 30 days		No	Yes, but I did not go to the doctor	So I went to the doctor
Abdominal pain or nausea	n	72	34	4
	%	65.5	30.9	3.6
Back pain	n	28	75	7
	%	25.5	68.2	6.4
Problems with sleeping	n	63	45	2
	%	57.3	40.9	1.8
Rash	n	102	6	2
	%	92.7	5.5	1.8
shortness of breath	n	99	11	0
	%	90.0	10.0	0.0
Pain in the chest	n	79	24	7
	%	71.8	21.8	6.4
Headaches	n	44	61	5
	%	40.0	55.5	4.5
Fever	n	99	7	4
	%	90.0	6.4	3.6
Heartburn	n	79	27	4
	%	71.8	24.5	3.6
eyestrain	n	thirty	75	5
	%	27.3	68.2	4.5
Diarrhea	n	100	10	0
	%	90.9	9.1	0.0
abdominal pain	n	83	27	0
	%	75.5	24.5	0.0
constipation	n	89	21	0
	%	80.9	19.1	0.0
Increased heart rate, which are not the result of physical exercises	n	66	40	4
	%	60.0	36.4	3.6
Infection	n	76	25	9
	%	69.1	22.7	8.2
loss of appetite	n	101	8	1
	%	91.8	7.3	0.9
Dizziness	n	67	39	4
	%	60.9	35.5	3.6
Fatigue	n	11	96	3
	%	10.0	87.3	2.7

All are symptoms of malaise among those participating in the research. The analysis of the data showed that nine of ten respondents reported fatigue in the last 30 days (90%), of which only 2.7% reported with this problem for the doctor. Another very common symptom of malaise indicated was back pain (74.6%).Only a small percentage of respondents who appeared analyzed ailments in the last 30 days have benefited from visits to the doctor. In the

case of malaise associated pelvic pain (24.5%), constipation (19.1%), dyspnea (10%), diarrhea (9.1%) respondents did not benefit from medical assistance.

In nearly 40% of respondents also experienced dizziness. The relationship between vertigo and education (Table 2).

Table 2. Dizziness and education.

Dizziness	Education			altogether
	Medium (High School Medical, Medical Study)	Bachelors	higher MA	
No	34	24	9	67
	50.7%	75.0%	81.8%	60.9%
Yes	33	8	2	43
	49.3%	25.0%	18.2%	39.1%
altogether	67	32	11	110
	100.0%	100.0%	100.0%	100.0%
χ^2= 7.595, p <0.022 *				

Statistically significantly (p <0.05) occurred more frequently dizzinessin people with secondary education. In this group it was felt 49.3% of respondents. Dizziness (past 30 days), much less declared the respondents with higher education Bachelor (25.0%), and even fewer graduate with higher (18.2%).

Nurses work is often associated with the exercise at night, which disturbs the human biological rhythm. The results included in Figure 1.

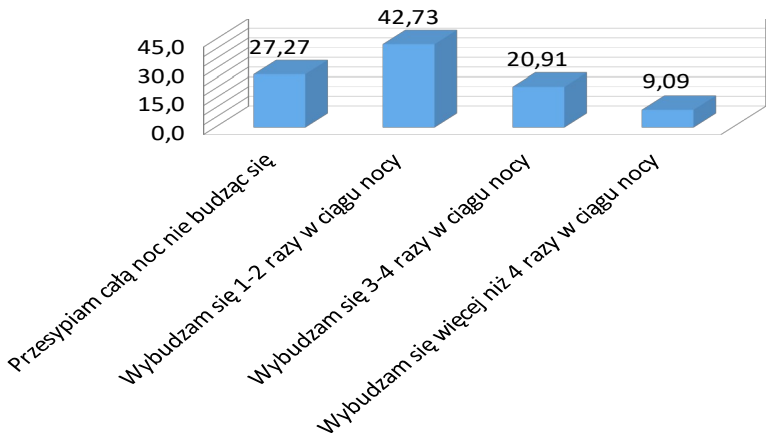

Chart 1. Problems sleep in the opinion of the respondents (in%)

The study found that a large percentage of nurses had trouble sleeping. Less than one third of patients (27.3%) declared that sleeps all night without waking up.

The relationship between the system work, and sleep problems respondents (Table 3).

Table 3. System time, and problems with sleep respondents

Problems sleeping respondents	The working time		altogether
	Jednozmianowy	shift	
I sleep all night without waking up	18	12	thirty
	45.0%	17.1%	27.3%
I wake up 1-2 times a night	15	32	47
	37.5%	45.7%	42.7%
I wake up more often than 1-2 times a night	7	26	33
	17.5%	37.1%	30.0%
altogether	40	70	110
	100.0%	100.0%	100.0%
χ^2= 10.919, p = 0.004 **			

Statistical analysis showed a highly statistically significant relationship (p <0.01) between the operating system and the problems of sleep, people working for change (even at night) often reported sleep problems. A small percentage of respondents working in shifts claimed that sleeps all night without waking up (17.1%), a much larger proportion of respondents arousable more often than 1-2 times during the night (37.1%). The incidence of sleep problems, the results of Figure 2.

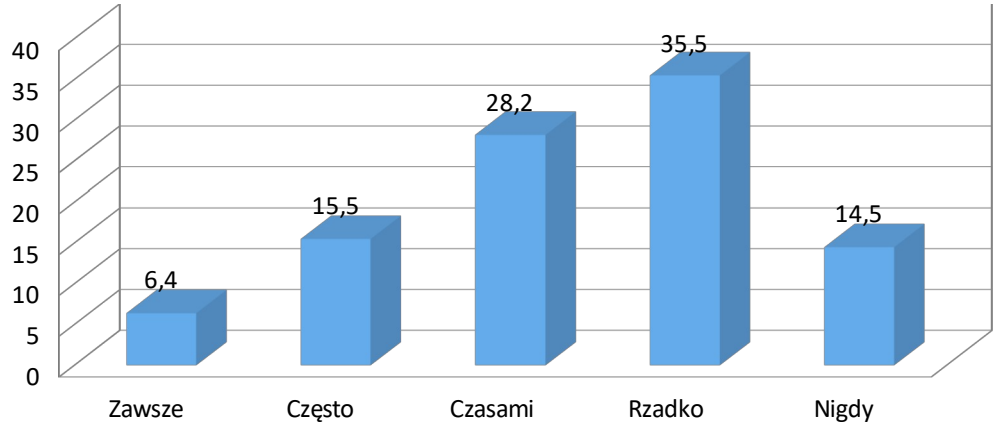

Chart 2. The frequency of sleep comfortably across respondents (in%)

Little more than one third of respondents rarely had problemssleeping (35.5%) sometimes occurred in 28.2% of the respondents, and often could not fall asleep 15.5% of the study population. More than half of respondents have problems concerning the possibility of

falling asleep, the easiest way to resolve it seems to be taking hypnotics or sedatives (Figure 3).

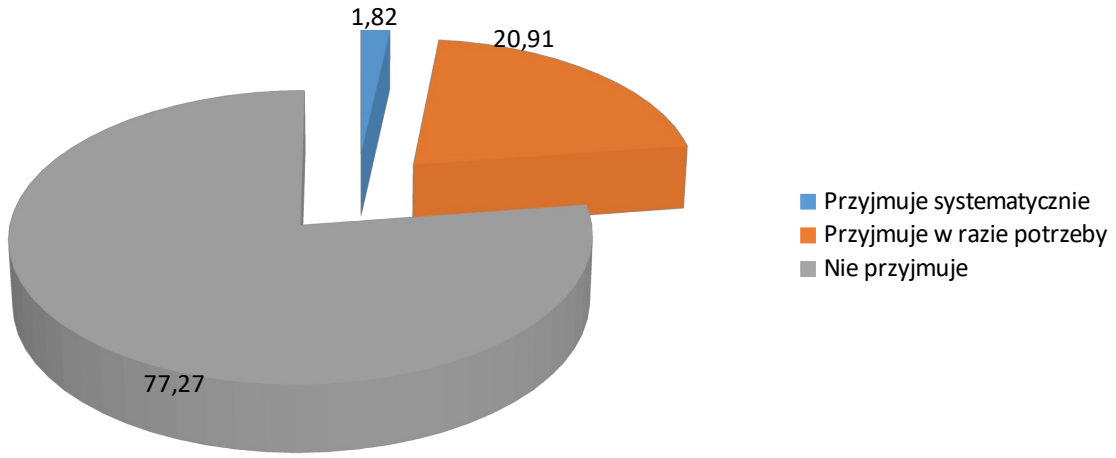

Figure 3. Taking hypnotics and sedatives by the respondents (in%)

Negligible percentage of people participating in the study (1.8%) systematically received hypnotics or sedatives. This optimistic results, which may be evidence of awareness regarding nurses become addicted to medication to help you sleep.

Forms of spending free time by respondents are important in the context of the psycho-physical recuperation of employees and minimize the effects of the workload. The way in which respondents most often spent their time off from work are shown in Table 4.

Table 4. Forms leisure respondents

Forms of spending free time	n	% (answers)	% (Respondents)
Active (walking, running, aerobics, cycling, another type of sport)	40	25.8	36.4
I am watching TV or using a computer	29	18.7	26.4
I spend time with family, friends	56	36.1	50.9
I sleep during the day	15	9.7	13.6
I do not have time to rest	15	9.7	13.6
altogether	155	100.0	

Question multiple choice answers.

More than half (50.9%) declared that they spend their free timewith family, friends, and 36.4% of the respondents declared active recreation (walking, running, aerobics, cycling, another type of sport). The results are a confirmation that the way of spending free time affects the respondents problems sleeping, Table 5.

Table 5. Spending free time and trouble falling asleep

Spending free time	The problem with falling asleep			altogether
	Always or often	Sometimes	Rarely or never	
Active (walking, running, aerobics, cycling, another type of sport)	10	10	20	40
	23.8%	23.8%	28.2%	25.8%
I watch TV or using a computer	7	10	12	29
	16.7%	23.8%	16.9%	18.7%
I spend time with family, friends	11	15	thirty	56
	26.2%	35.7%	42.3%	36.1%
I sleep during the day	8	5	2	15
	19%	11.9%	2.8%	9.7%
I do not have time to rest	6	2	7	15
	14.3%	4.8%	9.9%	9.7%
	χ^2= 19.141, p = 0.039 *			

Multiple choice answers

Based on the results research, you will find that people who actively spend their time and those who devote their free time to meet with family or with friends, often indicated the answer is rarely or never the question about problems with sleep than subjects who preferred passive forms of leisure . The differences were statistically significant (p <0.05).

Table 6. The working time and occupational exposure or an accident at work

Occupational exposure or an accident at work	The working time		altogether
	One way	shift	
Yes	17	46	63
	42.5%	65.7%	57.3%
No	23	24	47
	57.5%	34.3%	42.7%
altogether	40	70	110
	100.0%	100.0%	100.0%
	χ^2= 5.606, p = 0.018 *		

The time has an impact on the incidence of occupational exposure or other accidents. More often they are exposed to people working in shifts (12-hour, night work, Sundays and holidays) than 8 - hour (single shift). The differences are statistically significant ($p < 0.05$). The vast majority(65.7%) of respondents among shift workers, occupational exposure suffered an accident or has been associated with the work. Among the respondents declaring that they do not have experienced occupational exposure or accident at work, most employees were not working on the night and change (57.5%), and only 34.3% of the workforce changes.

Discussion

Numerous health problems of nurses working in shifts are occurring load for confirmation in their work. In the literature more and more attention paid to the problem of the negative impact of stress of shift work on the functioning of the economically active. So far, studies conducted among nurses show that professional stress, the emergence of depression and lack of control and job satisfaction significantly reduce the possibility of the proper performance of work [11,12,13]. The study K. Kowalczuk et al. On occupational hazards of medical staff, up to 85% of nurses indicated chronic fatigue syndrome [14]. Our study also showed that most respondents stated fatigue (96%) also a large group of -ból back and diarrhea (68.2%), headache (55.5%) less neurotic disorders (36.4%), and rash (40.9%). In Poland, the problem associated with the occurrence of allergies among medical staff concerned from 5.9% to 18.3%. In this study, 5.5%. Nurses are exposed to latex through the use of protective gloves and medical equipment, ie. Plasters, bandages, drains, catheters, anesthetic equipment. Allergenic properties of latex products to increase their production stage. May exhibit allergenic properties also of chemical substances added during the production process to accelerate vulcanization, the compounds and anti-flowable substances to facilitate donning of gloves [15,16,17].It is worrying to downplay the suffering from health problems because they are rarely a reason for the advice of a doctor. In contrast, dizziness occurring among nurses participating in the study indicate a relationship of symptoms with education. The higher the education, the less experience dizziness. The work of nurses in the inpatient ward requires providing care around the clock, which necessitates longer working hours and tasks at night. Sleep disorders are a significant effect of night work, rely on problems falling asleep, frequent waking, sleeping problems increase with age and seniority at night. In this study, 63.7% of respondents worked in shifts, of which 58.2% also at night, on Sundays and holidays. A large part of the respondents (41.8%) declare that they worked more than 20 years to change and night, and the 16.4% that 11-20 years. Our results show that significantly more often awaken to workers in the 12-hour clock and night ($p < 0.01$). As the

results of research, the position of a nurse, there are many factors affecting the workload. Research Zagroby M. et al. Found that 56% of nurses spent free time on chores, reading (books, newspapers) chose 40%, spending time watching TV 29% and 31% of walks, excursions outside the city 15%, and 18 % of respondents declare no free time. Active forms of spending less time was chosen [18]. The same results were obtained in this work. The largest percentage of respondents spends his free time with family or friends (50.9%), 26.4% watch TV or use a computer, physical activity prefers to 36.4%, and 13.6% is not time to rest. Own study also found that people spending free time with loved ones or active less likely to have trouble falling asleep than declaring passive leisure time activities ($p < 0.05$).

Conclusions:

1. The most frequently reported by nurses symptoms are malaise: fatigue (90%), back pain (74.6%), visual fatigue (72.7%), headache (60%) and problems sleeping (42.7%) , increased heart rate (40%). Among the most common health problems, up to 63.5% of nurses declares chronic fatigue, 40.6% of cardiovascular problems, and 28.1% gastrointestinal disorders.
2. Dizziness is more common among nurses with secondary education than among those with higher education ($p < 0.022$).
3. Employees working in two shifts of 12 hours and at night often have trouble sleeping, consisting of waking several times during the night, than who work in shift system ($p < 0.01$), the workload is also higher ($p < 0.05$)
4. Physical activity and spending time with family or close reduces the frequency of problems falling asleep ($p < 0.05$), determining a valid sleep (rest) has the effect of reducing the subjective feeling of the workload.
5. The vast majority (65.7%) of respondents among shift workers, occupational exposure has been associated with an accident or work ($P = 0.018$).

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