Team Performance in Surgical Operations at Private Cancer Hospital and Research Centre

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Abstract

Purpose: The purpose of this study is to evaluate the existing team dynamics within the surgical crew; to gain insights into the perceptions of different team members regarding team effectiveness and potential areas for improvement; to investigate factors crucial to successful teamwork in the operation theatre, and to analyze successful practices that have positively impacted team performance and patient outcomes.

Design/methodology/approach: Quantitative data was gathered through a validated questionnaire distributed among surgical team members at a private cancer hospital and research center in Thrissur District, Kerala. Descriptive research was adapted for this study. The population for the study includes the members of the surgical team. A sample size of 120 members including doctors, nurses, technicians, and other supportive members who participated in various surgeries, were selected using a random sampling technique for the data purpose.

Findings: The findings of the study disclosed that the challenges included occasional communication breakdowns and role ambiguity that seriously influenced the team performance of a surgical crew. Successful practices involved structured communication protocols, regular team training, and a collaborative leadership approach. Stakeholders accentuated the need for continuous improvement in strategies premeditated to the operation theatre's unique demands.

Research limitations/implications: The study's inferences underscore the necessity for targeted intermediations focusing on the factors manipulating the surgical teams. Implementing structured training programs, refining communication protocols, and fostering a collaborative leadership culture can notably improve team performance. Additionally, modifying these interventions to suit the specific demands of the operation theatre is essential for sustaining and augmenting positive changes in teamwork dynamics, ultimately elevating the quality of patient care and outcomes.

Social Implications: The empirical research contributed to enhancing the quality of surgical care, improving patient safety, and refining the overall performance of surgical teams in specialized healthcare settings through enhanced team performance for societal well-being by improving patient outcomes and reducing healthcare disparities. A more cohesive surgical team fosters a safer environment, positively impacting patient satisfaction, trust in healthcare, and overall community health. Additionally, it promotes a culture of collaboration and excellence, setting a precedent for improved healthcare practices within society.

Originality / Value: The originality of the study lies in its broad examination of team dynamics within a specialized setting, the operation theatre of a private cancer hospital and research center. The study offers insights into specific challenges, successful practices, and context-specific interventions, to enhance team performance and patient care in this distinct healthcare environment.

Keywords: Team Dynamics, Communication, Leadership, Team Performance, Performance Outcomes, Surgical Crew.

Introduction

Team performance in an operation theatre is critical for ensuring successful surgeries, especially in complex procedures such as those performed in cancer hospitals and research centers. The effectiveness

of a surgical team depends not only on the individual skills of the members but also on their ability to collaborate, communicate, and coordinate seamlessly during surgeries. Team dynamics are usually influenced by the culture and the institutional policies of an organization. A team can be defined as a set of two or more people working with diligent interdependence and adaptively toward common and valued goals.

Cooperation and proper communication among team members, characterized by mutual respect and a willingness to share information and responsibilities, is essential for effective teamwork whereas poor communication marked by functional silos, and disrespect leads to inefficiencies and errors. Communication among a surgical team plays a vital role in Operation Theatre (OT) efficiency. An OT environment demands precise teamwork to ensure patient safety, minimize errors, and optimal surgical outcomes. According to Rosen et al. (2018), effective teamwork treatments in the OT dramatically minimize surgical mistakes and postoperative problems. Strong cooperation and better understanding among the team members in surgical settings improve their performances and better patient outcomes.

Further to that the creation of procedures and technologies that improve group productivity and lower mistakes in healthcare environments has been made possible in large part by human factors engineering. Human factors play a critical role in team performance and have a big influence on patient outcomes and safety in healthcare. Training programs focused on human factors can improve team dynamics and reduce errors especially training has been suggested to improve teamwork in the OTs. Surgical training usually uses an apprenticeship model, where trainees learn by observing and assisting experienced surgeons. While technology can enhance team performance by providing tools for communication and decision support, it can also lead to issues such as information overload and reliance on automated systems. Developments in technology, including robotic surgery and communication tools, have influenced the surgical team dynamics. The incorporation of simulation training further facilitates skill acquisition and competency.

In particular, in private hospitals and research centers, surgeries are often intricate and demanding. Factors such as communication barriers, hierarchy, stress, workload, and team cohesion would affect the surgical team operation and potentially influence patient outcomes. The success of team effort in producing the desired outcome in their surgical operations is related to the competence and security of a structured healthcare delivery system i.e., the performance of surgical teams directly controls patient outcomes. Hence teamwork among healthcare professionals is of primitive requirement for effective and outcome-based treatment. Johnston et al. (2019) highlighted that prolonged working hours and insufficient rest are significant contributors to cognitive and physical fatigue, which in turn affect teamwork and patient safety. Therefore, strategies to manage workload and provide adequate rest are critical. Simulators replicate real-life surgical scenarios, allowing trainees to practice procedures in a risk-free environment. Virtual Reality simulators offer immersive training experiences and have been found to enhance spatial awareness and dexterity. Teams that routinely participate in simulation training exhibit notable improvements in crisis management, decision-making, and inter-professional teamwork during actual surgeries.

Statement of the problem

The dynamics of teamwork among the surgical crew within hospitals and research centers are inadequately understood, predominantly regarding the relationship of basic impacting causes such as team structure, communication, leadership, human factors & error management, training, and simulation. However, there is difficulty in probing hierarchical team structures in stimulating communication ability and decision-making processes. The role of leadership in nurturing a culture of mutual support and effective situation monitoring is less explored, as is the impact of individual passion and commitment on overall team cohesion and performance. Besides, there is a narrow understanding of how unremitting skill development and learning opportunities affect team dynamics and patient outcomes. Addressing these gaps through comprehensive, multidisciplinary studies could augment our knowledge of elevating surgical team performance and refining patient care in private cancer hospital settings.

Team Performance in Surgical Operations

Research Questions

The research questions which the study attempted to answer were as follows:

1. How do current communication patterns, collaboration, leadership styles, and roles/responsibilities distribution impact the team dynamics within the surgical crew?
2. What are the perceptions, opinions, and experiences of the medical staff regarding the effectiveness of the surgical team and the potential areas for improvement?
3. What are the factors crucial to successful teamwork in the operating theatre?
4. What strategies have been identified as successful in positively impacting team performance and patient outcomes within the specific context of the hospital and research center?

The study intends to answer these issues to provide important knowledge that can enhance surgical cooperation and patient care.

Objectives of the Study

The objectives of the study were as follows:

1. To evaluate the existing team dynamics within the surgical crew (including communication patterns, collaboration, leadership styles, and roles/responsibilities distribution).
2. To gain insights into the perceptions and experiences of different team members regarding team effectiveness and potential areas for improvement.
3. To investigate the crucial factors for the success of teamwork in operation theatres (especially concerning effective communication strategies, leadership qualities, role clarity, adaptability, and the impact of stress or high-pressure situations on team performance).
4. To identify and analyze successful practices that have positively impacted team performance and improvement in patient outcomes.

Review of Literature

Communication

Tørring et al. (2019) found that effective communication characterized by shared goals, mutual respect, and accurate, timely information exchange significantly improves team performance. Clements et al. (2007) underlined the significance of clear, concise, and respectful communication to prevent errors and improve patient outcomes. Oyediran et al. (2022) found that surgical teams with better levels of coordination and communication may shorten operating hours and cut down delays, which improved resource use and patient throughput. Cooperative skills and mutual respect among team members, including surgeons, nurses, anaesthesiologists, and support staff, significantly impact team performance (Reader et al., 2007). High levels of collaboration are linked to better patient outcomes and increased job satisfaction among healthcare workers (Healey et al. (2006)).

Team Dynamics and Leadership

Manser (2009) highlighted the importance of strong leadership and shared decision-making in enhancing surgical team performance. Leaders who inspire and motivate their teams, foster a supportive environment, and encourage professional development are often described as transformational. This leadership style has been linked to higher team performance and morale (Bass & Avolio, 1994). This style, which focuses on supervision and performance-based rewards and punishments, can be effective in ensuring adherence to procedures and protocols. However, it may not be as effective in fostering a collaborative team environment (Judge & Piccolo, 2004). West (1999) indicated that teams with strong, supportive leadership exhibit better communication and higher levels of mutual trust and respect. Team dynamics and patient outcomes are positively impacted by transformational leadership styles, which promote candid communication and team member empowerment (Arora et al., 2019).

Training and Simulation (TS)

Rosen et al. (2018) showed that simulation exercises can enhance team coordination, communication, and crisis management skills among surgical teams. According to a study by Babiker et al. (2014), patient outcomes and team performance are greatly enhanced by ongoing professional development. Studies have shown that simulation training improves technical skills, procedural knowledge, and confidence among surgical trainees (Aggarwal et al., 2010). Apprentice model often lacks standardization and can be limited by the availability of cases (Feldman et al., 2004). Research indicates that Virtual Reality training can reduce

the learning curve for complex surgical procedures (Seymour et al., 2002). Regarding a comprehensive analysis by Eppich et al. (2011), training that is focused on simulations is still essential for enhancing collaboration abilities.

Human Factors and Error Management (HFEM)

Factors like fatigue, stress, and individual characteristics can affect team dynamics and patient safety (Carthey et al., 2011). There can be significant gains in patient care by recognizing and addressing human variables including cognitive load, exhaustion, and communication (Carayon et al., 2014). Strategies for error management, such as checklists and briefings, have been applied to reduce errors and improve team performance (Gawande, 2009). Simulation-based training allows teams to practice communication, coordination, and crisis management in a controlled environment. Such training significantly enhances team performance and reduces adverse events (McCulloch et al., 2009). Checklists and protocols are effective in preventing errors. WHO's surgical safety checklist, for example, has been shown to reduce morbidity and mortality in surgical patients (Haynes et al., 2009).

Technology and Innovation (TI)

Parasuraman & Manzey (2010) highlighted the need for training and guidelines to ensure effective human-technology interaction. Studies explore how technological innovations affect teamwork and performance in the Operation Theatre (Undre et al., 2006). The adoption of robotic surgery has influenced the learning curve for surgeons. Reddy et al. (2023) suggested that while initial training for robotic systems can be intensive, surgeons generally achieve proficiency more quickly compared to traditional methods.

Patient Outcomes

Operating teams play a crucial role in determining patient outcomes in surgical settings and the performance of these teams, encompassing communication, coordination, technical skills, and use of technology, significantly impacts surgical success, patient safety, and recovery (Aggarwal, 2010). Galletta et al. (2017) indicated that when patients are involved in decision-making, they are more likely to adhere to treatment plans and experience better health outcomes. Studies often correlate effective teamwork and communication in the Operation Theatre with reduced surgical mistakes, complications, and better patient recovery (Makary et al., 2006).

Cultural and Organizational Factors

Catchpole et al. (2008) explored the impact of organizational structures, protocols, and cultural factors on surgical teams. Cultural diversity within operating teams can bring a range of perspectives and skills that enhance problem-solving and decision-making but can also present challenges in communication and teamwork if not managed effectively. Van Knippenberg et al. (2004) suggested that diversity can improve team performance when there is a strong emphasis on inclusive practices and effective communication. Organizational support for continuous learning and development fosters a culture of excellence and innovation, which is critical for improving patient outcomes (National Academies of Sciences, Engineering, and Medicine, 2018). It is essential to foster a culture of safety where team members can voice concerns and admit mistakes without fear of retaliation as the leadership programs, ongoing education, and the adoption of non-punitive reporting procedures can all help to promote this cultural change (Nwosu et al., 2022).

Continuous Improvement and Feedback

Hughes et al. (2016) pointed out the importance of learning from experiences and continuously improving teamwork in the Operation Theatre as continuous feedback mechanisms and post-surgery debriefing sessions have been proposed to enhance team performance.

It is highlighted from the above review of literature that team performance in surgical settings is multi-dimensional. It accentuates the critical role of communication, leadership, training, human factors, technology, and organizational culture in shaping the effectiveness of surgical teams and, ultimately, patient outcomes and therefore considered in this study as the variables.

Research Hypotheses

Based on the above review of literature review and the identified variable, the following hypotheses were defined.:

H_01: Team dynamics do not significantly affect Communication among the surgical crew.

H_02: Leadership does not significantly impact Human factors & Error management among the surgical crew.

H_03: Culture & Organizational factors do not significantly influence Technological support among the surgical crew.

H_04: Training & Simulation do not significantly affect Team performance among the surgical crew.

H_05: Training & Simulation do not significantly impact Patient Outcomes among the surgical crew.

Research Methodology

Descriptive research was adapted for this study. The population for the study includes the members of the surgical team i.e. doctors, nurses, technicians, and other supportive members who participated in various surgeries. The population of the members with an exposure of being a part of the surgical team is approximately accounted to 475 numbers. Thus, the sample size considered for the study was 120 members (which is about 25% of the population) of a private cancer hospital and research center in Thrissur District, Kerala, India, based on their contributions to the surgical operations as an active team player. The sample was selected by using a random sampling technique. A pilot test was conducted to check the validity of the questionnaire and was modified to ensure reliable data collection. The questionnaire was verified with 28 items using Cronbach's alpha, a statistical measure used to assess the internal consistency reliability of the scale. Cronbach's alpha value was read as 0.69 reflecting a fair internal consistency among the items. The data was analyzed and interpreted with suitable statistical tools.

Findings

The interpretation of data regarding team performance in the operation theatre aimed to provide actionable insights to enhance collaboration, communication, and overall effectiveness of the surgical team for better patient outcomes and operational efficiency.

Table. 1 Demographic Factors

Category	Particulars	Frequency	%
Age	<20 yrs	3	2.5
	21-30 yrs	29	24.2
	31-40 yrs	45	37.5
	>40yrs	43	35.8
Designation	Surgeons	19	15.8
	Nurse	62	51.7
	Anaesthetist	11	9.2
	Anaesthesia Technician	9	7.5
	PG Students	19	15.8
Gender	Male	30	25
	Female	90	75
Experience	1-5 Years	39	3
	6-10 Years	34	2
	11-15	15	1
	>15Years	32	2

Source: Questionnaire

The members included in the study were mostly middleaged. It was read that 51.7% of the respondents were nurses and 31.6% of the respondents were surgeons and PG students with the same percentage. 75% of them fall under the female category as the hospitality industries favor the highest employment opportunities for females. 32.5% of them have experience of 1-5 years.

Table. 2 Team Dynamics vs. Communication (H$_0$1)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.744[a]	3	.008
Likelihood Ratio	11.968	3	.007
Linear-by-Linear Association	10.857	1	.001
N of Valid Cases	120		

The Pearson chi-square test evaluates whether there is a significant association between Team dynamics and Communication. The p-value of .008 is less than the common significance level of 0.05, indicating that there is a statistically significant association between the variables. Therefore, we reject the null hypothesis and accept the alternative hypothesis i.e. the values of the linear-by-linear association, likelihood ratio, and Pearson Chi-Square tests show a strong relationship between the surgical team's communication style and Team dynamics. Hence in this context, Team dynamics has a big impact on communication.

Table. 3 Leadership vs. Human Factors & Error Management (H$_0$2)

		Leadership	HFEM
Leadership	Pearson Correlation	1	.117
	Sig. (2-tailed)		.205
	N	120	120
HFEM	Pearson Correlation	.117	1
	Sig. (2-tailed)	.205	
	N	120	120

There is a connection between Leadership and Human Factors & Error Management displaying a value of 0.117. This suggests that these two variables have a modest positive association. However, the p-value associated with this correlation coefficient is 0.205, which suggests that this correlation is not statistically significant at the conventional significance level of 0.05. Consequently, rather than reflecting a significant relationship between the two variables, it is likely that any association that has been detected between Leadership and Human Factors & Error Management is the result of chance. Effective monitoring of Human Factors & Error Management is a powerful leadership quality, particularly in the Healthcare Industry. As such, leadership is not just important but essential for robust Human Factors & Error Management practices within a hospital.

Table. 4 Cultural & Organizational factors vs. Technology Support (H$_0$3)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.238	2	.119	.123	.885
Within Groups	113.354	117	.969		
Total	113.592	119			

The p-value indicates the probability that the observed differences among group means occurred by chance. A common threshold for significance is 0.05. Since 0.885 is much higher than 0.05, the result is not statistically significant. This means that there is no evidence to suggest that the group means are significantly different from each other. Hence there is a significant relationship between Cultural & Organizational factors and Technology Support.

Table. 5 Training & Simulation vs. Performance Improvement (PI) (H_04)

		TS	PI
TS	Pearson Correlation	1	.214[*]
	Sig. (2-tailed)		.019
	N	120	120
PI	Pearson Correlation	.214[*]	1
	Sig. (2-tailed)	.019	
	N	120	120

*Correlation is significant at the 0.05 level (2-tailed)

The correlation analysis between Training & Simulation and Performance Improvement reveals a Pearson correlation coefficient of 0.214, indicating a weak positive relationship between the two variables. This suggests that as the scores for Performance Improvement increase, the scores for Training & Simulation also tend to increase. The p-value of 0.019 indicates that this correlation is statistically significant at the 0.05 level, meaning the observed relationship is unlikely to be due to random chance. Therefore, while the correlation is weak, there is a significant association between Training & simulation and Performance Improvement results based on the data from 120 observations.

Table. 6 Training & Simulation vs. Patient Outcomes (H_05)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.016	1	2.016	7.728	.006[b]
Residual	30.776	118	.261		
Total	32.792	119			

[a] Dependent Variable: Patient Outcomes
[b] Predictors: Training & Simulation

The ANOVA table provided is a summary of an Analysis of Variance (ANOVA) test conducted to assess the significance of a regression model. The p-value (.006) is less than the common alpha level of 0.05, indicating that the regression model is statistically significant. This means that the predictor – Training & Simulation significantly explain some of the variability in the dependent variable – Patient Outcomes. The regression model with Skills & Learning as the predictor significantly explains the variance in Patient Outcomes, as indicated by a low p-value of 0.006 and a notable F-statistic of 7.728. This suggests that Training & Simulation is a significant factor in determining Patient Outcomes.

Summary of Findings & Discussion
After the statistical analyses, the key findings are summarized as follows:
In surgical teams, there was a statistically significant correlation between Communication style and Team Dynamics. i.e. Team Dynamics has a significant impact on Communication inside the team. These findings highlighted how crucial it was to take team dynamics into account to improve the efficacy and efficiency of communication in surgical settings. The correlation is not statistically significant, suggesting no strong evidence to support a meaningful association between Leadership and Human Factors & Error Management. The observed differences among group means were not statistically significant, indicating no significant differences among the group means. Despite the weak correlation, the association between Training & Simulation and Performance Improvement is statistically significant, indicating that the relationship is unlikely to be due to random chance. The regression model is statistically significant, meaning Training & Simulation significantly explain some of the variability in Patient Outcomes. This suggests that Training & Simulation is an important factor in determining Patient Outcomes.

These statistics provide a comprehensive view of various aspects of Team Dynamics, Performance, Communication, Patient Outcomes, and Training & Simulation within the surgical team. Areas of strength and areas needing improvement are highlighted, offering insights for targeted enhancements to enhance overall team effectiveness and patient care.

Conclusion

Teamwork is essential in surgery. A surgeon alone cannot adequately fulfill his daily tasks, neither in the operating theater nor in the emergency department. The teamwork, in particular the nontechnical skills of teams in the surgical department, has an obvious impact on patient outcomes. The privilege and burden of decision-making are primarily focused on the surgeon. The performance of the team members depends on the behavior, knowledge, and interpersonal and leadership skills of the surgeon as a team leader. Every team leader depends on his team members. Leadership and teamwork must not be seen as contradicting characteristics of the teamsin the surgical department. Both are necessary for the surgical department to function. Each team must be regularly assessed for their nontechnical and technical skills. The causes & the results of good and bad teams must be identified in the characteristics of the team members. Feedback must be given to all team members. The identified weaknesses or strengths in the characteristics of the team members can thus be corrected or promoted.

Suggestions

Considering the results of the study the following suggestions were suggested for effective Team Performance:

1. The hospital can be specific about arranging need-based training for those working in surgical teams. The authority in charge of training should evaluate the training program in terms of pre- and post-training processes to understand the effectiveness of the training program designed for them.
2. Before the surgery, the team should be encouraged to hold necessary frequent meetings and reviews. This could enhance proper relationships and rapport among the members.
3. The team head should practice sharing feedback with the team members regarding all the efforts and arrangements taken for the surgery. This will help the team members to ensure quality preparation for various surgical phases.

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