

Occupational Health Hazards among Faculty of Nursing Students in Zagazig University

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Abstract

Background: Nursing education involves both theoretical and practical training processes. Clinical training is considered as an indispensable and highly significant component of professional nursing education. Nursing students are exposed to various types of occupational incidents which are biological, chemical, physical, ergonomic and psychological.

Aim of the study: was to investigate the occupational health hazards among faculty of nursing students in Zagazig University. **Subject and Methods: Research design:** a cross sectional descriptive design was used. **Setting:** faculty of nursing Zagazig University.

Subjects: 458 of nursing students were enrolled in the study. **Tools of data collection:** two tools were used to collect data; Tool I: socio-demographic characteristics of the study Subjects; Tool II: questionnaire sheet was developed by the researcher to identify types & risk factors of occupational health hazards, use of personal protective equipment and the related health problems. **Results:** of the present study revealed that that the most common hazards the students exposed to were ergonomic (88.8%) and psychological hazards (88.4%), while the lowest was the biological hazards (10.48%). More than half of the students were fully aware of using personal protective equipment (PPE) and safety regulations, the commonly reported health problems was anxiety, regarding musculoskeletal problems, lower back pain was the common moreover, second year students were the highly exposed to all types of hazards. **Conclusion:** nursing students are exposed to occupational health hazards especially ergonomic and psychological. Being a student in the second year, female student, and from rural area increase this risk. **Recommendations:** Nursing students must be equipped with adequate knowledge and skills about occupational health hazards, safety measures and personal protective equipment especially before their first field practice.

Keywords: occupational health hazards; nursing students; personal protective equipment.

Introduction:

Nurses are an integral component of the health care delivery system. In discharging their duties, nurses encounter a variety of occupational health problems which may be categorized into mechanical hazards, biological hazards, chemical hazards, physical hazards, and psychosocial hazards. The nursing students are younger, inexperienced, unskilled, less aware of self-protection, and lack of professional knowledge of protective measures as compared with the senior registered nurses, which make them more susceptible to occupational injury ⁽¹⁾.

Nursing students manual skills are insufficient and their clinical experience is limited. At the same time, they might have insufficient

background knowledge to recognize the level of risk that is posed by patients and insufficient knowledge about standard infection control principles ⁽²⁾.

Nursing students have not been the primary focus of any published study of exposure incidents, and nursing students were twice as likely to experience a sharp-related injury as "trained" nurses. They are more prone to occupational hazards and injuries in the course of their clinical training activities such as biological/infectious disease, chemical risks, environmental/mechanical risks, physical risks, and psychosocial risks ⁽³⁾.

Nursing students are at risk of such infections and injuries due to

accidental contamination during their practical occupational exposure. Exposure to infectious material can be minimized by adherence to standard precautions which are designed to reduce the risk of acquiring occupational infection from both known and unexpected sources in the healthcare setting⁽⁴⁾.

The Occupational Health Nurse (OHN) plays a multi-faceted role in influencing, improving or maintaining a worker's daily workplace health using prevention, protection and pro-active health interventions, creating productive healthy workers in a healthy workplace⁽⁵⁾. On the other hand, OHN primary work roles are advocacy, assessment, case management, evaluation, health promotion, illness and injury prevention, marketing, policy and procedure development, primary care, and program development.⁽⁶⁾

Occupational health nurses' role in direct clinical care is long-standing and valued by both employees and employers. They have a professional legacy as licensed health care professionals to provide direct care and nurture existing relationships with employees that are anchored in trust and credibility. Direct care activities, crossing all levels of prevention, are delivered on-site and off-site by occupational health nurses and nurse practitioners⁽⁷⁾.

Significance of the study:

Nursing students can encounter a real risk for occupational hazards, during their clinical training. The risk for accidental exposure has not been studied much in the nursing student population, especially with regard to the possible factors associated to it. In the same stream, a British study declared that, nursing students have not been the primary focus of any published study of exposure incidents, and nursing students were twice as likely to experience a sharp-related injury as "trained" nurses⁽³⁾. For the reason that students' safety is an

important issue to be considered henceforth, it was imperious to community health nurse to explore the potential occupational health hazards among nursing students.

Aim of the study:

The aim of the current study was to investigate the occupational health hazards among faculty of nursing students in Zagazig University.

Research Questions:

1. What is the prevalence of occupational health hazards among faculty of nursing students in Zagazig University?
2. What are common hazards facing faculty of nursing students in Zagazig University?
3. What are the risk factors behind occupational health hazards among faculty of nursing students in Zagazig University?

Subjects and methods:

Research design:

A cross sectional descriptive design was used.

Study setting:

The present study was conducted at faculty of nursing, Zagazig University.

Study subjects:

The subjects of the current study were nursing students from the 2nd to 4th grade. From whom 458 students were enrolled randomly by a stratified random sampling technique. Students in the first year were excluded because their practical training take place only in the faculty labs not in hospitals, henceforth they are not exposed to the field.

Exclusion criteria:

Having any of the following problems before joining the faculty:

- Musculoskeletal disorders (such as low back painetc).
- Skin problems (such as dermatitis..... etc).
- Blood transmitted disease (such as HCV, HBV.....etc).

- Respiratory problems (such as asthma.....etc).
- Psychosocial problems.

Tools of data collection:

A self-administered questionnaire sheet was used to collect data from participants. It consisted of two parts:

Part I:

Socio-demographic characteristics scale developed by El-Gilany ⁽⁹⁾. This scale contained seven domains they were; education and culture, parents' occupation, family, family possessions, home sanitation, economic and health care domain).

Part II:

This part was developed by the researcher to identify types, risk factors of the occupational health hazards, personal protective equipment and the related health problems.

Scoring system:

The total score of the Socio-demographic characteristics scale was 84, which was classified into levels as follow:

- Low level from 0 to 42 (<50%).
- Middle level from 43 to 63 (50-75%).
- High level from 64 to 84 (>75%).

Content of validity &reliability:

Validity was ascertained by five experts (3 from faculty of nursing and 2 from faculty of medicine) in the study field who reviewed the tools content for clarity, relevance, comprehensiveness and understandability. Moreover; the pilot study served to assess the reliability of occupational health hazard it showed a good level of reliability with Cronbach Alpha coefficient (0.71) and protective measures & PPE use (0.74). This was done through assessing its internal consistency.

Field work:

After gaining the official permission to conduct the study, the researcher reviewed the educational schedule for the selected grades, and found that it was better to collect data from practical classrooms (sections) as the number of students is small so they can be easily controlled a range of classrooms was selected randomly from the schedule. After that, data collection was done at the end of the class time in the presence of the responsible assistant staff. The researcher started by explaining the purpose of the study briefly to the students. Those who matched the criteria and accepted to participate in the study were given the questionnaire. The time consumed to answer each questionnaire sheet ranged from 20 to 25 minutes. Data collection took place from Sunday to Thursday; field work of the current study was executed in four weeks period starting from April 4th to May 2nd 2016.

Pilot study:

The pilot study was conducted on 46 students (10%) to evaluate the clarity & applicability of the questions in addition to estimating the time required for filling out the questionnaire (they were excluded from the main study sample).

Administrative and ethical considerations:

Firstly, permission was taken from Research Ethics Committee (REC) at faculty of nursing Zagazig University to conduct the study. Then, the agreement for participation of the subjects was taken after full explanation of the aim of the study. The subjects were given the opportunity to refuse the participation, also they were assured that the information would be confidential and used for the research purpose only. A letter containing the aim of the study was issued from post graduates affairs to the manager of the faculty of nursing, Zagazig University to gain the

official permission for conducting the study.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and interquartile ranges for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using chi-square test. Statistical significance was considered at p-value <0.05.

Results:

Results revealed that the mean age of the students was 21 ± 1.131 years, 75.5% of students were females and 73.1% of them belonged to rural areas. Ultimately, 46.9% of students belonged to high social class.

Figure (1): shows that the highly prevalent hazards were ergonomic and psychological hazards (88.8% and 88.4%) respectively, whereas the least common hazard was the biological hazards (10.4%).

Figure (2): The figure clarifies that 46.1% of students didn't have previous knowledge about occupational health hazards.

Table (1): describes the most common risk factors of occupational health hazards as perceived by nursing students. According to the students responses, lack of training occupied the highest level (76%) followed by lack of experience (68.1%) and inattentiveness (67.7%).

Figure (3): portrays nursing students reporting of injury to nursing or faculty staff. It is evident from the figure that 60.4% of students didn't

report their injury to nursing or faculty staff.

Table (2): The table clarifies that the highly reported PPE were washing or flushing hands or other skin areas with soap and water after contact with blood or other potentially infectious materials followed by washing hands immediately after removing gloves or other personal protective equipment (92.3% and 90.6%) respectively, while the least used PPE was safe lifting techniques and engineering control devices during patient movement and handling (46.9%).

Table (3): shows acquired health problems after joining the faculty of nursing. According to the students responses the highly reported problems were anxiety (70.3%) followed by depression (57.2%). Concerning musculoskeletal disorders were lower back pain (22.5%).

Table (4): The table clarifies a statistically significant relation between the use of personal protective equipment and the physical, psychological and ergonomic hazards (p value < 0.05), also there was a statistically significant relation between having previous knowledge about occupational health hazards & the high use of PPE ($p = 0.016$).

Table (5): The table clarifies a statistically significant relation between the academic year and the physical, psychological and ergonomic hazards (P value < 0.05). Such results reflect that being in the second year was a risk for physical, psychological and ergonomic hazards.

Discussion:

Nursing students, who are educated in health care clinics and who are future health care workers, are also exposed to various occupational incidents. The less mature hand skills of nursing students during clinical education and the low level of clinical experience may lead to

incidental injuries Unver et al⁽¹⁰⁾. Nursing students on the other hand are more vulnerable during training and skill acquisition. This makes them a group of interest that requires close monitoring as well as repeated evaluation of their competence Balami et al⁽¹¹⁾.

Nurses are an integral component of the health care delivery system. In discharging their duties, nurses encounter a variety of occupational health problems which may be categorized into mechanical, biological, chemical, physical, and psychosocial hazards Huang et al⁽¹⁾. Hence, the current study aimed to investigate the occupational health hazards among faculty of nursing students in Zagazig.

Considering the prevalence of occupational health hazards among nursing students, the current study results indicated that the highest reported hazards were the ergonomic hazards followed by psychological hazards. This might be attributed to improper lifting technique and engineering control devices during patient movement and handling which reported as the highly among nursing students in the present study. Also inappropriate mechanical handling aids, transferring or repositioning patients, where some units in hospitals are not ergonomically designed. In the same line, Eljedi⁽³⁾ in Gaza, Palestine found that the psychological risks were the most common hazards reported by nursing students followed by accidental hazards, chemical, biological and physical. Such difference might be attributed to the difference in setting and the design of healthcare setting.

Additionally the study results revealed that, the majority of nursing students were exposed to psychological hazards especially stress and role ambiguity. Possible explanation of this result is the students face changes in some procedures / techniques compared with what they learned in the faculty.

Also they are loaded with tasks in the practice field (hospital) beside obligations required from them in the faculty. In addition to the nature of nursing profession which requires dealing with intense emotional situation or bereaved family, caring with unconscious, irritable and dying patients and maltreatment especially from members of the medical team and the patients themselves and their family members.

In the same context, Huang et al.⁽¹⁾ in china found that the most common occupational injury is nursing work-related stress. In the same stream, Hopkins et al.⁽¹²⁾ in Australia found that over 57% of students had experienced non-physical violence while in the clinical setting. Also found that more than 33% of second year students had experienced some form of physical violence such as being punched, kicked or slapped and the perpetrator had been a patient, colleague or registered nurse.

Regarding the most common risk factors of occupational health hazards as perceived by nursing students, lack of training was the highly reported factor followed by lack of experience and inattentiveness. Congruently, to Souza-borges et al.⁽¹³⁾ in Brazil who found that the main reasons for the occurrence of exposures were lack of technical preparation, distraction and tiredness. Conversely, Kurşun and Arslan⁽²⁾ in Turkey found that the risk factors affecting the wounds were hurrying which was the highly reported factor followed by inattentiveness.

As regards nursing student reporting of injury to nursing or faculty staff, three fifths of students did not report their injury to nursing or faculty staff. This might be due to students' fear of blaming from nursing or faculty staff or the belief that nothing would be done if they reported. In the same line, Souza-borges et al.⁽¹³⁾ in Brazil found that the majority of nursing student who were stuck missed post-exposure evaluation because of little or no perception of risk,

embarrassment, lack of time, fear of the consequences of reporting, the negative effect on their professional career and the stigmatization by other students.

Also, Oluwatosin et al. ⁽¹⁴⁾ in Nigeria found that reporting of needle stick injury (NSIs) was very low. The low report might be due to lack of awareness of the risk factors of NSIs and absence of policy on NSIs. It might also be due to fear of getting into trouble or rebuke from supervisors for being careless and ignorance about the reporting mechanism of the hospital. Conversely, Efsthathiou et al. ⁽¹⁵⁾ in Cyprus found that about three quarters of Cypriot nurses have made a report of the incident, according to the policy of their hospital and the main reasons for not reporting such a critical incident included being too busy and forgetfulness.

Regarding using protective measures and personal protective equipment among nursing students, as 55.9% of students were highly used of protective measures and personal protective equipment it was obvious that the majority of students were fully aware of using protective measures and personal protective equipment however failure to act in accordance with a command in some areas such as use of safe lifting techniques and engineering control devices during patient movement and handling was reported. The findings of the current and other studies confirm that knowledge of universal precautions does not necessarily impact compliance. This result is similar to Labrague et al. ⁽⁴⁾ in Samar, Philippines who found that most of the students were knowledgeable concerning standard precautions.

Concerning acquired health problems after joining the faculty of nursing, according to the students' responses they suffered from anxiety, depression and musculoskeletal problems especially lower back pain, neck and shoulders and one or both ankles and feet. Possible explanation of such result is that nursing students

are loaded with long studying hours (practical & theoretical), homework and activity and the standing of the students for long times in lecture due to the large number of the students and the narrowing of the lecture hall. In the same context, Attar ⁽¹⁶⁾ in Jeddah, Saudi Arabia found that musculoskeletal symptoms occurred most commonly in the lower back, ankles and feet and shoulders.

The present study revealed a statistically significant relation between residence and the ergonomic hazards and being nursing student from rural area was indicator for ergonomic hazards. This might be attributed to the distance which students had to travel to reach the faculty the thing which put extra burden on those students.

The present study indicated the presence of statistically significant relation between sex (female), residence (rural) and the presence of psychological hazards. This might be due to stress in their practical training or that females by nature are more sensitive so they can be easily hurt emotionally. In the opposite to Eljedi ⁽³⁾ in Palestine which found that there was significant differences between male and female students in regards to the exposure to physical and biological hazards and Male students were more exposed to these two hazards than females.

The current study illustrate that there was statistically significant relation between the academic years especially the second year and the physical, psychological and ergonomic hazards. This might be due to the process of clinical training can be very stressful to student nurses especially in the areas of personal inadequacy and the fear of making mistakes, the fear of being considered to have poor clinical skills, their limited experience and knowledge and the second year consider the first year in practical training. In the same line with Eljedi ⁽³⁾ in Palestine who found that there was significant differences between the

level of study and both psychological hazard and physical hazard.

The current study revealed that there was statistically significant relation between the use of personal protective equipment and nursing students' previous knowledge about occupational health hazards. This might be due to that being equipped with adequate knowledge could promote the use of protective measures.

Concerning the relation between the use of personal protective equipment and occupational health hazards, the current study revealed that a statistically significant relation between the use of personal protective equipment and the physical, psychological and ergonomic hazards. This may be due to that half of the student don't wear special coat inside x-ray room, maltreatment and fear from the medical team which lead to use latex gloves several times with different patients and lack of use safe lifting techniques and engineering control devices during patient movement and handling, where these reasons are considered to have the lowest proportion among students' answers in the use of PPE.

Conclusion:

In the light of the present study results it can be concluded that:

The highly prevalent occupational health hazards among nursing students were ergonomic, psychological & physical health hazards. Lack of training and being in the second year were the highly perceived risk factors. Furthermore, anxiety and low back pain were the highly reported health problem among nursing students. Ultimately, being female students put females at greater risk for both ergonomic and psychological hazards.

Recommendations:

In the light of the current study results it is recommended to:

- Nursing students must be equipped with adequate knowledge and skills about occupational health hazards, safety measures and personal protective equipment especially before their first field practice.
- Nursing students should be trained on dealing with intense emotions, violence and body mechanics in the practical field.
- Nursing students should be formally report hazards to authority figures.
- Further studies on a large scale are suggested to confirm the study results among nursing students.

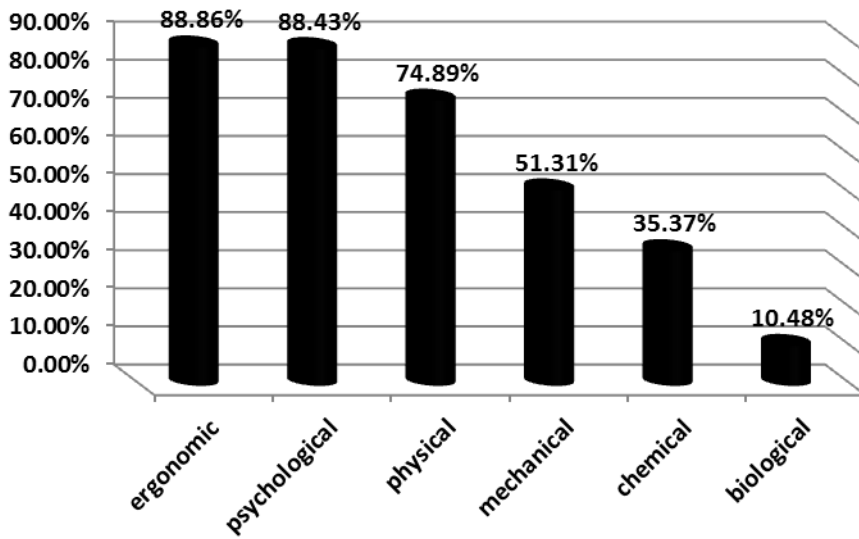


Figure (1): Prevalence of occupational health hazards among nursing students (n= 458).

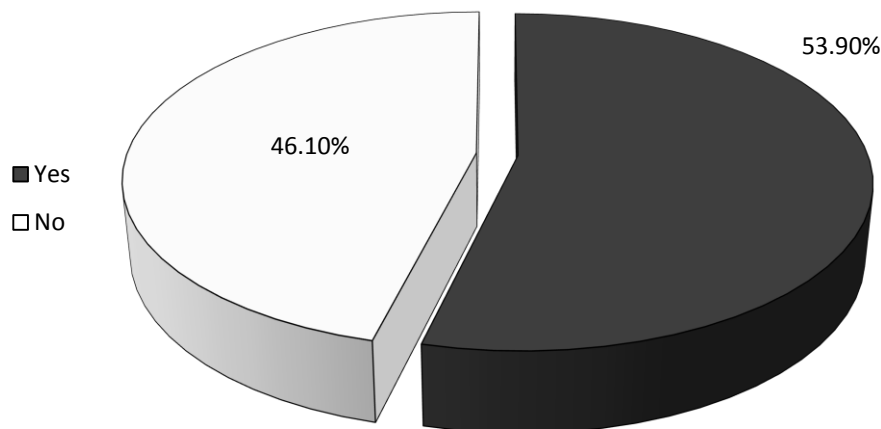


Figure (2): Nursing students' previous knowledge about occupational health hazards (n: 458).

Table (1): The most common risk factors of occupational health hazards as perceived by nursing students (n= 458).

Risk factors.*	N	%
▪ Lack of training.	348	76.0
▪ Lack of experience.	312	68.1
▪ Inattentiveness.	310	67.7
▪ Hurrying.	297	64.8
▪ Equipment shortage.	261	57.0
▪ Heavy workload.	253	55.2
▪ Contaminant removal.	172	37.6

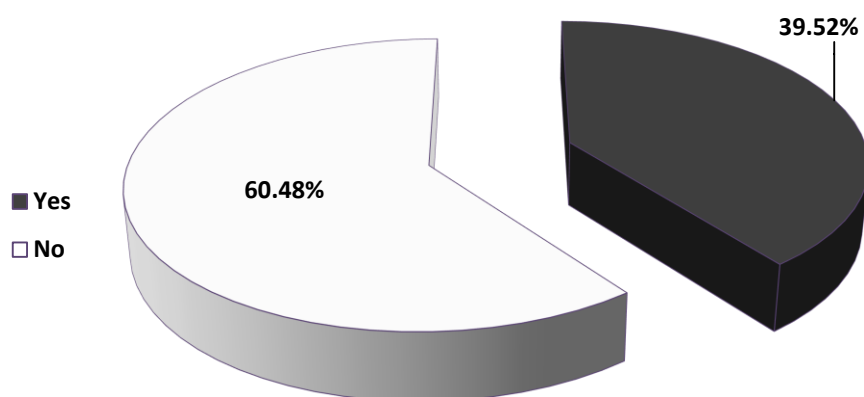


Figure (3): Nursing students reporting of injury to nursing or faculty staff (n= 458).

Table (2): Personal protective equipment (PPE) use among nursing students (n=458).

Preventive Measure*	N	%
▪ Wash hands immediately after removing gloves or other personal protective equipment.	415	90.6
▪ Wash or flush hands or other skin areas with soap and water after contact with blood or other potentially infectious materials.	422	92.3
▪ When the potential exists for exposure to blood borne pathogens, it is prohibited to eat, drink, apply cosmetics, and handle contact lenses in work areas.	296	64.6
▪ Must remove all personal protective equipment before leaving the work area.	373	81.4
▪ Must wear personal protective equipment such as gloves, gowns, laboratory coats, face shields or masks, and eye protection when potentially exposed to blood borne pathogens.	378	82.5
▪ Must discard contaminated sharps immediately or as soon as feasible into containers.	410	89.5
▪ May use latex gloves several times with different cases.	274	59.8
▪ Must wear special coat inside x-ray room.	226	49.3
▪ Use safe lifting techniques and engineering control devices during patient movement and handling.	215	46.9

Table (3): Acquired health problems after joining the faculty of nursing (n=458).

The problems:*	N	%
▪ Dermatitis.	41	9.0
▪ Chest allergy.	41	9.0
▪ Other problems		
✓ Anxiety.	322	70.3
✓ Depression.	262	57.2
✓ Other (insomnia and nervousness).	47	10.3
Musculoskeletal disorders:	N	%
• Neck and shoulders.	74	16.2
• Elbows		
✓ The right elbow.	22	4.8
✓ The left elbow	14	3.1
✓ The both elbows	14	3.1
• Wrists/ hands		
✓ The right wrists/hands.	31	6.8
✓ The left wrists/hands.	21	4.6
✓ The both wrists and hands.	17	3.7
▪ Upper back.	70	15.3
▪ Lower back.	103	22.5
▪ One or both of hips and thighs.	23	5.0
▪ One or both knees.	64	14.0
▪ One or both ankles and feet.	73	15.9

Table (4): Relation between occupational health hazards among nursing students, nursing students' previous knowledge about occupational health hazards and the use of personal protective equipment (n=458).

Occupational health hazards		Use of personal protective equipment (PPE)				Total	Chi-square	
		Weak	Average	High	X ²		P-value	
Biological hazards	No	N	64	115	231	410	0.414	0.813
		%	87.7	89.1	90.2	89.5		
	Yes	N	9	14	25	48	2.792	0.248
		%	12.3	10.9	9.8	10.5		
Chemical hazards	No	N	47	76	173	296	1.184	0.553
		%	64.4	58.9	67.6	64.6		
	Yes	N	26	53	83	162	10.028	0.007*
		%	35.6	41.1	32.4	35.4		
Mechanical hazards	No	N	35	58	130	223	16.231	0.000*
		%	47.9	45.0	50.8	48.7		
	Yes	N	38	71	126	235	14.818	0.001*
		%	52.1	55.0	49.2	51.3		
Physical hazards	No	N	16	21	78	115	8.223	0.016*
		%	21.9	16.3	30.5	25.1		
	Yes	N	57	108	178	343		
		%	78.1	83.7	69.5	74.9		
Psychological hazards	No	N	13	4	36	53		
		%	17.8	3.1	14.1	11.6		
	Yes	N	60	125	220	405		
		%	82.2	96.9	85.9	88.4		
Ergonomic hazards	No	N	12	4	35	51		
		%	16.4	3.1	13.7	11.1		
	Yes	N	61	125	221	407		
		%	83.6	96.9	86.3	88.9		
Nursing students' previous knowledge about occupational health hazards.	No	N	25	54	132	211		
		%	34.2	41.9	51.6	46.1		

Table (5): Relation between the academic year and occupational health hazards among nursing students (n= 458):

		Academic year			
		Second year	Third year	Fourth year	
Occupational hazards					
Biological hazards	Yes	N	22	13	13
		%	45.8	27.1	27.1
	No	N	149	162	99
		%	36.3	39.5	24.1
Chi-square	X ²		3.034		
	P-value		0.219		
Chemical hazards	Yes	N	59	68	35
		%	36.4	42.0	21.6
	No	N	112	107	77
		%	37.8	36.1	26.0
Chi-square	X ²		1.822		
	P-value		0.402		
Mechanical hazards	Yes	N	89	90	56
		%	37.9	38.3	23.8
	No	N	82	85	56
		%	36.8	38.1	25.1
Chi-square	X ²		0.115		
	P-value		0.944		
Physical hazards	Yes	N	141	118	84
		%	41.1	34.4	24.5
	No	N	30	57	28
		%	26.1	49.6	24.3
Chi-square	X ²		10.519		
	P-value		0.005*		
Psychological hazards	Yes	N	161	146	98
		%	39.8	36.0	24.2
	No	N	10	29	14
		%	18.9	54.7	26.4
Chi-square	X ²		10.472		
	P-value		0.005*		
Ergonomic hazards	Yes	N	162	147	98
		%	39.8	36.1	24.1
	No	N	9	28	14
		%	17.6	54.9	27.5
Chi-square	X ²		11.193		
	P-value		0.004*		

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