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Adherence to surgical safety checklist and its impact on workload and team attitudes in a Vietnamese hospital

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ABSTRACT

***Background**: The surgical environment demands meticulous attention to ensure patient safety, and the World Health Organization (WHO) recommends the Surgical Safety Checklist (SSC) as a critical component of risk mitigation and communication among surgical teams. Despite its importance, adherence to the SSC in Vietnam remains inconsistent, highlighting the need for further investigation into the factors influencing compliance and their impact on surgical outcomes. **Objectives**: This study aimed to (1) evaluate the adherence rates to the SSC, (2) examine causal relationships among workload burden, team attitudes and adherence to the SSC of surgical team members at My Thien hospital in Ho Chi Minh City, Vietnam. **Methods**: A cross-sectional descriptive study was conducted on 241 surgical team members, Data were collected using a structured questionnaire that included demographic information, the SSC, and the Maslach Burnout Inventory. Adherence rates were calculated, and statistical analyses were performed using Jamovi software to explore correlations and potential predictors of adherence. Results: The overall adherence rates to the SSC was 92.1%, with significant variations observed across different surgical phases. Emotional exhaustion (2.42 ± 0.39)) and depersonalization (2.36 ± 0.38)) scores were low, while personal accomplishment (3.59 ± 0.74)) was high, indicating a manageable workload for the surgical team. The attitudes of the surgical team towards the SSC are largely positive, with high mean scores for its usefulness (4.11 ± 0.52) and effectiveness in preventing mistakes (4.40 ± 0.52). However, concerns about its functionality and potential to cause delays were noted, with lower scores of 2.14 ± 0.45 and 2.59 ± 0.48, respectively. The study found that higher adherence was associated with lower workload burden, while the correlation between attitudes and workload dimensions was negligible. Notably, a significant direct relationship exists between positive attitudes towards the SSC and lower work burnout (estimate of 0.25, $p = 0.019$), suggesting that fostering positive attitudes may help reduce burnout among surgical team members. **Conclusion**: The findings underscore the importance of fostering positive attitudes towards the SSC among surgical team members to enhance adherence and improve patient safety. Regular interdisciplinary training and monitoring of workload and burnout levels are recommended to support the surgical team's well-being and performance. Future research should explore the barriers to effective SSC implementation and the impact of team dynamics on adherence and burnout.*

***Keywords**: Surgical Safety Checklist, Adherence, Workload burden, Surgical Team Attitudes*

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INTRODUCTION

The surgical environment requires meticulous attention to ensure patient safety, and the World Health Organization (WHO) recommends the Surgical Safety Checklist (SSC) as an important element of risk mitigation and communication among surgical team [1]. This comprehensive checklist divides the procedure into three phases: before anesthesia; before skin retraction; and before patient removal from the surgical room. The ultimate goal of the SSC is to ensure that surgical teams consistently adhere essential safety procedures, thereby minimizing common risks that can endanger the patient's life and health.

Globally, approximately 4.2 million deaths occur within 30 days of surgical intervention, accounting for 7.7% of all deaths worldwide [2]. The WHO estimates that around 230 million surgeries are performed annually, with surgical deaths representing 0.4% to 0.8% of these cases and surgical complications ranging from 3% to 16%. A study by Arvid S Haugen (2019) found that implementing a checklist provided significant benefits [3], with surgical adherence rates decreasing from 19.9% to 12.4% ($p < 0.001$) in the intervention group, alongside a reduction in hospital length of stay by 0.8 days ($p = 0.022$).

The complexity and intensity of surgical procedures are influenced by multiple factors, including workload burden and team attitudes. High workload levels - such as tight operating schedules, long working hours, and limited staffing - can lead to fatigue, decreased vigilance, and procedural shortcuts, all of which negatively impact SSC adherence [4]. Meanwhile, team attitudes, including collaborative culture, hierarchy perception, and communication effectiveness, play a crucial role in determining whether safety protocols are consistently followed. A supportive team environment fosters better compliance, while rigid hierarchies or resistance to change may lead to protocol deviations [5, 6].

In Vietnam, there is an increasing focus on hospital quality management and surgical safety. However, adherence to surgical safety protocols remains inconsistent. Studies have reported gaps in compliance, such as 8.33% of surgeries lacking surgery site marking [7], 25% failing to count instruments and swabs before the patient leaves the operating room [8], and only 66.7% adherence to safe practices during caesarean section [9]. These findings emphasize the critical need for improving adherence to surgical safety protocols, particularly the SSC, to enhance patient outcomes and surgical efficiency.

Therefore, this study aimed to (1) assess the adherence rates to the SSC; and (2) investigate the causal links between workload, team attitudes, and adherence to the SSC among surgical team members at My Thien hospital in Ho Chi Minh city, Vietnnam. Findings from the current study are expected to provide an understanding related to improving adherence to safety protocols and its connection to the overall performance and well-being of surgical teams in Vietnam.

MATERIALS AND METHODS

Study design:

This study employed a cross-sectional descriptive design.

Research locale and time period:

The study was conducted at My Thien Hospital in Ho Chi Minh City, Vietnam, from July 1, 2024, to August 31, 2024.

Population and sample: The required sample size was calculated using G*Power software. For an alpha of 0.01 and 99% power, a minimum sample size of 242 participants was estimated (effect size = 0,15).

Inclusion criteria: Healthcare professionals (surgeons, anesthesiologists, nurses) who are members of a surgical team.

Professionals with at least 9 months of experience in the operating room.

Cases involving patients aged 18-59 years.

Exclusion criteria: Participants without a valid practicing certificate.

Emergency surgeries.

Sampling technique:

The study utilized convenience sampling techniques to select participants.

Research instrument:

Data were collected using a structured questionnaire comprising four sections: (1) Demographic, including age, gender, education, and work experience; (2) Attitude questionnaire, (3) WHO Surgical Safety Checklist and (4) Maslach Burnout Inventory. The attitude questionnaire was developed by Suresh K. Sharma (2020), and consists of 5 items measured on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree", with high reliability (Cronbach's α of 0.81)[10]. The WHO Surgical Safety Checklist includes 24 items covering all three phases of surgical procedures: before the induction of anesthesia (11 items), before skin incision (7 items), and before the patient leaves the operating room (6 items). The Maslach Burnout Inventory includes 22 items measuring emotional exhaustion (9 items), depersonalization (5 items), and personal accomplishment (8 items). Respondents rate the frequency of their experiences on a six-point Likert scale ranging from never (1) to daily (6). A higher mean score indicates a higher level of burnout, with mean scores of 1-2.67 considered low, 2.68-4.34 considered moderate, and 4.35 or higher considered high. Reliability and validity of each instrument were revalidated [11].

The research instruments underwent content and construct validation by three experienced doctors to ensure cultural relevance and accuracy. The tools were translated from English to Vietnamese by two independent bilingual experts and then back-translated into English by another two independent experts. The finalized Vietnamese versions were pilot-tested on 30 medical staff at a public hospital in Ho Chi Minh City, who were excluded from the main study. Cronbach's alpha testing confirmed the instruments' reliability with a coefficient of 0.72.

Data collection:

Data for this study were collected using a self-administered questionnaire over a 4-week period. Initially, researchers engaged with surgical teams to explain the study and obtain consent. Each day, researchers coordinated with the Resuscitation Department to identify upcoming surgeries and collected preoperative data from medical records. Quick interviews with surgical team members addressed attitude assessments, while observations during surgeries were used to complete the surgical safety checklist. All responses were coded and organized for analysis, ensuring confidentiality and ethical adherence throughout the process.

Data analysis:

Jamovi software was utilized to analyze data. Descriptive statistics to summary demographic data and adherence rates. Pearson's correlation coefficient was applied to explore the associations between adherence to the SSC, workload burden, and attitudes of surgical team members. Multiple regression identified predictors of adherence and path analysis was utilized to model both direct and indirect relationships among variables, offering insights into how attitudes and workload burden influence adherence to surgical protocols.

Research ethics:

The study adhered to strict ethical guidelines to ensure the rights and well-being of participants were protected. Approval was obtained from the Institutional Review Board (IRB) of Trinity University of Asia. Additionally, permission was sought from the administration of the selected hospital before initiating the study. Participant's personal information and data obtained from the research were kept confidential and used only for research purposes.

RESULTS

Table 1. Demographics of the surgical team in a Vietnamese hospital (n = 241)

Levels		Frequency	Percentage (%)
Age		Mean ± SD: 42.56 ± 6.2	
Gender	Male	151	62.7
	Female	90	37.3
Work experience	1-5 years	6	2.5
	Over 5 years	235	97.5
Educational Status	University, postgraduate	241	100.0

After conducting the study on 242 surgical cases, one case was excluded due to errors, resulting in a final sample size is 241. The surgical team consisted of 241 members the average age of 42.56 ± 6.2 years. Most were males (151 out of 241, equal 62.7%), and 97.5% had over 5 year's experience. All members had a bachelor's degree or higher (see in Table 1).

Table 2. Adherence to the surgical safety checklist in a Vietnamese hospital (n = 241)

Surgical Phase	Percentage (%)
Before induction of anesthesia	100
Before skin incision	83.3
Before patient leaves operating room	93.0
Overall Adherence	**92.1**

The adherence rates to the surgical safety checklist varied by phase, with 100% adherence before anesthesia, 83.3% before skin incision, and 93% before the patient left the operating room. The overall adherence rate was 92.1% (see in Table 2).

Table 3. Mean, Standard Deviation, and Descriptive Interpretation of workload burden in the operating room

Statement	Mean	SD	Descriptive Interpretation
Emotional Exhaustion	2.42	0.39	Low
Depersonalization	2.36	0.38	Low
Personal Accomplishment	3.59	0.74	Moderately High
Overall Mean	**2.79**	**0.36**	**Moderately Low**

Legend: 1-1.82: Very low; 1.83 - 2.65: Low; 2.65 - 3.48: Moderately Low; 3.49 - 4.31: Moderately High; 4.32 - 5.14: High; 5.15 - 6: Extremely High

The surgical team reported a low level of emotional exhaustion (2.42 ± 0.39), and depersonalization (2.36 ± 0.38). The personal accomplishment was moderately high (3.59 ± 0.74). The overall workload burden was interpreted as moderately low (2.79 ± 0.36) (see in Table 3).

Table 4. Mean, Standard Deviation, and Descriptive Interpretation of attitudes towards the surgical safety checklists

Statement	Mean	SD	Descriptive Interpretation
SSC is useful	4.11	0.35	Agree
SSC prevents mistakes	4.40	0.52	Strongly Agree
SSC is reliable to use	4.25	0.47	Strongly Agree
SSC works well.	2.14	0.46	Neutral
SSC does not cause delays.	2.59	0.59	Neutral
Overall Mean	3.50	0.21	Positive

Legend: 1-1.81: Strongly Disagree/Very Negative; 1.82 - 2.61: Disagree/Negative; 2.62 - 3.41: Neutral/Less Negative; 3.42 - 4.21: Agree/Positive; 4.22 - 5: Strongly Agree/Very Positive

The study demonstrated strong agreement on the reliability and mistake-prevention capabilities of the checklist (4.25 ± 0.47, 4.40 ± 0.52, respectively). However, the team was neutral regarding whether the SSC "works well" or "does not cause delays." The overall attitude score was interpreted as positive (3.50 ± 0.21) (see in Table 4).

Table 5. Relationships Among Adherence to the surgical safety checklist, workload burden, and attitudes of surgical team

Type	Effect	Estimate	SE	Lower	Upper	β	z	p
Indirect	Attitude ⇒ Adherence ⇒ Work Burnout	0.001	0.006	-0.012	0.012	0.001	0.007	0.994
Component	Attitude ⇒ Adherence	0.0003	0.047	-0.092	0.093	0.0004	0.007	0.994
	Adherence ⇒ Work Burnout	0.135	0.144	-0.147	0.417	0.059	0.934	0.35
Direct	Attitude ⇒ Work Burnout	0.25	0.105	0.041	0.457	0.149	2.354	0.019
Total	Attitude ⇒ Work Burnout	0.25	0.106	0.041	0.458	0.149	2.345	0.019

Note. Confidence intervals computed with method: Standard (Delta method)

Note. Betas are completely standardized effect sizes

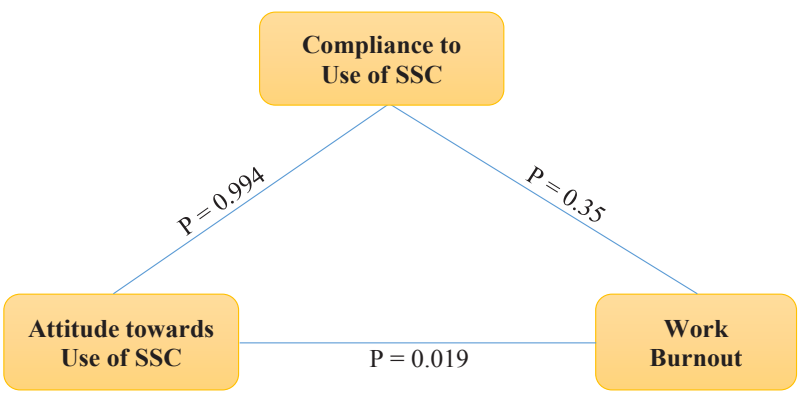

Figure 1. Path model of Adherence to the surgical safety checklist, workload burden, and attitudes of surgical team

The results indicated the relationship between adherence with the surgical safety checklist, workload burden, and the attitudes of the surgical team. The analysis showed an indirect effect of attitudes towards the SSC on job burnout through adherence, with an estimate of 0.001 and a p-value of 0.994, indicating no significant influence. Component analysis which valuated individual pathways, revealed that the relationship between attitudes and adherence also has a minimal impact (estimate = 0.0003, p = 0.994). However, a significant direct effect was found between attitudes towards the SSC and job burnout, with an estimate of 0.25 and a p-value of 0.019. The overall impact, both direct and indirect pathways, suggested a significant relationship between attitudes towards the SSC and job burnout, with an estimate of 0.25 and a p-value of 0.019 (see in Table 5 and figure 1).

DISCUSSIONS

The present study examined the adherence rates to the Surgical Safety Checklist (SSC) among a surgical team of 241 members, revealing an overall adherence rate of 92.1 This figure is consistent with the findings of Fridrich et al. (2022) [12], who reported an average adherence rate of 91% in their meta-analysis. However, adherence rates vary widely, ranging from 12% to 100%, with an average of 75% reported in various studies [13, 14]. The high adherence rate during critical surgical stages, particularly 100% adherence before anesthesia, 83.3% before skin incision, and 93% before the patient left the operating room, underscores the surgical team's commitment to maintaining high standards of surgical safety. Such adherence is crucial, as it has been linked to reduced surgical errors and improved patient outcomes [15].

The workload burden of the surgical team was classified as moderate low, with an average score of 2.79 ± 0.36. This suggested that the team is operating within a manageable workload, which is essential for maintaining optimal performance and reducing the risk of burnout reported by the surgical team further indicate that the members do not frequently encounter significant emotional stress or detachment from their patients. These findings are encouraging and suggest effective management of workload and responsibilities, which is vital for sustaining the well-being of healthcare professionals[16].

In contrast, the personal accomplishment score was significantly higher at 3.59 ± 0.74, reflecting a strong sense of achievement and effectiveness in their roles. This aspect is essential, as a high sense of personal accomplishment is associated with job satisfaction and motivation, which can enhance overall team performance and patient care [17, 18]. The overall positive attitude score of 3.50 ± 0.21 towards the SSC indicated that team members team members generally perceive the checklist as a beneficial tool in their surgical practice.

The strong agreement on the reliability and error-prevention capabilities of the SSC, with scores of 4.25 ± 0.47 and 4.40 ± 0.52, respectively, further reinforces the perceived effectiveness of the checklist among the surgical team. However, the neutral stance regarding the statements "The SSC works well" and "The SSC does not cause delays" suggests that while the team acknowledges the importance of the SSC, there may be practical concerns regarding its implementation in real surgical settings. This discrepancy highlights the need for ongoing training and discussions to address potential barriers to effective SSC utilization [19].

The analysis revealed a significant direct relationship between attitudes towards the SSC and job burnout, with an estimate of 0.25 and a p-value of 0.019. This finding that more favorable attitudes towards the SSC are associated with higher levels of burnout, which is counterintuitive and warrants further investigation (del Carmen Pérez-Fuentes et al., 2021) [20]. The confidence interval ranged from 0.041 to 0.457 reinforces the significance of this relationship, indicating that the surgical team's perceptions of the SSC may influence their emotional well-being. Conversely, the insignificant indirect effect of attitudes on job burnout through adherence (estimate = 0.001, p = 0.994) suggests that adherence alone does not account for the variance in burnout levels, emphasizing the complexity of factors contributing to job stress in surgical environments.

Given the demographic characteristics of the participants, with an average age of 42.56 ± 6.2 years and 97.5% having over five years of experience, it is plausible that the surgical team possesses a wealth of experience that may influence their attitudes and perceptions towards the SSC. The predominance of male members (62.7%) may also reflect gender dynamics within the surgical field, which could impact team interactions and perceptions of safety protocols [21].

In conclusion, the findings of this study underscore the importance of fostering positive attitudes towards the SSC among surgical team members to create a supportive work environment. Regular feedback sessions and discussions addressing concerns and misconceptions regarding the SSC are essential for enhancing team awareness and promoting adherence. Furthermore, prioritizing the mental health of the surgical team by addressing the factors contributing to burnout may lead to improved job satisfaction and overall performance. Future research should explore the underlying reasons for the observed relationship between attitudes towards the SSC and job burnout, as well as the potential impact of team dynamics and individual characteristics on these outcomes.

CONCLUSION AND RECOMMENDATIONS

The findings of this study underscore the critical role of the Surgical Safety Checklist (SSC) in enhancing surgical safety and reducing the incidence of postoperative complications. With an overall adherence rate of 92.1%, the surgical team demonstrated a strong commitment to implementing safety protocols during critical surgical phases. However, the neutral responses regarding the effectiveness and efficiency of the SSC highlight the necessity for further training and engagement among team members. It is essential to address the practical concerns surrounding the checklist's implementation to ensure that it is perceived not only as a procedural requirement but as a valuable tool that contributes to patient safety and team efficiency. The significant direct relationship between attitudes towards the SSC and job burnout suggests that fostering a positive culture around the checklist could mitigate burnout and enhance job satisfaction among surgical staff.

To optimize the effectiveness of the SSC, it is recommended that healthcare institutions implement regular interdisciplinary training sessions and communication workshops to enhance collaboration among nurses, surgeons, and anesthesiologists. Such initiatives can facilitate better understanding and teamwork, ultimately improving adherence to the SSC. Additionally, establishing a comprehensive workload monitoring system is crucial for assessing emotional exhaustion, depersonalization, and burnout among staff. This proactive approach can help identify at-risk personnel and implement targeted interventions. Furthermore, to streamline SSC processes and reduce perceived delays in surgical procedures, it is essential to involve the surgical team in the overall evaluation of current SSC protocols. By integrating feedback from team members, hospitals can enhance the checklist's usability and effectiveness. Future research should focus on exploring the barriers to effective SSC implementation and the impact of team dynamics on adherence and burnout, which could provide valuable insights for continuous improvement in surgical safety practices.

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