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## **Opinion on the health and social functioning of nurses employed in a shift work system. Selected aspects**

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**Key words:** nurses, shift work, health

### **Abstract**

Daily cycles of sleep/wake, is misaligned with behavioral patterns during shift work, leading to an increased risk of developing cardiovascular/metabolic/gastrointestinal disorders, some types of cancer, and mental disorders.

The aim of this study was to understand the opinion on the health and social functioning of nurses employed in the shift work system.

This study was conducted in 2016 on 100 selected nurses working in a shift system in one of the hospitals in Lublin. The average age of respondents was 41,54 years old. Results were collected with the author's questionnaire.

According to the nurses' opinion, work in a shift system has a negative impact on their health. Respondents complained primarily about problems with the digestive and circulatory systems. The number of nurses who feel the negative impact of shift work on their health increases with age and seniority. According to the respondents, shift work system causes them additional stress. Statistically significant dependence was shown between seniority in the shift system and an opinion on the negative impact of shift work on family life. The longer the shift work experience, the greater the percentage of respondents declaring its negative impact on family life. It is vital to implement measures reducing the negative effects of such a work system through the education of employees. It is also necessary to adapt the forms of work organization to the psychophysical possibilities of employed nurses.

### **Introduction**

The definition of shift work was defined in art. 128 § 2 pt. 1 of Labor Code and stands for *performing work comprising recurring periods of hours, days or weeks, in which different groups of workers do the same jobs in relay*. [10]. Shift work should be treated as a factor that favors, accelerates, or may increase the occurrence and course of numerous diseases, ailments or pathological conditions [9].

### **Purpose of work**

The aim of this study was to understand the opinion on the health and social functioning of nurses employed in the shift work system.

### **Material and method**

This study was conducted in 2016. It was conducted on 100 selected nurses working in a shift system in one of the hospitals in Lublin, Poland.

The research used the method of a diagnostic survey, using a custom questionnaire, consisting of 35 questions regarding the impact of shift work on the physical and mental health of nurses examined, as well as their social and family functioning. Statistical calculations were performed using the IBM SPSS Statistics software. The level of significance was  $p < 0,05$ .

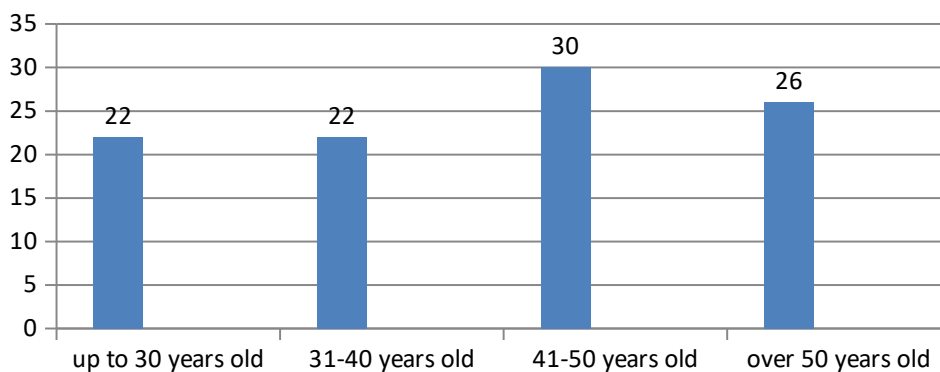


Fig. 1. Structure of the examined group by age (in percentages).

The studied group was analyzed by age, level of education and seniority in the shift work system. Due to the age, the largest group of nurses belonged in the 41-50 years old category (30%). The average age of respondents was 41.54 years old. Detailed data is presented in Fig. 1.

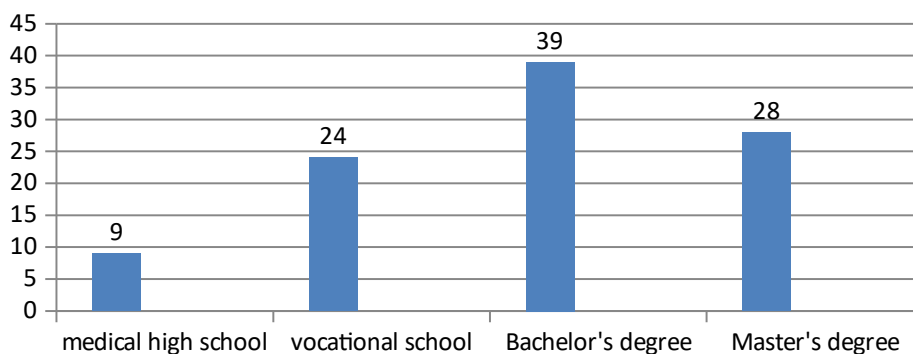


Fig. 2. Structure of the examined group by education (in percentages).

Analyzing the structure of the surveyed in terms of education, it can be stated that the largest group - 39% were people with a Bachelor's degree, 28% had a Master's degree, and 24% of nurses graduated from a medical vocational school. Nurses from a medical high school accounted for 9% of respondents (Fig. 2).

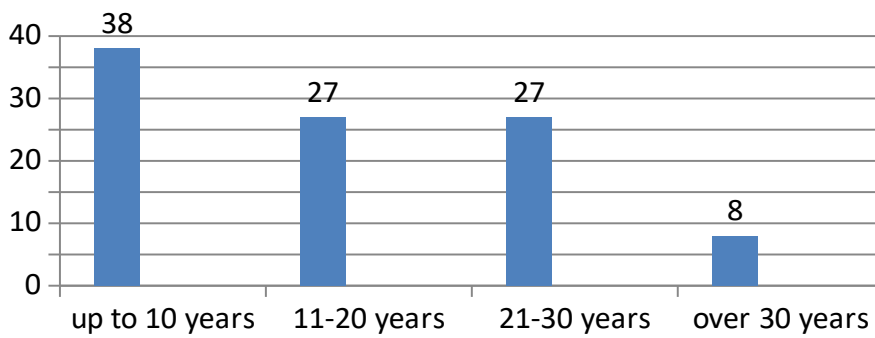


Fig. 3. Structure of the examined group by seniority in shift work (in percentages).

Another independent variable taken into consideration was the shift work experience of surveyed. 38% of respondents spent under 10 years working in the shift system, 27% of them worked between 11-20 years, same as in 21 - 30 years bracket. The smallest group consisted of people with over 30 years of work experience in shift system (8%). The average work seniority was 16.45 years (Fig. 3).

## Results

The examined nurses employed in the shift system most often indicated the symptoms and diseases of the digestive (26% and circulation (24%) systems (Fig.4). On the part of the gastrointestinal tract following ailments were found: irregular bowel movements (11%), bloating (9%), stomach ulcers and constipation (7% each), as well as heartburn (6%).

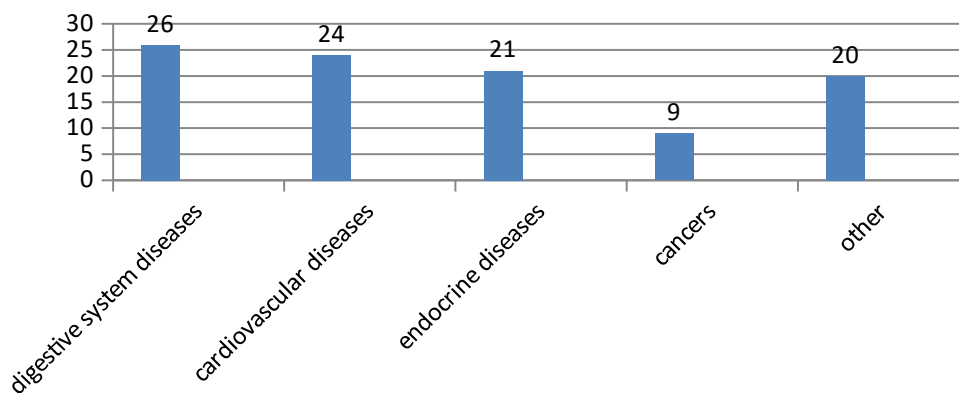


Fig. 4. Occurrence of diseases among examined nurses (in percentages).

47% of the examined gained up to 5 kg of body weight, 34,8% gained between 6 and 10kg, and 18.2% gained over 10kg of weight.

A statistically significant relationship was found between age and the opinion of the respondents on the negative impact of work in the 12-hour system on their health ( $p < 0.05$ ).

Table 1. Relationship between socio-demographic factors and the opinion on the negative impact of shift work on the health of respondents.

Socio-demographic factors		Shift work has a negative influence on one's health			Statistics
		Yes	No	Not sure	
Age	Under 31 years old	40,9%	18,2%	40,9%	$\chi^2=13,899$ $p=0,031$
	31-40 years old	40,9%	18,2%	40,9%	
	41-50 years old	53,3%	3,3%	43,3%	
	Over 50 years old	80,8%	3,8%	15,4%	
Education	Medical high school	55,6%	0,0%	44,4%	$\chi^2=5,868$ $p=0,438$
	Vocational school	70,8%	4,2%	25,0%	
	Bachelor's degree	51,3%	15,4%	33,3%	
	Master's degree	46,4%	10,7%	42,9%	
Shift work seniority	Below 11 years	45,5%	21,2%	33,3%	$\chi^2=12,978$ $p=0,043$
	11-20 years	42,9%	4,8%	52,4%	
	21-30 years	60,0%	6,7%	33,3%	
	Over 30 years	81,3%	0,0%	18,8%	

The belief that shift work has a negative impact on health ( $p < 0,05$ ) was shared by 40.9% of the subjects aged up to 30 years old and 31-40 years old, 53.3% between 41-50 years old and 80.8% of respondents between 51 and 60 years old. With age, the percentage of people who perceive the negative impact of the shift system on health (Table 1) increases.

A correlation was found ( $p < 0.05$ ) between seniority and the opinion on the negative impact of work in a 12-hour system on health. Along with increased work seniority, the percentage of respondents that perceive the negative impact of shift work on their health increases (Table 1).

The opinion concerning the influence of shift work on mental functioning of subjects was examined. More than half (65%) pointed to shift work as a stress factor. 17% of surveyed nurses said that the job was not stressful, 18% did not have an opinion about it.

All respondents stated that in their workplace there are no training courses in matters of dealing with the stress resulting from the specificity of work..

Table 2. Ailments observed in subjects after taking up work in a 12-hour system.

Problems/afflictions	n	%
Apathy	78	78,0
Anxiety	4	4,0
Depression	2	2,0
Neurosis	8	8,0
Nervousness	38	38,0
Aggression	21	21,0
Lack of concentration	90	90,0
General fatigue	86	86,0
Disorders of social functions	15	15,0
Lower patience	57	57,0
Higher coffee consumption	53	53,0
Higher alcohol consumption	5	5,0
Sleeping pills usage	1	1,0
Sedatives usage	4	4,0
Negative attitude towards work	39	39,0
Increased susceptibility to diseases	21	21,0
Other	1	1,0
Overall	523	

*Respondents could choose more than one answer.*

Among the problems/afflictions after starting work in the 12-hour system subjects observed: lack of concentration (90%), general fatigue (86%) and apathy (78%). Lower patience (57%) and a higher consumption of coffee (53%) were less frequently indicated. Detailed data can be found in Tab.2.

Since the moment of starting shift work, nearly a quarter of surveyed (24%) had problems with sleeping. Most often these were problems with falling asleep (16%). 4% of the respondents felt that their sleep became much deeper and another 4% stated that their sleep became shallow.

There was no statistically significant relationship established between the socio-demographic factors (age, education, seniority in the shift work system, marital status, place of residence) and the level of fatigue of those surveyed.

Table 3. Relationship between socio-demographic factors and the opinion on the negative impact of shift work on family/personal life.

Socio-demographic factors		Shift work has a negative impact on one's personal/family life		Statistics
		Yes	No	
Age	Under 31 years old	18,2%	81,8%	$\chi^2=5,958$ p=0,114
	31-40 years old	27,3%	72,7%	
	41-50 years old	36,7%	63,3%	
	Over 50 years old	50,0%	50,0%	
Education	Medical high school	55,6%	44,4%	$\chi^2=7,702$ p=0,053
	Vocational school	37,5%	62,5%	
	Bachelor's degree	41,0%	59,0%	
	Master's degree	14,3%	85,7%	
Shift work seniority	Below 11 years	23,7%	76,3%	$\chi^2=4,579$ p=0,032
	11-20 years	29,6%	70,4%	
	21-30 years	48,6%	51,4%	

A statistically significant relationship was also found between the length of shift work experience and the opinion on the negative impact of work on family/personal life ( $p < 0.05$ ). A negative effect was declared by 23.6% of respondents with shift-based work experience of up to 10 years, 29.6% of surveyed having from 11 to 20 years of experience and 48.6% of respondents with seniority in the shift work system of 21 years and more. The longer the seniority, the greater the percentage of respondents declaring the negative impact of the shift work on family/personal life (Table 3).

Also, a statistically significant relationship was found between the seniority in shift work and the opinion on resignation from work due to health problems  $\chi^2=10,290$ ;  $p=0,036$ . The willingness to resign was expressed by 39.5% of respondents with seniority up to 10 years in a shift system; 77.8% with work experience from 11 to 20 years and 62.9% employed 21 years and more. The respondents with the shortest seniority statistically less often declared that they would be willing to give up the shift system due to health problems. The data is presented in Fig. 5.

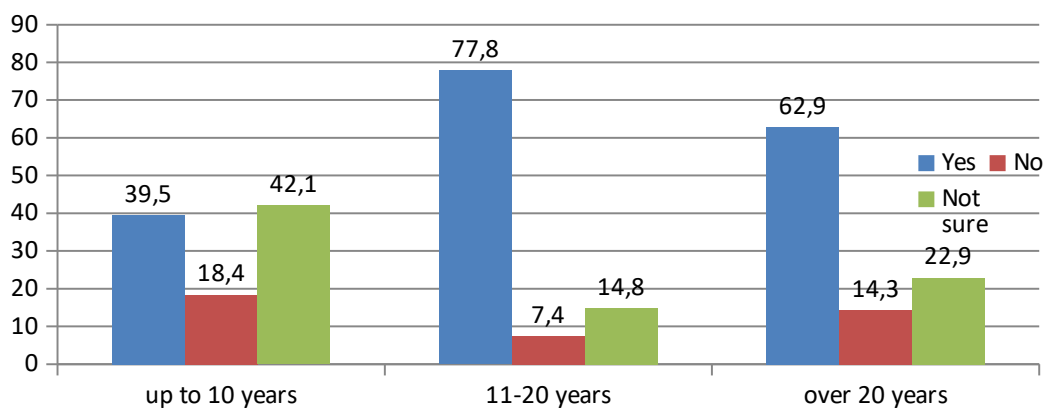


Fig. 5. The relationship between seniority and the opinion about resignation from it for health reasons.

There were no statistically significant relationships between socio-demographic factors and the opinion about the negative impact of working the 12-hour system on social life.

## Discussion

The number of shift workers is increasing every year. The effects of shift work are analyzed in three aspects: health, sociological, and biological.

Such a system of work hinders family life and it impacts the employee's health. Shift work may increase the risk of suffering from many conditions and illnesses. It is estimated that only 10% of people on shift work do not experience its adverse effects and approximately 20% must quit due to health problems [18].

Working in a shift system is associated with higher incidence rates of cardiovascular diseases.

Harrington's research [6] concludes that people that worked in a shift system for 15-20 years suffered from: coronary disease, hypertension or myocardial infarction (approximately 20% of workers), and these afflictions occurred 3 times as frequently, compared to people on fixed working hours.

Epidemiological research concluded that the risk of developing ischemic disease is around 40% higher among shift workers, and increases with job seniority [19].

Kawachi and others [8] compared nurses working in a shift system to nurses that never worked in such a system. Compared to them, the risk of ischemic disease for nurses working in a shift system under 6 years amounted to 1,21 (0,92 to 1,59), and for nurses working more than 6 years - 1,51 (1,12 to 2,03).



Results obtained in own research confirm increased risks of circulatory system diseases amongst participants. 24% of respondents were diagnosed with circulatory system diseases. All subjects indicated the occurrence of hypertensive disease.

Bilski, [2] comparing the frequency of gastrointestinal complaints and diseases among 241 professionally active nurses, found a statistically significant relationship between irregularities of bowel movements in nurses working in shifts compared to people who do not work in this system (38% to 25,7%;  $p < 0,05$ ).

Nojkova and others [13] confirmed a higher frequency of irritable bowel syndrome among nurses working on night shifts.

Schernhammer and others [14] conducted a cohort study among nurses, which displayed a 35% increased risk of colon cancer after 15 years of working night shifts.

In the studies of Segawa and others [15], the frequency of gastric and duodenal ulcers appearing is higher in shift workers than those working during the day. Thus, shift work can play a significant role in the development of peptic ulcers. In own research, 26% of the surveyed concluded that they were experiencing problems/afflictions with their digestive system. The most frequent complaints from the subjects were: irregular bowel movements, bloating, gastric ulcers and constipation. According to Stryjewski and others [17] problems with digestive system are even 2-3 times more frequent in employees working shifts and 2-5 times more frequent in those who work exclusively during nights. Authors believe that because of changes in diet and meal times, problems such as bloating, irregular bowel movements, abdominal pains and nausea appear more often.

In studies conducted among nurses and midwives by Burdelak and others [3], the most frequently reported diseases were chronic backache (47.2%), hypertension (24.5%) and thyroid disease (21.2%).

The dependence of the influence of shift work on the mental functioning of nurses was examined. Over half (65%) of respondents believe that the shift work system is stressful. The subjects most often indicated: apathy, lack of concentration, general fatigue, decreased patience. Nearly a third of nurses noticed irritation and attacks of aggression.

Kasperczyk and Joško [7] noticed the impact of shift work on malaises. The examined most frequently indicated fatigue, irritability and increased emotional tension.

Other researchers [9], while assessing shift work, stated that the main causes of potential accidents were lack of sleep and reduced concentration.

In a study of 1,200 nurses, it was shown that shift work was associated with depression (11.2%) and social dysfunctions (79.5%) [1].

Lee's study [12] shows a higher prevalence of depressive symptoms among nurses who worked shifts and suggests that shift work may increase the severity of depressive symptoms among female nurses in South Korea.

Among the health problems of shift workers, increased risk of type 2 diabetes, dyslipidemia and cardiovascular disease are mentioned as well [11].

Night shift work of nurses is most strongly associated with a higher risk of obesity/overweight [4].

The study of workers employed in the shift work system showed a higher frequency of health problems (e.g. sleep problems, general fatigue, anxiety, heart disease), compared to employees working in a one-shift system [5].

In own research, 34% of nurses were of the opinion that shift work negatively affects their personal and family life. The examined pointed towards decreased patience, greater nervousness and irritability in dealing with their loved ones. 30% of respondents believe that this work system also has a negative impact on relationships with children. 1/3 of respondents were of the opinion that working in a shift system makes it much more difficult or even impossible to participate in various family celebrations and holidays.

Other authors noticed in their research that as many as 76.2% of workers noticed the negative impact of shift work on their family life, 17.2% think that such work organization does not affect it, but interestingly, 6.6% think that that such a system of work is positive for their family life. Similar results concerned social life, where 72.4% of respondents noticed the negative impact of shift work on social life, 20.5% - lack of such impact, while 5.3% considered that such a work system had a positive effect in this area [7].

According to Siemigowska and others, [16] the work-family conflict was significantly higher among nurses working in shifts than in those who worked only during the day. In order to avoid adverse effects of shift work, an appropriate work environment should be created.

## **Conclusions**

1. According to the nurses' opinion, work in a shift system has a negative impact on their health. Respondents complained primarily about problems with the digestive and circulatory systems.
2. The number of nurses who feel the negative impact of shift work on their health increases with age and seniority.
3. According to the respondents, shift work system causes them additional stress.

4. Statistically significant dependence was shown between seniority in the shift system and an opinion on the negative impact of shift work on family life. The longer the shift work experience, the greater the percentage of respondents declaring its negative impact on family life.
5. It is vital to implement measures reducing the negative effects of such a work system through the education of employees. It is also necessary to adapt the forms of work organization to the psychophysical possibilities of employed nurses.

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