



Occupational Risk Perception of Nursing Students, Affecting Factors and Their Association with Occupational Accidents: A Crosssectional, Multicenter Study

Hemşirelik Öğrencilerinin Mesleki Risk Algısı, Etkileyen Faktörler ve Mesleki Kazalar İle İlişkisi: Kesitsel, Çok Merkezli Bir Çalışma

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Abstract

Aim: The aim of this study is to evaluate the relationship between the occupational risk perceptions of nursing students, the factors affecting their occupational risk perceptions and occupational accidents.

Material and Method: Study was carried out with 728 nursing students in six universities. The data were collected using "Data Gathering Form" prepared by researchers and "Occupational Risk Perception Scale (ORPS)".

Results: The mean age was 20.8±1.65 (min.18-max.35) years and the majority (82.0%) of the participants were females. 65.1% of the students defined their clinical practice areas as high risk. 30.6% of the students (n=223) stated that they encountered an occupational accident during their clinical practice. ORPS score was significantly higher in women, health vocational high school graduates, students with previous occupational health and safety training and students those who encountered occupational accidents before (p <0.05). The ORPS scores of the students included in the study were found to be high (71.8±11.27; min.17-max.85).

Conclusions: ORPS score was found to be affected by gender, health vocational high school graduation, occupational health and safety training, and previous occupational accidents. It was determined that the most important factor affecting the occupational risk perceptions of nursing students was occupational accident during clinical practice.

Keywords: Occupational risk perception, nursing students, occupational accident

Öz

Amaç: Bu çalışmanın amacı, hemşirelik öğrencilerinin mesleki risk algıları, mesleki risk algılarını etkileyen faktörler ile mesleki kazalar ile arasındaki ilişkinin değerlendirilmesidir.

Gereç ve Yöntem: Çalışma altı üniversitede 728 hemşirelik öğrencisi ile gerçekleştirildi. Veriler, araştırmacılar tarafından hazırlanan "Veri Toplama Formu" ve "Mesleki Risk Algısı Ölçeği (MRAÖ)" kullanılarak toplanmıştır.

Bulgular: Ortalama yaş 20,8±1,65 (en az 18-en fazla 35) yıl olup, katılımcıların çoğunluğu (%82,0) kadındı. Öğrencilerin %65,1'i klinik uygulama alanlarını yüksek riskli olarak tanımladı. Öğrencilerin %30,6'sı (n=223) klinik uygulamaları esnasında mesleki kaza ile karşılaştığını belirtti. MRAÖ puanı kadınlarda, sağlık meslek lisesi mezunlarında, daha önce iş sağlığı ve güvenliği eğitimi almış öğrencilerde ve daha önce mesleki kaza geçirmiş öğrencilerde anlamlı olarak daha yüksekti (p<0.05). Araştırmaya dahil edilen öğrencilerin MRAÖ puanları yüksek bulundu (71,8±11,27; en az 17-en çok 85).

Sonuç: MRAÖ puanının cinsiyet, sağlık meslek lisesi mezuniyeti, iş sağlığı ve güvenliği eğitimi ve geçirilmiş mesleki kazalardan etkilendiği bulundu. Hemşirelik öğrencilerinin mesleki risk algılarını etkileyen en önemli faktörün klinik uygulamalar sırasında mesleki kaza yaşama olduğu saptandı.

Anahtar Kelimeler: Mesleki risk algısı, hemşirelik öğrencileri, mesleki kaza



INTRODUCTION

Due to multidimensional and complex business processes, intensive use of technological devices, high workload and working hours, healthcare services possess high probability of exposure to occupational accidents and diseases for employees.^[1-4] Therefore, the World Health Organization emphasizes that the healthcare sector has the top priority in terms of occupational risk prevention.^[5] The healthcare services are covered in "Very Dangerous Jobs" according to "Hazard Classes List Relating Work Health and Safety".^[1]

Nurses comprise the largest single component of healthcare professionals and face occupational risks during their practices.^[2-3] In recent years attention has been paid to the occupational risks and accidents of nurses.^[6] International Council of Nurses (ICN) announced the themes of the nurses week in 2016 as "Positive Work Environments, Quality Workplaces=Quality Patient Care" to draw attention to a safe working environment.^[7] The American National Institute for Occupational Safety and Health has reported different hazard and risks.^[1] These risks may be encountered as; physical, biological, chemical, psycho-social or ergonomic risks.^[1,8]

Clinical practice constitute a large and important part of nursing education. Nursing students encounter all occupational risks during their education that nurses may be exposed to.^[2,9-11] However, students do not have the same awareness, experience and knowledge about dealing with this situation. This makes students more prone to occupational risks. Occupational risks by leading to accidents and diseases can adversely affect the health of nursing students and can cause serious injuries.^[8,11] Therefore, students are expected to be aware of these risks in order to be aware of occupational accidents or diseases and take precautions.^[12]

Risk perception is defined as "individual's personal judgments about the severity and nature of the risk" and many factors affect this.^[13] It is important for the individual to perceive the conditions he/she is in as a risk for himself/herself, to take precautions and to develop rational interventions.^[6,12] Studies in the literature focus on evaluating occupational accidents that nursing students encounter during clinical practice. However, studies on nursing students' perception of occupational risk are limited.^[11] This study was aimed to evaluate the occupational risk perception of nursing students and the factors affecting it and their association with occupational accidents.

Research Questions:

1. What is the level of perception of occupational risks that nursing students may encounter in clinical practice?
2. What are the factors affecting occupational risk perception in nursing students?
3. Is there an association between nursing students' perception of occupational risks and the factors affecting this with occupational accident?

MATERIAL AND METHOD

Study Design

This study was conducted in a descriptive, cross-sectional and multicenter design.

Population

The study was conducted in autumn semester of 2020-2021 academic year (October-December). Study was carried out in six universities in Turkey. The population was composed of all the students (n=1135) in these universities and 728 students were included in the study. The study was conducted using an online questionnaire through Google survey. Participants who accepted the study were able to see the survey questions. Nursing students in the 2nd, 3rd and 4th years who have been in clinical practice and agreed to participate in the study were included in the study. One hundred and twenty-one students who declined to participate in the study and first-year students (n=286) who have not been in clinical practice were excluded from the study.

Research Tools

- **Data Gathering Form:** Data gathering form was designed by conducting a comprehensive literature ^[2,12-13] search and included 16 questions. In addition to the socio-demographic characteristics, the data gathering form inquired about knowledge, attitude about occupational safety and incidence of occupational accidents among nursing students. In this form, socio-demographic information such as age, gender, class of students, previous education about occupational risks (attending any occupational safety related courses), experience of occupational accidents and which situations are considered as occupational risks (the part focused on the knowledge about occupational risks, which included physical, biological, chemical, psycho-social and ergonomic risks) are evaluated.
- **Occupational Risk Perception Scale:** Occupational risk perception scale (ORPS), was developed by Aksoy & Pasli Gurdogan (2016) to determine nursing students' perceptions of occupational risks encountered in clinical practice. This scale consists of 17 questions with 5-point Likert-type scale. There are three sub-dimensions in the scale. The first sub-dimension includes items that evaluate students' perceptions of psychological and ergonomic risks, the second sub-dimension to evaluate risks originating from individuals and institutions, and the third sub-dimension to evaluate the perceptions of risks about physical environment. The lowest score that can be obtained from the scale is 17, and the highest score is 85. The increase in the score on the scale indicates that the occupational risks are perceived as high risk by the students and the awareness is high. As the score decreases, the risk perception and awareness also decrease. In statistical analysis (Cronbach alpha value $\alpha=0.826$, Spearman value $S=0.730$ and Guttman value $G=0.777$) the internal consistency reliability of the scale was found to be high. In this study, Cronbach alpha value was found to be 0.857.

Ethical Considerations

All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Scale permission and appropriate institutional permissions were obtained from the universities where the study was planned. The study was carried out with the permission of Istanbul Kültür University Institutional Review Board (Date: 20.05.2020, Decision No: 2020.36). The participants were assured that their responses would remain anonymous and confidential.

Data Collection and Statistical Analyses

A self-administered questionnaire was offered to 1135 nursing students at six university. 728 students participated in this study and signed an online informed consent form before collecting data. This study was conducted using an online questionnaire through Google survey.

Continuous variables are expressed as means±SD, and categorical variables are expressed as percentages. Baseline clinical and demographic characteristics of the groups were compared with chi-square or Fisher exact test for categorical data, independent t-test and one-way analysis of variance (ANOVA) for continuous variables. For all tests, two-sided P values <0.05 were considered as significant. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows (SPSS Inc, Chicago, Illinois, USA).

RESULTS

The mean age was 20.8±1.65 (min.18-max.35) years and the majority (99.2%) of the participants (n=728) were under 25 years old. Of the all participants 82.0% were females and 81.3% of them graduated from a high school other than health vocational high school. 35% (n=255) of the students participating in the study were in second grade, 34.6% (n=252) were in third grade, and 30.4% (n=221) were in fourth grade.

77.7% of the students stated that they received education on professional risks in the content of the courses in undergraduate education and 72.6% of these students believed that the education was sufficient. Also, 79.7% of the all students received Occupational Health and Safety (OHS) training. Clinical practice areas were defined as high risk areas by the 65.1% of the students. Number of the students encountered any health threatening occupational accidents in clinical practice was 223 (30.6%). The most common occupational accidents were reported as needle-stick and sharp tool injuries (23.4%), contact with blood or body fluids (5.8%), and fall-slip-injury (0.7%). The minority of participants (9.2%) had not been vaccinated (Hepatitis B) before beginning to clinical practice (**Table 1**).

Table 1. Knowledge, attitude about occupational safety and incidence of occupational accidents among nursing student

	N	%
Have you received training on occupational risks in your undergraduate courses?		
Yes	566	77.7
No	162	22.3
If you have received training, to what extent do you think you are informed?		
Sufficient	411	72.6
Insufficient	155	27.4
Have you received OHS training?		
Yes	580	79.7
No	148	20.3
Have you had Hepatitis B vaccine before clinical practice?		
Yes	466	64.0
No	67	9.2
Not required (Hepatitis patient / carrier / immune)	195	26.8
In your opinion, what is the risk level of the clinical practice area?		
Low risk	28	3.9
Intermediate risk	226	31.0
High risk	474	65.1
Do you think that the personal protective equipments (gloves, masks, aprons, goggles, etc.) you need during the applications are provided at a sufficient level?		
Yes	231	31.7
No	136	18.7
Partially	361	49.6
Have you encountered an occupational accident that will threaten your health in clinical practice?		
Yes	223	30.6
No	505	69.4
Which occupational accident have you encountered?		
Needle-stick and sharp tool injuries	170	23.4
Fall-slip-injury	5	0.7
Contact with blood or body fluids	42	5.8
Chemotherapeutic agent or exposure to radiation	3	0.4
Other	3	0.4
Does violence in health (physical or verbal) pose an occupational risk to you?		
Yes	703	96.6
No	25	3.4

*OHS: Occupational Health and Safety

Occupational risk perception of the students was evaluated by using ORPS scores. Mean psychological and ergonomic risks (first sub-dimension) perception score was 31.6±5.16 (min.7-max.35), personal and institution-based risks (second sub-dimension) perception score was 21.3±3.65 (min.5-max. 25) and physical environment related risks (third sub-dimension) perception score was 18.8±3.82 (min.5-max.25). The mean total perception score of the participants from the ORPS was 71.8±11.27 (min.17-max.85).

Occupational risk perception was significantly higher in women, health vocational high school graduates, students with previous OHS training and students those who encountered occupational accidents before ($p < 0.05$) (**Table 2**). Factors such as, age, gender, grade, graduation from health vocational high school, receiving courses related to occupational risks in undergraduate education and receiving OHS training were significantly associated with encountering an occupational accident during clinical practice ($p < 0.05$) (**Table 3**).

Table 2. Mean Occupational Risk Perception Scale scores of nursing students according to demographic and educational characteristics

Variables	First domain		Second domain		Third domain		Whole scale	
	mean	p	mean	p	mean	p	mean	p
Age (yr)								
18-21 yr	31.5±5.0	0.45	21.2±3.5	0.09	18.8±3.8	0.28	71.5±10.8	0.20
22 yr and over	31.8±5.7		21.7±3.9		19.1±3.9		72.7±12.4	
Gender								
Female	32.0±4.9	0.001*	21.6±3.5	0.001*	19.0±3.8	0.06	72.6±10.9	0.001*
Male	29.8±5.8		20.0±3.9		18.3±4.0		68.1±12.4	
Grade								
Second	31.2±5.0	0.12	21.2±3.4	0.06	18.8±3.9	0.95	71.3±10.7	0.26
Third	31.5±5.1		21.0±3.7		18.9±3.8		71.4±11.4	
Fourth	32.2±5.4		21.8±3.8		18.9±3.7		72.8±11.7	
School of Graduation								
Vacational high school of health	32.7±3.7	0.008*	22.0±3.0	0.006*	19.1±3.8	0.38	73.4±9.1	0.02*
High school	31.4±5.4		21.1±3.8		18.8±3.8		71.3±11.7	
Occupational safety education in nursing curriculum								
Yes	31.6±5.3	0.71	21.3±3.7	0.81	18.7±4.0	0.01*	71.6±11.6	0.54
No	31.5±4.7		21.2±3.4		19.5±3.3		72.2±10.2	
OHS training								
Yes	31.8±5.1	0.03*	21.4±3.6	0.02*	19.0±3.8	0.008*	72.3±11.7	0.00*
No	30.8±5.2		20.7±3.6		18.1±4.0		69.6±11.3	
Occupational accidents								
Yes	32.4±4.6	0.004*	21.7±3.5	0.02*	19.4±3.7	0.01*	73.5±10.6	0.005*
No	31.2±5.3		21.1±3.7		18.6±3.8		71.0±11.5	

*OHS: Occupational Health and Safety

Table 3. Occupational accident status of nursing students according to demographic and educational characteristics

Variables	Occupational accident				p
	Yes		No		
	n	%	n	%	
Age (yr)					
18-21 yr	152	28.2	387	71.8	0.01*
22 yr and over	71	37.6	118	62.4	
Gender					
Female	193	32.3	404	67.7	0.03*
Male	30	22.9	101	77.1	
Grade					
Second yr	40	15.7	215	84.3	0.001*
Third yr	79	31.3	173	68.7	
Fourth yr	104	47.1	117	52.9	
School of Graduation					
Vacational high school of health	56	41.2	80	58.8	0.003*
High school	167	28.2	425	71.8	
Occupational safety education in nursing curriculum					
Yes	187	33.0	379	67.0	0.003*
No	36	22.2	26	77.8	
OHS training					
Yes	199	34.3	381	65.7	0.000*
No	24	16.2	124	83.8	

*OHS: Occupational Health and Safety

DISCUSSION

Clinical practices constitute major part of the nursing education at nursing schools in Turkey. In order to develop professional skills of students in nursing application, they rotate through different clinics according to their vocational courses during their education. For these clinical courses, students attend formal clinical practice in different clinics/areas of hospitals one to three days a week (it may vary from one university to another). Academicians and supervisor nurses accompany the students during their clinical practices. However, students are more likely to be exposed to occupational risks in clinical practice due to reasons like high number of students, the distribution of the students to different inpatient and outpatient clinics of the hospital and the workload of the supervisor nurses, etc. [2,10,14]

Failure to perceive, underestimate or ignore clinical risks can lead to an increase in students' vulnerability to these accidents.^[11] Although there are studies on occupational accidents that nursing students are exposed to, studies evaluating occupational risk perception and the factors affecting this are limited. In this study we aimed to evaluate the occupational risk perception of nursing students and the factors affecting it and their association with occupational accidents.

Mean age of the students participating in the study was 20.8 ± 1.65 (min.18-max.35) and the vast majority of them were women. The number of second year, third year and fourth year students in the study were found to be close to each other. Mean perception score of women was found to be high but also their occupational accident rate was statistically significantly higher compared to men ($p < 0.05$). The sample of the study was similar to other studies in the literature conducted in Turkey.^[2,10,12] The high number of females in the study sample was associated with having a high proportion of female students in the nursing schools in Turkey.

A hazard or risk can be perceived differently by different people and groups. Risk perception to some extent determines our behavior and as a result affects our attitude and behavior towards these risks.^[11,13] While some people take no risks other than acceptable ones, some people tend to take risks that could jeopardize their safety.^[13] The majority of the students in the study stated that they considered clinical practice areas as high risk areas. At the same time ORPS of the students (71.8 ± 11.27) were higher than the average. It is thought that this is due to the fact that majority of the students have the opportunity to experience clinical practice and education about occupational risks. The total scale score of the students in Aksoy & Pasli Gurdogan's (2016) study was found to be 71.68 ± 6.91 . This result seems to be in parallel with the result of our study.

In some studies conducted with nurses and the other healthcare professionals, it has been shown that risk perception affects attitude at work.^[6,11] In the study conducted by Cheah et al. (2016), the occupational risk perception of nurses was found to be low. In the study of Yesilgul et al., (2018) it was emphasized that nurses were still experiencing preventable health problems, although they knew about occupational risky situations. Although the mean total score (71.8 ± 11.27) of the students in our study from the ORPS was higher than the average (meaning higher perception), rate of having occupational accidents was still high. In addition, 49.6% of the students thought that the supply of the protective equipments needed during clinical practices were "partially" sufficient. This result showed that nursing students were unsuccessful to transform their perception and awareness into behavior. In addition, number of those who think that the protective equipments needed in clinical practices were sufficient was low. It is important to have the opportunity of access to protective equipment to avoid occupational risks. Therefore, the increase in occupational accidents may have been due to safety deficiencies in clinical practices.

The security measures for the workers in hospitals and other health institutions in Turkey are reported to be inadequate. In addition, the risks encountered in the health sector may vary depending on the job itself and the unit of work.^[1-2] When the literature about nursing students is

examined, it is noteworthy that there are important safety deficiencies in clinical practices.^[2,10-11] OHS training has an important place in recognizing and avoiding clinical risks.^[6,8] It is observed that occupational accident risk is higher in people who have not received OHS training before.^[1] OHS trainings are compulsory for the students with acceptance to the internships in the workplaces within the scope of employee safety in Turkey (Occupational Health and Safety Law No. 6331). Also, employees cannot be started to work without health certificates. It was found that most of the students in the study received OHS training. It was determined that there was a statistically significant difference between the scores of the ORPS sub-dimension and the total score of the students who received OHS training. These results showed that the perceptions of psychological and ergonomic risks, personal and institutional risks and risks related to physical space were significantly higher among students who received OHS training. But the rate of occupational accidents was found to be significantly ($p < 0.001$) higher in students who received OHS training compared to those who did not. According to this result; in addition to the adequacy of the OHS training received by students and its effect on raising awareness, raises the question is whether it is sufficient to protect students against occupational risks.

In the literature, there are different studies evaluating the knowledge and attitudes of nursing students about occupational risks and mostly students' level of knowledge is high.^[3,9,16-18] Almost all of the students in Eyi & Eyi's (2020) study ($n=140$) stated that they had knowledge about OHS, but it was revealed that the knowledge and awareness of the students about occupational risks was very low. Nursing students during undergraduate training receives education against professional risks in the content of various courses in Turkey. While 77.7% of the students in this study stated that they received education on professional risks in the content of the courses in undergraduate education, 72.6% of these students had found this education sufficient. It was found that students who received education about occupational risks in undergraduate education had more occupational accidents compared to students who did not receive education ($p=0.003$). Students' perception of risks related to physical space was significantly higher, but there was no significant difference in the other sub-dimension and in the total score of the scale. According to these results, it seemed that the education given in the courses included in undergraduate education did not have an effect on occupational risk perception and is insufficient in preventing occupational accidents. This may be due to the limited time allocated for risks in vocational courses and the limitation of subject content.

Perception score of the students in the study regarding psychological and ergonomic risks (first sub-dimension) was $31,6 \pm 5,16$ (min.7-max.35), perception score regarding risks originating from person and institution (second

sub-dimension) was $21,3 \pm 3.65$ (min.5-max.25) and the perception score regarding the risks related to physical space (third sub-dimension) was 18.8 ± 3.82 (min.5-max.25). Students with OHS training and occupational accident experience found to have significantly higher scores in all sub-dimensions. Perception scores regarding psychological and ergonomic risks and personal and institutional risks were found to be significantly higher among women and those who graduated from health vocational high school. Results of the study are in parallel with the study of Aksoy & Pasli Gurdogan (2016). These results might be due to the small number of male students included in the study and to the knowledge level of the students level and personal values and perspectives. There was no significant difference across the students' grades and scale scores. The perception score of the students those who received courses on occupational risks in undergraduate education regarding risks related to physical space was found to be significantly high.

Attitude at work is influenced by years of experience and even individual experience.^[11] Porrás-Povedano et al., (2014) concluded that nurses generally tend to underestimate occupational risks. In addition, researchers state that individuals tend to rely on their risk assessments and personal experiences.^[13] It is also known that as the professional knowledge level of the students increases, they practice more than before. Occupational exposure increases even more towards upper classes. Studies show that students perform risky practices mostly in upper classes. In addition, it has been shown that there is a relationship between the amount of invasive procedures performed and the perceived risk.^[2,11] Nabil Attia et al., (2018) reported in his study that second graders had more occupational accidents. In the study by Eyi & Eyi (2020) on second and third grade students, it was found that the second grade students were injured more. This situation is explained by the more frequent occurrence of occupational accidents in surgical clinics during surgery course in the second year, where percutaneous interventions are common. In this study, 4th grade students had more occupational accidents ($p=0.001$). As the students approach to graduation their knowledge and the area of and clinical practice increases. We believe that as the time spent in the clinic increases, the number of exposure to occupational risk increases cumulatively.

Both the total and all the sub-dimension scores of the ORPS scores of the students who had an occupational accident were found to be statistically significantly higher. In addition, no statistical difference was found across the grade in terms of mean perception scores of the students. These results suggest that encountering an occupational accident that may threaten the health of students during the clinical practices increases their perception and awareness about occupational risk factors.

A limitation of this study is that this is a survey and as such is prone to selection bias.

CONCLUSION

Occupational risk perception was found to be affected by gender, health vocational high school graduation, OHS training, and previous occupational accidents. Experiencing occupational accident during clinical practices was found to be the most striking factor in nursing students' perception of occupational risk. In order to increase the perception and awareness of the occupational risks that nursing students may encounter during clinical practices, occupational risks education should be included in the curriculum of all nursing schools that provide undergraduate education and occupational risk perceptions should be periodically evaluated before clinical practice and throughout undergraduate education.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Istanbul Kültür University Institutional Review Board (Date: 20.05.2020, Decision No: 2020.36).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

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