The article was received on November 26, 2020, and accepted for publishing on March 05, 2021.

REVIEW

Leadership skills in surgeons: a review of the literature

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Abstract: *Clinicians, professors of medicine in general, students, and professionals from the health sciences tend to focus their efforts on technical training related to their discipline in practice as well as activities that produce some benefit direct or personal satisfaction. It is unusual to devote time and effort to training in areas such as teaching or expand their skills in sociological and organizational aspects. Would you like to take a course on strategic planning if not a director or officer of the hospital? Manage time in your schedule for a workshop on communication and conflict management? Have room in your schedule for educational activities on leadership, organizational change, and diffusion of innovations, science or science complexity of implementation? Generally, doctors and teachers do not spend much time on these activities (at least voluntarily) because we feel that what we have learned from these topics on personal experience is enough [1].*

Effective teamwork, not only in the operating room but also throughout the perioperative route is considered an important and critical component of the safety and effectiveness of surgical care and leads to good results and quick recovery of surgical patients. Therefore, considerable efforts have been made to understand how teams work within the route of surgical care and to improve teamwork [2].

The simple act of bringing together some experts does not guarantee that turned out an expert team. Given the evidence suggests that teamwork in the operating room sometimes is far from harmonious and effective, the importance of training the surgical team to work effectively is receiving international acceptance as a key strategy to maximize safety in surgery.

This systematic literature review aims to present a review of literature that focuses on the importance and role of leadership skills in the surgeon and how these skills can play a significant role in increasing the quality of care and patients' safety in operating room (OR) settings.

Keywords: *leadership, surgeons, operating room, qualities, leader, surgical team, conflict*

INTRODUCTION

Clinicians, professors of medicine in general, students, and professionals from the health sciences tend to focus their efforts on technical training related to their discipline in practice as well as activities that produce some benefit direct or personal satisfaction. It is unusual to devote time and effort to training in areas such as teaching or expand their skills in sociological and organizational aspects. Would you like to take a course on strategic planning if not a director or officer of the hospital? Manage time in your schedule for a workshop on communication and conflict management? Have room in your schedule for educational activities on leadership, organizational change, and diffusion of innovations, science or science complexity of implementation? Generally, doctors and teachers do not spend much time on these activities (at least voluntarily) because we feel that what we have learned from these topics on personal experience is enough [1].

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The way to see the errors and patient safety has changed radically over the last 15 years. Effective teamwork, not only in the operating room but also throughout the perioperative route is considered an important and critical component of the safety and effectiveness of surgical care and leads to good results and quick recovery of surgical patients. Therefore, considerable efforts have been made to understand how teams work within the route of surgical care and to improve teamwork [2].

During the past 15 years, the conceptualization of security in surgery has changed substantially. There is a growing awareness that the skills required to consistently achieve security in surgery go far beyond the knowledge and technical skills of the surgeon [3]. Teamwork, defined in terms of "a set of behaviors, actions, cognitions, and attitudes that facilitate the work to be done" [4], is increasingly seen as an essential component of safe surgery. Work crews are essential when "errors can result in serious consequences; when the complexity of the activity exceeds the capacity of one person; when the working environment is ill-defined or ambiguous or stressful; when you need to make many decisions quickly, and when the lives of others depend on the collective view of the members'. The importance of teamwork to the safety and efficiency of operations has been recognized for some time and, therefore, is an integral part of the education, training, and evaluation of workers in many industries. It seems that, finally, the health community begins to embrace the concept of "work teams are a source of security" [5].

The simple act of bringing together some experts does not guarantee that turned out an expert team. Given the evidence suggests that teamwork in the operating room sometimes is far from harmonious and effective, the importance of training the surgical team to work effectively is receiving international acceptance as a key strategy to maximize safety in surgery. The development of training interventions to provide surgical team knowledge, skills, and attitudes that serve as a foundation for effective performance has become a dominant theme in the literature of surgery, anesthesia, and nursing.

OBJECTIVE

This systematic literature review aims to present a review of literature that focuses on the importance and role of leadership skills in the surgeon and how these skills can play a significant role in increasing the quality of care and patients' safety in operating room (OR) settings.

METHODS

A systematic review of the available literature was performed on leadership skills in the operating room. The search was made on the PubMed, JSTOR, and Cochrane library databases on June 10th, 2020 using the following formula: (Leadership skills AND Surgeons AND Operating Room). First, the articles were screened by title and abstract. The following inclusion criteria for relevant articles were used during the initial screening of titles and abstracts: must focus on leadership skills of surgeons, must focus on models of leadership for surgeons, and must focus on skills required by surgeons to be good leaders for the OR team. Other exclusion criteria were: studies published before 2010, studies other than the English language, studies conducted in under-developed countries, studies focusing on non-technical skills other than leadership skills.

In the second step, the full texts of the selected articles were screened, with further exclusions according to the previously described criteria. Moreover, articles not reporting clinical results were excluded. Relevant data were then extracted and collected in a single database with a consensus of the two observers to be analyzed for the present manuscript.

Table 1 provides the list of articles that are included in the review.

Table 1: List of articles included in the review.

Author (year)	Title
Yue-Yung Hu, Sarah Henrickson Parker, Stuart R Lipsitz, Alexander F Arriaga, Sarah E Peyre, Katherine A Corso, Emilie M Roth, Steven J Yule, Caprice C Greenberg (2016).	Surgeons' Leadership Styles and Team Behavior in the Operating Room
Arora, S., Hull, L., Fitzpatrick, M., Sevdalis, N. and Birnbach, D. (2015).	Crisis Management on Surgical Wards.
Balch, C., Shanafelt, T., Sloan, J., Satele, D. and Freischlag, J. (2019).	Distress and Career Satisfaction Among 14 Surgical Specialties, Comparing Academic and Private Practice Settings.
Culley, D., Fahy, B., Xie, Z., Lekowski, R., Buetler, S., Liu, X., Cohen, N. and Crosby, G. (2014).	Academic Productivity of Directors of ACGME-Accredited Residency Programs in Surgery and Anesthesiology.
Danis, D., Klinkner, G., Malec, A. and Rees, S. (2007).	Improving Patient Safety by Standardizing Handoff Communications.

Author (year)	Title
Dominguez, D., Garcia, C. and LaFrance, K. (2013).	Developing A New Graduate Program In Healthcare Management: Embracing The Transformation Of Healthcare Management Education On A Pathway To Success.
Doumouras, A., Keshet, I., Nathens, A., Ahmed, N., and Hicks, C. (2012).	A Crisis of Faith? A Review of Simulation in Teaching Team-Based, Crisis Management Skills to Surgical Trainees.
Graafland, M., Schraagen, J. and Schijven, M. (2012).	Systematic review of serious games for medical education and surgical skills training.
Hudspeth, R. (2008).	Complex Healthcare Regulation.
Khatrouch, I., Kaddes, M., Kermad, L., Boujelbene, Y. and ElMhamedi, A. (2013).	New approach for building multidisciplinary teams: case of surgical teams.
Kothari, S., Brethauer, S., Rosenthal, R., Nguyen, N. and Morton, J. (2015).	Response to "Ensuring Excellence in Centers of Excellence Programs".
McKean, S. (2012).	Principles and practice of hospital medicine.
Mitchell, L., Flin, R., Yule, S., Mitchell, J., Coutts, K. and Youngson, G. (2011).	Thinking ahead of the surgeon. An interview study to identify scrub nurses' non-technical skills.
Mumghamba, E. (2013).	Integrating a Primary Oral Health Care Approach in the Dental Curriculum: A Tanzanian Experience.
Parker, S., Flin, R., McKinley, A. and Yule, S. (2019).	The Surgeons' Leadership Inventory (SLI): a taxonomy and rating system for surgeons' intraoperative leadership skills.
Parker, S., Yule, S., Flin, R. and McKinley, A. (2012).	Surgeons' leadership in the operating room: an observational study.
Patel, V., Warren, O., Humphris, P., Ahmed, K., Ashrafian, H., Rao, C., Athanasiou, T. and Darzi, A. (2010).	What does leadership in surgery entail?
Siassakos, D., Fox, R., Bristowe, K., Angouri, J., Hambly, H., Robson, L. and Draycott, T. (2020).	What Makes Maternity Teams Effective and Safe? Lessons From a Series of Research on Teamwork, Leadership, and Team Training.
Sittig, D. (2011).	Defining Health Information Technology–Related Errors.
Stevens, L., Cooper, J., Raemer, D., Schneider, R., Frankel, A., Berry, W. and Agnihotri, A. (2017).	Educational program in crisis management for cardiac surgery teams including high realism simulation.
Thomas, E., Sexton, J. and Helmreich, R. (2003).	Discrepant attitudes about teamwork among critical care nurses and physicians*.
Valentine, M., Nembhard, I. and Edmondson, A. (2014).	Measuring Teamwork in Health Care Settings.
Winlaw, D., Large, M., Jacobs, J. and Barach, P. (2011).	Leadership, surgeon well-being and non-technical competencies of pediatric cardiac surgery.
Yeung, J., Ong, G., Davies, R., Gao, F. and Perkins, G. (2012).	Factors affecting team leadership skills and their relationship with quality of cardiopulmonary resuscitation
Yule, S. and Paterson-Brown, S. (2012).	Surgeons' Non-technical Skills.

RESULTS

Importance of Leadership and Teamworking for Surgeons

From the technological point of view, surgery is highly complex and is a practice that faces a constantly changing scenario. The surgeon works in the Department of Surgery, often in a specialized unit, and participates with interdisciplinary teams, and develops their daily clinical practice with other specialists and technicians working in different settings (such as operating room, ward) [6]. The primary objective of a surgeon is to provide the best patient care, with greater safety. When required today in most prestigious forums, safe surgery for the patient, it must be remembered that the complications that arise during treatment (about 45% in surgical patients) are rarely the result of the failure of a single individual, but in over 80% of cases they are related to poor planning of patient care systems, or with failures in teamwork [7].

A significant number of studies draw attention to the importance of effective teamwork, which by nature must be interdisciplinary, to get quality treatment over the surgical patient stays. Among them are two: the one entitled "To Err is Human: Building a Safer Health System" [8] published by the Institute of Medicine in 2000, in which the high percentage of errors detected was evaluated in the Health System of the USA and the well-known Kennedy Report in May, which analyzed the very high mortality of pediatric cardiovascular surgery service in Bristol, UK. As a result of the Surgery Quality Improvement Project with which has reduced mortality by a third and two-fifths in morbidity in all the services of surgery [9]. They participated in June. The overall analysis has led to a clear conclusion: the causes of

human errors and their adverse consequences for the patient are deficiencies related to teamwork, as well as the communication between its members.

While the topical figure of an individualist and arrogant surgeon, and even violent with his surgical environment, has already been exceeded, it is not uncommon that surgeons think they work together, when in fact, most do in the group [10]. Team working requires leadership essentially, to ensure that decisions making is done by consensus, analyze the reasons for the disagreements and try to fix them, ensure that the objectives are understood and accepted by the team, encourage all members to contribute their ideas, require the operation of the equipment is periodically reviewed [11]. It can only be made possible by the work of each of its members to appreciate, and finally, that leadership is shared, as necessary. Teamwork is not easy, but with good leadership and proper training of its members in cognitive abilities, and personal relationships, it can be achieved.

The results of recent research, advise that surgical services training programs to develop teamwork in specific tasks (operating room, emergency department, hospital ward), as has already been done, and successfully in other high-risk professions, such as aviation, by applying the methodology called crew resource management (CRM). The key elements of this methodology that can be applied to the work of the surgeons are: the "briefing" (a previous discussion of the action plan), the question between senior member and juniors team of decisions, and take "de-briefing" sessions (understood as the discussion of what happened afterward). Compliance with these requirements can only be achieved in an atmosphere of work and communication between members of a team in which everyone is always willing to learn [12].

The "Non-technical skills for surgeons' project, designed by the University of Aberdeen, has identified several cognitive skills and personal relationships, which must be the essential complement to the expertise of the surgeon, to keep the OR, high levels of quality and safety [13]. These skills include the surgeon's ability to exercise leadership, the state of permanent alert, the ability to take the right decision at all times, and the ability to stimulate communication and teamwork. It is currently available instruments to assess, on stage at the theatre, the teamwork, and skills that are not just technical.

Several studies have shown a relationship between teamwork (surgeons, anesthetists, and instrumentalists) [14], the "performance" and safety in the operating room. It is estimated that up to 1/3 of the duration of the activity in an operating room, communication failures occur in the team. 33% of these failures originate delays, workarounds an unsolved problem ("workaround"), increased environmental stress, unnecessary expense, and disturbance to the patient. A recent study assessed for the first time, the impact that a training course in non-technical skills (CRM methodology) had on the results of two types of surgery, showing that the improvement observed in the teamwork produced the best technical results. These data confirm, albeit in a different field, the results of the multicenter project MedTeams [15], in the US, where the application of CRM in the emergency services model was evaluated and found to a reduction in clinical errors (30.9 to 4.4%) and improved teamwork and attitudes of its members [16]. This is the clearest example of how improved teamwork can avoid complications. It is possible that system-based training, as well as patient simulators that allow the practice of specific behaviors, can avoid the need for real instructors.

However, since efficient teamwork does not arise spontaneously, should be encouraged as soon as possible the development of new hospital culture, for the hospital administration and the Department of Surgery must provide the training tools to help its implementation. But above all, it is essential to have well-trained surgical leaders, able to motivate and change, for the good behavior of team members, with the ultimate goal, to always be the best possible result for the patient. It would be desirable that scientific societies and the NHS itself develop programs similar to the Royal College of Surgeons of England, aimed at the specific training of leaders, and their corresponding surgical equipment, improving, no doubt, patient safety [17].

Leadership in Surgeons

Leadership is one of the most important qualities for a successful surgeon. Surgical outcomes depend critically on a surgical team rather than on an individual; therefore, the role of surgeons is essential for optimal management of patients in a surgical service [18]. There are different kinds of leadership: one who asks the group to follow him, the group encouraged to follow you, or those who are forced to follow. It is important to remember that the most effective leader is using different styles at different times. One should be aware of the strengths and weaknesses in him/her as a leader and recognize what kind of leadership is most often used, as must implement leadership strategies in line with the situation [19].

Several points should be present in every surgeon in assuming the leadership role within a surgical team and in OR [20]:

- One must learn the art of conflict resolution: it is important

to remember that there is a conflict over a point of view and always more of a perception of truth. The surgeon should try to understand each different point and perspective, but it has not always solved them, has to determine the ideal to maintain the cohesion of the group and its mission.

• Role model: is defined as a guide; they are people showing the right path to be followed, through their actions and behaviors. It is a huge responsibility and a great opportunity to demonstrate their attitudes and skills. They can demonstrate such using a suitable treatment with the patient, excellent academic foundation, and good relationships.

• Counsellor: young interns and residents come daily to the surgeon with conflicts, patient care questions, personal problems, etc. In these situations, the surgeon should be a director and confidant. He/she should be affable, confident ear, who can provide advice on mental and physical health for the residents. Also, he/she helps monitor the stress level of the residents.

• It is the right program director to indicate the stress level of the residents; remember the old phrase of "praise in public and criticize in private". Feedback should attentively, timely, and honest, but critical. Compliments are an effective way to encourage positive behavior, academic, interpersonal, and professional effort among residents.

CONCLUSIONS

In conclusion here are some final tips for excellent leadership development for surgeons:

1. Be seen as someone approachable and trustworthy; residents gain a better understanding as people.

2. Time Management: schedule daily activities; new things appear daily, so the surgeon should learn to prioritize the moment they happen.

3. Surgeons must take time for personal growth and professional development.

4. Surgeons must create a relationship with their boss, additional close work with the program director.

Limitations of this Study

Since this is a systematic literature review, therefore, the main limitation of this study is that it lacks primary research. This is a purely secondary research study although the research reviewed in this review does contain primary research evidence.

Also, the author of this review could only conduct searches in only three databases. Another limitation of this review is that it includes studies in English only and therefore studies published in another language have been excluded.

The scope of the review is also limited because it focuses on the leadership skills of surgeons only and does not focus on the leadership skills of other staff in the operating room. Although there are several limitations in this review yet as explained in previous sections the search strategy is comprehensive and systematic which ensures reliability and validity of the results and findings.

Implications of this review

The main implication of this review is for surgeons and students. They can understand the importance of leadership skills and include the development of leadership skills in their development plans.

Besides, the management and administration of hospitals can also benefit from this review and motivate surgeons and other staff to develop leadership skills and ultimately maximize the quality of care and patients' safety in their hospitals.

The review stresses the importance of leadership skills and therefore it recommends that administrations should plan and implement training courses for surgeons and OR staff to enhance their leadership skills.

References:

1. Flin, R., Yule, S., McKenzie, L., Paterson-Brown, S., & Maran, N. (2006). Attitudes to teamwork and safety in the operating theatre. The Surgeon, 4(3), 145-151.

2. Sevdalis, N., Hull, L., & Birnbach, D. J. (2012). Improving patient safety in the operating theatre and perioperative care: obstacles, interventions, and priorities for accelerating progress. British journal of anaesthesia, 109(suppl 1), i3-i16.

3. Vincent, C., Moorthy, K., Sarker, S. K., Chang, A., & Darzi, A. W. (2004). Systems approaches to surgical quality and safety: from concept to measurement. Annals of surgery, 239(4), 475.

4. Salas, E., Guthrie, J. W., Wilson-Donnelly, K. A., Priest, H. A., & Burke, C. S. (2005). Modeling team performance: The basic ingredients and research needs.Organizational simulation, 185-228.

5. Salas, E., Cooke, N. J., & Rosen, M. A. (2008). On teams, teamwork, and team performance: Discoveries and developments. Human Factors: The Journal of the Human Factors and Ergonomics Society, 50(3), 540-547.

6. Siassakos, D., Fox, R., Bristowe, K., Angouri, J., Hambly, H., Robson, L. and Draycott, T. (2020). What Makes Maternity Teams Effective and Safe? Lessons From a Series of Research on Teamwork, Leadership, and Team Training. Obstetric Anesthesia Digest, 34(4), p.201.

7. Parker, S., Yule, S., Flin, R. and McKinley, A. (2012). Surgeons' leadership in the operating room: an observational study. The American Journal of Surgery, 204(3), pp.347-354.

8. Sittig, D. (2011). Defining Health Information Technology–Related Errors. Arch Intern Med, 171(14), p.1281.

9. Kothari, S., Brethauer, S., Rosenthal, R., Nguyen, N. and Morton, J. (2015). Response to "Ensuring Excellence in Centers of Excellence Programs". Annals of Surgery, p.1.

10. Winlaw, D., Large, M., Jacobs, J. and Barach, P. (2011). Leadership, surgeon well-being and non-technical competencies of pediatric cardiac surgery. Progress in Pediatric Cardiology, 32(2), pp.129-133.

11. Valentine, M., Nembhard, I. and Edmondson, A. (2014). Measuring Teamwork in Health Care Settings.Medical Care, p.1.

12. Parker, S., Flin, R., McKinley, A. and Yule, S. (2019). The Surgeons' Leadership Inventory (SLI): a taxonomy and rating system for surgeons' intraoperative leadership skills. The American Journal of Surgery, 205(6), pp.745-751.

13. Mitchell, L., Flin, R., Yule, S., Mitchell, J., Coutts, K. and Youngson, G. (2011). Thinking ahead of the surgeon. An interview study to identify scrub nurses' non-technical skills. International Journal of Nursing Studies, 48(7), pp.818-828.

14. Khatrouch, I., Kaddes, M., Kermad, L., Boujelbene, Y. and ElMhamedi, A. (2013). New approach for building multidisciplinary teams: case of surgical teams. IJBHR, 4(3/4), p.343.

15. Stevens, L., Cooper, J., Raemer, D., Schneider, R., Frankel, A., Berry, W. and Agnihotri, A. (2017). Educational program in crisis management for cardiac surgery teams including high realism simulation. The Journal of Thoracic and Cardiovascular Surgery, 144(1), pp.17-24.

16. Bleetman, A., Sanusi, S., Dale, T. and Brace, S. (2011). Human factors and error prevention in emergency medicine. Emergency Medicine Journal, 29(5), pp.389-393.

17. Arora, S., Hull, L., Fitzpatrick, M., Sevdalis, N. and Birnbach, D. (2015). Crisis Management on Surgical Wards. Annals of Surgery, 261(5), pp.888-893.

18. Yule, S. and Paterson-Brown, S. (2012). Surgeons' Non-technical Skills. Surgical Clinics of North America, 92(1), pp.37-50.

19. Chipman, J. and Schmitz, C. (2009). Using Objective Structured Assessment of Technical Skills to Evaluate a Basic Skills Simulation Curriculum for First-Year Surgical Residents. Journal of the American College of Surgeons, 209(3), pp.364-370.e2.

20. Mumghamba, E. (2013). Integrating a Primary Oral Health Care Approach in the Dental Curriculum: A Tanzanian Experience. Med Princ Pract.

21. Balch, C., Shanafelt, T., Sloan, J., Satele, D. and Freischlag, J. (2011). Distress and Career Satisfaction Among 14 Surgical Specialties, Comparing Academic and Private Practice Settings. Annals of Surgery, 254(4), pp.558-568.

22. Patel, V., Warren, O., Humphris, P., Ahmed, K., Ashrafian, H., Rao, C., Athanasiou, T. and Darzi, A. (2010). What does leadership in surgery entail? ANZ Journal of Surgery, 80(12), pp.876-883.

23. Yeung, J., Ong, G., Davies, R., Gao, F. and Perkins, G. (2012). Factors affecting team leadership skills and their relationship with quality of cardiopulmonary resuscitation*. Critical Care Medicine, 40(9), pp.2617-2621.