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EVALUATING EFFECTIVENESS OF THE EDUCATION GIVEN TO NURSING STUDENTS ABOUT PEDIATRIC PAIN MANAGEMENT: A QUASI-EXPERIMENTAL STUDY*
HEMŞİRELİK ÖĞRENCİLERİNE VERİLEN ÇOCUK HASTALARDA AĞRI YÖNETİMİ EĞİTİMİNİN DEĞERLENDİRİLMESİ: YARI DENEYSEL BİR ARAŞTIRMA

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ABSTRACT

The study aimed to investigate the effectiveness of education given to nursing students on pain management in pediatric patients. A single group pretest-posttest quasi-experimental research was conducted with 98 students in the nursing department of a university in 2022. Data were collected using the Student Socio-demographic Information Form and the Pediatric Pain Management Scale for Nursing Students. An online education program with active educational methods was applied to the students, and their pediatric pain management levels were evaluated before and after the education. Of the students, 78.6% were female and the total mean age was 21.49±2.5 years. A statistically significant difference was found between the median scores of the Pediatric Pain Management Scale and its sub-dimensions before and after the education ($p<0.05$). Students' median scale score before the education was 99, and 104 after the education. A statistically significant difference was determined between the median scores of all sub-dimensions of the scale before and after the education ($p<0.05$). The study showed that the pain management education in pediatric patients given to nursing students increased their knowledge level of pain awareness, physiopathology, obstacles in pain management, diagnosis, evaluation, and control of pain management.

Keywords: Nursing, pain management, pediatric pain,

ÖZ

Çalışmanın amacı, hemşirelik öğrencilerine 'Çocuk Hastalarda Ağrı Yönetimi' konusunda verilen eğitimin etkinliğini araştırmaktır. Tek grup ön test-son test yarı deneysel tasarımlı araştırma Mart- Haziran 2022 tarihinde bir üniversitenin hemşirelik bölümünde 98 öğrenci ile gerçekleştirilmiştir. Araştırma verileri 'Öğrenci Sosyo-demografik Bilgi Formu' ve 'Hemşirelik Öğrencileri İçin Pediatrik Ağrı Yönetimi Ölçeği' ile toplanmıştır. Öğrencilere çocuk hastalarda ağrı yönetimi konusunda çevrimiçi eğitim programı uygulanmış olup, eğitim öncesi ve eğitim sonrası pediatrik ağrı yönetim düzeyleri değerlendirilmiştir. Öğrencilerin %78.6'sı kadın, yaş ortalaması 21.49±2.5'tir. Pediatrik Ağrı Yönetimi Ölçeği ve alt boyutlarının medyan puanları arasında eğitimden önce ve sonra istatistiksel olarak anlamlı bir fark bulunmuştur ($p<0,05$). Öğrencilerin eğitim öncesi Pediatrik Ağrı Yönetimi Ölçeği ortanca puanı 99, eğitim sonrası 104'tür. Öğrencilerin eğitim öncesi ve eğitim sonrası Pediatrik Ağrı Yönetimi Ölçeği ve alt boyutları puan ortancaları arasında istatistiksel olarak anlamlı bir fark saptanmıştır ($p<0.05$). Çocuk hastalarda ağrı yönetimi konusunda verilen eğitim programının, hemşirelik öğrencilerini ağrı farkındalığı, fizyopatolojisi, ağrı yönetiminde engeller, tanılama, değerlendirme ve kontrolü konularında bilgi düzeyini arttırdığı belirlenmiştir.

Anahtar kelimeler: Hemşirelik, ağrı yönetimi, pediatrik ağrı.

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INTRODUCTION

Pain is an unpleasant condition that all children experience at least once in their childhood, whether it is acute or chronic.[1-3] In addition to the pain caused by disease, procedures such as venous or heel blood collection, vascular access, lumbar puncture, bone marrow aspiration, and vaccination applications cause considerable pain in children during outpatient and hospitalization diagnostics or treatment.[4,5] Untreated or uncontrolled pain delays a child's growth and development, lowers their quality of life, adversely affects the child and its family physiologically, psychologically, and economically, and increases the length of hospitalization and costs.[6,7]

Effective pain management in pediatric patients includes the diagnosis and evaluation of the pain, the planning of age-specific nursing interventions, and the administration of those analgesics requested by the physician; this shows that pain should be managed with a multidisciplinary team approach. [8,9] To date, many clinical guidelines have been developed for the management of pain symptoms.[10-13] Despite these guidelines, studies have shown that the use of clinical guidelines is inadequate in pain management, that pediatric patients experience moderate or severe pain. More research is needed on the management of pain symptoms.[14-18]

Nurses, who are an important part of multidisciplinary teams regarding the management of pain, receive education on pain physiology, diagnosis, and evaluation of pain, as well as on the planning of nursing interventions during their undergraduate program.[2,3,19] For graduation, nurses are required to gain the skills of comprehending, analyzing, and synthesizing theoretical knowledge, evaluating and applying nursing skills for pain, one of the NANDA nursing diagnoses that nurses can make individually.[18,20] Descriptive studies carried out with university nursing students studying in different classes showed that the students' knowledge level, attitudes, and behaviors concerning pain are insufficient or moderate.[21-24]

The most frequently used method to increase the use of evidence-based practices in pain management of pediatric patients is education.[25-27] It is thought that education to be carried out with active learning methods in undergraduate education is important for the development of students.[16, 17, 28, 29]

This study aims to investigate the effectiveness of the education given to nursing students on pain management in pediatric patients.

MATERIALS AND METHODS

Type of Study

This is a single-group pretest-posttest quasi-experimental study.

Study Place, Population, and Sample

The study was conducted between March and June 2022 with 3rd-grade nursing students studying in the nursing department of a university in Türkiye. The power analysis of the research was conducted in G. Power 3.0.10 program. In the power analysis, considering the effect size as 0.3 (medium effect), power as 90%, and alpha type error as 0.05, it was calculated that 88 students would be included in the study, and it was aimed to include all students taking the child health and disease nursing course in the study. The study population comprised 124 students who took the child health and diseases nursing course class. The study concluded with 98 students who agreed to participate in the study who filled out the forms used to collect the study data completely. Two students were excluded from the present study because they did not attend the classes and a further 14 students were excluded because they did not fill in the forms completely. 10 students were not included in the study because they did not participate in the education at different stages of the education program.

Data Collection Tools

The study data were collected with the Student Socio-Demographic Information Form and the Pediatric Pain Management Scale for Nursing Students.

Student Socio-Demographic Information Form: It is a questionnaire form consisting of seven questions about the students' socio-demographic characteristics created by the researchers in line with the literature.[25-27]

Pediatric Pain Management Scale for Nursing Students: The 5-point Likert-type scale developed by Aydın and Bektaş (2021) comprises 29 items and 6 sub dimensions. It was determined that the scale explained 50.30% of the total variance and that Cronbach's alpha coefficient was 0.864. The correlations of the scale items with the total scale score ranged from 0.285 to 0.625. The lowest possible score obtainable from the scale is 29 and the highest is 145. An increase in score indicates that the respondent has more knowledge about pediatric pain management.[18] In the current study, the Cronbach alpha coefficient was calculated as 084.

Data Collection

An online education program on pain management in pediatric patients was applied to the participating students. Before the education, the data was communicated to the students via Google forms, with the students being asked to fill them out within 10 minutes. The education was given by an registered nurse who has research on pain in children, has a doctorate degree in child health and disease nursing, and has 14 years of professional experience. The education program consists of 3 parts held on different days during the spring semester. First of all, the 60-minute education program was conveyed via PowerPoint presentation and included theoretical information about pain physiology, reactions to pediatric pain and diagnosis of pain, the evaluation of pain, and pain management specific to pediatric-age periods in March, 2022. The education was held via Google Meet with all students' cameras turned on. Active participation of the students was provided in the form of questions and answers, brainstorming and sharing of experiences. The second part of the education program was 45 minutes in April, 2022. Subsequently, videos about the reactions to pain specific to pediatric periods and the evaluation of pain were shown to the students. Students were then asked to make contributions and share their experiences about the subject, and their questions were answered. After this, four different cases specific to infancy, play, pre-school, and school-age periods were discussed. The students were first asked to determine the childhood period, to indicate differential responses to age-specific pain, to carry out pain evaluation, and to make age-specific nursing interventions regarding pain management. Three parts of the

education program were carried out by ensuring that the students evaluated the pain of the patient they cared for during the period they went to practice in the clinic May, 2022. It is thought that conducting the education intermittently at different times will increase the effectiveness of the education program. After the education, data collection tools were communicated to the students via Google forms who were then asked to fill them out within 10 minutes. Ethical approval from the Social and Human Sciences Ethics Committee of a university and institutional permission from the health sciences faculty were obtained (2022-136) to carry out the study. Informed consent was written at the beginning of the Google forms to be sent to the students and their consent was obtained.

Statistics Analysis

The SPSS 22.0 program was used to analyze the study data. Descriptive statistics (percentage, frequency) of socio-demographic data were completed. The analysis of conformity to the normal distribution was performed with the Kolmogorov–Smirnov test, which determined that the data did not show normal distribution. Therefore, the Wilcoxon test was used in the comparison of the median pretest and posttest scale median scores. The statistical significance level was accepted as $p<0.05$.

RESULTS

Of the students, 78.6% were female and the total mean age was 21.49±2.5. It was found that 42.9% of the students lived in a district and that 83.7% had a nuclear family. When the students were asked how they would evaluate their course success, 58.2% said moderately effective and 49.0% said that they found online education effective (Table 1.)

A statistically significant difference was found between the students' median pre- and post-education Pediatric Pain Management Scale scores ($p<0.05$). The students' median Pediatric Pain Management score was 99before education and 104 after education. A statistically significant difference was determined between the median pre- and post-education scores across allsubdimensions ($p<0.05$). The students' median Pain Awareness score was 23 before education and 24 after education. The students' median Pain Physiopathology score was 16 before education and 16 after education. The students' median Obstacles in Pain Management score was 30 before education and 36 after education. The students' median Pain Diagnosis core was 8 before education and 8 after education. The students' median Pain Evaluation score was 6 before education and 7 after education. The students' median Pain Management score was 14 before education and 16 after education. (Table 2).

DISCUSSION

The study results showed that the education program on pain management in pediatric patients increased the students' median Pediatric Pain Management Scale

Table 1. Characteristics of Nursing Students

Socio-demographic Data			
Age: X±SD (Minimum–Maximum)		21.49±2.5 (18–40)	
		n	%
Gender	Female	77	78.6
	Male	21	21.4
Marital status	Single	98	100
Place of residence	Province	39	39.8
	District	42	42.9
	Village	17	17.3
Family type	Nuclear	82	83.7
	Extended	16	16.3
Course success	Good	38	38.8
	Moderate	57	58.2
Finding online education effective	Yes	48	49.0
	No	50	51.0

Table 2. Students' Pediatric Pain Management Scale Scores

Pediatric Pain Management Scale and Subdimensions	**Before education X±SD/Median Median (Minimum-Maximum)**	**After education X±SD/Median (Minimum-Maximum)**	***p value***
Pediatric Pain Management Scale Score	98.93±5.67 99 (77–111)	106.20±11.58 104 (78–136)	-4.72 **<0.001**
Pain Awareness	23.37±1.99 23 (18–26)	24.47±2.35 24 (20–30)	-3.40 **<0.001**
Pain Physiopathology	16.37±2.05 16 (13–20)	15.66±1.72 16 (11–20)	-2.51 **0.012**
Obstacles in Pain Management	30.09±3.10 30 (23–37)	35.83±6.05 36 (24–48)	-6.80 **<0.001**
Pain Diagnosis	8.13±1.30 8 (4–10)	7.54±1.54 8 (2–10)	-2.85 **<0.001**
Pain Evaluation	6.39±0.98 6 (4–10)	7.14±1.42 7 (3–10)	-4.11 **<0.001**
Pain Management	14.56±1.20 14 (10–16)	15.54. ±2.12 16 (6–20)	-4.01 **<0.001**

score. Children often experience pain due to acute or chronic diseases. Although each child's response to pain varies according to age, pain is affected by demographic factors such as age, gender, cognitive development, temperament, previous pain experiences, fear, culture, and parental attitude.[30-32] Admissions to the hospital for any reason and experiencing pain symptoms directly affect children's experiences of illness and hospitals. Nurses are those healthcare professionals who communicate most frequently with children during the illness and treatment process, provide them with care, and undertake a key role in the assessment and management of pain. Nurses' knowledge, skills, and experience are important in the management of pain that causes physiological and psychological symptoms in children.[33,34] The place where nurses gain theoretical knowledge, psycho-motor skills, and experience that is specific to all life periods concerning pain management are those universities in which the nurses receive their vocational training. The subject of pain management is included in the content of the Nursing National Core Education Program in Türkiye and training specific to different branches are given to students starting from the 1st year of their nursing education.[19] The fact that children are physiologically, psychologically, and socially different, and because they are more sensitive than adults make the evaluation and management of pain symptoms experienced by them more important. An examination of the literature showed that the issue of pain management in children is still an important research subject. A systematic examination of the relevant studies determined that they were mostly descriptive, and that in the last ten years only two studies were semi-experimental and that only one was designed as a randomized controlled study.[35]

In the study, it was determined that the nursing students' pre-education Pediatric Pain Management Scale median score was moderate. Gadallah et al (2017) reported in their study that 76.2% of the students answered fewer than 50% of the survey questions correctly.[23] Ortiz et al (2015) found that nursing students answered at least 7 questions correctly, and at most 26 questions out of the 40 survey questions on this subject and that the mean score of answering the questions correctly was 16.1±3.0.[22] Omari (2015) reported that nursing students had insufficient knowledge on pain and an inadequate attitude toward pain management in children and that they answered only 18.36% of these questions correctly.[21] Amponsah et al (2019) reported a correct answer rate of 42.1%.[24] According to a general evaluation of the literature, it was determined that the knowledge level and attitudes of nursing students concerning pain management in children were moderate or insufficient.[21-24,36]

The students' median Pediatric Pain Management score was 104 after education. Liu et al (2020) researched the effect of training given to nursing students on different methods of pain management in children in regard to pain knowledge and found that the pain-management knowledge and skill levels of the students increased after the education.[37] In the pretest-posttest quasi-experimental study by Buyuk (2019), nursing and midwifery students were provided with video-assisted education on pain management in newborns; the students reported that pain management knowledge levels of the students increased significantly compared with pre-education levels.[38] Similarly, Hunter et al (2015) found that education on pain management in children given to students studying in different health fields increased the students' scores.[39] Ulgen and Tufekçi (2019) made a presentation to nurses and distributed a training booklet to nurses on pain management in children.[40]It was found that the nurses' pain and attitude scores increased after the training. Huth et al (2009) determined that a 4-hour training program given to nurses on pain management in pediatric patients increased the nurses' knowledge level and positively affected their attitudes concerning pain management.[27] In the literature, it is seen that different training programs varying from 2–16 hours were applied to different groups, including nursing students and nurses, and that the trainings increased the level of knowledge about pain management in pediatric patients.[11,25,40]

Nursing students were given education on pain management in pediatric patients with active learning methods. With this education, the theoretical knowledge levels of the students were evaluated in line with their self-reports, but their attitudes and skills could not be evaluated. The education period lasted an average of 4 months. Although pre- and post-education evaluations were made, the lack of longer-term follow-ups can be considered a limitation.

CONCLUSION

It was found that an education program on pain management in pediatric patients increased nursing students' pain awareness and their knowledge of physiopathology, obstacles in pain management, diagnosis, evaluation, and management. Accordingly, nursing students' knowledge, attitudes, and behaviors should be supported to increase the quality of patient care using an individual and traumatic approach. In this regard, pain and pain management in nursing undergraduate education programs should be taught with active learning methods using developing technology. It is recommended that researchers conduct randomized controlled studies using different training methods.

Ethics Committee Approval: Ethics committee approval was received for this study from the Social and Human Sciences of Ethics Committee of Ondokuz Mayıs University (Date: 25.02.2022, Number: 2022-136)
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REFERENCES

1. Birnie KA, Chambers CT, Fernandez CV, et al. Hospitalized children continue to report undertreated and preventable pain. *Pain Research and Management.* 2014;19(4):198-204. doi:10.1155/2014/614784
2. IASP Announces Revised Definition of Pain International Association for the Study of Pain. Accessed July, 22, 2022. https://www.iasp-pain.org/publications/iasp-news/iasp-announces-revised-definition-of-pain/
3. IASP Curriculum Outline on Pain for Nursing International Association for the Study of Pain. Accessed July, 22, 2022. https://www.iasp-pain.org/education/curricula/iasp-curriculum-outline-on-pain-for-nursing/
4. Canbulat Sahiner N, Turkmen AS. The effect of distraction cards on reducing pain and anxiety during intramuscular injection in children. *Worldviews on Evidence Based Nursing*. 2019;16(3):230-235. doi:10.1111/wvn.12359.
5. Karaatmaca B, Sahiner UM, Soyer O, et al. The impacts of skin prick testing on pain perception and anxiety in children and parents. *Allergologia et Immunopathologia*, 2021;49(2):72-79. doi:10.15586/aei.v49i2.68
6. Royal College of Nursing. *The Recognition and Assessment of Acute Pain İn Children Recommendations*. RCN Publishing, London, 2009. Accessed July, 22, 2022. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.choiceforum.org/docs/ chnpain.pdf
7. Ung A, Salamonson Y, Hu W, et al. Assessing knowledge, perceptions and attitudes to pain management among medical and nursing students: a review of the literature. *British Journal of Pain.* 2015;10(1):8-21. doi:10.1177/2049463715583142
8. Harmon J, Summons P, Higgins I. Nurses' culturally mediated practices influencing pain care provision for older people in acute care: Ethnographic study. *Applied Nursing Research*. 2019;48:22-29. doi:10.1016/j.apnr.2019.05.010
9. Carlson CL. Use of three evidence-based postoperative pain assessment practices by registered nurses. *Pain Management Nursing*. 2009;10(4):174-187. doi:10.1016/j.pmn.2008.07.001
10. Agency of Health Care Policy and Quality-AHCPQ. *Acute pain management infants, children and adolescents: operative and medical procedures.* Clinical Practice Guideline. Publication no, 92-0020. Rockville, 1995. Accessed July, 22, 2022.
11. American Pain Society Quality of Care Committee, Quality Improvement guidelines for the treatment of acute and cancer pain. *Journal of the American Medical Association.* 1995;274(3):1874-1880. doi:10.1001/jama.1995.03530230060032
12. Joint Commission on Accreditation of Healthcare Organizations, *Pain Assessment and Management: An Organizational Approach*. Oakbrook Terrace: Joint Commission Resources, 2001. Accessed date: March, 2022.
13. Registered Nurses Association of Ontario Nursing Best Practice Guideline. *Assessment and Management of Pain*, 2007. Accessed date: March, 2022 https://rnao.ca/sites/rnao-ca/files/Assessment_and_Management_of_Pain.pdf
14. World Health Organization, *Guidelines on The Pharmacological Treatment of Persisting Pain in Children with Medical Illnesses*. France: WHO Library Cataloguing, 2012. Accesed date: March, 2022. https://www.ncbi.nlm.nih.gov/books/NBK138354/
15. Stevens B, Yamada J, Stinson J, et al. Pain intensity in hospitalized children in Canada. *The Journal of Pain*. 2012;13(4):5. doi:10.1016/j.jpain.2012.01.025
16. Chow K, Chan JC. Pain knowledge and attitudes of nursing students: A literature review. *Nurse Education Today.* 2015;35(2):366-372. doi:10.1016/j.nedt.2014.10.019
17. Akatın Y, Kocaman G. Strategies on compliance to evidence-based practice recommendations regarding pain assessment in pediatric patients*. Izmir Katip Celebi University Faculty of Health Sciences Journal*. 2018;3(1):23-31. Accessed date: March, 2022. https://dergipark.org.tr/en/pub/ikcusbfd/issue/36212/412550
18. Aydın B, Bektaş M. Pediatric pain management knowledge levels of intern nursing students. *American Society for Pain Management Nursing.* 2019;21:290-298. doi:10.1016/j.pmn.2019.06.012
19. National Nursing Core Education Program in Turkey. 2022 Accessed March 17, 2022.https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Ulusal-cekirdek-egitimi-programlari/hemsirelik_cekirdek_egitim_programi.pdf
20. Hroch J, Van Den Kerkhof EG, Sawhney M, et al. Knowledge and attitudes about pain management among Canadian nursing students. *Pain Management Nursing.* 2019;20(4):382-389. doi:10.1016/j.pmn.2018.12.005
21. Omari O. Knowledge and attitudes of Jordanian nursing students toward children's pain assessment and management: A cross-sectional study. *Journal of Nursing Education and Practice*. 2015;6(3). doi:10.5430/jnep.v6n3p51
22. Ortiz MI, Ponce-Monter HA, Rangel-Flores E, et al. Nurses and nursing students' knowledge and atti-

tudes regarding pediatric pain. *Nursing Research and Practice.* 2015;1-8. doi:10.1155/2015/210860
23. Gadallah MAEA, Hassan AMH, Shargawy SAEH. Undergraduate nursing students' knowledge and attitude regarding pain management of children in Upper Egypt. *Journal of Nursing Education and Practice*. 2017;7(6):100. doi:10.5430/jnep.v7n6p100
24. Amponsah AK, Kyei-Dompim J, Kyei EF, et al. Final year nursing students' knowledge and attitudes regarding children's pain. *Pain Research and Management.* 2020;7283473:1-6. doi:10.1155/2020/7283473
25. Chiang LC, Chen HJ, Huang L. Student nurses' knowledge, attitudes, and self-efficacy of children's pain management: evaluation of an education program in Taiwan. *Journal of Pain and Symptom Management*. 2006;32(1):82-89. doi:10.1016/j.jpainsymman.2006.01.011
26. Ameringer S, Fisher D, Sreedhar S, et al. Pediatric pain management education in medical students: impact of a web-based module. *Journal of Palliative Medicine*. 2012;15(9):978-983. doi:10.1089/jpm.2011.0536
27. Huth MM., Gregg TL, Lin L. Education changes Mexican nurses' knowledge and attitudes regarding pediatric pain. *Pain Management Nursing*. 2010;11(4):201-208. doi:10.1016/j.pmn.2009.11.001
28. Foronda CL, Fernandez-Burgos M, Nadeau C, et al. Virtual simulation in nursing education: a systematic review spanning 1996 to 2018. Simulation in Healthcare: *The Journal of the Society for Simulation in Healthcare.* 2020;15(1):46-54. h doi:10.1097/sih.0000000000000411
29. Harmon J, Pitt V, Summons P, Inder KJ.Use artificial intelligence and virtual reality with in clinical simulation for nursing pain education: A scoping review. *Nurse Education Today*, 2021;97:104700. doi:10.1016/j.nedt.2020.104700
30. Boztepe, H. Pediatric nurses view about parental presence during children's painful procedures. *The Journal of The Turkish Society of Algology*. 2012;24(4):171-179. doi:10.5505/agri.2012.58561
31. Harrison D, Joly C, Chretien C, Cochrane S, Ellis J, Lamontagne C, Regis V.Pain prevalence in a pediatric hospital: raising a wareness during pain a wareness week. *PainResearchand Management*. 2014;19(1):24-30. doi:10.1155/2014/737692
32. Conk Z, Başbakkal Z, Bal Yılmaz H, Bolışık B. *Pediatric nursing*. Academician Bookstore, Ankara/Turkey, 2018.
33. Aslan FE, Badır A. Reality about pain control: the knowledge and beliefs of nurses on the nature, assessment and management of pain. *Pain.* 2005;17(2):44-51. https://jag.journalagent.com/agri/pdfs/AGRI_17_2_44_51.pdf. Accessed time: March, 2022.
34. Kara R, Bal Yılmaz H. Examining the methods used to reduce the interventional pain by nurses in pediatric clinics. *Journal of Education and Research in Nursing*. 2020;17(2):104-11. doi:10.5222/head.2020.13334
35. Uzsen H, Koyun M, Odabasoğlu E, Tural Büyük E. Nursing students' knowledge levels on 'pain management in pediatric patients': a systematic review. International Pediatric Symposium. May 17, 2022. Full text, Oral presentation.
36. Aydın B, Bektaş M. Pediatric pain management knowledge scale for nursing students: assessment of the psychometric properties. *The Journal of Pediatric Research.* 2021;8(1): 82. doi:10.1016/j.pmn.2019.06.012
37. Liu YM, Lin GL, Chao KY, et al. Comparison of the effectiveness of teaching strategies for a pediatric pain management program for undergraduate nursing students: A quantitative evaluation using an objective structured clinical examination. *Nurse Education in Practice*. 2020;43:102707. doi:10.1016/j.nepr.2020.102707.
38. Buyuk E. The effect of video-assisted training given to midwifery and nursing students about pain and its management in newborns on students' level of knowledge. *Journal of Nursing and Midwifery Sciences*. 2020;7(1):7. doi:10.4103/jnms.jnms_56_18
39. Hunter JP, Stinson J, Campbell F, et al. novel pain inter professional education strategy for trainees: assessing impact on inter professional competencies and pediatric pain knowledge. *Pain Research and Management*. 2015;20(1):12-20. doi:10.1155/2015/159580
40. Ulgen H, Tufekci GF. Studies on pain in children: a review. 2nd International 7th National Pediatric Nursing Congress, İzmir, Turkey, 27 November-30 December 2019, vol.4, pp.994-1001. Cataloguing, 2012.