

# Analysis of the Surgeons-Anaesthetists Communicative and Collaborative Relationship in the Operating Rooms (An Inside Perspective)

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## Abstract

**Introduction:** Effective collaboration and communication among health care professionals are essential for efficient patient-care; however, collaboration can be challenging in a highly demanding, Operating Room (OR) environment, where different team members have a shared responsibility for a single patient.

The surgeon and anaesthetist are two physicians in charge of one patient, however with different focus and aspects of care, and thus their communication is importance to ensure patient safety, reduce medical errors and achieve the best outcome.

**Purpose:** The purpose of this research study was to understand the current collaborative relationship between surgeons and anaesthetists at a tertiary hospital, discussing different factors that might have contributed to this relationship and how that might impact, patients, practice, and healthcare trainees.

**Design, setting and participants:** The Study was conducted at a tertiary center university-based hospital on the east coast of Saudi Arabia, using a quantitative descriptive, cross-sectional survey design. The inclusion criteria included any anaesthetist or surgeon who had spent at least six months in the institution. The instrument used was "The Assessment of Inter-professional Team Collaboration Scale II" (AITCS II) in its online version.

**Results:** A total of 85 participants data were considered for analysis, the data analysis indicated a positive collaborative relationship.

Surgeons overall collaboration means were higher than the anaesthetists, but the difference was statistically insignificant between disciplines. Also the overall collaboration scores were higher among females but again statistically insignificant.

**Conclusion:** The survey demonstrated a positive Inter Professional Collaborative (IPC) relationship among surgeons and anaesthetists in the institution, with stronger collaboration seen amongst senior staff which alludes to the importance of the reinforcement of collaboration through role modelling and training especially in academic institutions, high lightening the need of involving program directors, educators, and policy makers, in the process towards a collaborative patient-centred care.

**Keywords:** Anesthetist; Surgeon; Interprofessional collaboration; Relationship; Operating room

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## Introduction

There is strong evidence in the published literature that

teamwork and collaboration are essential to maintain safe practice and optimise patients' care [1]. Effective collaboration and communication have been shown to reduce potential risks,

improve outcomes and increase patient and staff satisfaction with the service provided [2].

Inter Professional Collaboration (IPC), is defined as a partnership between a team of health providers and a client in a collaborative and coordinated approach to shared decision making around health and social issues [3]. IPC has been described as a process that embraces communication and decision-making to create a patient-centered, care-oriented team [4].

Cooperation might be considered challenging in the demanding, and stressful environments, such as the Operating Room (OR), Emergency Department (ED), and Critical Care Unit (CCU), where hierarchical cultures are prevalent, and inter-changeable roles among staff exist [5].

Communication failure has been identified as one of the factors, which leads to operating room delay or procedure cancellation, subsequently jeopardising patient care and increasing healthcare costs [6]. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO), reported communication failures as the root of over 60% of sentinel events [7].

In the operating room, the primary personnel in direct contact with the patient are surgeons, nurses, and anaesthetists. There is some available literature, exploring the interaction and reasons for conflicts, between these parties [8] and the impact of interprofessional training on the development of IPC through improvement of staff knowledge, skills, and attitudes [9]. Some studies focused on surgeon-nurse perspectives, as the primary caregivers to the patient [10]. Other studies included the anaesthetist as part of the team, and one investigated surgeon-anaesthetist conflicts [8]. However, there was limited literature studying the surgeon-anaesthetist relationship, the actual application of IPC, and its impact on patient outcomes.

Although the nursing role cannot be overlooked, their contact with the patient commences when patient arrives in the OR, while the surgeon and the anaesthetist start their encounter with the patient from the preoperative period, collecting clinical histories, requesting the necessary investigations and working up systems to prepare and optimise patient condition for surgery. They are two physicians in charge of one patient, but their focus is on different aspects of care and information, their differing roles may result in different priorities, and opinions, increasing the risk of triggering conflict, impacting the work climate and in turn the safety of the patient [11]. The surgeon and anaesthetist are therefore key players in the OR, and their continuous communication is of paramount importance for the best patient outcome [12].

A literature gap was identified, concerning the surgeon-anaesthetist collaborative relationship with the patient-centred care as a goal, rather than working independently for the same target.

Many healthcare professionals believe they practice collaboratively. However, assessing the actual IPC requires an accurate and validated assessment tool to measure collaboration within their setting.

The purpose, of this research, was to understand the current collaborative relationship between surgeons and anaesthetists at a tertiary hospital, discussing different factors that might have contributed to this relationship and how that might impact patient safety, clinical practice, and training.

## Materials and Methods

The study was conducted at a tertiary center university-based hospital on the east coast of Saudi Arabia, the inclusion criteria included any anaesthetist or surgeon who had spent at least six months in the same institution. The study adopted a quantitative descriptive, cross-sectional survey design. The study protocol was approved by the Ethics Committee of the Medical Faculty of the University of Dundee and from the local hospital committee at which the survey was carried.

The participation was entirely voluntary, and the participants were informed about their right to withdraw, with no further obligation.

The participants signed a digital informed consent, indicating their full understanding of all the terms and conditions before filling in the survey form.

The assessment tool used was “The Assessment of Interprofessional Team Collaboration Scale II” (AITCS II) through an online invitation link to maintain the anonymity of the participants.

The AITCS-II, is a likert-type scale with established evidence for internal consistency, reliability and constructs validity [13]. It is designed to measure interprofessional collaboration among practice-based team members, It consists of 23 statements considering characteristics of interprofessional collaboration (how the team works and acts). Scale items represent three elements that are considered the key domains of collaborative practice. The subscales are (i) Partnership-8 items, (ii) Cooperation-8 items, and (iii) Coordination-7 items [13].

Two hundred online questionnaires were sent to all potential participants, a reminder email was sent two weeks after the initial invitation, and those who gave their digital consent could complete the questionnaire any time within the six months.

The total number of participants who received the questionnaire was 200; however, 66 respondents did not go beyond the consent page, and a total of 49 did not progress to the last page. In summary 85 responses were completed.

After obtaining permission from the author, some minor modifications of the scale related to the initial demographic part, and discipline specification, which do not affect the substance of the scale, were done and it was designed within the Joint Information Systems Committee (JISC) online format (formerly Bristol Online Survey-BOS). JISC is a United Kingdom not-for-profit company whose role is to support post-16 and higher education, and research, by providing relevant and useful advice, digital resources, network and technology services, while researching and developing new technologies and ways of working.

## Statistical analysis

The sample size was 85 which reflect the number of completed survey responses. Both descriptive and inferential statistics for the characteristics of Inter Professional Collaboration (IPC) scale were used. According to Norman, the parametric tests are more robust than nonparametric tests that tend to give unbiased and close to the correct answers when analysing Likert scale responses [14]. Moreover, many experts have argued that if there is an adequate sample size and if the data are normally distributed (or nearly normal), parametric tests can be used with Likert scale ordinal data [15]. Kolmogorov-Smirnova test was applied to check the normality of the data.

Based on the above facts, parametric tests were used in analysing the data (e.g., t-tests, analysis of variance, and Pearson correlations). Data were analysed by IBM SPSS. Frequencies and percentages were calculated for all categorical variables while the mean and standard deviation of each item were calculated and then summed for each subscale. The average item scores were calculated for each subscale. Higher scores on all scales indicate a greater presence of the attribute or dimension being measured. Independent t-tests were used to compare the mean score of each item and means of subscale between gender and disciplines (surgery vs. anaesthesia) while one-way ANOVA was used to compare the mean scores of subscale and total collaboration between categories of years in practice. Although a high-reliability coefficient was already established for the instrument, we repeated the cronbach alphas for the study to determine the reliability coefficient of the overall AITCS-II and its subscales, while correlation coefficient was calculated between subscale and total collaboration to check the internal consistency of AITCS. The level of significance was set at  $\leq 0.05$ .

## Results

A total of 200 survey questionnaires were sent out, and 85 respondents completed the questionnaires. Kolmogorov-Smirnova test showed the pattern of normally distributed data. Baseline descriptive statistics of study participants are presented in **Table 1**. The majority of participants 57 (67.1%) belonged to surgery, and 28 (32.9%) were from anaesthesia. Gender distribution shows strong male predominance with the male to female ratio of 3.7: 1, {67(78.8%) were male, and 18 (21.2%) were female}. The average age of participants was  $37.8 \pm 9.5$  years (min-max=25-62 years). Majority 49 (57.6%) of participants

had age between 31-50 years. A total of 30 (35.3%) individuals were in practice five years or less since achieving license, while 54 (63.5%) of participants had been functioning in their present team for 5 or fewer years (**Table 1**).

	Frequency	Percentage (%)
Discipline		
Anaesthesia	28	32.9
Surgery	57	67.1
Gender		
Male	67	78.8
Female	18	21.2
Age (Years)	Mean $\pm$ SD	43
$37.8 \pm 9.5$	Min-Max	43
25-62	43	43
$\leq 30$	23	27.1
31-50	49	57.6
$> 50$	13	15.3
Years in practice	43	43
(since achieving license to practice)		
$< 5$	30	35.3
5-10	18	21.2
11-20	24	28.2
$> 20$	13	15.3
Years with your current team		
$< 5$	54	63.5
5-10	17	20
11-20	10	11.8
$> 20$	4	4.7

**Table 1:** Baseline characteristics of the participants (n=85).

Most participants were in practice five years or less since achieving license to practice. Respondents indicated their general level of agreement on AITCS-II items on a scale of Never=1, rarely=2, occasionally=3, most of the time=4, always=5. The higher the average depicts, the more the agreement with the item. Overall descriptive statistics of AITCS are presented in **Table 2**. The partnership subscale means for the eight items (maximum possible score=40) was  $30.7 \pm 5.8$ , whereas for cooperation the average for eight items (maximum possible score=40) was  $32.1 \pm 6.2$  and for coordination, the mean for its seven items (maximum possible score=35) was  $25.5 \pm 6.1$ . The overall collaboration means of the 23 items (maximum possible score=115) of  $88.3 \pm 16.8$  which is on the positive side. The average of individual item scores was calculated in **Table 2**.

	Min-Max	Mean $\pm$ SD	Median
<b>Partnership</b>	12-40	$30.7 \pm 5.8$	31
Include patients in setting goals for their care	1-5	$4.19 \pm 0.89$	4
Listen to the wishes of their patients when determining the process of care chosen by the team	2-5	$4.21 \pm 0.83$	4
Meet and discuss patient care on a regular basis	1-5	$3.87 \pm 1.02$	4
Coordinate health and social services (e.g. Financial, occupation, housing, connections with community, spiritual) based upon patient care needs	1-5	$3.2 \pm 1.12$	3
Use consistent communication with all team members to discuss patient care	2-5	$3.87 \pm 0.84$	4

Are involved in goal setting for each patient	2-5	3.89 ± 0.91	4
Encourage each other and patients and their families to use the knowledge and skills that each of us can bring in developing plans of care	1-5	3.61 ± 1.03	4
Work with the patient and his/her relatives in adjusting care plans	1-5	3.85 ± 0.89	4
<b>Cooperation</b>	10-40	32.1 ± 6.2	33
Share power with each other	1-5	3.88 ± 0.96	4
Respect and trust each other	1-5	4.21 ± 0.9	4
Are open and honest with each other	1-5	4.02 ± 0.98	4
Make changes to their team functioning based on reflective reviews	1-5	3.87 ± 0.88	4
Strive to achieve mutually satisfying resolution for differences of Opinions	1-5	4 ± 0.82	4
Understand the boundaries of what each other can do	2-5	4.01 ± 0.88	4
Understand that there are shared knowledge and skills between health Providers on the team	2-5	4.09 ± 0.85	4
Establish a sense of trust among the team members	1-5	4.02 ± 0.98	4
<b>Coordination</b>	12-40	25.5 ± 6.1	26
Apply a unique definition of Inter professional collaborative practice to the practice setting	1-5	3.71 ± 0.96	4
Equally divide agreed upon goals amongst the team	2-5	3.78 ± 0.89	4
Encourage and support open communication, including the patients and their relatives during team meetings	1-5	3.62 ± 1.18	4
Use an agreed upon process to resolve conflicts	1-5	3.72 ± 0.96	4
Support the leader for the team varying depending on the needs of our patients	1-5	3.96 ± 1.07	4
Together select the leader for our team	1-5	3.26 ± 1.27	3
Openly support inclusion of the patient in our team meetings	1-5	3.47 ± 1.16	4
Total (Overall)	32-115	88.3 ± 16.8	89

**Table 2:** Overall descriptive statistics of AITCS (n=85).

Study analysis included instrument reliability and internal consistency across the three tool subscales of partnership, cooperation and coordination which are shown in **Table 3**. The overall Cronbach alpha was 0.966 which indicate excellent reliability. The Cronbach alpha values for the subscales of partnership, cooperation, and coordination displayed excellent reliability across the three domains. The internal consistency as indicated by Pearson's correlation coefficient (r) between subscales and the total collaboration was 0.786-0.930. All the correlation coefficients were significant ( $p < 0.01$ ).

Mean item scores of partnerships domain were statistically similar in disciplines (i.e. surgeons and anaesthetists) except "Include patients in setting goals for their care". Mean scores were significantly higher among surgeons ( $p$ -value=0.016). In the cooperation domain, means of all items were statistically the same between both disciplines. In the coordination domain, mean scores of the following items: (Apply a unique definition of Inter Professional Collaborative practice to the practice setting), (equally divide agreed upon goals amongst the team and (encourage and support open communication, including the patients and their relatives during team meetings), were statistically significant among surgeons. Mean differences in other items scores were statistically insignificant.

Overall subscale scores and collaboration between disciplines are presented in **Table 4** Surgeons' total collaboration means were higher than anaesthetists, but the difference was statistically insignificant in both disciplines. Also, mean subscales scores were also higher in surgeons, but the difference was statistically insignificant between disciplines.

Overall subscale scores and collaboration between genders are presented in **Table 5**. Total collaboration means and subscale means were higher in females, but the difference of means between genders was insignificant.

Overall subscale scores and collaboration between years in practice are presented **Table 6**. Individuals with 11-20 years in practice had significantly higher mean scores in partnership and cooperation domain ( $p$ -values $<0.05$ ) while in coordination domain mean score was also higher in individuals with 11-20 years in practice but  $p$ -value was insignificant. Also, the overall collaboration score was also significantly higher in individuals with 11-20 years in practice.

Overall subscale scores and collaboration between years in practice with current team are presented **Table 7**. Subscale scores and overall collaboration scores were statistically similar between years in practice with the current team ( $p$ -values $>0.05$ ).

	Correlations-r			
	Partnership	Cooperation	Coordination	Total
Partnership		0.786	0.796	0.925
Cooperation			0.793	0.929
Coordination				0.930

**Table 3:** Internal consistencies among the ATICS and the subscales.

Subscales of AITCS	Number of Items	Discipline		P-values
		Anaesthesia (n=28)	Surgery (n=57)	
Partnership	8	29.2 ± 7.1 (12-40)	31.4 ± 5 (19-40)	0.3
Cooperation	8	31.1 ± 7.5 (10-40)	32.6 ± 5.5 (19-40)	0.1
Coordination	7	23.8 ± 6.8 (10-35)	26.4 ± 5.5 (13-35)	0.64
Total (Collaboration)	23	84.1 ± 20.1 (32-115)	90.4 ± 14.6 (57-115)	0.11

**Table 4:** Comparison of overall subscale scores and collaboration between disciplines (Anaesthesia vs. Surgery) (n=85).

Subscales of AITCS	Number of Items	Gender		P-values
		Mean ± SD (Min-Max)		
		Male (n=67)	Female (n=18)	
Partnership	8	30.4 ± 6.1 (12-40)	31.7 ± 4.8 (21-39)	0.4
Cooperation	8	32 ± 6.3 (10-40)	32.5 ± 5.9 (20-40)	0.77
Coordination	7	25.4 ± 6.3 (10-35)	25.9 ± 5.3 (15-33)	0.74
Total (Collaboration)	23	87.8 ± 17.4 (32-115)	90.2 ± 14.6 (62-109)	0.6

**Table 5:** Comparison of overall subscale scores and collaboration between gender (male vs. female) (n=85).

Subscales of AITCS	Years in practice (since achieving license to practice)				P-values
	<5	5-10	11-20	>20	
	Mean ± SD				
Partnership	28 ± 6.1 (12-36)	30.7 ± 6.4 (19-40)	33.3 ± 4.7 (25-40)	31.9 ± 4.1 (22-38)	0.007
Cooperation	29.3 ± 7.4 (10-40)	33.5 ± 5.8 (20-40)	34.2 ± 4.3 (26-40)	32.8 ± 5 (24-40)	0.018
Coordination	23.6 ± 6.2 (10-33)	25.9 ± 6.8 (13-35)	27.7 ± 4.7 (15-35)	25.3 ± 6 (17-35)	0.17
Total (Collaboration)	81 ± 18.5 (32-108)	90.2 ± 17.5 (57-115)	95.2 ± 12.5 (72-115)	90 ± 13.4 (63-115)	0.015

**Table 6:** Comparison of overall subscale scores and collaboration between overall years in practice (n=85).

Subscales of AITCS	Years in practice with current team				P-values
	<5	5-10	11-20	>20	
	Mean ± SD				
Partnership	29.9 ± 6.3 (12-40)	32.2 ± 5.5 (19-40)	32.4 ± 2.8 (29-37)	30.8 ± 6.3 (22-37)	0.49
Cooperation	31.2 ± 6.7 (10-40)	34.2 ± 5.1 (24-40)	34.1 ± 4.5 (26-40)	30.3 ± 6.1 (24-38)	0.41
Coordination	25.2 ± 6.1 (10-35)	26.6 ± 5.9 (13-35)	25.2 ± 6.3 (15-35)	26 ± 7.5 (17-35)	0.23
Total (Collaboration)	86.4 ± 17.8	92.9 ± 15.5 (57-112)	91.7 ± 12 (72-111)	87 ± 19.4 (63-110)	0.87

**Table 7:** Comparison of overall subscale scores and collaboration between years in practice with current team (n=85).

## Discussion

The surgeon-anaesthetist relationship is perhaps the most critical element of overall team performance in OR, as the well-functioning relationship is conducive towards a safe practice, while a dysfunctional relationship could jeopardise patient care. Although there is little literature discussing this relationship and what could be done to optimise it, conflicts between the anaesthetist and the surgeon is a phenomenon which has been witnessed in the OR and which is of significant concern when it comes to the best interest of the patient [16].

The goal of this study was to understand the current collaborative relationship in a university-based institution in Saudi Arabia and discuss the different factors that might have contributed to it. These survey findings revealed that an interprofessional collaborative relationship exists between the surgeons and the anaesthetists in the institution. The presence of such collaborative relationship has been consistently highlighted in the literature to increase the likelihood of team success, improve patient outcomes, reduce preventable adverse drug reactions, and above all increase job satisfaction [17].

When deconstructing the AITCS scale to the three domains of partnership, cooperation and coordination, both surgeons and anaesthetists were similar in their partnership aspects except for the item "including the patients in setting goals for their care". That item was scored higher by the surgeons compared to anaesthetists, which might be attributed to some factors:

1. The fact that anaesthetists have lower interaction with patients compared to surgeons.
2. The possibility that anaesthetists assumed that the plan is the whole patient management plan which is often a surgical team role.

Although the anaesthetist is involved in the entire perioperative period that includes preoperative evaluation, intraoperative, and postoperative recovery their role is often fragmented and shared within a team of anaesthetists. The above phases are the way how anaesthetic care is delivered which may have a negative impact on the perception of collaborative relationship with surgical colleagues.

Although the institution has a system in communication among the department in the form of electronic documentation in the database through the pre-anaesthesia evaluation clinic, and verbal endorsement of the critical patient information among colleagues, but it is more like a habit than a written departmental policy which is an area that needs to be revisited and improved in a structured approach.

Interestingly enough Kopp and Shafer, discussed the perioperative communication among anaesthetists, and pointed that the unique arrangements of the anaesthesia practice impose a form of communication challenges for anaesthetists, at which diffusion of some tasks within the anaesthesia care team can result in confusion and overlapped responsibilities, they concluded that a clear, succinct, and respectful communication is essential to

working successfully in the specific context of the anaesthesia practice [18].

The two disciplines were similar in the cooperation domain which might signify the shared power, trust, respect, and honesty between surgeons and anaesthetists which are the characteristics of the effective team and globally recognized as an essential tool for constructing a more effective and patient-centered health care delivery systems [19].

These finding indicated low tension and working towards a goal-oriented approach by the two parties. That was similar to the finding by Lingard et al., who examined the nature of communication and sites of tension in the operating room [20], and found higher-tension between surgical and nursing staff, compared to the surgeons and anaesthetists, they explained this by the possibility of:

- Minimal recording of the surgeon-anaesthetist interaction.
- The nature of the recorded procedures.
- Context-related or any other variable.

These consistent finding might form the base of further exploration into the surgeons-anaesthetists interaction and the different factors involved.

In the third domain of coordination which according to the Cambridge dictionary, implies organization and planning, surgeons seem to have a higher score in the following three aspects; Apply a unique definition of Inter Professional Collaborative (IPC) practice to the practice setting, (Equally divide agreed upon goals amongst the team), and (Encourage and support open communication, including the patients and their relatives during team meetings), which appears to be mainly related to logistics. These data might be explained by the closer involvement of the surgical team in planning all the clinical and non-clinical aspects of the patient and the procedure, while the anaesthetist role is mainly concerned with direct coordination with the surgeon in case of associated morbidities, or occurrence of critical incidents.

Data from the survey showed that physicians with more work experience have more collaboration than others. Some different factors might explain this: people with more work experience may have already established their professional characteristics to appreciate the importance of communication, and collaboration with other colleagues, also senior staff may have more familiarity and be more at ease with the surrounding and other workers. However the implementation of communication skills among the junior colleagues shouldn't be overlooked which could be an area that need to involve the program directors who are more involved with trainee by endorsing the collaborative approach through teaching and role-modelling in preparation of collaborative-oriented clinical practice.

As the findings indicated, there is a positive interprofessional collaborative relationship among the surgeons and anaesthetists in the institution; this might be better understood by considering three categories of factors:

## Organisational

These variables relate to the work environment being safe, secure and supportive, as being in an academic institution constitutes better job security compared to other sectors, the stability of the work and familiarity among the staff are among the most important predictors of a safe work climate.

Some studies showed that work climate and safety culture has a direct effect on intra-organizational collaboration, and teamwork [21], leading to increase safety and reduced medical errors [22].

## Inter-personal

Some personal attributes like trust, and accountability are more likely to reinforce effective team collaboration, and cohesive culture [23].

## Professional competencies

Competencies such as the ability to share information and resources, effective and timely communication for instant conflict resolution, are among some of the factors that have been cited in the literature as determinants for successful collaboration [24].

Most papers highlighted the need for the team members to acknowledge their shared interest and appreciate the value in their collaboration, for them to be productive and successful [25].

## Limitations of the study

The findings of this study were limited to a university-based hospital and therefore might not be generalizable to other military or public hospitals. Besides, due to socio-cultural differences, the findings may not be transferrable to other countries. However, it highlighted some important points:

1. The significance of the surgeons-anaesthetists relationship and its clinical, training and educational implications.
2. The different factors that contributed to a specific pattern of collaborative relationship which could vary between individuals, cultures, education, gender, and many others, which are further to be explored.

In addition, the study was conducted cross-sectionally and it would be interesting to consider studying the development of interprofessional attitudes prospectively.

Further research is required to investigate whether similar finding prevails in other contexts and whether other possible related factors exist and if so what is their impact on interprofessional collaboration and service delivery.

## Conclusion

In conclusion, the survey indicated the existence of a positive surgeons-anaesthetists collaborative relationship in the institution. It proposed some factors that might have contributed to this particular relationship, which were aligned with some factors and attributes that have been addressed and considered in the literature as essential elements in successful teams and

goal-oriented collaborative performance.

As the stronger collaborative relationships were seen amongst those with more years of practice in both disciplines the data alludes to the importance of the reinforcement of collaboration through acknowledgement and training among the staff, and through involvement of educators, and program directors, especially in the academic-based institution at which staff act as a role model to their junior's colleagues.

The data indicated that the way the anaesthetic care is organized in preoperative, intraoperative, and postoperative phases, might hinder collaboration, in the form of overlapped tasks, which require a structured and well written departmental policy clearly defining responsibilities, and setting the path of communication and endorsement, and thus this should be endorsed to administrative and policy makers.

Moreover, these findings might be an excellent initiative to introduce the concept of interprofessional education and collaborative practice in the University-curriculum as a prerequisite to reinforce and develop the collaborative practice in the institution in a structured model.

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## References

1. Mayo AT, Woolley AW (2016) Teamwork in Health Care: Maximizing collective intelligence via inclusive collaboration and open communication. *AMA J Ethics* 18: 933-940.
2. Manojlovich M, Antonakos C (2008) Satisfaction of intensive care unit nurses with nurse-physician communication. *JONA: J Nurs Adm* 38: 237-243.
3. Canadian Interprofessional Health Collaborative (2010) A National Interprofessional Competency Framework.
4. Maheux B, Cote L, Sobanjo O, Authier L, Lajeunesse J, et al. (2014) Collaboration between family physicians and nurse clinicians: Opinions of graduates in family medicine. *Can Fam Physician* 60: e416-e422.
5. Kaldheim HKA, Slettebo A (2016) Respecting as a basic team work process in the operating theatre. *Nordisk Sygeplejeforskning* 5: 49-64.
6. Wong J, Khu KJ, Kaderali Z, Bernstein M (2010) Delays in the operating room: Signs of an imperfect system. *Can J Surg* 53: 189-195.

7. Joint Commission on Accreditation of Healthcare Organizations (2003) Sentinel event statistics.
8. Shams T, El-Masry R, Al-Wadani H (2013) Anesthesiologist-surgeon conflicts at the workplace: An exploratory single-center study from Egypt. *Ibnosina J Med Biomed Sci* 5: 148-156.
9. Weaver SJ, Rosen MA, DiazGranados D, Lazzara EH, Lyons R, et al. (2010) Does teamwork improve performance in the operating room? A multilevel evaluation. *Jt Comm J Qual Patient Saf* 36: 133-142.
10. Dougherty MB, Larson E (2005) A review of instruments measuring nurse-physician collaboration. *J Nurs Adm* 35: 244-253.
11. Bala N, Sandhu K, Bansal L, Attri J, Sandhu G, et al. (2015) Conflicts in operating room: Focus on causes and resolution. *Saudi J Anaesth* 9: 457-463.
12. Goyal R (2013) Surgeons and anesthesiologists: Need to communicate? *J Anaesthesiol Clin Pharmacol* 29: 297-298.
13. Orchard C, Pederson LL, Read E, Mahler C, Laschinger H (2018) Assessment of Inter professional Team Collaboration Scale (AITCS). *J Contin Educ Health Prof* 38: 11-18.
14. Norman G (2010) Likert scales, levels of measurement and the "laws" of statistics. *Adv in Health Sci Educ* 15: 625-632.
15. Jamieson S (2004) Likert scales: How to (ab)use them. *Med Educ* 38: 1217-1218.
16. Cooper JB (2018) Critical Role of the Surgeon–Anesthesiologist Relationship for Patient Safety. *Anesthesiology* 129: 402-405.
17. Bosch B, Mansell H (2015) Interprofessional collaboration in health care. *Can Pharm J Revue des Pharmaciens du Canada* 148: 176-179.
18. Kopp VJ, Shafer A (2000) Anesthesiologists and Perioperative Communication. *Anesthesiology* 93: 548-555.
19. Babiker A, El Hussein M, Al Nemri A, Al Frayh A, Al Juryyan N, et al. (2014) Health care professional development: Working as a team to improve patient care. *Sudan J Paediatr* 14: 9-16.
20. Lingard L, Reznick R, Espin S, Regehr G, DeVito I (2002) Team communications in the operating room: Talk patterns, sites of tension, and implications for novices. *Acad Med* 77: 232-237.
21. Chien SF (2012) Factors influencing teamwork and collaboration within a tertiary medical center. *World J Methodol* 2: 18-23.
22. Institute of Medicine (US) Committee on the Work Environment for Nurses and Patient Safety. *Keeping Patients Safe: Transforming the Work Environment of Nurses*. Page A, editor. Washington (DC): National Academies Press (US) 2004.
23. Bakir M (2006) A model for successful teamwork. *Research Online*.
24. Doherty, Meghan and National Policy Consensus Center (2015) *Factors of Successful Collaboration: Oregon's Watershed Councils as Collaborative Systems*. National Policy Consensus Center Publications and Reports.
25. Rosen MA, Granados D, Dietz AS, Benishek LE, Thompson D, et al. (2018) Teamwork in healthcare: Key discoveries enabling safer, high-quality care. *Am Psychol* 73: 433-450.