

EVALUATING COMPLIANCE TO WORLD HEALTH ORGANIZATION SURGICAL SAFETY CHECK LIST IN OPERATING ROOM

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Abstract

Background: The Surgical safety check list is an inexpensive tool capable of shifting the hierarchical culture in the operating room and fostering patient safety attitudes. **Aim of the study:** The present study aimed to: 1) Evaluate compliance to World Health Organization surgical safety check list in operating room in selected setting, 2) To determine barriers of compliance to World Health Organization surgical safety check list (WHO SSC) in selected hospital. **Method:** Descriptive Comparative design was utilized to attain the aim of the present study. **Sample:** Convenience sample from all available health care workers in operating room including 107 surgeons, 51 anesthesiologists and 120 nurses. Was collected with using tool consisted of two tools: Tool I: Part 1) Demographic characteristics, Part II) Barriers of compliance to world health organization Surgical Safety Checklist. Tool II: Compliance to world health organization surgical safety check list. **Reliability:** The reliability test was made by Cranach Alfa = 0.818 for clarify and applicability. **Results:** The study revealed that, there were statistically significant differences regarding sign in for both nurses and anesthetists. Also, a strong statistically significant difference was found regarding total score of both sign in and time out in two hospitals. Mostly (83.3%) of the health care workers reported that lack of training about SSC is the greatest barrier found. **Conclusion:** Majority of the health care workers reported that lack of training about Surgical Safety Check list was the greatest barrier found, There was no statistically significant difference between the two hospitals as regard compliance to world health organization surgical safety in "time out " and sign out . **Recommendations:** applying surgical safety check list in operating room including surgeons, anesthesiologists and nurses. **Key words:** Barriers, Compliance, Surgical safety check list.

Introduction

Hospitals are not the safe places we would like them to be. A systematic review has shown that 1 in every 150 patients admitted to a hospital dies as a consequence of an adverse event and that almost two thirds of in-hospital events are associated with surgical care. In recognition of the disproportionate number of such events that are associated with surgical care, several interventions

have been proposed to increase patient safety, including relegating surgical procedures to high-volume centers, establishing training programs for laparoscopic surgery, and improving the quality of teamwork in the operating room. In addition, a number of surgical checklists have been developed (De varies et al., 2010)

The operating room (OR) is one of the most complex work environments in

health care. It is also a common site for adverse events. Poor communication is the single most frequent cause of adverse events across all facets of health care, resulting in problems that range from delays in treatment to wrong-site surgery. Wrong-site/wrong-procedure surgeries, retained sponges, unchecked blood transfusions and overlooked allergies are examples of potentially catastrophic events, which can be prevented by improved communication and safer hospital systems. Creating a culture of safety should be of high priority for OR teams (Nilsson, Lindberget, Gupta & Vegfors, 2010).

The Surgical safety check list is an inexpensive tool capable of shifting the hierarchical culture in the operating room and fostering patient safety attitudes. Approximately 234 million operations are performed annually and with regard to surgical procedures the WHO SSC has shown the potential to be effective at reducing complications and mortality rates (Anderson, Appelbaum, Bartz-Kurycki, Tsao, & Browne, 2018).

Multiple barriers such as misuse, nonuse or incomplete execution are reported and reduce chances for the best possible outcomes. Reasons for this can lie in a lack of positive role models or less than enthusiastic team members, hierarchical barriers, limited knowledge of correct usage and inappropriate implementation procedures. Thereby, active involvement in the implementation phase as well as continuous evaluation and training is presumed to greatly impact the compliance and acceptance by all team members (Longtin et al., 2010).

Significance of the study:

Because surgery is the main procedure responsible for surgical infection, provide immediate,

transformative treatment for many conditions and major source of avoidable morbidity and mortality, so improvement can be achieved by implementing of the surgical safety checklist. The major goals of implementing WHO surgical safety check list are minimizing complications associated with invasive procedures, assess what operating room nurse believes influences the patient safety and what their role in preventing surgical complications.

Aim of the study

This study aimed to: 1) Evaluate compliance to world health organization surgical safety checklist in an operating room in a selected setting, 2) To determine barriers of compliance to World Health Organization surgical safety check list (WHO SSC) in selected hospital.

Research questions

- Q1:** What is the extent of commitment to world health organization surgical safety checklist in the operating room?
- Q2:** What are the barriers for compliance of World Health Organization surgical safety checklist (WHO SSC) in the selected hospital?

Method

Research design

The descriptive Comparative design was used.

The study setting :

The present study was conducted at Mansoura University Hospitals (MUH). The hospital provides care at delta region.

The study sample:

Convenience sample of all available health care workers in operating room including 107 surgeons, 51 anesthesiologists and 120 nurses. Total = 278.

Tool of data collection:-

The data collection tool was included two tools: **Tool I: part I**) Health care workers' characteristics, **Part II:** Barriers of compliance to WHO Surgical Safety Checklist, **Tool II:** WHO Surgical safety check list.

Part I:

Personnel characteristics. It was included Personnel characteristics of Surgical teams working in the hospitals. Was developed by researcher after extensive literature review to recent and international references (**Melekie, 2015**), (**Walker, Reshamwalla Wilson, 2012**), (**WHO, 2011**).

Part II:

Barriers of compliance to the WHO Surgical Safety Checklist: inventory was developed by (**Fourcade, Blache, Grenier, Bourgain & Minvielle, 2012**) and Adopted by the researcher.

Part III:

WHO Surgical safety check list: developed by **WHO, 2009**), (**Russ et al., 2015**) and modified by a researcher.

Validity:

The developed tool was tested for content –related validity by 5 experts, three experts from the faculty of nursing – medical surgical department there were 2 assistance professors and one professor, two professors from the faculty of medicine, whom reviewed the tool for clarity, relevance, understanding and applicability for implementation. According to their critiques, minor modifications were done.

Reliability

The reliability test was made by Cranach Alfa = 0.818 for clarifying and applicability.

Pilot study

A pilot study was carried out with 10% (27) of health care workers and the

necessary modifications were done prior to data collection. And were excluded from the main study. The reliability test was made by Cranbach Alfa = 0.818 for clarifying and applicability.

Field work description:

The data were collected by researcher interviews. In each day, each participant in Mansoura university hospital was interviewed at morning shift because the operating list has done in morning shift only. Each person in emergency hospital was interviewed at morning, late, evening shift because nature of emergency hospital over a data collection period of 6 months beginning from April 2017 and ending on September 2017.

Once the participant had enrolled in the study, the researcher communicated with the participant and collecting data. At the first time, the researcher introduced himself to participate. Then, researcher informed the participant about the purposes, method and procedure. Interviewing each participant Individually regarding sociodemographic and barriers of compliance sheet. The average time taken by the researcher to fill out a form for every participant was 10 minutes, total hours = 2780 hours. With regard to filling in the form of compliance to the surgical safety checklist, which the researcher makes by observing, from the first reception of the patient to the end of the operation, the time it takes varies according to the type and duration of the operation.

Ethical considerations:

Prior to conducting the study, approval was obtained from research ethical committee, explanation of the nature and the aim of the study were done by the researcher to health care workers about the aims, benefits of the

study as well as the procedure of data collection, each participant was volunteered to participate in this study and could withdraw at any time without penalty. Furthermore, a verbal consent was attained from each participating prior to inclusion into the study.

Administrative Design

An official permission was attained from Mansoura University Hospital administrator for conducting the study.

Statistical Design: The collected data were ordered, tabularized and analyzed statistically via SPSS software (Statistical Package for the Social Sciences, version 21, SPSS

Results:

Table 1. socio demographic of studied sample (n = 278):

| Variables | Nurse (n=120) | | Surgeons + assistant (n=107) | | Anesthetist (n=51) | |
|--|---------------|------|------------------------------|------|--------------------|------|
| | N | % | N | % | N | % |
| Age | | | | | | |
| 20 – <30 years | 36 | 30.0 | 24 | 22.4 | 20 | 39.2 |
| 30 – <40 years | 58 | 48.3 | 56 | 52.3 | 28 | 54.9 |
| 40 – 50 years | 26 | 21.7 | 27 | 25.2 | 3 | 5.9 |
| Gender | | | | | | |
| Female | 110 | 91.7 | 7 | 6.5 | 15 | 29.4 |
| Male | 10 | 8.3 | 100 | 93.5 | 36 | 70.6 |
| Level of education | | | | | | |
| Diploma | 101 | 84.2 | - | - | - | - |
| Technical institute | 19 | 15.8 | - | - | - | - |
| Bachelor | - | - | 20 | 18.7 | 17 | 33.3 |
| Master degree | - | - | 61 | 57.0 | 32 | 62.7 |
| Doctorate | - | - | 26 | 24.3 | 2 | 3.9 |
| Years of experience | | | | | | |
| <5 years | 12 | 10.0 | 29 | 27.1 | 21 | 41.2 |
| 5 - 10 years | 32 | 26.7 | 9 | 8.4 | 9 | 17.6 |
| > 10 years | 76 | 63.3 | 69 | 64.5 | 21 | 41.2 |
| Availability of surgical safety checklist | | | | | | |
| No | 120 | 100 | 107 | 100 | 51 | 100 |
| Yes | 0 | 0 | 0 | 0 | 0 | 0 |
| Utilization of the checklist | | | | | | |
| No | 120 | 100 | 107 | 100 | 51 | 100 |
| Yes | 0 | 0 | 0 | 0 | 0 | 0 |
| Training courses regarding patient safety | | | | | | |
| No | 120 | 100 | 107 | 100 | 51 | 100 |
| Yes | 0 | 0 | 0 | 0 | 0 | 0 |

Table 1 illustrated the demographic and occupational characteristics of the studied sample. Regarding nurses, 48.3% of them ranged from 30 to 40 years old and 91.7% of them were females. Also, 84.2% of them graduated from diploma nursing school, 63.3% of them had more

than 10 years of experience. None of them had the surgical safety checklist nor could have utilized it, nor attended courses regarding patient safety. Concerning Surgeons and assistants, 52.3% of them ranged from 30 to 40 years old and 57% had master degree,

93.5% of them were males, 64.5% of them had more than 10 years of experience. Also, none of them had the surgical safety checklist nor could have utilized it, nor attended courses regarding patient safety.

Furthermore, regarding Anesthetists, 54.9% of them ranged from 30 to 40 years old, 70.6% of them were

males and also 62.7% had master degree, 41.2% of them had less than 5 years of experience and the same percentage of them had more than 10 years of experience. The surgical safety checklist wasn't available for them, and also, they couldn't utilize it. Moreover, they haven't had any training courses about that checklist.

Table 2. Distribution of the studied participant to hospital departments n = (278)

| Variables | Nurse (n=120) | | Surgeons + Assistant (n=107) | | Anesthetist (n=51) | |
|----------------------|---------------|------|------------------------------|------|--------------------|------|
| | N | % | N | % | N | % |
| Hospital name | | | | | | |
| The general hospital | 95 | 79.2 | 91 | 85.0 | 36 | 70.6 |
| Emergency hospital | 25 | 20.8 | 16 | 15.0 | 15 | 29.4 |
| Departments | | | | | | |
| Emergency | 25 | 20.8 | 16 | 15.0 | 15 | 29.4 |
| Specialized Surgery | 71 | 59.2 | 77 | 72.0 | 25 | 49.0 |
| General Surgery | 24 | 20.0 | 14 | 13.0 | 11 | 21.6 |

Table 2 demonstrated the study participant's distribution to hospital departments, about three quarter of studied sample (70.6%) worked in the general hospital and less half (49%) were in the specialized surgery department. As regards the specialized surgery

department, nurse, (surgeons + assistant) and anaesthetist distributions were 59.2%, 72% and 49% respectively. As regards the general surgery department, nurse, (surgeons + assistant) and anaesthetist distributions were 20%, 13% and 21.6% respectively.

Table 3: Comparing compliance to WHO surgical safety checklist in different hospitals (Sign in- Time out- Sign out). N= 278

| Variable | Main hospital | Emergency | Student's t test | |
|-----------------|---------------|------------|------------------|-------|
| | Mean ±SD | Mean ±SD | T | P |
| Sign in | 9.37 ±0.49 | 9.22 ±0.60 | 1.952 | 0.05* |
| Time out | 8.21 ±0.7 | 8.30 ±1.0 | 0.783 | 0.435 |
| Sign out | 4.42 ±1.6 | 4.35 ±1.8 | 0.285 | 0.776 |

N.B: * P<0.05 significant

Table 3 demonstrated the relation among different hospitals and compliance to WHO surgical safety checklist (sign in- Time out- Sign-out). Shows a statistically significant difference between both main and emergency hospitals and the compliance

** P< 0.001 highly significant to WHO surgical safety checklist regarding sign in within p=0.05, but there were no statistically significant differences between these hospitals and compliance to WHO surgical safety checklist regarding either time out or Sign out within p>0.05.

Table 4. Compliance among study participants in different hospitals regarding WHO surgical safety checklist (sign in- Time out- Sign out) (n= 278).

| Variables | General hospital | Emergency hospital | Significance | |
|-----------------------|------------------|--------------------|--------------|-------|
| | Mean ±SD | Mean ±SD | T | P |
| Sign in | | | | |
| Nurse | 0.91 ±0.10 | 0.86 ±0.10 | 2.224 | 0.028 |
| Surgeon | 0.77 ±0.23 | 0.69 ±0.31 | 1.214 | 0.227 |
| Anesthetist | 0.97 ±0.01 | 0.98 ±0.02 | 2.388 | 0.021 |
| Sign out | | | | |
| Nurse | 0.43 ±0.14 | 0.46 ±0.08 | 1.026 | 0.307 |
| Surgeon | 0.36 ±0.11 | 0.38 ±0.17 | 0.613 | 0.541 |
| Anesthetist | 0.46 ±0.09 | 0.54 ±0.21 | 1.920 | 0.061 |
| Time out | | | | |
| Nurse | 0.54 ±0.19 | 0.57 ±0.18 | 0.710 | 0.479 |
| Surgeon | 0.78 ±0.22 | 0.81 ±0.19 | 0.512 | 0.609 |
| Anesthetist | 0.69 ±0.31 | 0.73 ±0.27 | 0.435 | 0.665 |
| Total | General Hospital | Emergency Hospital | T | P |
| Sign in total | 0.87 ±0.11 | 0.84 ±0.14 | 2.855 | 0.005 |
| Sign out total | 0.42 ±0.11 | 0.46 ±0.45 | 1.463 | 0.144 |
| Time out total | 0.65 ±0.24 | 0.70 ±0.21 | 2.656 | 0.008 |

N.B: * P<0.05significant

Table 4 illustrated Comparing between study participants in different hospitals and compliance to WHO surgical safety checklist table shows that there were statistically significant differences regarding sign in for both nurses and anesthetists within p = 0.02 for each of them. Also, a strong

** P< 0.001 highly significant

statistically significant difference was found regarding the total score of both sign in and time out within p = 0.005 & 0.008 respectively. On the other side, there were no statistically significant differences for any of the sign out or time out for all health care workers.

Table 5: Barriers of compliance to WHO surgical safety checklist among health care workers (n=278)

| Variables | No | | Yes | |
|---|------------|-------|-----|------|
| | N | % | N | % |
| Duplication with existing checklist | 6 | 100.0 | 0 | 0 |
| Poor communication between operating team | 6 | 100.0 | 0 | 0 |
| Time consuming | 6 | 100.0 | 0 | 0 |
| Dose not make sense | 4 | 66.7 | 2 | 33.3 |
| Inappropriate timing | 6 | 100.0 | 0 | 0 |
| Unaccounted risks | 4 | 66.7 | 2 | 33.3 |
| Ignorance team compliance of WHO SSC | 6 | 100.0 | 0 | 0 |
| Repeated question cause patient anxiety | 6 | 100.0 | 0 | 0 |
| Gaming of team compliance of WHO SSC | 6 | 100.0 | 0 | 0 |
| Lack of training about SSC | 1 | 16.7 | 5 | 83.3 |
| Lack of communication between team | 6 | 100.0 | 0 | 0 |
| Total score | 0.11 ±0.49 | | | |

Table 5 demonstrate barriers of compliance to the surgical safety checklist, table shows mostly (83.3%) of the health care workers reported that lack of training about SSC is the greatest barrier found, and more than quarter (33.3%) of them reported that the dose not make sense, and unaccounted risks are considered following barriers. Conversely, duplication with existing checklist, poor communication between operating team, time consuming, inappropriate timing, ignorance team compliance of WHO SSC, repeated questions cause patient anxiety, gaming of team compliance of WHO SSC and also lack of communication between team weren't considered barriers of the compliance to surgical safety checklist as reported by 100% of the health care workers.

Discussion

Quality improvement in delivering healthcare services is the main mission of every health system to ensure patients' recovery and satisfaction properly (Mohebifar, Hasani, Barikani & Rafiei, 2016). Many undesirable outcomes caused through surgical procedures are common worldwide and lead to considerable cases of mortalities and morbidities among patients (Asefzadeh, Rafiei, Saeidi, & Karimi (2017).

Regarding the demographic and occupational characteristics of the studied sample and beginning with the nurses, it was found that near to half of them in the third decade and the majority of them were females. Also about two thirds of them had more than ten years of experience. Additionally, more than half of the surgeons and their assistants in the

third decade and had master degrees, the majority of them were males, and about two thirds of them had more than ten years of experience. Furthermore, regarding anesthetists, more than half of them in the third decade, three quarter of them were males and also about two third had master degree, more than two fifth of them had years of experience less than five years and also the same percentage of them had more than ten years of experience.

Similarly, Koopman, (2018) found that about half of the participants in his study including nurses, surgeons and also anesthetists in the operating rooms in the third decade with experience more than ten years and more than half of them were female.

On completing the current study, there was no statistically significant difference between the two hospitals as regard compliance to WHO surgical safety in "time out" (before start of surgical intervention). A study by Rydenfält, Johansson, Odenrick, Åkerman & Larsson, (2013) showed that the WHO Checklist time-out is not always applied as intended. One explanation could be linked to; the personnel's underlying understanding of the intention of the checklist. This checklist is designed to reduce risk, so the understanding of risk among those conducting the time-out may be important to implementation. From a safety perspective, the checklist can be regarded as a barrier or a 'defense' against failure

Regarding the sign out item (before any members leave the operating room) of the WHO SSC, there were no statistically significant differences

between the different hospital settings and WHO surgical safety checklist. Similarly, in sign-out period of the study by **Melekie&Getahun, (2015)**, the results depicted that participants verbally confirmed the names of performed procedure in about half of the cases and they never trained to use the SSC.

Additionally, A similar study by **Soria-Aledo, Da Silva, Saturno, Grau-Polan& Carrillo-Alcaraz, (2012)** confirmed less conformity in two items of sign-out and timeout of the checklist. The main contributing reasons were mentioned to be the absence of surgeon in the operating room after surgery or existence of reluctant and tired personnel not believing in patient safety.

The current study studied the barriers of compliance to surgical safety check list and found that the mostly of the health care workers reported that lack of training about SSC is the greatest barrier found, and only one third of them reported that the dose doesn't make sensitivities, and unaccounted risks are considered following barriers.

The study by **Fourcade, Blache, Grenier, Bourgain, &Minvielle, (2012)** identified many organizational barriers to implementation of the WHO SSC such as poor communication between the anesthetic and surgeon, lack of leadership, inappropriate timing for checking an item, time taken up by checklist completion, and difficulty in identifying the role and responsibility of each staff member.

Clearly, they explained these barriers for two reasons. The first relates to work organization; a checklist is often put across as a tool to enhance communication and as a reminder in

stressful circumstances but, like other operational tools, it impacts on the organization of work. The second reason relates to professional relationships and cultural habits in clinical practice; verbal communication between health professionals (surgeons, anesthetists and nurses) has to be egalitarian for checklist use to be effective but the findings suggest that operating room staff practices are rooted in a time-honored hierarchy.

Conclusion

- * There were no statistically significant differences between health care workers and compliance to WHO surgical safety check list
- * There were no statistically significant differences between the different hospital settings and compliance to WHO surgical safety checklist regarding the time out item
- * There were no statistically significant differences between the different hospital settings and compliance to WHO surgical safety checklist regarding the sign out item
- * Lack of training about compliance to SSC is the greatest barrier of compliance to WHO SSC.

Recommendation

- *Establish systems, protocols, policies and strategy to enhance health care workers knowledge, skills, practice about patient safety
- *Provide training programs to health care workers to enhance compliance of surgical safety check list level
- *Provide training programs about the importance of patient safety to enhance compliance

- *Use the finding of the study as a blueprint to improve working environment that foster competency and creative ability of health care workers.
- *Availability of surgical safety checklist regarding hospital rules and policies.
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