

# HOW NURSES ASSESS THE PRINCIPLES OF OCCUPATIONAL HEALTH AND SAFETY'S IMPACT ON THEIR SAFETY AT WORK?

JAK PIELĘGNIARKI OCENIAJĄ WPŁYW ZASAD BEZPIECZEŃSTWA I HIGIENY PRACY NA ICH BEZPIECZEŃSTWO W PRACY?

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#### ABSTRACT

**Introduction.** Due to their job characteristics, nurses are highly exposed to many occupational diseases and accidents at work. Up to 1 per 3 nurses each year gets injured at work, and almost 80% suffer from back pains.

**Aim.** Nurses' opinions and experiences related to OHS and injuries at work are worth assessing. It might help to point specific groups for which educational programs are needed.

**Material and methods.** A survey study was conducted on a group of 101 nurses. The occurrence of correlation between answers and respondents' characteristics was checked.

**Results.** A high percentage of nurses questioned assessed their OHS knowledge as insufficient and, at the same time, did not believe that adherence to the rules might protect them from injuries. The place of work (hospital ward) and education level was correlated with nurses' knowledge and experiences.

**Conclusions.** It is essential to propose special educational and motivational programs to nurses working at specific hospital wards to encourage them to adhere OHS and ergonomic rules during their work.

KEYWORDS: nurses, workplace, accident prevention, ergonomics, work performance.

## Introduction

The Health and Safety Policy serves to instruct employers and employees in the actions and regulations needed to ensure the safety of all staff in the organization. Good knowledge of these principles among staff is able to prevent accidents at work and reduce the risk of occupational diseases [1]. Employee safety is particularly important in medical facilities where staff are exposed to many harmful factors. In particular, nurses, who are the backbone of the medical team, offering direct and long-term care to many patients, are exposed to drugs, chemicals, infectious materials, and psychologically and physically exhausting work. These factors may re-

## STRESZCZENIE

**Wstęp.** Pielęgniarki z racji specyfiki swojej pracy narażone są na wiele chorób zawodowych oraz wypadków przy pracy. Nawet 1 na 3 pielęgniarki każdego roku doznaje urazu w pracy, a prawie 80% odczuwa bóle pleców.

**Cel pracy.** Warte oceny są opinie i doświadczenia pielęgniarek w zakresie BHP i urazów w pracy, w celu wyznaczenia grup, dla których przydatne będą programy edukacyjne.

**Materiał i metody.** Badanie ankietowe przeprowadzono na grupie 101 pielęgniarek. Sprawdzono występowanie korelacji między odpowiedziami a cechami badanych osób.

**Wyniki.** Wysoki odsetek badanych pielęgniarek oceniał poziom swojej wiedzy na temat BHP jako niewystarczający oraz nie wierzył w skuteczność stosowania tych zasad. Miejsce pracy (oddział) oraz poziom wykształcenia były skorelowane z wiedzą i doświadczeniami pielęgniarek.

Wnioski. Konieczne jest zaproponowanie pielęgniarkom pracującym na konkretnych oddziałach specjalnie przygotowanych programów edukacyjnych i motywacyjnych w celu zachęcenia pracowników do przestrzegania zasad BHP i ergonomii w pracy.

SŁOWA KLUCZOWE: pielęgniarki, miejsce pracy, zapobieganie wypadkom, ergonomia, wydajność pracy.

sult in physical (needlestick injuries, musculoskeletal pains and problems and varicose veins), biological (infections), chemical (allergies and other skin reactions) or mental (burnout, sleep problems) problems [2–6]. Some injuries, especially to the back and shoulders, occur quite frequently and are associated with non-ergonomic work. Backache and arm pains are caused by inadequate posture, unnatural movements and the force given to the patient's limbs when performing tasks such as lifting and holding patients' limbs, moving patients from and to bed, reaching and lifting the apparatus and standing for long periods of time [7]. Studies carried out on a large (655 individuals) group of nurses indicated

that injuries at work occur worrvingly frequently - almost 32% of the individuals surveyed experienced an accident at work in the last year, and over 78% suffered from back pain [8]. However, many nurses risk their health, and even while feeling back pain, they continued to work (over 53% guite often, almost 29% sometimes). The main reasons given for continuing to work despite the injury were lack of attention to the accident, lack of time, lack of clear guidelines on how to report the injury, as well as issues related to organizational culture - treating the injury as part of the job, lack of replacement for the period of sick leave or lack of motivation on the part of management to report the accident and seek treatment. Stress resulting from an inadequate working environment and fatigue may in turn, reduce the safety and quality of work performed by employees [9]. In a study carried out on a group of nursing students, most confirmed their knowledge of health and safety at work [10]. Unfortunately, their actual state of knowledge was insufficient. This was due to their feeling of burnout at the beginning of their careers, minor accidents at work due to carelessness, and also to experiencing many symptoms of exposure to harmful agents. Performing nursing duties in full compliance with health and safety recommendations is seen by some nurses as necessary and right, but it is also problematic because of the complex situations they face in their daily work, which are not covered by the rules [11]. The lack of time and the multitude of tasks to be performed cause them to omit some procedures or, based on experience, to decide on their own how to solve a specific problem. This may contribute to a significant prevalence of reported back pain among medical workers compared to other professions [12]. At the work of nurses, it is important to perform their duties not only in accordance with health and safety rules, which can reduce the risk of occupational diseases but also in accordance with ergonomic principles in order to reduce the risk of injuries in the long term.

All occupational injuries and illnesses among experienced and necessary medical personnel contribute not only to the increased costs of a given organization – related to the need to employ a new person to substitute or permanently replace the previous employee – but also to the loss of know-how, experience and professional knowledge [13]. It is, therefore, necessary to check the knowledge and opinions on the use of health and safety rules by nurses in order to improve motivation, organize more ergonomic working conditions or provide additional training. Most of the research so far has been devoted to the relationship between stress, injuries and compliance with nurses' safety rules and the characteristics of their workplace or gender. Therefore, it makes sense to explore this area more closely. Up-to-date and high level of nurses' knowledge in the field of occupational health and safety is essential to protect the employee's health during their work. For this reason, the aim of this research was to check the use, opinion and knowledge of nurses in the field of health and safety at work and whether these responses are correlated with the socio-demographic characteristics of the respondents.

## Material and methods

In order to examine the knowledge and opinions of nurses about the principles of health and safety at work in medical care facilities, a proprietary questionnaire form was used. The survey was conducted between 29 September 2020 and 26 October 2020 on a group of 101 nurses who actively perform their profession. The examined group consisted of persons working as a nurse in the Samodzielny Publiczny Zespół Zakładów Opieki Zdrowotnej in Kozienice and in the Samodzielny Publiczny Zakład Opieki Zdrowotnej Zespołu Zakładów im. Duńskiego Czerwonego Krzyża in Maków Mazowiecki. The survey used was anonymous and voluntary. Respondents gave their oral consent to take part in the survey before it began.

The questionnaire form used contained eight closed-ended single-choice questions concerning knowledge and use of occupational health and safety rules in health care facilities. In addition, the form contains 8 questions about the socio-demographic characteristics of the respondents. The following questions were used in the study:

- 1. How do you assess compliance with the health and safety rules of the employees of the medical facility where you also work?
- 2. Do you think that health and safety regulations affect the safety of medical personnel in the workplace?
- 3. In connection with the COVID-19 epidemic, have you been trained in occupational health and safety?
- 4. Do you think that training in health and safety rules at your workplace is sufficient?
- 5. Does good knowledge of health and safety regulations improve the quality of your work?
- 6. In the course of your career, have you noticed any gross violations of health and safety regulations?
- 7. Has training in health and safety regulations helped you to reduce your risk of developing occupational diseases?
- 8. Do you know what ergonomics science does?

# **Statistics**

Due to the nominal nature of the data obtained, the Chisquare test was used to investigate the occurrence of statistically significant correlations between responses and socio-demographic characteristics of respondents [14]. As the limit level of statistical significance  $\alpha$ =0.05 was used.

The Chi-square test allows to assess whether, in terms of variables, there is a statistically significant difference between the expected and observed frequencies.

The test statistics are calculated using the following formula:

$$\chi^{2} = \sum_{k=1}^{n} \frac{(O_{k} - E_{k})^{2}}{E_{k}}$$

Where  $O_k$  means observed and  $E_k$  means expected frequency values for *k* levels.

After calculating the value of the test statistics, the number of degrees of freedom is estimated using the following formula:

$$df = (r-1)^*(c-1)$$

Where *r* and *c* are the numbers of levels of the variables for which the test statistics are calculated. The degrees of freedom are used to calculate the test statistics for the values from the distribution tables and reverse Chi-square distribution. The selected level of statistical significance allows to calculate a critical value below which there are no grounds for rejecting H0 with no correlation between the variables.

#### Results

Among the nurses surveyed, women predominated (91%), persons aged 18–25 (53%), respondents living in the city (73%), persons with higher education (73%), work experience of 0–10 years (59%), as well as nurses with 1 to 4 specialist courses (68%) and without one specialization (77%). **Table 1** presents a summary of the frequency of occurrence of selected socio-demographic features in the studied group.

The majority (64%) of the nurses surveyed had a good opinion of the application of OHS principles in their workplace. The vast majority of people (85%) believed that OHS affects the safety of medical personnel in the workplace. The prevailing opinion among the respondents was that knowledge of occupational health and safety rules did not reduce the risk of occupational diseases (64%). There is a relationship between the answers to the safety assessment and the opinion on the impact of OHS on employee safety. The relationship between the answers to these questions is shown in **Figure 1**.

Table	1.1	_ist o	of res	ponder	nts'	socio	-demo	ogra	ohic	char	act	erist	tics

Socio-demographic o	Ν	%	
Condor	Female	92	91
Gender	Male	9	9
	18–25	54	53
	26-35	11	11
Age	36-45	9	9
	46-55	12	12
	56-65	15	15
Place of stay	City	74	73
Fidee of Stay	Village	27	27
	Secondary	15	15
Education level	Higher	74	73
	Postgraduate	12	12
	0–10	60	32
	11–20	16	35
Job seniority	21–30	15	30
	31-40	6	4
	>40	4	4
He as the law and	Gynecology and obstetrics	9	9
Hospital ward	Surgery	14	14
	Internal medicine	78	77
	0	14	14
Number of specialist	1–4	69	68
courses	4–8	9	9
	>8	9	9
	0	9	9
Number of specializations	1	78	77
	2 and more	14	14

Source: own work



Figure 1. Contingency plot of answers whether OHS rules influence safety, reduce risk of occupational diseases and are respected at respondents' workplace

A significant proportion of the nurses surveyed (64%) believed that the knowledge of health and safety

regulations does not improve the quality of their work (**Figure 2**). Just as with the relationship between the assessment of compliance and the impact of OHS on worker safety, a similar relationship can be observed with regard to opinions on the impact of OHS on the quality of work. The results also indicate the relationship between the department where the examined nurses worked and the answers to these two questions.



Figure 2. Contingency plot of answers whether OHS rules influence quality of work, they are respected at respondents' workplace in relation to the hospital ward they work at

Due to the epidemiological situation in the country, it is particularly important to refresh and broaden the knowledge of medical workers in the field of occupational health and safety. Unfortunately, only 64% of the nurses surveyed have received additional training in this area since the outbreak of COVID-19. Only 53% of the surveyed persons assess the level of OHS training in the workplace as sufficient (**Figure 3**). There is a relationship between the additional safety training during the COVID-19 pandemic, the department where the examined nurses worked and the opinion that they received sufficient safety training in the workplace.

At the same time, an alarmingly high percentage (85%) of respondents noticed a gross violation of health and safety rules during their career. However, not too many people (64%) knew the principles of ergonomics (**Figure 4**). A relationship can be observed between the age of the respondents and the fact that the case of breaking health and safety rules among the co-workers of the nurses surveyed is observed.



Figure 3. Contingency plot of answers whether respondents received additional OHS trainingduring COVID-19 pandemic, they feel that they received sufficient OHS training at their workplace in relation to the hospital ward they work at



Figure 4. Contingency plot of answers whether respondents have knowledge about ergonomics, they spotted OHS rules violation with relation to their age

Correlation between the variables under consideration Values for the reverse distribution of the Chi-square have been calculated for the observed numbers (**Table 2**). The bold values in Table 2 indicate that there is no rejection of H0 test for the relationship.

 Table 2. Values for the reverse distribution of the Chi-square calculated for the observed frequencies

Question Number	Age	Gender	Place of stay	Education level	Job seniority	Hospital ward	Courses	Specializations
1	3,45	0,13	0,20	2,02	2,57	5,96	0,85	2,46
2	2,06	0,06	0,07	1,17	7,18	8,22	0,35	1,77
3	0,39	0,00	0,00	0,16	2,27	3,61	0,02	0,23
4	1,26	0,00	0,02	0,46	3,58	2,07	0,05	0,04
5	2,13	0,00	0,02	0,38	8,09	0,79	0,03	0,00
6	2,06	0,06	0,07	1,17	7,18	8,22	0,35	1,77
7	2,13	0,00	0,02	0,38	8,09	0,79	0,03	0,00
8	0,39	0,00	0,00	0,16	2,27	3,61	0,02	0,23

Source: own work

The Chi-square test confirmed the presence of a statistically significant correlation between most of the used socio-demographic characteristics and the examined variables concerning knowledge and opinions about the use of health and safety regulations in medical facilities. The occurrence of correlation has not been confirmed for the following relationships:

- The age of the respondent and:
  - Training in health and safety in connection with the COVID-19 pandemic
  - Knowledge of the field of ergonomics
- Gender of the respondent and:
  - Training in health and safety in connection with the COVID-19 pandemic
  - Assessing whether the training on occupational health and safety in the workplace is sufficient
  - Opinion on whether knowledge of occupational health and safety at work improves the quality of work
  - Opinion whether knowledge of occupational health and safety rules reduces the risk of occupational diseases
  - Knowledge of the field of ergonomics
  - The respondent's workplace and:
    - Training in health and safety in connection with the COVID-19 pandemic
      - Knowledge of the field of ergonomics
- Number of specialist courses held by the respondent and all questions concerning opinions on OSH principles
- A number of specialities and:
  - Assessing whether the training on occupational health and safety in the workplace is sufficient

- Opinion on whether knowledge of occupational health and safety at work improves the quality of work
- Opinion whether knowledge of occupational health and safety rules reduces the risk of occupational diseases

## Discussion

Health is one of the basic goods that every person cares about. Some professions, such as nurses, are particularly vulnerable to health damage due to accidents at work or occupational diseases. This is due to the many harmful factors to which people in this professional group are exposed during their daily work. Safety rules, health and safety regulations or ergonomic rules serve to minimize the risk of diseases and injury among employees of a given organization. In order to be able to fully recover and care for patients for as long as possible, it is necessary to pay attention to the safety of nurses. Employers should not only provide medical personnel with a safe workplace but also motivate the crew to follow health and safety rules during their work activities. It is worth checking the level and use of ergonomics and safety knowledge among employees to organize the necessary training or to introduce the additional motivation for the crew, if necessary. The innovative results of this study give additional insight to individuals responsible for motivation and preparation of additional trainings for nurses. Properly addressed concerns related to work organization or the whole environment, taking socio-demographic characteristics of the employees into account, might bring a diminishing number of accidents or occupation diseases among nurses. Such influence is crucial due to facilities' economic reasons.

In this study, the group of nurses surveyed had some knowledge of OHS and ergonomics but did not assess the level of training received in this area as sufficient. They also lacked confidence in the effectiveness of these principles in improving the quality and safety of their work. Unfortunately, many of them have encountered a violation of these rules in their work. A statistically significant correlation has been shown between most of the pairs of variables used. The level of education and place of work of the respondents were correlated with the answers to all questions, while age and place of residence with most of the answers. The number of specialist courses was not correlated with the answers to any of the questions used. This indicates a different attitude towards health and safety at work among people with different work experience, working in different environments. This may be influenced by the specific ward where the examined nurses worked and the situation observed by them.

Studies carried out on nurses on the use of ergonomics and safety principles show similar conclusions. Gender and work patterns (length of shifts and thus indirectly the hospital ward of the work performed) have been shown to influence fatigue and stress levels among medical staff [15]. This, in turn, can lead to mistakes or decreased immunity. The workplace and thus the amount of additional ergonomic equipment and a motivating organizational climate support nurses in using their knowledge and equipment to protect their own health [16]. The research also points to the need for constant evaluation of the level, effectiveness and opinion of employees on the training offered in occupational health and safety and ergonomics. Nurses who have received intensive, one-week training in ergonomic techniques for lifting patients have not recorded significantly fewer work-related back pain cases than nurses who have received only basic training [17]. Training alone may not be sufficient to encourage nurses to use ergonomic equipment and put new knowledge into practice [18]. This may lead to an additional conclusion - a lack of willingness to change the procedures and habits developed. This is consistent with the results of this survey, in which the respondents did not associate high levels of OHS knowledge with improvements in the guality or safety of their work.

There are some limitations to this study. It was performed on a group of only 101 nurses working within one voivodeship. For this reason, these results should not be translated into relationships that exist in the society of the whole country or the world. However, this study may be an introduction to more detailed and extended research on the state of knowledge and use of OHS principles in the work of nurses and possibly other medical professions. It is worth considering checking the exact level of knowledge and opinions of respondents by means of detailed questions or short situational descriptions.

## Conclusions

Most of the nurses' characteristics were correlated with their opinions and knowledge about OHS rules usage. It presents significant information to individuals responsible for the motivation and education of medical personnel. Negligence in this area might impact the medical facility's activity. Especially lack of additional training at the beginning of a worldwide pandemic is a threat to employees' and patients' overall safety. Health as a precious good should not be overlooked at the workplace.

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