Assessing Health Threatening Problems among Nursing or Midwifery Students during the Clinical Education Course in Turkey

Besey ÖREN¹, *Neriman ZENGIN²

¹. Department of Midwifery, Faculty of Health Sciences, Health Science University, Istanbul, Turkey
². Department of Midwifery, Faculty of Health Sciences, Istanbul University-Cerrahpaşa, Istanbul, Turkey

*Corresponding Author: Email: zneriman@yahoo.com

(Received 26 Nov 2017; accepted 21 Jul 2018)

Abstract

Background: This study determined the occupational exposure and health problems experienced by nursing and midwifery students during their clinical internships.

Methods: The study population consisted of 1719 nursing and midwifery students studying at the health sciences faculties of six Turkish universities in 2016. Data were collected using a questionnaire prepared by researchers, namely Occupational Exposure and Health Problems in Clinical Environment Questionnaire, and the State-Trait Anxiety Scale. The data were analyzed using Mann Whitney U test, Kruskal Wallis variance analysis, and Spearman correlation analysis. Significance was accepted in a 95% confidence interval and a level of $P<0.05$.

Results: The students had a mean age of 20.86 yr (1.72), and 48.6% had midwifery and 51.4% had nursing major. More than 17.8% of the students were experienced occupational exposure during their clinical internships. Total score for students was 2.15 ± 0.71. The scores of the students examined for exposure to hazards and verbal violence was 2.13 ± 1.17, for needle stick injury it was 2.10 ± 1.13. In addition, when the scores of the students' health problems were examined, insomnia 3.57 ± 1.22, low back pain 2.84 ± 1.29, shoulder or arm pain 2.68 ± 1.29 were determined statistically. There was a positive significant relationship between the mean clinical occupational hazardous exposure and health problems and state-trait anxiety scores ($P<0.01$).

Conclusion: Approximately one-fifth of the students were exposed to occupational hazardous at the hospital while they were on their clinical internship programs. Students rarely experience occupational exposure, but often suffer from insomnia, sometimes musculoskeletal pains (back, shoulder arm, neck), rarely have skin problems.

Keywords: Occupational exposure; Injuries; Nursing; Health occupations

Introduction

The nursing and midwifery students are the largest groups in the healthcare students. Therefore, the clinical education of these students is very important, as they are crucial in providing healthcare. Nursing and midwifery education in Turkey is 4600 h (1, 2), these programs consist of 50% of clinical training (1-3). Students can participate the patient care in clinical education on the supervision of the instructor. The number of schools offering nursing and midwifery undergraduate education in Turkey has increased in recent years. Unfortunately, the number of in-
STRUCTORS did not increase at the same level. This has created the risk of students' exposure to occupational hazards due to shortage of instructors (4).

Clinical practice is an intensive aspect of contemporary nursing and midwifery curriculum (5-7) and is a required core component of their education (7, 8). This education takes place in the various clinical settings, which build the foundation for the ongoing development of students' critical thinking and decision-making skills; as well as developing professional practice competency (9, 10). However, the clinical settings consist of highly occupational hazardous and risky environments with human resources from different qualities and quantities, complicated work processes, intense use of technology (11, 12). Because of these hazardous environments, the health of many trainees and workers are compromised each year (12, 13). Health workers may be exposed to hazardous environments and drugs such as chemotherapy drugs and gases, (14-16) violence (12, 17), needlestick injuries (NSI)(18-20), skin problems, latex allergies (21), musculoskeletal system problems (back injuries) (22, 23), cancer from working at night (24), loss of hearing (25) and mental health problems (26). Especially midwifery and nursing students can experience stress (27, 28) and anxiety (29) because of their underdeveloped skills, lack of information, assignments with deadline, being exposed to occupational hazardous as other professional health workers in the clinical environment (30). Moreover, students seek to learn new protocols or due to nature of job, they perform practices outside of the common procedure (31).

The researchers conducted the studies about contaminated or non-contaminated needlestick injury (18, 19, 32-34) around the world, the subjects of sleeplessness, musculoskeletal system disorders, hospital infections, and varicosity, which are all occupational health problems and often encountered in health workers. However, the number of studies investigating all these problems is limited in students.

This cross-sectional study was conducted to assess occupational exposure and health problems among nursing or midwifery students during the clinical education course, and to examine the relationship between health problems and anxiety.

Methods

Participants

Health and Sciences Faculties of 57 Turkish universities have midwifery and nursing departments. A survey was conducted of students at 14 universities among the 57 universities, which have these departments. The universities and students were randomly but homogenously selected at different regions and classes. The study was conducted in the first half of 2016 and a survey mailed to the selected faculties. After brief introduction by the faculty members to the students, the surveys were filled out and mailed backed. The number of students participated in the survey was 4800. The number reflected entire population and just 1719 students completed the survey as without any error and without missing parts. The rest of the surveys were excluded.

Instruments

Data were collected using a questionnaire prepared by researchers, namely Occupational Exposure and Health Problems in Clinical Environment Questionnaire (35), and the State-Trait Anxiety Scale (STAI)(36).

The questionnaires were designed to ask about the socio-demographic characteristics of the students, during their university study years, the services where they performed clinical applications, their status regarding being exposed to occupational hazardous as other professional health workers in the clinical environment (30). Moreover, students seek to learn new protocols or due to nature of job, they perform practices outside of the common procedure (31).

The Occupational Hazardous Exposure and Health Problems in Clinical Environment Questionnaire

The form was developed by Sarıçam in 2012 in Turkey. This form consists of two sections which assess occupational hazardous exposure, health problems (Table 1) and protection from them.
Table 1: Occupational hazardous exposure and health problems (N=1719)

| Occupational hazardous exposure                                      | Mean (Sd) |
|---------------------------------------------------------------------|-----------|
| • Were you ever exposed to verbal violence by patient relatives in the hospital? | 2.13 (1.17) |
| • Did you experience needlestick injury?                            | 2.10 (1.13) |
| • Were you ever exposed to the negative effects of chemotherapy drugs? | 1.32 (0.87) |
| • Were you ever harassed by patient relatives?                      | 1.31 (0.85) |
| • Were you ever exposed to physical violence by patient relatives in the hospital? | 1.28 (0.82) |
| • Did you experience a viral infection stemming from the hospital?   | 1.67 (1.11) |

Health problems

| • Did you experience sleeplessness?                                  | 3.57 (1.22) |
| • Did you experience back pain that negatively affected your health? | 2.84 (1.29) |
| • Did you experience shoulder or arm pain that negatively affected your health? | 2.68 (1.29) |
| • Did you experience neck pain that negatively affected your health? | 2.52 (1.30) |
| • Did you experience skin problems because of latex gloves?         | 2.45 (1.46) |

Total: 2.15 (0.71)

sd=standard deviation, (5) always, (4) often, (3) sometimes, (2) rarely, and (1) never.

High score indicates increased hazards and health problems.

Twelve items evaluating occupational hazardous exposure and health problems were used. Five of the items in the form related to the occupational hazardous exposure and seven items to the experienced health problems in the clinical environment. (35). This 12-question form encompassed the situations of being injured by needlestick, being exposed to the effects of chemotherapy drugs, being exposed to verbal or physical violence or harassment from the relatives of patients, neck, back, shoulder and arm pain or sleeplessness, varicosity, experiencing skin related health problems because of latex gloves, and viral infections stemming from the hospital. The terms were scored in a 5-way Likert type manner with the answers always=5, often=4, sometimes=3, rarely=2, and never=1. The score originally varies between 12 and 60, and a higher score indicates higher exposure to risks stemming from the clinical practice environment. Cronbach’s alpha coefficient of the scale was 0.59. The Cronbach alpha coefficient of the form in the current study was found to be 0.80.

State-Trait Anxiety Scale (STAI)

The STAI scale, was implemented for the Turkish population in 1995 and measures the anxiety level of individuals 14 and older. The STAI consists of two subscales, i.e. (1) the state and (2) the trait anxiety. State anxiety (A-State) is defined as the fear an individual feel because of a stressful situation. Trait anxiety (A-Trait) is the predilection that an individual experiences anxiety. The total score can theoretically vary between 20 and 80. A high score means a high level of anxiety while a lower score shows a lower level of anxiety (36). A Cronbach’s alpha coefficient reported for the A-State Scale of 0.92-0.81 and 0.85-0.71 for the A-Trait Scale (37, 38). In this study, Cronbach alpha for A-State was 0.90 and for A-Trait was 0.82.

Procedure

The study was conducted in six health sciences faculties from three regions. After the students were informed on the aim of the study by department chairs or responsible lecturers, the students that agreed to participate were given questionnaires. The forms were retrieved via postage and fees were paid by the researcher.

Data analysis

Statistical evaluation was performed using the IBM SPSS 21 software (Chicago, IL, USA). De-
scriptive statistics such as frequency, mean, standard deviation, and percentage were used to analyze all the variables under study. In the comparisons between binary groups, the Mann Whitney U test was used, and in the comparison of groups with three or more variables, the Kruskal Wallis variance analysis was used. The relationship between health problems and anxiety levels was examined using Spearman correlation analysis. Significance was accepted in a 95% confidence interval and a level of \( P<0.05 \).

**Ethical considerations**

Before the study, permission was taken from the local board of ethics (Medipol University Ethical Board: Date: 30-03-2015 and No:108400987-157). Students were informed before participation, and participation was on a voluntary basis.

**Results**

The mean age of the students was 20.86 (1.72). There was almost a 50/50 ratio between students that study to become a midwife or nurse (48.6%; n=841 studied midwifery and 51.4%; n=878 studied nursing). Ten percent of the students were freshmen, 35.2% were sophomores, 30% were juniors, and 24.8% were seniors. Most of the students had clinical internships in internal diseases (64.8%), surgery (65.4%), and obstetrics (56.0%) clinics. Midwifery students had their clinical internships in the obstetrics clinics (76.0%) and outpatient services (59.9%) while most of the nursing students had their internships in internal diseases (89%) and surgery (77.0%) clinics. 17.8% of the students were exposed to occupational hazard in the clinical environment (Table 2).

| Variable                          | Midwifery | Nursing | TOTAL |
|-----------------------------------|-----------|---------|-------|
| **Age (yr)**                      | Mean(SD)/median | Mean(SD)/median | Mean(SD)/median |
| Age (yr)                          | 20.89 (1.66) / 21 | 20.83 (1.77) / 21 | 20.86 (1.72) / 21 |
| Clinical internship (hours)       | 14.59 (7.76) / 16 | 16.07 (6.67) / 16 | 15.36 (7.25) / 16 |
| Gender                            | Female 826 | 711 (81.4) | 1537 (90.4) |
| Gender                            | Male 0 | 163 (18.6) | 163 (9.6) |
| Grade                             | 1st 102 (12.3) | 68 (7.8) | 170 (10) |
| Grade                             | 2nd 278 (33.7) | 320 (36.6) | 598 (35.2) |
| Grade                             | 3rd 274 (33.2) | 236 (27.0) | 510 (30.0) |
| Grade                             | 4th 172 (20.8) | 250 (28.6) | 422 (24.8) |
| Clinical internship fields        | Internal diseases 333 (39.6) | 781 (89.0) | 1114 (64.8) |
| Clinical internship fields        | Surgery 449 (53.4) | 676 (77.0) | 1125 (65.4) |
| Clinical internship fields        | Intensive care unit 165 (19.6) | 306 (34.9) | 471 (27.4) |
| Clinical internship fields        | Pediatrics 271 (32.2) | 188 (21.5) | 459 (26.7) |
| Clinical internship fields        | Obstetrics 639 (76.0) | 325 (36.8) | 962 (56.0) |
| Clinical internship fields        | Out-patient 504 (59.9) | 221 (25.2) | 725 (42.2) |
| Occupational hazardous exposure   | Yes 137 (8.0) | 167 (9.82) | 304 (17.88) |
| Occupational hazardous exposure   | No 704 (83.7) | 711 (81.0) | 1416 (82.4) |
| Training on occupational exposures| Yes 499 (59.3) | 512 (58.3) | 1011 (58.8) |
| Training on occupational exposures| No 342 (40.7) | 366 (41.7) | 708 (41.2) |

Mean clinical occupational exposure and health problem score of the students are 2.15±0.71. When the student's occupational hazardous exposure examined, they rarely experienced verbal violence by patient’s relatives (2.13±1.17), and NSI (2.10±1, 13). However, when the student's health problems were monitored, the scores were as follow: most-
ly sleeplessness (3.57 ± 1.22), rare pain in the back (2.84 ± 1.29), in the shoulders and arms (2.68 ± 1.29), pain in the neck (2.52 ± 1.30) and skin problems related to the use of gloves (2.45 ± 1.46) (Table 1).

A significant difference was found between the years of study in school and the occupational hazardous exposure and health problems stemming from the clinical internships. The mean score of the seniors (2.26±0.67) was significantly (P<0.001) higher than the mean scores of the freshmen, sophomores, and juniors (1.96±0.76, 2.08±0.72, 2.21±0.69 respectively). Furthermore, a positive significant relationship was found between the mean clinical occupational hazardous exposure and health problems scores and the A-Trait (r=.124 P<0.001), State-A (r=0.103, P<0.001) and anxiety scores (Table 3).

Table 3: The statues of the students regarding experiencing occupational exposures and health problems in the clinical internship according to certain characteristics (N=1719)

| Characteristics                                                | Occupational hazardous exposures and health problems | Mean (Sd) | Kw- χ²=45.754 | P=0.000 |
|----------------------------------------------------------------|------------------------------------------------------|-----------|---------------|----------|
| Grade 1st                                                      | 1.964 (0.76)                                         | 45.754    | P=0.000       |
| Year 2nd                                                       | 2.078 (0.72)                                         |           |               |
| Year 3rd                                                       | 2.214 (0.69)                                         |           |               |
| Year 4th                                                       | 2.261(0.67)                                          |           |               |
| Department Midwifery                                           | 2.169 (0.72)                                         | z=- .860  | P=0.390       |
| Department Nursing                                             | 2.136 (0.69)                                         |           |               |
| Gender Female                                                  | 2.157(0.69)                                          | z=-1.760  | P=0.078       |
| Gender Male                                                    | 2.115 (0.83)                                         |           |               |
| Training Yes                                                   | 2.132 (0.71)                                         | z=-1.616  | P=0.106       |
| Training No                                                    | 2.181 (0.70)                                         |           |               |
| Occupational hazardous exposure of the clinical internship and health problems | A-State                                              | r=0.112 p<0.001 | -        |
| Were you ever exposed to verbal violence by patient relatives in the hospital | A-Trait                                              | r=0.141 p<0.001 | -        |
| Did you experience back pain that negatively affected your health? | r=0.108 P<0.001                                       | -         |               |
| Did you experience shoulder or arm pain that negatively affected your health? | r=0.103 P<0.000                                       | -         |               |
| Total score                                                    | r=0.103 P<0.000                                       | r=0.124   | P<0.000       |

Sd= Standard deviation, Kw- χ² = Kruskal Wallis Test, z= Mann-Whitney U

Discussion

This study presents health-threatening problems among nursing or midwifery students during the clinical education course. 17.8% of the students were exposed to at least one occupational hazardous exposure. Students are rarely exposed to verbal violence and needlestick in the clinical period and reported health problems associated with the clinic were mostly insomnia, rarely musculoskeletal pain and skin problems.

In Turkey, 74.4% of health workers were found to be exposed to violence for reasons stemming from the health care system, with most of the violence being verbal (39). In another study in Turkey, similarly, verbal violence (91.1%) was reported to be more prevalent than physical violence (33%) (40). Students encounter violence in the clinical area and have insufficient information on the management of the problem (41). In our study, rarely of the students stated that they were exposed to violence (Table 1). The reason behind this low rate may be students not dealing with patients actively as much as professional health workers and the students lacking information on the definition of violence.
Exposure to bloodborne pathogens due to NSI resulting in serious occupational diseases constitutes a potential risk factor for nursing and midwifery students (42-44). Students are especially susceptible to NSI’s because of lack of workplace safety awareness and limited clinical experience. The frequency of NSI in studies conducted in Turkey varies between 19.4% and 52.5% (18, 45-48), while in other countries the frequency of NSI occurs between 13.9% and 59.9% (19, 49-51). In our study rarely needlestick cases were seen (Table 1). The lower rate in Turkey compared to other studies may be tied to the fact that students in Turkey do not participate in active application in many fields because of the rising number of students, they receive a mandatory course regarding workplace safety trainings, as well as increased number of simulation laboratories, increased lab hours in nursing and midwifery curricula and decreased clinical internship hours. Training given to students decreases NSI (34). In our study, 67.7% of the students exposed to clinical risk received training (Table 2).

In our study, the most frequent health problem of the students is sleeplessness (3.57±1.2) (Table 1). Nursing students reported that sleep problems were common, headache, severe depression and poor quality of life were effective in the formation of sleep problems, smoking, physical pain, and prevalence is between 26.7% and 56.7% (52). In our study, students often experience insomnia. This may not be a health problem directly related to clinical practice. However, this finding may not be evaluated in the study but may be related to the beginning of the clinical practice in the early morning hours, the physical exhaustion of students throughout the day, the stressful clinical setting, individual characteristics of the students, and the high level of homework related to the clinic. Our results are consistent with the literature in terms of the frequency of insomnia problem.

The second health problem of the students was musculoskeletal problems. Musculoskeletal problems were reported to start in nursing students before even starting the occupation (30). This result supports the findings and shows that the health of students gets disrupted by the working environment just like professional health members.

In our study, the third health problem was “experiencing skin problems because of latex glove use”. In studies, worldwide latex sensitivity is reported to be 1% in the general population and 5%-12% for occupational latex sensitivity (53). In a study with health care students, the frequency of skin problems related to latex glove use was reported to be 4%, with the rate being lower in students compared to health workers (54). Findings of the study are similar to the literature.

In this study, senior students experienced more health problems. Most of the senior students spent an average of 32 h/wk in the clinic due to internship applications which could count for the higher rate of health problems. The stress levels of sophomore nursing students were found to be greater than freshmen nursing students because of increased time of clinical work during sophomore year (55).

Nurses and midwife’s students emphasize the importance of clinical experience and environment as an effective factor in students’ anxiety (37, 38, 56, 57). In our study, the clinical anxiety levels of the students were found to be mild or medium (State anxiety 42.03±6.85; Trait anxiety 47.51±6.62), with their health problem status and their state and trait anxiety being related on a positive low level (Table 3).

Health workers may have mental health problems such as anxiety and depression related to the work environment (58, 59). Occupational exposure has also been reported to have psychological effects (31, 60) In nurses experiencing exposure to occupational hazards, the prevalence of anxiety is higher (26), and nurses experiencing exposure to occupational hazards feel a significant level of anxiety, anger, and guilt (60, 61). Similarly, there are similar mental problems in the studies conducted in the students (31, 62). In our study, anxiety levels increased as a result of experiencing severe exposure, waist, arm and shoulder pain in the clinical environment and the fear of experiencing such stressful situations they live (31, 62). However, unlike the literature (31), there is no relationship between NSI and anxiety (Table 3).
In addition, occupational exposure and health problems total score and state-trait anxiety increased in our study. As well as professional nurses (26, 61) there was a positive correlation between exposure to hazards and health problems and anxiety among students. These results are consistent with the literature. A limitation of this study was primarily based on students’ memories or recall experiences. Moreover, the results of this study are limited to the studied sample and cannot be generalized.

Conclusion

The increase in clinical internships led to more health problems. Waist, arm and shoulder pains, as well as violence situations, increase correlates with student’s anxiety level increase. As the frequency of occupational exposure and health problems increases, the state-trait anxiety levels also increase. Further studies are needed to define the risks encountered by nursing and midwifery students in the clinical field and the consequences on their health. Because a few reports have shown the factors affecting the health of nursing and midwifery students in the clinical application process. Further research will support nursing and midwifery training in the prevention of risks and exposures.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that there is no conflict of interests.

References

1. Council of Higer Education (2017). Nursing Undergraduate Education Workshop.
2. Yörük S (2016). Education of midwifery in world. J DU Health Sci Inst, 6(1):46-50.
3. Apay SE, Kanbur A, Ozdemir F, Pasinlioglu T (2012). Midwifery education in Turkey. Coll Antropol, 36(4):1453-6.
4. Council of Higer Education (2018). Number of students and teaching staff by educational institutions, 2017-2018.
5. Ironside PM, McNelis AM, Elbright P (2014). Clinical education in nursing: Rethinking learning in practice settings. Nurs Outlook, 62(3):185-91.
6. Antohe I, Riklikenie O, Tichelaar E, Saarikoski M (2016). Clinical education and training of student nurses in four moderately new European Union countries: Assessment of students' satisfaction with the learning environment. Nurse Educ Pract, 17:139-44.
7. World Health Organization (2009). Global standards for the initial education of professional nurses and midwives. Geneva, Switzerland: Department of Human Resources for Health, World Health Organization.
8. Dahlke S, O’Connor M, Hannesson T, Cheetham K (2016). Understanding clinical nursing education: An exploratory study. Nurse Educ Pract, 17:145-52.
9. Tanda R, Denham SA (2009). Clinical instruction and student outcomes. Teach Learn Nurs, 4(4):139-47.
10. Phelan A, R OC, Murphy M, McLoughlin G, Long O (2014). A contextual clinical assessment for student midwives in Ireland. Nurse Educ Today, 34(3):292-4.
11. Cebeci H (2013). Work-related accidents and employee safety in the hospitals: An application at karabuk city centre. Business And Management Studies: An International Journal, 1(1):62-82.
12. Ulutasdemir N, Cirpan M, Copur EO, Tanir F (2015). Occupational risks of health professionals in Turkey as an emerging economy. Ann Glob Health, 81(4):522-9.
13. The National Institute for Occupational Safety and Health (NIOSH). Workplace Safety and Health Topics Healthcare Workers: Centers
for Disease Control and Prevention; 2017
https://www.cdc.gov/niosh/topics/healthcare/default.html

14. He B, Mendelsohn-Victor K, McCullagh MC, Friese CR (2017). Personal protective equipment use and hazardous drug spills among ambulatory oncology nurses. Oncol Nurs Forum, 44(1):60-5.

15. Silver SR, Steege AL, Boiano JM (2016). Predictors of adherence to safe handling practices for antineoplastic drugs: A survey of hospital nurses. J Occup Environ Hyg, 13(3):203-12.

16. Boiano JM, Steege AL (2016). Precautionary practices for administering anesthetic gases: A survey of physician anesthesiologists, nurse anesthetists and anesthesiologist assistants. J Occup Environ Hyg, 13(10):782-93.

17. Magnavita N, Heponiami T (2011). Workplace violence against nursing students and nurses: an Italian experience. J Nurs Scholarsh, 43(2):203-10.

18. Unver V, Tastan S, Coskun H (2012). The frequency and causes of occupational injuries among nursing students in Turkey. Arch Environ Occup Health, 67(2):72-7.

19. Zhang X, Chen Y, Li Y, et al. (2018). Needlestick and sharps injuries among nursing students in Nanjing, China. Workplace Health Saf, 66(6):276-84.

20. Zhang X, Gu Y, Cui M, Stallones I, Xiang H (2015). Needlestick and sharps injuries among nurses at a teaching hospital in China. Workplace Health Saf, 63(5):219-25.

21. Hamnerius N, Svedman C, Bergendorff O et al (2018). Wet work exposure and hand eczema among healthcare workers: a cross-sectional study. Br J Dermatol, 178(2):452-61.

22. Bernal D, Campos-Serna J, Tobias A et al (2015). Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. Int J Nurs Stud, 52(2):635-48.

23. Cheung K (2010). The incidence of low back problems among nursing students in Hong Kong. J Clin Nurs, 19(15-16):2355-62.

24. Samulin Erden J, Noto HO, Skare O, et al. (2017). Mechanisms of breast cancer risk in shift workers: association of telomere shortening with the duration and intensity of night work. Cancer Med, 6(8):1988-97.

25. Broadwater K, Brueck S (2017). Health hazard evaluation report: evaluation of a surgical staff’s noise exposures during total knee replacement surgeries. Report No: Report No. 2014-0154-3275.

26. Xiong X, Li MJ, Jiang Y, Tong X, Peng Y (2017). Study of blood exposure-related mental health illness among clinical nurses. Front Med, 11(1):147-51.

27. Taşdelen S, Zaybak A (2013). The determination the level of stress of nursing students during their first clinical experience. Florence Nightingale Journal of Nursing, 21(2):101-6.

28. Yıldırım N, Karaca A, Cangur S, Acıkgöz F, Akkus D (2017). The relationship between educational stress, stress coping, self-esteem, social support, and health status among nursing students in Turkey: A structural equation modeling approach. Nurse Educ Today, 48:33-9.

29. Arabacı LB, Korhan EA, Tokem Y, Torun R (2015). Nursing students’ anxiety and stress levels and contributed factors before-during and after first clinical placement. Journal of Hacettepe University Faculty of Nursing, 2(1).

30. Cheung K, Chan CK, Chang MY, et al. (2015). Predictors for compliance of standard precautions among nursing students. Am J Infect Control, 43(7):729-34.

31. Hambridge K, Nichols A, Endacott R (2016). The impact of sharps injuries on student nurses: a systematic review. Br J Nurs, 25(19):1064-71.

32. Yang YH, Wu SJ, Wang GLe et al (2013). Incidence of needlestick and other sharp object injuries in newly graduated nurses. Am J Infect Control, 41(10):944-5.

33. Yao WX, Yang B, Yao C, et al. (2010). Needlestick injuries among nursing students in China. Nurse Edu Today, 30(5):435-7.

34. Yao WX, Wu YI, Yang B, et al. (2013). Occupational safety training and education for needlestick injuries among nursing students in China: intervention study. Nurse Edu Today, 33(8):834-7.

35. Sançam H (2012) Faced nurses under the occupational health and safety risk and hazards on the effect of level of work stress. İzmir: Dokuz Eylül University.[Master Science]
36. Öner N, LeCompte WA (1998). Trait-State anxiety inventory: Handbook. Istanbul: Boğaziçi University Publishing.
37. Kaya H, Kaya N, Pallos AO, Kucuk L (2012). Assessing time-management skills in terms of age, gender, and anxiety levels: a study on nursing and midwifery students in Turkey. Nurse Educ Pract, 12(5):284-8.
38. Aydin Kartal Y, Yazici S (2017). The determination of anxiety and stress levels of midwifery students beginning the first clinical experience and post-experience period. HSP, 4(3):190-5.
39. Kaya S, Bilgin Demir I, Karsavuran S, Urek D, Ilgun G (2016). Violence against doctors and nurses in hospitals in Turkey. J Forensic Nurs, 12(1):26-34.
40. Celik SS, Celik Y, Agirbas I, Ugurluoglu O (2007). Verbal and physical abuse against nurses in Turkey. Int Nurs Rev, 54(4):359-66.
41. Shapiro J, Boyle MJ, McKenna L (2018). Midwifery student reactions to workplace violence. Women Birth, 31(1):e67-e 71.
42. Pruss-Ustun A, Rapiti E, Hutin Y (2005). Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. Am J Ind Med, 48(6):482-90.
43. Cheung K, Ho SC, Ching SS, Chang KK (2010). Analysis of needlestick injuries among nursing students in Hong Kong. Accid Anal Prev, 42(6):1744-50.
44. Cheung K, Ching SS, Chang KK, Ho SC (2012). Prevalence of and risk factors for needlestick and sharps injuries among nursing students in Hong Kong. Am J Infect Control, 40(10):997-1001.
45. Büyükk ET, Rizalar S, Yüksel P, Yüksel VT (2016). Students’ experiences on sharp object injuries and the effect of practice training on their levels of knowledge. Samsun Sağlık Bilimleri Dergisi, 1(1):1-11.
46. İrmak Z, Baybuga MS (2011). Needlestick and sharps injuries among Turkish nursing students: A cross-sectional study. Int J Nurs Pract, 17(2):151-7.
47. Karadag M (2010). Occupational exposure to blood and body fluids among a group of Turkish nursing and midwifery students during clinical practice training: frequency of needlestick and sharps injuries. Jpn J Nurs Sci, 7(2):129-35.
48. Talas MS (2009). Occupational exposure to blood and body fluids among Turkish nursing students during clinical practice training: frequency of needlestick/sharp injuries and hepatitis B immunisation. J Clin Nurs, 18(10):1394-403.
49. Prasuna J, Sharma R, Bhart A, et al. (2015). Occurrence and knowledge about needle stick injury in nursing students. J Ayub Med Coll Abbottabad, 27(2):430-3.
50. Smith DR, Leggat PA (2005). Needlestick and sharps injuries among nursing students. J Adv Nurs, 51(5):449-55.
51. Suliman M, Al Qadire M, Alazzam M et al (2018). Students nurses’ knowledge and prevalence of Needle Stick Injury in Jordan. Nurse Educ Today, 60:23-7.
52. Angelone AM, Mattei A, Sbarbati M, Di Orso F (2011). Prevalence and correlates for self-reported sleep problems among nursing students. J Prev Med Hyg, 52(4):201-8.
53. Katrancha ED, Harshberger LA (2012). Nursing students with latex allergy. Nurse Educ Pract, 12(6):328-32.
54. Lamberti M, Buonanno R, Ritonnaro C, et al. (2015). Molecular profile of sensitization in subjects with short occupational exposure to latex. Int J Occup Med Environ Health, 28(5):841-8.
55. Lo R (2002). A longitudinal study of perceived level of stress, coping and self-esteem of undergraduate nursing students: an Australian case study. J Adv Nurs, 39(2):119-26.
56. Dahlen HG, Caplice S (2014). What do midwives fear? Women Birth, 27(4):266-70.
57. Banks P, Kane H, Rae C, Atkinson J (2012). Support for nursing and midwifery students: a special case? Nurse Educ Today, 32(3):309-14.
58. Taghinejad H, Suhrabi Z, Kikhavani S, Jaafarpour M, Azadi A (2014). Occupational mental health: a study of work-related mental health among clinical nurses. J Clin Diagn Res, 8(9):WC01-3.
59. Asad Zandi M, Sayari R, Ebadi A, Sanainasab H (2011). Abundance of depression, anxiety and stress in militant Nurses. Iranian Journal of Military Medicine, 13(2):103-8.
60. Zhang MX, Yu Y (2013). A study of the psychological impact of sharps injuries on
health care workers in China. *Am J Infect Control*, 41(2):186-7.

61. Jeong JS, Son HM, Jeong IS, et al (2016). Qualitative content analysis of psychologic discomfort and coping process after needlestick injuries among health care workers. *Am J Infect Control*, 44(2):183-8.

62. Reis RK, Gir E, Canini SR (2004). Accidents with biological material among undergraduate nursing students in a public Brazilian University. *Braz J Infect Dis*, 8(1):18-24.