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## The Status of Use of Surgical Safety Check List and Opinions of Nurses

### Güvenli Cerrahi Kontrol Listesinin Kullanılma Durumu ve Hemşirelerin Görüşleri

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Özgün Araştırma

#### Abstract

**Objective:** To determine “the status of use of surgical safety check list (SSCL) and opinions of nurses”. Surgical safety check list that is developed by World Health Organization helps the surgical team to decrease the number of patient safety related adverse incidents.

**Methods:** The study was performed at a private university hospital between August-September 2013 and included all intensive care units, clinics, and operating rooms where adult patients who underwent surgical procedure received care. The design of the first part of the research was retrospective and 383 patient files were examined for SSCL. The second part was cross sectional and descriptive and 105 (69%) nurses participated in the study.

**Results:** Patient files were examined and it was found that 20.1% of the nurses completely filled all of the corresponding parts in the SSCL; while the ratios were 2.3% and 42.0% in surgical doctors and anesthetists, respectively. Most of the nurses (92.4%) used SSCL, and according to 78.1% of the nurses, SSCL was effective in the prevention of medical errors.

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**Conclusions:** Although nurses used the surgical safety check list effectively, it was determined that there were problems in the application of surgical safety check list; hence, development of programs to increase the effective use of surgical safety check list was suggested.

**Keywords:** Nursing, surgery, patient safety, surgical safety check list

## Öz

**Amaç:** Güvenli cerrahi kontrol listesinin kullanılma durumunun ve hemşirelerin güvenli cerrahi kontrol listesine yönelik görüşlerinin belirlenmesidir. Dünya Sağlık Örgütü tarafından geliştirilen güvenli cerrahi kontrol listesi, hasta güvenliği ile ilgili olumsuz olayların sayısını azaltmak için cerrahi ekibe yardımcı olur.

**Yöntem:** Bu çalışma, Ağustos-Eylül 2013 tarihinde Ankara’da bir özel üniversite hastanesinde cerrahi girişim geçiren erişkin hastaların yattığı tüm yoğun bakımlar, klinikler ve ameliyathanede yapılmıştır. Çalışmanın birinci bölümü retrospektif olup, 383 hasta dosyası güvenli cerrahi kontrol listesi bakımından incelenmiştir. İkinci bölümü kesitsel ve tanımlayıcı olup, 105 (%69) hemşire çalışmaya katılmıştır.

**Bulgular:** Hasta dosyaları incelenmiş, güvenli cerrahi kontrol listesinin hemşirelere ait bölümünün tamamının işaretlenme oranının %20,1; cerrahlara ve anestezi doktorlarına ait bölümlerin ise %2,3-%42,0 olduğu belirlenmiştir. Hemşirelerin çoğu (%92,4) güvenli cerrahi kontrol listesi kullanmış ve %78,1’i güvenli cerrahi kontrol listesinin tıbbi hataların önlenmesinde etkili olduğunu belirtmiştir.

**Sonuç:** Hemşirelerin güvenli cerrahi kontrol listesini etkin bir şekilde kullandıklarını belirtmesine rağmen güvenli cerrahi kontrol listesinin uygulamasında problemler olduğu belirlenmiş ve güvenli cerrahi kontrol listesinin etkin kullanımını artırmaya yönelik programlar geliştirilmesi önerilmiştir.

**Anahtar Kelimeler:** Güvenli cerrahi kontrol listesi, hemşirelik, cerrahi, hasta güvenliği

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## Introduction

Health institutions have a highly complicated structure due to intense use of technology, multiple parameters in service process and problems in the communication among personnel. This complicated structure may cause lethal mistakes, inadequacy and consequently problems in patients’ safety.<sup>1,2</sup>

The whole system must be re-designed in order to improve patient safety, and prevent injuries and deaths caused by mistakes in the health service. Surgical care is the most important component of the world-wide health care system for over a century. World Health Organization (WHO) data on 2007 states that 234 million surgeries are done in a year world-wide, and one in every 25 person has at least one surgery in his/her life time. In Turkey, 4 million and 410 thousand surgeries have been performed in 2012.<sup>3</sup> The operating rooms are stressful environments as the patient and surgical team are in physical contact for long time, and as many occasions are life threatening or require fast decision making.<sup>4,7</sup>

According to WHO 2014 data, death ratio after major operation is 0.5-5% and ratio of complication on patients after operation is above 25%. In a systemic review about surgical adverse incidents that investigated 14 studies covering 16,424 surgical operations, it was found that in 14.4% of the patients, an adverse incident happened and among them 5.2% were determined to be preventable.<sup>8</sup> JCI 2013 data shows that among 887 cases that threatens patient safety, the cause of the threat was late treatment (113) in the first place, followed by wrong patient/side/procedure (109) and forgetting material in the body during operation (102).<sup>9</sup>

It has been determined that surgery related mistakes in all countries and environments are common, lethal and preventable. For this reason WHO Patient Safety Alliance established a world-wide program and started “Safe Surgery Saves Lives” project to decrease the surgery related deaths.<sup>11</sup> Surgical Safety Check List (SSCL) covers evaluation of four areas; prevention of surgical area

infections, safe anesthesia, safe surgical team and surgical clinics.<sup>6</sup> It was found that the use of SSCL decreased post operational complication and death ratios.<sup>12,13</sup>

In the context of WHO's 2008 initiative "Safe Surgery Saves Lives" project, Turkish Ministry of Health included safe surgery applications in Service Quality Standards, hence established this project in Turkey. According to the research and follow-up reports on safe surgery applications, the SSCL was further improved to four parts from three parts and released to the use of health care personnel as Surgical Safety Check List TR in 2011.<sup>14</sup> Hospitals in Turkey, as in many other countries, use SSCL widespread. Nurses, with other health care personnel, have important responsibilities in providing safe surgery service.<sup>6,10,15,16</sup>

There have been some problems in the effective use of SSCL in Turkey, as happens in other countries. Conley *et al.*<sup>17</sup> reported that if how and why the SSCL was not explained enough by project leader, then a decrease in the interest and frequency of using SSCL among personnel was observed.

It is thought that the results of this study would aid in effective use of SSCL by surgical teams, in determination of problems and in sharing the information on SSCL application process with team members, in emphasizing the importance and benefits of using SSCL hence improving patient satisfaction. Aims of the study was to determine the frequency of use of the SSCL and the percentage completion of the SSCL when used.

## **Methods**

### ***Design***

This study determines the status of use on surgical safety check list and opinions of nurses was comprised of two parts. The first part was retrospective and the second part was descriptive and cross sectional.

### ***Research Questions***

- 1- What is the status of use of the surgical safety check list?
2. What is the opinions of nurses on the surgical safety check list?

### ***Sample***

In the first part, the universe of the study comprised of 15,272 patient files that had a surgical operation between February 20<sup>th</sup> 2012 and July 19<sup>th</sup> 2013. The time interval was chosen according to the date when revision on SSCL was made. New version was revised by Health Minister for Turkey in 2011 and this form was used firstly in hospital that was performed study in 2012. 400 patient files were selected by systematic sampling method. Among the sample, 17 files did not contain SSCL so they were excluded and study was carried out in 383 patient files.<sup>19</sup>

Total 152 nurses worked in intensive care units, surgical clinics and operating rooms during study period, we targeted all nurses but 105 (69%) nurses agreed to participate in the study.

### ***Data Collection***

This study was done between August-September 2013; in a private university hospital and included all operation performing units on patients involving intensive care units, clinics and operating rooms. In average, 975 surgical operations were performed per month in the hospital.

*In the first part of the study*, we used a check list form that is adapted from the SSCL and it also included 5-questions about patients' characteristics.

SSCL form is composed of four parts: "before patient leaves the clinic", "before induction of anesthesia", "before skin incision" and "before patient leaves operating room". In the hospital where this study was conducted, clinic nurses were responsible for the application, filling and signing of the

form for the first part of SSCL. Anesthetists and surgeon were responsible for the second part, surgeon for the third and anesthetists and the surgeon for the fourth part of SSCL. This form is introduced to nurses by nurse educator in clinical orientation process. Patient file was investigated filling of SSCL by researchers.

*In the second part of the study*, two separate questionnaires were used for clinic and operating room nurses. Second part of the study was done to determine the opinions of nurses on SSCL, and was done by interview with 105 nurses.

*Questionnaire for Clinic Nurses:* This questionnaire involved 29 questions aiming to determine the opinions of clinic nurses on SSCL. The questions were developed by researches based on literature and involved SSCL items.<sup>15</sup>

*Questionnaire for Operating Room Nurses:* This questionnaire involved 45 questions to determine the opinions of operating room nurses on SSCL. The questions were based on SSCL items<sup>15</sup>.

The questionnaires on the second part of this study were tested on 12 nurses before using in the study and no changes were done. Questionnaires were given to all nurses after explaining aim of the study and forms. All nurses filled in the questionnaires themselves. The average duration of filling the questionnaire is 10 minutes.

#### ***Statistical analysis***

Statistical Package for Social Science (SPSS 15 for Windows) package program was used for the analysis of data. Data analysis involved number and percentage distributions, mean and standard deviation calculations.

#### ***Ethical Considerations***

Permissions were obtained from University Medicine and Health Sciences Research Council, ethical council and hospital administration. Nurses participating in the study gave consent after the purpose of the research was explained.

#### ***Limitations of Research***

A questionnaire was used in this study and only it was performed at a university hospital.

### **Results**

This study determined that 32.4% of the patients were 65 years old or more and 61.9% were female. Among 11 surgery type, most (27.2%) were gynecological operations and 62.1% of the operations were done under general anesthesia.

In the first part of the form, the ratio of filling the form completely by nurses was 20.1%, most frequently filled item was "patient identity information" (88.3%) while least frequently filled item was "control of patient's necessary laboratory and radiology tests" (42.3%) (Table 1).

The ratio of filling the form completely by anesthetists and surgeons in the second part of the form was found as 42.0%. In general, half of the form was found to be filled and most frequently filled item was "whether the patient has any allergies" (51.2%) while least frequently filled item was "completeness of anesthesia safety control check list" (47.0%) (Table 2).

The third part of the form which was supposed to be filled by surgeons was about 'before skin incision' and on average 90% of the form was not filled. Most frequently filled item was "introduction of team members by name, surname and task" (6.3%) (Table 3).

The fourth part of the form was under responsibility of anesthetist and surgeon. The most frequently filled items were "confirming the patient verbally for the surgery", "type of surgery", and "the clinic where the patient will be transferred after surgery" (44.4%), and the least frequently filled

item was “checking the critical needs after surgery” (30.8%). The ratio of completely filling every item in the form was 30.8% (Table 4)

**Table 1. The Status of filling out Part of I of the SSCL by Surgery Team**

<b>Part I. Before patient leaves the clinic</b>	<b>n (%)</b>
1. Confirmation of patient’s identity information	338 (88.3)
2. Confirmation of patient’s surgery	325 (84.9)
3. Confirmation of the patient's operative site	324 (84.6)
4. Control of the patient’s consent	329 (85.9)
5. Control of the patient’s hunger status	339 (88.5)
6. Control of operation region shaving	322 (84.1)
7. Control of presence of makeup/nail polish, prosthesis, valuable items	330 (86.2)
8. Control of removal of patient’s clothes and clothing on surgery gown and bonnet.	327 (85.4)
9. Control of presence of special procedure before the surgery	279 (72.8)
10. Confirmation of the necessary material preparation for the surgery; special materials, implant, blood or blood product	175 (45.7)
11. Control of the necessary laboratory and radiology tests of patient	162 (42.3)
12. Name/surname of the responsible personnel	177(46.2)
13. Signature of the responsible personnel	305 (79.6)
<b>The status of complete filling out</b>	<b>77 (20.1)</b>

**Table 2. The Status of Filling Out Part II of the SSCL by Surgery Team**

<b>Part II. Before patient is given anesthesia</b>	<b>n (%)</b>
1. Confirmation of identity information from the patient	186 (48.6)
2. Confirmation of surgery from the patient	186 (48.6)
3. Confirmation of operation site from the patient	185( 48.3)
4. Verification of patient’s consent on surgery	185 (48.3)
5. Control of operation site markings	183 (47.8)
6. Completeness of anesthesia safety check list	180 (47.0)
7. Control of the pulse oximeter working properly on patient	185 (48.3)
8. Control of known allergies of patient	196 (51.2)
9. Control of presence of necessary screening equipment	184 (48.0)
10. Control of presence risk of losing 500 ml. or more blood in the patient	186 (48.6)
11. Name/surname of the responsible personnel	177 (46.2)
12. Signature of the responsible personnel	184 (48.0)
<b>The status of complete filling out</b>	<b>161 (42.0)</b>

Among SSCL containing 383 files, in only 3 (0.8%) of them all the parts in the check list was completely filled and responsible personnel was clear with name, surname and signature. Nurses had a mean age of 25.6±5.6 and 88.6% were female; 60% had a university or higher degree. Among the nurses participating in this study, 43.8% has been working for less than 1 year, 53.3% has been working in their current place for less than 1 year. 70.5% of the nurses were working in the adult surgery clinics and 9.5% had head nurse positions (Table 5)

It was determined that 44.8% of the nurses joined to a course/certificate/congress about patient safety, 53.3% took orientation on SSCL application, all of them used SSCL, and 92.4% used SSCL in every intervention. Most of the nurses (78.1% ) thought SSCL application was effective in prevention of medical mistakes, 3.8% thought was not effective.

While a few nurses (7.6%) stated that have problem about SSCL application, some nurses (10.5%) stated that have problem occasionally. The problems in SSCL application were described as follows; nurses stated that she had problem in filling the 2<sup>nd</sup>, 4<sup>th</sup> and 8<sup>th</sup> items in the first part of the form, in some emergency cases it was not possible to take patient consent in the clinic, and implant

and special material application situations could not be determined in the clinic when the patient was directly taken to surgery. One nurse stated that when she could not control the items 2, 8 and 9, the importance of the form was diminished hence she felt disturbed to sign an incomplete form.

Most of the nurses (75.2%) stated that director nurses investigate whether SSCL was applied or not. Clinic nurses described their responsibility for before leaving the clinic, "check the shaving of the surgery side of the patient" (86.6%) and "check the laboratory and radiological tests of the patient" (86.5%) items of SSCL.

**Table 3. The Status of Filling out Part III of the SSCL by Surgery Team**

<b>Part III. Before Skin Incision</b>	<b>n (%)</b>
1. Team members' introduction of themselves by name, surname and task	24 (6.3)
2. Confirmation of identity of the patient, type of surgery and region of surgery loudly by one team member	20 (5.2)
3. Consideration of critical events	19 (5.0)
4. Examination of prophylactic antibiotic application	20 (5.2)
5. Preparation of materials to be used	20 (5.2)
6. Control of the sterilization of materials	20 (5.2)
7. Control of blood sugar	20 (5.2)
8. Control of anticoagulant use	20 (5.2)
9. Necessity of deep vein thrombosis prophylaxis	20 (5.2)
10. Name/surname of the responsible personnel	11 (2.9)
11. Signature of the responsible personnel	15 (3.9)
<b>The status of complete filling out</b>	<b>9 (2.3)</b>

Nurses suggested to improve the effective use of SSCL, such as "form should be filled completely by the whole surgery team", "each part of the form should be controlled by responsible personnel in the surgery team", "a form should be developed specially for pediatrics department", "short educational programs should be done to improve the awareness and importance of SSCL", "nurses should be informed at least half an hour before the patient is taken for surgery", "form should be designed according to the needs of surgical departments", "doctors should give necessary information to the nurses about the items that are related to doctors but are supposed to be filled by nurses".

**Table 4. The Status of Filling out Part IV of the SSCL by Surgery Team**

<b>Part IV. Before patient leaves operation</b>	<b>n (%)</b>
1. Confirmation of the patient's control	170 (44.4)
2. Confirmation of type of surgery	170 (44.4)
3. Confirmation of the operation site	169 (44.1)
4. Control of count of material, sponge/compress and needle	157 (41.0)
5. Control of the label (patient name) of specimen surgically removed from patient	139(36.3)
6. Review of critical needs after surgery	118 (30.8)
7. Confirmation of the clinic which the patient will be taken after surgery	170 (44.4)
8. Name/surname of the responsible personnel	163 (42.6)
9. Signature of the responsible personnel	173 (45.2)
<b>The status of complete filling out</b>	<b>118 (30.8)</b>

Operating room nurses stated that SSCL was used commonly by surgery team (100% of nurses, 87.5% of anesthetists, 75% of surgeons) and they knew the importance of SSCL for patient safety and legal responsibilities. Most of the nurses thought that in the third part of SSCL (before the skin incision), it was their responsibility to fill the items "whether the material to be used during surgery is ready" and "whether the sterilization of material is appropriate"; and stated that the application in the

hospital was in such manner. Nurses thought that in the fourth part of SSCL (before patient leaves surgery) it was their responsibility to fill the items “filling the label on the specimen removed from the patient” and “count of material, sponge/compress and needles”; nurses stated that they did the application of these items as they should do, but the responsibility in SSCL was on surgeon and anesthetist.

**Table 5. Defining Characteristics of Nurses (n=105)**

<b>Defining Characteristics</b>	<b>n (%)</b>
<b>Age</b>	
$\bar{X}$ = 25.09+-5.59 (min:19 max: 45)	
<b>Gender</b>	
Female	93 (88.6)
Male	12 (11.4)
<b>Education Status</b>	
High school/ Associate Degree Program	42 (40.0)
Bachelor's degree or higher	63 (60.0)
<b>Working period in profession</b>	
Less than 1 year	46 (43.8)
1-3 years	26 (24.8)
More than 3 years	33 (31.4)
<b>Work place</b>	
Adult clinic	74 (70.5)
Pediatrics clinic	23 (21.9)
Operating room	8 (7.6)
<b>Working period in work place</b>	
Less than 1 year	56 (53.3)
1-3 years	27 (25.7)
More than 3 years	22 (21.0)
<b>Assignment in work place</b>	
Clinical nurse	95 (90.5)
Head nurse	10 (9.5)

### **Discussion**

SSCL, which was developed by WHO has been widely used all the world. <sup>20</sup> SSCL is an important, effective and economic tool that improves the perioperative patient safety and personnel satisfaction, and that decreases communication problems, mortality and morbidity.<sup>16,21-24</sup>

Turkey is one of the countries that apply SSCL. There was no research about SSCL application in Turkey. Patient file examination revealed that in all parts of SSCL, the items were not completely filled by personnel. Patient file examination in the first part of the study revealed that the first part of SSCL that should be filled by clinical nurses was filled in 20.1% ratio, while in the second part of this study the clinical nurses stated that they fill majority of the form. Those findings showed that the statements of nurses toward SSCL and patient file examinations did not show parallel results. This indicates that even though the nurses knew their responsibility on filling the SSCL form, enough evaluation was not done in application.

Shauna *et al.*<sup>25</sup> reported that although SSCL before skin incision (part 3) was filled 100% according to hospital records, in practice the application rate was 30%. In Sweden, 24 operation was recorded by video and determined that the evaluation of surgery team's their own applications on the SSCL items related to patient name, type of operation, antibiotics and incision region was not in accordance with the video recording results.<sup>18</sup> On the other hand, Siu *et al.*<sup>26</sup> determined that the preoperative part of

check list was fully completed for 34 operations. Borchard et al.<sup>23</sup> noted that coordination and efficiency are critical factors. They showed that the coordination of surgery team on application of SSCL was successful, but still further study was required in the application of SSCL.

Our study found that the SSCL was not fully filled by nurses and anesthetists and the least completed parts were under responsibility of surgeons. In another study carried out about the human factor on SSCL, it was found that nurses had a positive attitude towards SSCL in terms of patient safety and team work; however application of SSCL was found to lack caution. Same study also reported that nurses were more sensitive in resolving the problems encountered in SSCL application than anesthetists and surgeons, besides, unlike the results of this study, they reported that anesthetists were less enthusiastic about using SSCL compared to nurses and surgeons.<sup>27</sup> In other study performed in Switzerland reported 25.1% the doctors and nurses used the WHO checklist and 71% of the doctors and 60.8 % of the nurses satisfied using checklist.<sup>28</sup> In our study, using of this checklist may be affected some factors such as workload, not being aware of the importance of the SSCL, lack of time or control.

In our study some items in the form were less frequently filled, also name, surname and signature fields were left empty. It can be thought that some items were considered as general descriptions and were not clearly understood by the personnel. For example in the item "check the critical needs after surgery", the critical needs term was not clearly defined, hence it might be the reason why this item was filled in less frequently. Besides, transferring patients to operation from clinic in emergency resulted in incomplete application of SSCL by nurses in the clinic. It can be thought that leaving the name and signature parts empty might be caused by the tendency to avoid institutional and legal problems that may arise due to not completing the SSCL form completely. Shauna *et al.*<sup>25</sup> reported that the patient name was filled in highest frequency (97%) while the other items were filled under 60% frequency.

In the literature, there were various reasons for incomplete filling of the forms. These reasons included unawareness of the importance of the form in avoiding mistakes, lack of education about the form, high number of items in the form, communication problems within the team, not believing in the benefits of the form, high work load on health team and form increasing the work load, form items being difficult to understand, lack of time, uncertainties and unexpected events avoiding application of the form.<sup>24,26,29</sup> The application levels were lower than expected in this study, and the reasons might be same as described above.

This study found that 78.1% of the nurses thought SSCL application was effective in prevention of medical errors. Norton et al.<sup>30</sup> determined most perioperative clinical staff reflected positive attitudes toward checklist use and also using checklist reduced complications and errors and improved patient safety, communication among team members, teamwork in complex procedures, and efficiency in the operating room.

In this study the nurses generally stated that they had positive opinions about the form. However the check list was not fully completed by nurses. The Reason of this result can be time pressure, organization or education needs for using SSCL or communication problems with team member. Nurses also made certain suggestions to improve the application like; awareness educations for the whole team, planning enough time to fill and evaluate the form before taking the patients to surgery, shared responsibility among team members in filling out the form and revision of some form items. The study which was carried out on 107 surgery team members, to increase the caution in SSCL use, it was suggested that the whole team should use the SSCL, hospital administration should support the use and education of SSCL and consider the problems in using the form.<sup>27</sup>



## Conclusion

This study showed that the nurses working in surgical clinics and operating rooms thought that use of SSCL was effective in preventing medical mistakes and they all stated to use the form in perioperative part; however, it was determined in file examination that neither nurses nor surgery team applied the form effectively. It is imperative how the team understand the role of effective use of SSCL in preventing the mistakes. It is suggested that;

- Hospital administrations should establish initiatives to support and encourage SSCL use and to increase team communication and control,
- The awareness about patient safety should be increased and importance of SSCL use and application should be covered in educations,
- More detailed qualitative studies including whole team members should be conducted to more precisely determine the application status of SCCL and to determine the factors preventing the use of SSCL.

## Cotribution of Authors

Study design: A-B, Z-U, S A-I, A-K, H-Ü, N Ö-E

Data Collection/ Data Analysis: A-B, Z-U, S A-I, A-K, H-Ü, N Ö-E

Preperation of article: A-B, Z-U, S A-I, A-K, H-Ü, N Ö-E

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