

## Original Article

## The Effect of Clinical Learning Environment on Occupational Risk Perception of Nursing Students: A Cross-Sectional Study

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### Abstract

**Background:** The clinical learning environment provide students with the opportunity to transfer knowledge, skills and concepts learned from lessons to practice and has an important role in nursing education. Nursing students are at occupational risks such as physical, biological, chemical, ergonomic, and psychological risks that nurses face in their work environments in clinical environments. They are prone to accidents and diseases throughout their training. To determine the relationship between nursing students' clinical learning environment and their occupational risk perceptions.

**Methods:** This descriptive and cross-sectional study, conducted with 552 nursing studens who agreed to participate. The data was collected using a questionnaire form, the "Occupational risk perception scale in nursing students" and the "Clinical Learning Environment Scale". The number and percentage distribution, multiple linear regression were used evaluation of data.

**Results:** The total score of the Occupational Risk Perception in Nursing Students was  $71.36 \pm 8.17$ , the total score of the Clinical Learning Environment Scale was  $62.30 \pm 9.02$ . The factors contributing to the occupational risk perception of students were determined as the clinical learning environment perception, age, gender, the anxiety caused by the communication problems between individuals in clinical settings and the level of knowlwdge about protection from sharp injuries..

**Conclusion:** This study highlights that there is a relationship between the clinical learning environment and occupational risk perception in nursing. Nursing students reported positively perceive the clinical learning environments and their occupational risk perceptions are high. Selecting clinical learning environments such that targeted clinical learning is encouraged and all measures are taken against occupational risks may impact how perceive occupational risk perception. Strategies are needed to address to organize clinic-oriented training programs at regular intervals to increase the occupational risk perception.

**Impact statement:** Selecting clinical learning environments such that targeted clinical learning is encouraged will be able to provide better perceive occupational risk perception.

**Keywords:** Clinical Learning Environment, Occupational Risk Perception, Nursing Student

### Background

Clinical learning has an important role in the implementation of theoretical and practical training in nursing education (Warne et al., 2010). The clinical area, which is accepted as the center of nursing education, is an essential and irreplaceable part of the education that prepares students for their professional roles (Dunn & Hansford, 1997). The clinical learning

environment helps students to develop problem-solving, decision making, time management skills and gain professionalism by providing students with the opportunity to transfer knowledge, skills and concepts learned from lessons to practice (Azizi-Fini et al., 2015). Also, students take the healthy/ill individual as a whole to protect and improve their health and they acquire holistic caregiving skills and behavior with clinical

training (Peyrovi et al., 2005). In order for students to acquire these skills and behaviors, it is very important to select clinical learning environments among those that have the characteristics encouraging a targeted clinical learning (D'Souza et al., 2013).

Clinical learning environments are social environments consisting of individuals with different expectations and needs and where the control of conditions that affect learning is weak. There are many factors in clinical learning environments that surround the student such as the clinic equipment, patients, instructors, other health professionals, clinical nurses, and the physical condition of the clinic. The abundance of these factors makes it difficult to control the clinical environment of students (Papp et al., 2003). In the literature, it is stated that the appropriateness of clinical learning environments should be checked by clinical guidance nurses and instructors, and the necessary measures should be taken against accidents that may occur (Papp et al., 2003). However, despite all precautions, the students occasionally encounter physical, biological, chemical, ergonomic, and psychological risks that nurses face in their work environments (Al Wutayd et al., 2019).

Studies reveal that students face occupational risks in clinical environments and are prone to accidents and diseases. In a study conducted by Savci, Serbetci, and Kilic (2018) with students of healthcare disciplines, it was determined that 23.9% of the students in clinical environments faced physical, 23% faced biological, 22.5% faced psychosocial risk factors. In the same study, 13.9% of the students were exposed to occupational accidents in clinical environments; where 80.9% of these accidents were reported to be sharp injuries, 11.1% was exposure to contaminated body fluids, 6.5% was exposure to X-Ray, and 1.5% was poisoning.

In a study conducted by Demiss, Seid, and Fiseha (2018) with students of medical and health sciences, it was found that 50% of the participants did not use safe practice methods despite having sufficient knowledge about Hepatitis B and C transmission and preventive measures.

In the study conducted by Reis and Rita (2004) with nursing students, the causes of occupational accidents faced by students in clinical environments were examined and it was stated that the most important causes of occupational

accidents were carelessness, professional inexperience, technical inability, difficulty in handling the material and hurriedness.

In a study conducted by Huang, Yi, Tang, and An (2016), it was reported that in clinical environments, nursing students are mostly exposed to stress due to the care they provide to patients, respectively followed by needle stick injuries (NSI); exposure to body fluids spilled on the skin and mucosa; sprain; sharp injuries during the preparation of medications; musculoskeletal disorders in the lower back, neck, and shoulders, injuries due to direct exposure to chemicals.

In another study conducted by Eljedi (2015) with nursing students, it was stated that exposure to psychological hazards has the highest rate of all occupational hazards for nursing students.

Although the clinical learning environment is difficult to control, determining the occupational risk perceptions of nursing students, accident tendencies and problems around the clinical learning environment will enable students to obtain positive results in the clinical environment. It is thought that there is a two-way relationship between the clinical learning environment and occupational risk perception. It is an important requirement to determine the relationship between the clinical learning environment and occupational risk perception in an era when quality education and occupational safety are becoming more and more important. Therefore, this study aims to determine the relationship between nursing students' clinical learning environment and their occupational risk perception.

## Methods

**Study design:** This descriptive and cross-sectional study was conducted between March and June 2018 with the students studying at the department of nursing of the faculty of health sciences at a university in Turkey (N=562).

**Participants:** The study was aimed to reach the universe without sample selection (N=562). According to literature, to achieve 80% power, the minimum sample size was reported to be 138 by using G-power analysis for correlation, with an  $\alpha$  value of 0.05 and an effect size of 0.3 (Faul, Erdfelder, Buchner, & Lang, 2009). In this study, the questionnaires were given to all students who were attending education on March and June 2018 to increase the representation of the universe. Participants were explained the purpose of the

study by researchers and informed about participation be voluntary. A total of 10 nursing students were excluded from the study for the following reasons: they did not agree to participate in the study (6 students) and they did not attend education on the dates of the study's carried out (4 students). 552 nursing students were included in the study.

**Data Collection and Instruments:** The data were collected by using the questionnaire form consisting of questions including the socio-demographic characteristics of the nursing students and their knowledge and experience about occupational risks, "Clinical Learning Environment Scale (CLES)" and "Occupational Risk Perception Scale in Nursing Students (ORPSNS)".

**Clinical Learning Environment Scale (CLES);** Turkish validity and reliability of the scale, developed by Dunn and Burnett (Dunn & Burnett, 1995) for the students to evaluate the clinical learning environment, were performed by Sari. The scale consists of 22 items and 5 sub-dimensions. The five sub-dimensions are staff-student relations, instructor responsibilities, patient relations, student satisfaction, hierarchy, and routines. The scale consists of 22 expressions, of which 5 are reverse (negative) and 17 are straightforward (positive). The highest score to be obtained from the 5-point Likert type scale is 110 and the lowest score is 22. The increase in the score indicates that the student positively evaluated the clinical learning environment. In the study of Sari, the Cronbach's alpha value of the scale was found to be 0.82 (Sari, 2001). In this study, the Cronbach's alpha value of the scale was found as 0.71.

**Occupational risk perception scale in nursing students (ORPSNS):** The scale was developed by Aksoy in order to determine nursing students' occupational risk perception. The scale, which consists of 17 questions, has 3 sub-dimensions including the psychological and ergonomic risks, person and institution-related risks, and risks related to the physical environment. The lowest score that can be obtained from the scale is 17, and the highest score is 85. As the score obtained from the scale increases, the occupational risk perception of the student increases. In the study of Aksoy and Gurdogan, the Cronbach's alpha value of the scale was found to be 0.82. In this study, the Cronbach's alpha value of the scale was found to be 0.85. (Aksoy, 2016).

**Ethical issues:** To conduct the study, written approval was obtained from the Scientific Research Ethics Committee of a university (xxxxx, decision number: xxxx) and the relevant institution. The purpose of the study was explained to nursing who voluntarily participated in the study in accordance with the "Helsinki Declaration of Human Rights". They were verbally informed that the participation was voluntary and the personal information and privacy of the participants were protected. Their informed consent was obtained.

**Data analysis:** IBM SPSS 22.0 package software was used to evaluate the data. The conformity of the data to normality was evaluated with the Kolmogorov-Smirnov test since there was no lower limit for the expected frequencies and preventing the loss of information. The number and percentage distribution were used in the evaluation of categorical data, and mean-standard deviation was used for continuous data. Multiple linear regression, "backward" method was used to define the descriptive variables on occupational risk perception. Backward stepwise regression is a stepwise regression approach that begins with the complete regression equation. This regression approach eliminates the independent variables from it in the order find a reduced model that best explains the data (Sutter & Kalivas, 1993).  $p < 0.05$  was considered significant in this study.

## Results

**Descriptive Characteristics:** The mean age of the students participating in the research is  $20.38 \pm 1.61$ , 81.2% of them were female and 29% were first-year students. 70.3% of the students stated that they were sufficiently informed about occupational risks in the courses; 72.3% of them did not encounter any occupational accident during the practices; 91.5% of them stated that they know how to protect themselves from sharp injuries, 81.7% from bloodborne diseases and 75.2% from diseases transmitted through the respiratory tract. 87.7% of the students stated that they know the preventive measures to be taken during the preparation of medications, 70.1% during patient transfer and lifting. 54.7% stated that they know what to do when they encounter any act of violence in the hospital. It was determined that 72.3% of the students did not encounter any accident that would threaten their health during clinical practices, 76.8% of them were concerned about the possibility of encountering an accident that could pose a risk to

them in clinical practices and 56.7% of them were concerned about the communication problems occurring in the clinical setting.

The mean total scores of the scales and sub-dimensions used in the study are presented in Table 2. Accordingly, it was determined that the mean total score of the Nursing Students' Occupational Risk Perception Scale was  $71.36 \pm 8.17$ , and the mean total score of the Clinical Learning Environment Scale was  $62.30 \pm 9.02$  (Table 2).

**Regression Statistic Section:** In the study, the evaluations of the students about the clinical learning environment and the effect of their socio-demographic characteristics on their occupational risk perception were evaluated by multiple regression analysis. Among the variables

considered in the multiple regression model; clinical learning environment scale total score ( $p=0.006$ ;  $B:0.106$ ), age ( $p<0.002$ ;  $B:0.645$ ), gender ( $p=0.000$ ;  $B:3.456$ ), concern about communication problems in the clinical setting ( $p<0.045$ ;  $B:1.394$ ) and the level of knowledge about protection from sharp injuries ( $p=0.090$ ;  $B:2.056$ ) were found to have a statistically significant effect on the total score of the occupational risk perception scale. As clinical learning environment scale total score and age increased, the overall occupational risk perception increased. Also, being female, being concerned about communication problems in clinical settings and knowledge of protection from sharp injuries increased the occupational risk perception (Table 3).

**Table 1. Socio-demographic characteristics of the participants (n=552)**

Variables	N	%
<b>Age (years)</b>		
Mean $\pm$ SD = $20.38 \pm 1.61$	-	-
<b>Gender</b>		
Female	448	81.2
Male	104	18.8
<b>Grade</b>		
1st year	160	29.0
2nd year	149	27.0
3rd year	114	20.7
4th year	129	23.4
<b>To what extent do you think you have been informed about occupational risks in your courses?</b>		
Sufficient	388	70.3
Insufficient	164	29.7
<b>Did you encounter an accident that could threaten your health during practices?</b>		
Yes	153	27.7
No	399	72.3
<b>Do you know the protective measures to be taken during the preparation of medications?</b>		
I know	484	87.7
My knowledge is insufficient	68	12.3
<b>Do you know how to protect yourself from a sharp injury?</b>		
I know	505	91.5
My knowledge is insufficient	47	8.5
<b>Do you know how to protect yourself from bloodborne diseases?</b>		
I know	451	81.7
My knowledge is insufficient	101	18.3
<b>Do you know how to protect yourself from diseases transmitted through the respiratory tract?</b>		
I know	415	75.2

My knowledge is insufficient	137	24.8
<b>Do you know what you should do if you encounter any act of violence in the hospital?</b>		
I know	302	54.7
My knowledge is insufficient	250	45.3
<b>Do you know the protective measures to be taken during patient transfer and lifting?</b>		
I know	387	70.1
My knowledge is insufficient	165	29.9
<b>I was worried about the possibility of an accident that could threaten my health in clinical practice</b>		
Yes	424	76.8
No	128	23.2
<b>I was worried about the communication problems between individuals in the clinical setting</b>		
Yes	313	56.7
No	239	43.3

Table 2. Mean Total Score and Sub-Dimension Scores of the Scales (n=552)

Scales	Min-Max	X±SD	Scale limits
<b>Occupational Risk Perception Scale in Nursing Students</b>	43-85	71.36±8.17	17-85
Physical Environment Risks Subscale	7-25	18.48±3.61	5-25
Psychological and Ergonomic Risks Subscale	17-35	31.63±3.84	7-35
Person and Institution-Related Risks Subscale	11-25	21.24±2.90	5-25
<b>Clinical Learning Environment Scale</b>	37-98	62.30±9.02	22-110
Personnel Student Relationships Subscale	6-30	16.66±3.80	6-30
Education Staff Responsibilities Subscale	4-20	10.80±2.99	4-20
Patient Relationships Subscale	4-20	12.80±2.52	4-20
Student Satisfaction Subscale	4-20	10.80±2.99	4-20
Hierarchy and Routines Subscale	4-20	11.14±2.74	4-20



**Table 3. Factors Contributing to the Occupational Risk Perception Scale in Nursing Students (n=552).**

Variables		Occupational Risk Perception Scale in Nursing Students				
		B	SD	Beta	F	p*
<b>Clinical Learning Environment Scale (Total)</b>	<b>Numeric</b>	.106	.038	.117	2.787	.006
<b>Age</b>	<b>Numeric</b>	.645	.210	.128	3.065	.002
<b>Gender</b>	<b>0: Male 1: Female</b>	3.456	.868	.166	3.981	.000
<b>I was worried about the communication problems between individuals in clinics</b>	<b>0: No 1: Yes</b>	1.394	.692	.085	2.014	.045
<b>Protection from sharp injuries</b>	<b>0: My knowledge is insufficient 1: I know</b>	2.056	1.211	.070	1.698	.090

Adjusted  $R^2 = 0.066$  Clinical Learning Environment Scale, age, gender, protection from sharp injuries, communication problems among individuals in clinical settings \*Backward multiple regression analysis.

## Discussion

The quality of students' learning environment carries a great importance in the learning processes (Papastavrou et al., 2010). For this reason, the learning environments of nursing students should be selected from the environments that encourage clinical learning and have a healthy workplace quality (D'Souza et al., 2013; Peyrovi et al., 2005).

In this study, which was carried out to determine the effect of the clinical learning environment on nursing students' occupational risk perception, it was determined that the students positively perceived the clinical learning environments. Similarly, Masilaca, Kumar and Balekiwai (2018) and Pitkänen et al. (2018) found that students positively perceived their clinical learning environments (Masilaca et al., 2018; Pitkänen et al., 2018). In the study conducted by Neupanel, Pandey, and Sah, it was determined that the participants' perceptions about the clinical learning environment were positive (Neupane et al., 2018). The results of this study are consistent with the literature, suggesting that clinical learning environments are selected from environments that will positively contribute to students' professional knowledge and skills, and

help develop self-confidence as well as their professional roles and responsibilities.

Clinical practice training in nursing education is carried out in hospitals and health organizations under the supervision of guidance nurses and educators. During the training, nursing students encounter all occupational risks faced by nurses in the working environment (Savcı et al., 2018). In the study conducted by Unver, Tastan and Coskun (2012), 96.3% of nursing students were reported to be aware of occupational risks. In a study examining the occupational risk perceptions of intern nursing students, it was determined that they perceive the physical hazards as the highest risk followed by chemical hazards; and biological hazards as the lowest risk (Elewa & El Banan, 2016). In a study conducted by Shivalli (2014), it was found that nearly 70% of nursing students consider HIV exposure as a high risk. In a study was stated that the occupational risk perceptions of medical and nursing students are at a moderate level (Pavani et al., 2015). In the study conducted by Bayhan, it was determined that more than half of the nursing students considered the working environment in clinical settings as risky or too risky (Bayhan, 2005). In this study, the total score of the students' occupational risk perception scale was found to be  $71.36 \pm 8.17$ . This result is in line

with the literature and shows that students participating in the study have a high occupational risk perception in all aspects.

In order to prepare students for work life and make them aware of the dangers that may be encountered in professional life, they should have knowledge about hazards and risks in clinical environments, methods of protection, occupational accidents and occupational diseases (Savci et al., 2018). In the study, as the students' positive thoughts about the clinical learning environment increased, their occupational risk perceptions increased. In a good clinical learning environment, there is a supportive approach by both instructors/guidance nurses and clinical staff. In a supportive approach, students can transfer the knowledge they have learned in theory to practice and complete their missing information (Peyrovi et al., 2005). The result of this study suggests that appropriate learning environments increase students' awareness and increase their occupational risk perception.

In the study, it was found that as the ages of the students increased, their occupational risk perception increased. In the study conducted by Reang, Chakraborty, Sarker and Tripura (2015), it was determined that 94.1% of participants over the age of 22 had better knowledge and practices about Hepatitis B compared to the other age groups. In the study carried out by Elewa and El Banan (2016) to determine the occupational hazards perceived by the intern nurses and the protective measures to take, no significant relationship was found between age and occupational hazard perception and the protective measures they. In a study conducted by Demsis, Seid and Fiseha (2018), no relationship was determined between the age of the medical and health science students and their knowledge and practices regarding Hepatitis B and C transmission. In the study, it was found that female students have higher occupational risk perception. Similarly, in the study was stated that the risk perceptions of male students are lower than female students (Moreno-Arroyo et al., 2016).

In a study conducted by Sulimana et al., 2018, no significant difference was found between gender and the knowledge of nursing students about sharp injury. In the study conducted by Reang, Chakraborty, Sarker and Tripura (2015), no difference was found between gender and

students' knowledge and practices about Hepatitis B.

In a good clinical learning, positive learning environment, support of clinical educators, face-to-face communication with students; the student's communication with peers and patients are important (Rahmani et al., 2011; Sercekus & Baskale, 2016). Effective communication in clinical settings positively affects students' learning (Sercekus & Baskale, 2016). In the study carried out by Arkan, Ordin and Yilmaz (2018), it was determined that positive communication with clinical educators and clinical nurses had a positive effect on students' learning, and the overprotective attitudes of the patient's family had a negative effect on their learning by shortening the opportunity to communicate and practice with the patient. In this study, it was found that students who are concerned about the communication problems in the clinical settings have higher occupational risk perception. It is thought that when students cannot effectively communicate with educators, clinical nurses, peers, patients and family members, they cannot adapt to the clinical learning environment, do not feel safe and therefore have a high occupational risk perception.

Sharp injuries are one of the most important occupational hazards threatening the safety of nurses and nursing students in the transmission of blood-borne pathogens (Demsiss et al., 2018). Nursing students experience sharp injuries due to factors such as lack of clinical experience and knowledge and lack of hand practices (Braeckman et al., 2017). A study conducted in Turkey reported that 58.5% of nursing students experienced a sharp injury during clinical practice (Oren & Zengin, 2019).

It is important to take protective measures during the clinical training of students, to eliminate the lack of knowledge and to raise awareness about occupational risks in the prevention of sharp injuries (Kayis et al., 2019). In this study, it was concluded that knowing the protection methods from sharp injuries increases the occupational risk perception. Similarly, a study by Nawafleh, El Abozead, Al Momani, and Aaraj (2017) revealed that nursing students thought they were prone to the risk of sharp injury, so they have a high awareness of such injuries.

**Impact statement:** Nursing students are at occupational risks such as physical, biological,

chemical, ergonomic, and psychological risks in clinical learning environment. Our study emphasizes size of the relationship between nursing students' clinical learning environment and their occupational risk perception. Selecting clinical learning environments such that targeted clinical learning is encouraged and all measures are taken against occupational risks may impact perceive occupational risk perception positively. So students face less occupational risks and accidents in clinical environments.

**Conclusions:** The results of our study show that students positively perceive the clinical learning environments and their occupational risk perceptions are high. The positive perception of the clinical learning environment, increased age, female gender, anxiety about communication problems occurring in the clinical environment, and knowing the ways of protection from sharp injuries increase the occupational risk perception.

Based on these findings, we recommend selecting students' clinical learning environments such that targeted clinical learning is encouraged and all measures are taken against occupational risks; to organize clinic-oriented training programs at regular intervals to increase the students' occupational risk perception.

**Limitations:** Some limitations should be noted in this study, students spent short periods of time which from two to three days per week during a period of seven to eight weeks as "short clinical rotations" in clinic environments. These time may not provide sufficient time to understanding CLE and risk perception in students. A longitudinal approach will be very helpful in assessing students' perception. Due to the small sample drawn from one university in Turkey, the research's findings may not be generalizable. Yet despite the limitations of the current study, our results are much in accordance with recent relevant studies. Nursing students represent the future nursing workforce, thus the presentation of clinical settings in which students are aware of occupational risks and receive a good education is important.

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