

Non-technical Training in Orthopedic Surgery: An Unrecognized Need

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ABSTRACT

Objectives: Surgical safety has become a raising concern over the past few decades. Many studies have shown that it is correlated to nontechnical performance rather than clinical expertise, and it can be improved if nontechnical competencies are combined with technical training in the surgical profession. The primary purposes of this study were to assess and prioritize the perceived needs of orthopedic surgeons for nontechnical skills for orthopedic surgeons in correlation to years of experience. **Methods:** An online survey was sent to 200 AOTrauma members in the Middle East clearly stating the study purposes and volunteer participation. A 5-point Likert scale was used to collect surgeons' ratings of the selected nontechnical topics. **Results:** One-hundred and nine of 200 (54.5%) invited participants responded. More than half (65.1%) being surgeons with >10 years of experience. The majority (92%) of respondents emphasized the importance of nontechnical skills training for orthopedic surgeons. Of the enlisted topics, professionalism and patient privacy scored the highest priority for junior surgeons, while more experienced surgeons ranked patient safety and teamwork as their top two desired topics. An interesting finding was that medicolegal training was rated as an increasing need as more surgical experience was gained. **Conclusions:** This study highlights the demand for nontechnical skills training from the orthopedic trauma surgeons' perspective. The results showed that topics such as patient safety essentials, professionalism, teamwork, and medicolegal issues came on the top of the list. Addressing this demand by creative and specialty-focused nontechnical skills courses will help to improve patient care.

Keywords: Non-technical skills, orthopedic surgery, patient safety, professionalism, soft skills, surgical education, surgical training

INTRODUCTION

It has been established that there is a growing demand from an institutional perspective for nontechnical training aiming to improve patient care and patient safety.^[1-3] This demand was derived mainly by the rise of adverse events in surgery that have highlighted the value of nontechnical skills such as communication challenges, clinical leadership, patient-shared decision-making, conflict management, and patient safety.^[4,5] It has been reported that many adverse events are mainly due to failure in nontechnical performance rather than clinical expertise.^[6,7] Many complex aspects of patient care require a particular type of nontechnical skill, such as communication, teamwork, breaking bad news, professionalism, and leadership skills. In a complex clinical environment, such as the operating theater or emergency setting, inadequate nontechnical abilities have been linked to producing undesirable impact on patient safety.^[8-12] For instance, surgeons are susceptible to different types of stressors that can negatively affect their patient

outcomes; however, studies have shown that nontechnical skills, such as appropriate communication, reduce such stress.^[10,13] Therefore, health-care providers' competency in nontechnical skills will have a significant impact to improve patient care.

Currently, efforts are being made to address the demand for nontechnical training utilizing educational intervention in undergraduate or postgraduate training.^[1,2] However, most of the educational efforts in undergraduate or postgraduate training focus on technical competencies in the desired

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specialty. Therefore, many important aspects, such as decision-making, leadership, and teamwork, are overlooked during undergraduate and postgraduate training programs. This lack of nontechnical training generates a considerable knowledge gap between the academic side and the clinical side when those graduates start caring for their patients. Recently, some colleges and postgraduate programs began to incorporate nontechnical training as part of their curricula. For instance, Canadian residency training programs have implemented the CanMEDS framework, which incorporates six nontechnical competencies incorporated into the training program aiming to graduate medical expert.^[14,15] In addition, there are some other rising structured training programs such as “Team Strategies and Tools to Enhance Performance and Patient Safety” (TeamSTEPPS®), which is structured communication training aiming to improve patient safety.^[16]

In orthopedic specialty, nontechnical skills are not yet established as an essential part of most of orthopedic residency trainings or as an essential supplementary program linked to major orthopedic scientific events. These skills are defined as “the cognitive, social, and personal resource skills that complement technical skills and contribute to safe and efficient task performance.^[17,18] The challenge is to make this type of education more relevant and attractive to orthopedic surgeons. Furthermore, the types of needed training and their relevance based on surgeons’ experience and demands have not been sufficiently explored or defined for the orthopedic specialty. As most of the current nontechnical skills courses are general and not specialty based, many surgeons feel that these courses are not relevant and might not be attractive to them. The primary purpose of this study was to explore the needs of orthopedic surgeons for nontechnical skills and identify the most relevant topics that need to be addressed.

MATERIALS AND METHODS

An online questionnaire was sent to 200 orthopedic trauma surgeons (AOTrauma members) in the Middle East aiming to identify and understand their perceived needs for nontechnical training. In addition, we surveyed the respondents’ likelihood to participate in a complementary nontechnical skills educational activity on one of the listed topics when combined with a major orthopedic event. This self-administered questionnaire in English language covered 12 items and made available securely online based on published guidelines.^[19-22] The questionnaire was structured with a combination of categorical 5-point Likert-type scale questions to explore the preferred type of topics versus years of experience in orthopedic surgery.

The survey was pretested to obtained face and content validity by asking five orthopedic surgeons and one consultant in medical education to review the questionnaire and provide input and feedback. Subsequent changes to areas of concern and ambiguity were made accordingly. Further, the questionnaire was piloted on five orthopedic surgeons to obtain approximate timing and transparency.

Implementation and data collection

Following the approval of the study by the Research Ethics Board and obtaining a list of AOTrauma members in the Middle East, the surgeons were contacted electronically by sending direct E-mail invitations. The purpose of the study was clearly described to the study participants in the cover letter before enrollment into the study. A participants’ decision to complete the questionnaire was an indication of their consent to participate. After removing identifying information and replacing it with number coding to ensure their confidentiality, the raw data were collected and converted to Microsoft Excel® spreadsheet and analyzed using SPSS Statistics for Windows, Version 20.0. (IBM Corp., Armonk, NY). Based on a 5-points Likert scale, the data were analyzed in categorical fashion, and variables were summarized as descriptive statistics (i.e., frequency, percentage, mean, median, mode, and standard deviation) to summarize the results for all collected data as appropriate.

RESULTS

One-hundred and nine of 200 (54.5%) invited participants responded. The results showed that the respondents had a wide range of experience. Forty-nine percent of respondents had >5 years’ experience [Table 1]. Interestingly, most of the respondents (91.7%) agreed on the importance of the enlisted nontechnical skills topic as an essential need for their practice [Figure 1].

The data showed that the respondents had a somewhat different likelihood regarding the rank order of the enlisted topics. Of all topics, patient safety came as the top-ranked priority to be addressed [Table 2]. When the data were weighted against the level of experience to explore the need accordingly, it was found that surgeons who had <5 years of experience ranked professionalism, patient privacy and confidentiality, and conflict management as their top needs, respectively [Table 2].

Table 1: Respondents according to their level of experience

Experience in years	Response (%)	Number
<5 years	5.50%	6
5-10 years	29.36%	32
11-15 years	20.18%	22
>15 years	44.95%	49

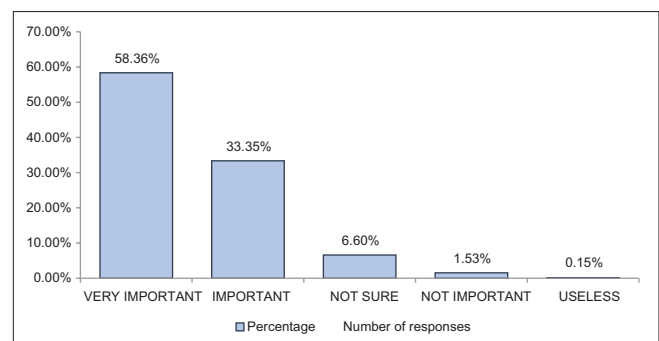


Figure 1: Total responses on all topics

In contrast, experienced surgeons with >15 years of practice choose patient safety, teamwork, and professionalism as their top-ranked priorities, respectively.

The responses on the importance of 12-scored items showed good inter-rater reliability (Cronbach's alpha: 0.82) for 107 valid respondents (list-wise deletion of two respondents based on all variables in the procedure). Most of the respondents (85.3%) showed a high likelihood to attend a 1-day

complementary nontechnical skills educational activity on one of the listed topics when combined with a major orthopedic event [Table 3]. (The responses showed good inter-rater reliability (Cronbach's alpha: 0.926) calculated for 103 valid respondents (as six respondents were omitted based on all variables in the procedure).

One of the interesting findings was to see that medicolegal importance was found to increase progressively over time starting from the 10th rank for <5 years' experience group of respondents to the third rank for the +15 years' experience group [Table 4].

Table 2: Rank of topic importance based on respondents, classified according to years of experience

Topic	Rank for respondents (years)				Overall rank
	>5	5-10	11-15	>15	
Medicolegal issues	9 th	4 th	4 th	5 th	5 th
Communication challenges	11 th	3 rd	5 th	6 th	6 th
Clinical leadership	8 th	8 th	9 th	9 th	9 th
Professionalism	1 st	5 th	2 nd	3 rd	3 rd
Patient privacy and confidentiality	2 nd	6 th	3 rd	7 th	7 th
Patient-shared decision-making	5 th	9 th	7 th	8 th	8 th
Conflict management	3 rd	10 th	10 th	10 th	10 th
Patient safety	4 th	1 st	1 st	1 st	1 st
Teamwork	6 th	2 nd	8 th	2 nd	2 nd
Conflict of interest	12 th	12 th	11 th	12 th	12 th
Breaking bad news	10 th	11 th	12 th	11 th	11 th
Doctor-patient relationship	7 th	7 th	6 th	4 th	4 th

Table 3: Respondents' likelihood of attending one-day course on one of the enlisted topics

Answer choices	Responses (%)	Number
Very likely	49.54	54
Likely	35.78	39
Not sure	11.01	12
Unlikely	3.67	4
Very unlikely	0.00	0
Total		109

DISCUSSION

In this study, the desire of orthopedic surgeons to participate in selected nontechnical skills topics was explored. In addition, their wish list of topics to be taught was assessed, which varied according to years of experience. The surgical literature is very rich in material that addresses all aspects of technical skills or addresses the surgeons' needs to optimize their surgical performance. Moreover, scientific events and conferences are focused on keeping surgeons updated regarding clinical knowledge and technical skills. However, adequate patient care requires both technical precision and nontechnical skills to achieve the desired goal.^[23,24] Therefore, addressing the needs of nontechnical skills will help to promote patient care. This study result came aligned with the growing worldwide demand to recognize and teach nontechnical skills to health-care providers, particularly in complex clinical settings.^[5,18,24,25] However, teaching such skills presents many challenges, such as identification and prioritization of the types of skills needed and the best teaching methods to achieve the desired goals.

The results showed that there is a good desire of orthopedic surgeons to explore many aspects of nontechnical skills topics. The collected data demonstrated that the respondents perceived it as an essential need. This should guide us to meet this need, utilizing creative teaching methods and practical scenarios to address this demand. Furthermore, the data showed

Table 4: Rank of likelihood to attend one of the courses, classified by years of experience

	Rank for respondents (years)				Overall rank
	<5 years	5-10 years	11-15 years	>15 years	
Medicolegal issues	10 th	6 th	4 th	3 rd	3 rd
Communication challenges	11 th	5 th	2 nd	5 th	6 th
Clinical leadership	3 rd	1 st	6 th	6 th	4 th
Professionalism	1 st	2 nd	1 st	1 st	1 st
Patient Privacy and Confidentiality	4 th	11 th	11 th	8 th	11 th
Patient-shared decision-making	7 th	10 th	7 th	10 th	9 th
Conflict management	2 nd	7 th	9 th	12 th	8 th
Patient safety	5 th	3 rd	5 th	2 nd	2 nd
Teamwork	8 th	4 th	8 th	4 th	5 th
Conflict of interest	9 th	8 th	10 th	11 th	10 th
Breaking bad news	12 th	12 th	12 th	9 th	12 th
Doctor-patient relationship	6 th	9 th	3 rd	7 th	7 th

a high likelihood of respondents willing to participate in complementary nontechnical skills educational activities when combined with a major orthopedic event. We consider this as an indication that teaching these skills should be incorporated into technical orthopedic courses and conferences. Utilizing creative and relevant teaching methods for nontechnical skills will create an opportunity for discussion and open the horizon for orthopedic surgeons to reflect on how to incorporate these skills into their daily practice.

The study results can be utilized as a guide to select topics based on the prioritization list presented. Among all, patient safety issues seem to be one of the most desired topics to be addressed. This finding is aligned perfectly with the growing demand from an institutional perspective to teach patient safety essential aiming to promote excellence in patient care.^[26] Case-based teaching can be utilized to teach patient safety, which will make it more relevant to orthopedic participants' practice. The data also provide a guide to scientific activity organizers to select the topics that suit their audience. Several nontechnical skills assessment tools have been tried for a nonorthopedic surgical specialty without having a consensus as to which tools have substantial impact on patient outcome.^[5,27] Our results showed the most interesting topics ranked by priority that could be attractive to orthopedic surgeons according to their level of experience.

Our results also demonstrate how surgeons realize the varying importance of medicolegal issues throughout their clinical years. This result could be linked to the Dunning–Kruger effect wherein fresh graduates have difficulty recognizing their incompetence, which leads to an inflated self-assessment.^[28] It is our supposition that this early overestimation of abilities is gradually tempered over the years by experience and exposure to different types of events, which make the orthopedic surgeon more cognizant of the need for increased learning concerning medicolegal issues.

Limitations

This study has a number of limitations. First of all, it addresses a particular group of orthopedic surgeons in one specific region. However, this can be considered as a guide for a higher scale needs assessment to expand the view and explore the demand of a larger sample of orthopedic surgeons. In addition, the selection of AOTrauma group was based on the background that the AO foundation is an active organization that utilized structured educational methodology and standardized curricula in their course worldwide to improve orthopedic surgeons' competencies. Moreover, this study can serve as a pilot study to call for action aiming to perform larger scale studies to assess the demand and needs of orthopedic surgeons in their unique clinical setting globally. Another limitation is the relatively small sample size to give reliable results that address these needs. However, the 200 orthopedic trauma surgeons contacted are a representing sample of AOTrauma members in the Middle East region. Furthermore, the 54.5% response rate is very high for a survey of this type. Therefore, this study can serve as a pilot study for a larger scale

study to assess the demand and needs of orthopedic surgeons in their unique clinical setting globally. Finally, an important limitation of this study is the way in which the content of the survey was derived.

Recommendation

Surgical safety can be improved substantially if nontechnical competencies are combined with technical training in the surgical profession, especially in the current era of increased patient safety issues. Therefore, effort and resource allocation should be directed to enhance nontechnical skills for orthopedic surgeons in different levels of their professional career from early interns to senior consultants. Topics such as patient safety essentials, team working, medicolegal issues, and doctor–patient relationship shall be on the top of the list. We highly recommend that training of these skills should be taken to the next level by formally incorporating them in internship programs in addition to professional training and education. The issue of education attractiveness remains a challenge, and it can be addressed by well-structured interactive workshops, case-based teaching, or any other innovative teaching methods such as CanMEDS and TeamSTEPPS. Moreover, this study opens our eyes to an angle that was not addressed before for orthopedic surgeons' education. The results could stimulate more research in this area. Furthermore, it can be utilized to open horizon for scientific bodies organizing major events to incorporate such material in their future activities.

CONCLUSIONS

This study highlights the high demand for nontechnical skills training from the orthopedic trauma surgeons' perspective. Topics such as patient safety essentials, professionalism, teamwork, and medicolegal issues should be on the top of the list. Addressing this demand by creative and specialty-focused nontechnical skills courses will help to improve patient care.

Ethical consideration

The approval of the study was by AO foundation Research Center, Davos, Switzerland.

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Conflicts of interest

There are no conflicts of interest.

Authors' contribution

KA conceived and designed the study, conceptualized the idea, designing the questionnaire, conducted research, data

collection, and organization, and drafted the first manuscript. AE Analyzed and interpreted data, manuscript edit, and critical review during the writing of the manuscript. SB designing the questionnaire and critical review during the writing of the manuscript. WT critical review during the writing of the manuscript and provided logistic support. MU critical review during the writing of the manuscript, critical review of analyzed data. All authors participated in the writing of and made essential contributions to this paper and critically reviewed and approved the final manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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