Original Article

Comparison of the Efficacy of two Different Training Methods on the Surgical Safety Checklist: A Randomized Study

Sena Melike Tasci, RN, MSc (c)
Maltepe University, School of Nursing, Marmara Training Village, Istanbul, Turkey

Elif Gezginci, RN, PhD
Assistant Professor, University of Health Sciences, Hamidiye Faculty of Nursing, Istanbul, Turkey

Sonay Goktas, RN, PhD
Associate Professor, University of Health Sciences, Hamidiye Faculty of Nursing, Istanbul, Turkey

Correspondence: Elif Gezginci RN, PhD, Assistant Professor, University of Health Sciences, Hamidiye Faculty of Nursing, Istanbul, Turkey Email: el_gez@hotmail.com

Abstract

Aim: The aim of this study was to compare the effectiveness of structured verbal training and web-based training methods given to operating room nurses on the Surgical Safety Checklist.
Methods: This randomized experimental study was conducted between June and August 2018 with fifty nurses working in the operating room unit of a private hospital in Istanbul, Turkey. The participants were divided into two equal groups: structured verbal training and web-based training by simple randomization method. The data were collected as the Pre-test and Post-test in the form of a Questionnaire prepared by the researchers using the literature on the Surgical Safety Checklist and the Personal Information Form. Post-test was performed 3 weeks after structured verbal training and web-based training methods. The data were analyzed using SPSS (Statistical Package for Social Sciences) 22.0 program. Number, percentage, median, minimum, maximum, Chi-Square test, Mann-Whitney U test and Wilcoxon test were used to evaluate the data.
Results: Sixty percent of structured verbal training group and ninety two percent of web-based training group were women. A statistically significant difference was found between structured verbal training and web-based training in terms of gender, educational levels and working time in the operating room ($p < 0.05$). While there was no statistically significant difference between the two groups before and after training given to the operating room nurses related to the Surgical Safety Checklist ($p > 0.05$), there was a statistically significant difference between the Pre-test and Post-test in both groups ($p < 0.05$).
Conclusion: According to this study, there was no difference between structured verbal training and web-based training methods given to operating room nurses on the Surgical Safety Checklist; however, both training methods were found to be effective.

Keywords: Operating room nursing, surgery, surgical safety checklist training

Introduction

Patient safety, which is an important indicator of quality in the field of health services, is the whole of the measures used and developed in order to prevent harm or minimize the errors that may occur during the health care service the individual takes from hospitalization to discharge (Kim et al., 2015). Surgical patient safety is the most important factor affecting patient safety. Ensuring surgical safety constitutes the basic principle of patient care: “first, avoid harming” (Christian et al., 2006). It is seen that, most common medical errors that pose a risk to surgical patient safety and made by health professionals are related to drug and blood transfusion application errors, falls, wrong patient, wrong side and wrong procedure, infections related to health services, lack of information in nursing practices, inability to communicate with the team, stab injuries and retained foreign body (Avci and Aktan, 2015; Kim et al., 2015). At an international conference sponsored by the European Commission in Geneva in October 2007, the World Health

Organization (WHO) called for further research on patient safety, stressing that approximately 10 million people worldwide are injured or killed by preventable surgical and medical errors each year (WHO, 2008). In 2008, to ensure the safety of surgical patients, WHO developed the Surgical Safety Checklist (SSCL) consisting of three sections and 19 items (Haynes et al., 2009). SSCL was evaluated in an international pilot study conducted by Pan American Health Organization in 8 countries between 2007-2008 (Haynes et al., 2009; Weiser et al., 2010). As a result of the study, it was stated that the complication rate decreased from 11% to 7% while the mortality rate dropped from 1.5% to 0.8% (Haynes et al., 2009). In this respect, WHO's SSC has been routinely implemented in many health institutions around the world since 2009 (WHO, 2008; Gökay et al., 2016). In order to draw attention to patient safety, slogans "Clean Care, Safe Care" and "Safe Surgery Saves Life" were announced to the world in 2009 and 2010 respectively (WHO, 2010). Within the scope of "Safe Surgery Saves Life Project" by World Health Organization, 10 objectives have been determined for medical errors before, during and after surgical intervention. Based on the American health model, the Joint Commission International (JCI) has established standards of accreditation for surgeons and nurses in surgical clinics to reduce risks during healthcare delivery, contribute to patient safety and ensure risk management (WHO, 2009; JCI, 2012). These standards are used as an important quality guide in health care in hospitals of our country as well as in the world (Ozkan & Giersbergen, 2016).

International Council of Nurses (ICN) emphasizes the need for comprehensive measures to improve the safety and training of health care professionals and to improve patient safety in areas such as infection control, safe use of drugs and environmental safety (ICN, 2006). When the World Health Organization stated that each institution could edit the Surgical Safety Checklist according to their own requirements, the Ministry of Health in Turkey organized the SSCL as a four-digit procedure considering that safe surgery should be started while the patient is in the clinic. SSCL used in our country consists stages "before leaving the clinic, before anesthesia, before the surgical incision and before end of the operation" (Ministry of Health, 2015). The purpose of SSCL is to ensure that the whole team speaks one language together, and with the help of this, prevent medical malpractice that may occur in patients (Weiser & Haynes, 2018).

By its very nature, operating rooms are places patients are vulnerable; therefore, it places great responsibility on operating nurses in line with their professional ethics. Surgical nurses who are patient advocates in the operating room, play an important role in the effective implementation of surgical procedures and surgical safety checklists (Kapikiran G, Bulbuloglu S & Aslan F, 2018). It was stated that positive results were obtained from the studies of the surgical team's use of SSCL (Takala et al., 2011; Oak et al, 2015, Ozkan & Giersbergen, 2016). In the study of Ozkan and Giersbergen (2016), it was determined that the opinions of the surgical team towards SSCL were positive and that the nurses had the most positive opinion among the team members (Ozkan & Giersbergen, 2016). In a pilot study conducted by Takala et al. (2011) on the application of SSCL, it was found that SSCL application increased the awareness of the surgical team about the risk of medical errors and improved the communication of the team members (Takala et al., 2011). In a study on the application of SSCL in pediatric surgery, it was emphasized that SSCL should be used as a basic safety tool by the surgical team and should be intensified as well (Oak et al., 2015). In line with these studies, various studies have been conducted on the use of SSCL by surgical team, while no randomized study has been found on SSC that investigates the effectiveness of the training methods given to operating room nurses.

Aim

This study was conducted to compare the effectiveness of structured verbal training and web-based training method given to operating room nurses on surgical safety checklist. In this research, answers to the following questions were sought.

1. Is the structured verbal training method given on the surgical safety checklist effective?
2. Is the web-based training method given on the surgical safety checklist effective?
3. Is there any difference between structured verbal training and web-based training method given about the surgical safety checklist?

Methods

Trial Design: This is a single-center randomized experimental study.

Participants: Research was carried out with a total of 50 operating room nurse working in the operating unit of a private hospital in Istanbul, Turkey between June-August 2018. With the help of a computer based simple randomization method, participants were divided into two equal groups as structured verbal training (n = 25) and web-based training (n = 25) groups. The criteria for participation in the study are being over 18 years of age, working in the operating room, being a nurse and agreeing to participate in the study. Due to the design of the study, the researchers and participants were not blinded.

Interventions: Before the study, participants were informed about the purpose of the study. Participants were included in structured verbal training and web-based training groups in order of randomization list. Operating room nurses in the structured verbal training group were given structured verbal training on the Surgical Safety Checklist created by the researchers using the literature. The same training content was given to the web-based training group as web-based. Both of the training methods took approximately 15 to 20 min. A Pre-test was applied to participants before the training to measure their knowledge level about SSCL. 3 weeks after the training, the Final Test was performed to evaluate the effectiveness of the training methods.

Outcome Measures: Data from participants were collected through the Personal Information Form and Questionnaire Form prepared by the researchers using the literature on the Surgical Safety Checklist and applied as "Pre-test" and "Final Test".

Personal Information Form consisted of 10 questions including the sociodemographic and descriptive characteristics of the participants.

The Questionnaire for the Surgical Safety Checklist contains 33 questions prepared by the researchers using the literature and aimed to measure the knowledge level of the operating room nurses for SSC (Bohmer et al., 2012; Low, Walker & Heitmiller, 2012; O'Connor et al., 2013; Giersbergen & Ozkan, 2016). The questionnaire prepared in three point Likert scale consisted options "yes, no and I don't know". The correct answers in the questionnaire were given 1 point and the wrong answers were given 0 points. The total score obtained from the questionnaire was converted into a 0-100 point system. High score obtained from the questionnaire indicates that the level of knowledge about SSC is high. This questionnaire was administered to both groups as "Pre-Test" before trainings and as "Final Test" 3 weeks after training. The primary outcome of this study is the change in the mean knowledge scores before and after 3 weeks of training given on the Surgical Safety Checklist.

Sample Size: In the calculation of research sample size, it was aimed to reach the whole universe. The population of the study consisted of a total of 54 operating room nurses working in the operating unit of this hospital between the dates mentioned and the sample of the research included 50 operating room nurses meeting the inclusion criteria.

Statistical Analysis: SPSS 22.0 software was used for the statistical analysis of the data of the study (10.0 for Windows). The suitability of the data for normal distribution was analyzed by Shapiro-Wilk test. Number, percentage, median, minimum and maximum values were used for statistical analysis of descriptive data. The comparison of categorical variables was evaluated by Chi-Square test. The difference between the two groups that did not fit the normal distribution was compared with the Mann-Whitney U test, and the difference between pre- and post-training was analyzed by Wilcoxon test. Statistical significance was accepted as $p < 0.05$.

Ethical Consideration: Before the study, participants were informed about the research and written and oral consent was obtained from the volunteers. Permission was obtained from the Non-Interventional Clinic Research Ethics Committee of Istanbul Medipol University (Decision No: 283) and the relevant institution to conduct the study.

Results

Participants' Characteristics: 50 operating room nurses participated in the study were randomized into two equal groups and the study was completed with a total of 50 people (Figure 1). The comparison of the characteristics of participants is presented in Table 1. It was found that 60% of the structured verbal training group was female, 68% was associate degree graduate and 52% had an experience of 3-4 years in the operating room. It was determined that 92% of the web-based training group was female, 44% was bachelor's degree, and 40% was working in the operating room for 10 years or more. A statistically significant difference was found between the operating room nurses who received

structured verbal training and web-based training in terms of gender, educational status and operating time in the operating room (p<0,05). It was confirmed that 92% of the structured verbal training group and 96% of the web-based training group received training on the surgical safety checklist.

Comparison of Structured Verbal and Web-Based Training Groups: The comparison of the difference between the groups before and after the training practices on the surgical safety checklist is presented in Table 2. There was no statistically significant difference between the two groups before and after the training (p>0,05). Table 3 shows the comparison of the difference between the scores before and after the training. There is a statistically significant difference between pre and post-training in structured verbal training group (p<0,001). Similarly, there was a statistically significant difference between pre-and post-training in web-based training group (p<0,001).

Table 1. Comparison of the Descriptive Characteristics of the Participants, (n=50)

Characteristics	Structured Verbal Training		Web Based Training		Statistics*	P-value
	n	%	n	%		
Gender						
Female	15	60.0	23	92.0	7.018	**0.008**
Male	10	40.0	2	8.0		
Education level						
High School	2	8.0	9	36.0	20.767	**0.001**
Associate degree	17	68.0	2	8.0		
Bachelor degree	6	24.0	11	44.0		
Postgraduate degree	0	0.0	3	12.0		
Working time in operating room						
0-2 years	8	32.0	8	32.0	8.127	**0.043**
3-4 years	13	52.0	5	20.0		
5-10 years	0	0.0	2	8.0		
10 years and over	4	16.0	10	40.0		
Training received related to the Surgical Safety Checklist						
Yes	23	92.0	24	96.0	0.355	0.552
No	2	8.0	1	4.0		

*Chi-square test

Table 2. Comparison of the Difference Between Two Groups Before and After Training (n=50)

	Structured Verbal Training	Web Based Training	Statistics*	P-value
	Med (min-max)	Med (min-max)		
Before Training	51.51 (39.39-72.72)	51.51(24.24-69.69)	290.500	0.665
After Training	93.93(84.84-99.99)	93.93(84.84-99.99)	254.500	0.253

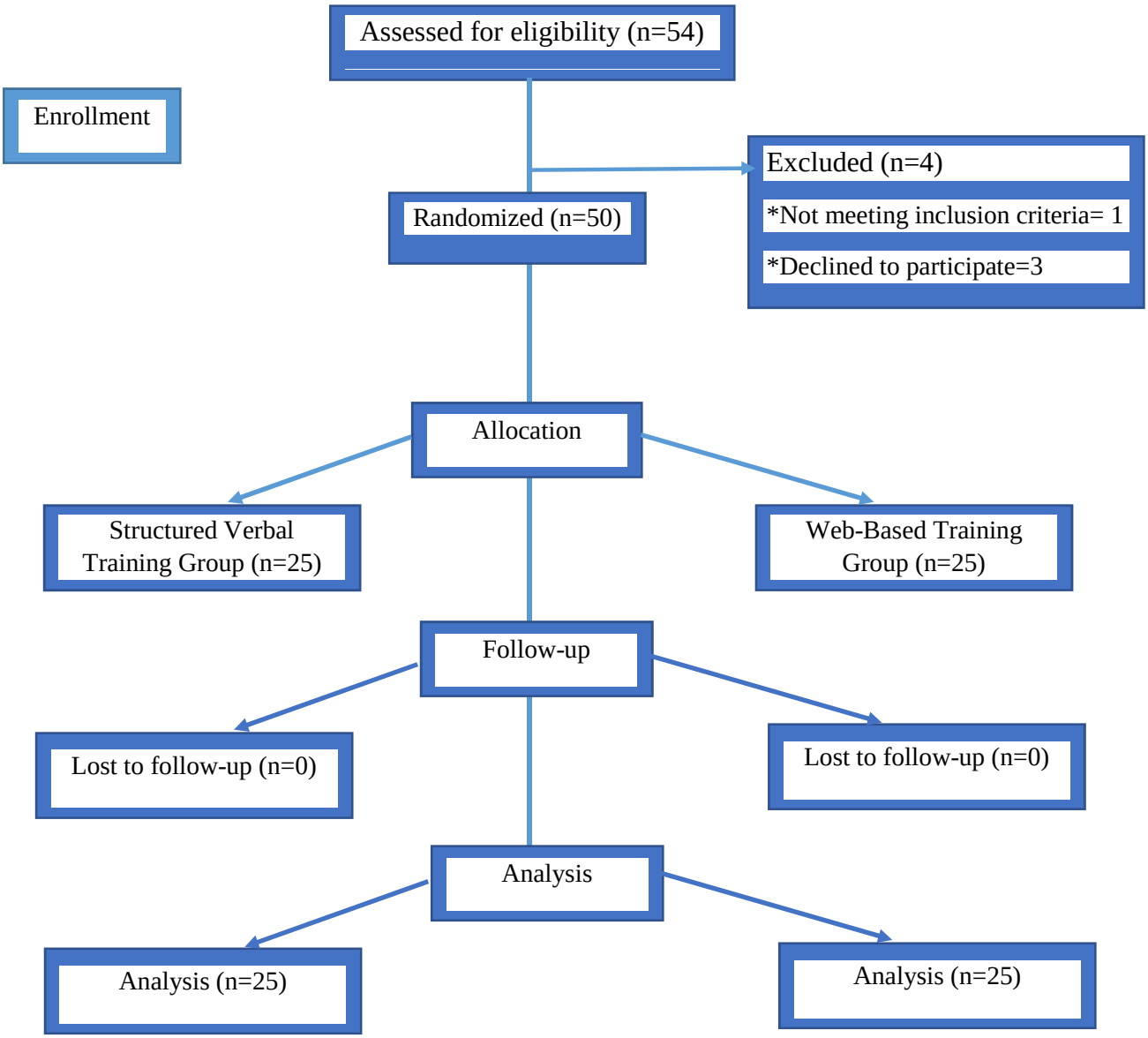
*Mann-Whitney U test

Table 3. Comparison of Before and After Training Score Differences of Each Group (n=50)

	Before Training Med (min-max)	After Training Med (min-max)	Statistics*	P-value
Structured Verbal Training	51.51 (39.39-72.72)	93.93(84.84-99.99)	-4.381	**<0.001**
Web Based Training	51.51(24.24-69.69)	93.93(84.84-99.99)	-4.378	**<0.001**

*Wilcoxon test

Figure 1. Flow Diagram



Discussion

Developed by the World Health Organization, SSCL is widely used all over the world and is regulated by the Ministry of Health in Turkey according to health care standards and covers the preoperative, intra and postoperative periods (Oztekin et al., 2017). SSCL develops perioperative patient safety and health care professionals in terms of surgical patient safety; improves patient satisfaction and team communication, reduces patient care costs and thus reduces mortality and morbidity (WHO, 2009; Conley et al., 2011). This study was conducted to determine the effectiveness of web-based training and structured verbal training methods of operating room nurses on the application of SSCL in the operating room. According to a research of Shauna et al. (2012) concerning the use of SSCL, it was clear that despite the fact that 100% of SSC was filled by the surgical team before the surgical incision according to the hospital records; application rate is stated to be 30%. In a study conducted by Abbasoglu et al. (2016) it was determined that 78.1% of the operating room nurses stated that SSCL was effective in preventing medical errors and their attitudes towards SSCL were found to be positive. In addition, it was stated that the first part of SSCL which should be filled by clinical nurses, was filled by 20.1% and that clinical nurses were not qualified enough to implement SSCL and couldn't make effective evaluation (Abbasoglu et al., 2016). Based on these studies, it was concluded that nurses' use rate of SSCL vary and further studies are needed to increase the effective use of SSC (Salyers, 2007, Weiser et al., 2010; Abbasoglu et al., 2016; Gokay et al., 2016; Oztekin et al., 2017).

Web-based training and structured verbal training methods used in lifelong learning and in-service trainings were applied both to remind operating room nurses their knowledge of SSC and to investigate the effectiveness of training methods. Although there was no significant difference between web-based training and the structured verbal training method given to the operating room nurses about the safe surgical checklist, both training methods were found to be effective. When the literature is examined, there are studies supporting the positive results of web-based training on cognitive skills in nursing education (Jang et al., 2005; Salyers, 2007; Chen et al., 2007; Ozturk & Dinc, 2014). In a study given to nursing students by web-based distance training and traditional training method of electrocardiography reading course, it was reported that the students who received web-based distance training were more successful than the other education group and they were satisfied with the application (Jang et al., 2005). In the study conducted by Salyers (2007) with nursing students, web-based skills education was given to the experimental group and traditional training method was used in the control group. It was found that the web-based education group scored higher in the cognitive and psychomotor skills evaluation than the traditional education group. In another study conducted by Ozturk and Dinc (2014) with nursing students, urinary catheter insertion skills trainings were given to one group via web-based distance training and the other group with traditional education method. As a result of the study it was clear that there was no difference in the level of knowledge between web based training and traditional education group, but urinary catheter insertion skills scores were found to be higher in the web-based training group than the traditional education group. In another study that provided nursing education to students through face-to-face education and web-based distance education method, it was established that students' satisfaction levels of both education methods were high; but there was no significant difference between the two groups (Dwyer & Searle, 2009). According to these studies, although better results are obtained in web-based training method, both education methods seem to be effective. The reason for the lack of difference between web-based training and verbal training method may be the difference in learning skills of the groups. It is seen that the Surgical Safety Checklist includes all the possibilities of patient, surgery or surgical team that may threaten safety in surgery. For this reason, the use of Surgical Safety Checklist to serve its intended purpose and the reduction of medical errors caused by the operating room is an absolute result (Ozkan & Giersbergen, 2016; Oztekin et al., 2017). The study revealed that the majority of operating room nurses received in-service training on SSCL. Both of the training methods given on SSCL had positive effects on the knowledge of operating room nurses. Thanks to the training given to operating room nurses, it is believed that their knowledge on SSCL has been updated and their awareness of SSCL has been raised.

Conclusion: According to the results of the study, it is stated that web-based and structured verbal training methods on SSCL applied to operating room nurses were effective; but there was no difference between the two methods. This study provides guidance for operating room nurses to understand the importance of SSCL and to learn how to apply this list.

Limitations: Since the primary limitation of this study is a single center study, it cannot be generalized to all operating room nurses. Study in more sample groups is recommended.

References

Abbasoglu A., Ugurlu Z., Isik S., Karahan A., Unlu H., Elbas N. (2013) Effective use of the safe surgery checklist and the views of nurses on the safe surgery checklist. 8th National Surgery and Operating Room Nurses Congress.

Avci K., Aktan T. (2015) Medical errors and patient safety as a system problem. Journal of Duzce University Health Sciences Institute 5(2): 48-54.

Bahar A. (2015) An Innovation in nursing basic skills education: web based education. Journal of Anatolia Nursing and Health Sciences 18(4): 304-311.

Bohmer A.B., Wappler F., Tinschmann T., Kindermann P., Rixen D., Belendir M., Schwanke U., Bouillon B., Gerbershagen M.U. (2012) The implementation of a perioperative check list increases patients' perioperative safety and staff satisfaction. Acta Anaesthesiologica Scandinavica 56(3): 332-338.

Chen S.W., Stocker J., Wang R.H., Ching Chung Y., Chen M.F. (2007) Evulation of self regulatory online nursing in blended course for post registration nursing students in Twain. Teaching and Learning in Nursing 2(1): 89-98.

Christian C.K., Gustafson M.L., Roth E.M., Sheridan T.B., Gandhi T.K., Dwyer K., Zinner M.J., Dierks M.M. (2006) A prospective study of patient safety in the operating room. Surgery 139(2): 159-73.

Conley D.M., Singer S.J., Edmondson L., Berry W.R., Gawande A.A. (2011) Effective surgical safety check-list implementation. Jam Coll Surgical 212(5): 873-879.

Gokay P., Tastan P., Ayhan H., Iyigun E., Can M.F. (2016) Use of the World Health Organization surgical safety checklist: a systematic analysis. Gulhane Medical Journal 58: 136-142.

Dwyer T., Searle K.R. (2009) Web-enhanced and on-line learning: a comparison of first year undergraduate nursing students' learning. Studies in Learning. Evaluation Innovation and Development 6(2): 16-28.

Jang K., Soon S.H., Park S.J., Kim Y.M., Kim M.J. (2005) Effects of a web based teaching method on undergratuade nursing students learning of electrocardiography. Journal of Nursing Education 4(1): 44-55.

Joint Commission Internatıonal Accreditation Standards for Hospitals (JCI) (2012) (Access address: https://issuu.com/pedrozaraza/docs/2012 jci_annual_report_online), Access date: 17.05.19.

Haynes A.B., Weiser T.G., Berry W.R., Lipsitz S.R., Breizat A.H., Dellinger E.P., Herbosa T., Joseph S., Kibatala P.L., Lapitan M.C., Merry A.F., Moorthy K., Reznick R.K., Taylor B., Gawande A.A. (2009) A surgical safety checklist to reduce morbidity and mortality in a global population. The New England Journal of Medicine 360(5): 491-9.

International Council of Nurses (ICN) (2006) Safe staffing saves lives. International Nurses Day Information 3-60.

Kapikiran G., Bulbuloglu S., Aslan F. (2018) Patient safety, patient safety culture, medical errors and adverse events: review. Journal of Health and Nursing Management 5(2): 132-140.

Kim F.J., Silva R.D., Gustafson D., Nogueira L., Harlin T., Paul D.L. (2015) Current issues in patient safety in surgery: a review. Patient Safety Surgical Journal 9(26): 1-9.

Low D., Walker I., Heitmiller E.S. (2012) Implementing check-lists in the operating room. Paediatr-Anaesthesia 22(10): 1025-31.

Ministry of Health (2015) Safe surgery practice guide. (Access address: https://dosyamerkez.saglik.gov.tr/Eklenti/3516,21072015guvenlicerrahiuygulamarehberipdf.pdf?0), Access date: 22.07.19.

Oak S.N., Dave N.M., Garasia M.B., Parelkar S.V. (2015) Surgical check-list application and its impact on patient safety in pediatric surgery. Journal of Postgrad Medicine 61(2): 92-4.

O'Connor P., Reddin C., O'Sullivan M., O'Duffy F., Keogh I. (2013) Surgical checklists: the human factor. Patient Safety in Surgery 7(14): 1-7.

Ozkan D., Giersbergen M. (2016) Examination of the operating team thinking about safe surgery checklist. Turkiye Clinics J Surg Nurs-Special Topics 2(3): 22-8.

Oztekin S.D., Tohumat S.G., Sengor K., Kara O. (2017) The use of the safe surgery checklist in Turkey, 2nd International 10. National Turkish Surgery and Operating Room Nursing Congress (pp.317-325).

Ozturk D., Dinc L. (2014) Effect of web-based education on nursing students urinary catheterization knowledge and skills. Nurse Education Today 34(5): 802-8.

Salyers V. (2007) Teaching psychomotor skills to beginning nursing students using a web enhanced approach: A quasi experimental study. International Journal of Nursing Education Scholarship 4(1):23-9

Shauna M.L., Casey S.E., Russell B.H., Jane Y.Z., Kaitlin D., Lillian S.K. (2012) Implementing a surgical checklist: more than checking a box. Surgery 152(3): 331-336.

Takala R.S., Pauniaho S.L., Kotkansalo A., Helmio P., Blomgren K., Helminen M. (2011) A pilot study of the implementation of WHO surgical checklist in Finland: Improvements in activities and communication. Acta Anaesthesiologica Scandinavica 55(10): 1206-14.

Weiser T.G., Haynes A.B., Dziekan G., Berry W.R., Lipsitz S.R., Gawande A.A. (2010) Effect of a 19-item surgical safety checklist during urgent operations in a global patient population. Annals of Surgery 251(5): 976-980.

Weiser T.G., Haynes A.B. (2018) Ten years of the surgical safety checklist. The British Journal of Surgery 105(8): 927-929.

World Health Organization (WHO). Safe surgery saves lives the second global patient safety challenge, (Access address: http://www.who.int/patientsafety/safesurgery/en/). Access date: 19.07.2019.

World Health Organization (WHO) (2006) World alliance for patient safety, Forward Programme

2006-2007. (Access address: https://www.who.int/patientsafety/ information_centre/WHO_EIP_HDS_PSP_2006.1. pdf) Access date: 12.07.2019.

World Health Organization (WHO) (2008) Summary of the evidence on patient safety: Implications for research. (Access address: https://www.who.int/patientsafety/ information_centre/Summary_evidence_on_patien t_safety.pdf) Access date: 17.06.2019.

World Health Organization (WHO) (2009) Guidelines approved by the guidelines review committee. (Access address: https://www.who.int/publications/guidelines/en/) Access date: 21.04.2019.

World Health Organization (WHO) (2010) A brief synops is of patient safety. (Access address: data/assets/pdf_file, /0015/111507/E93833.pdf.), Access date: 18.06.2019.